TECHNOLOGIES FOR RURAL WOMEN IN AFRICA

RAISING AGRICULTURAL PRODUCTIVITY, IMPROVING FOOD SECURITY, AND REDUCING PHYSICAL BURDEN OF WOMEN IN AGRICULTURE

Despite women accounting for 43 percent of the agricultural labor force in developing countries and even more than 50 percent of the agricultural workforce in most of the Eastern and Southern Africa (ESA) region, the productivity gap between men and women farmers persists (FAO, 2011). Existing family farm research shows that women consistently have lower productivity compared to male farmers, with the productivity deficit estimated to range between 13–25 percent in Sub-Saharan Africa (O’Sullivan, Rao, Banerjee, Gulati, & Vinez, 2014).

Empirical evidence suggests that if women had access to the same productive agricultural inputs as men, they could increase their agricultural yields by 20 to 30 percent. It is possible to potentially increase overall agricultural output in developing countries by 2.5 to 4 percent and bring 100 to 150 million people out of hunger just by providing equal access to productive inputs to men and women (FAO, 2011).

In Tanzania, Malawi, Uganda, for example, narrowing the gender gap in agricultural productivity has the potential of raising the gross domestic product by USD 105 million, USD 100 million, and USD 65 million, respectively.

Past studies that have investigated labor, land, and agricultural productivity trends in African nations have paid little attention to differentiating these results by gender. There is overwhelming evidence demanding urgent attention to address the needs of women farmers, particularly in improving their access and adoption of technologies for improving their agricultural productivity. Empirical studies have suggested that women spend a greater share of their income in improving the welfare of the household as compared to men. Raising women’s incomes through improved access to agricultural technologies has a higher multiplier effect than men in raising the food and nutrition security of their families, which is key to improving the living standards of future generations (A. R. Quisumbing & Pandolfelli, 2010).

This policy brief lays out priority issues surrounding innovation, development, and adoption of agricultural technologies by women, as they continue to fulfill their role as farmers and primary agro-processors. It focuses on the programmatic actions that donors, governments, and civil society organizations – African and international – can implement today to bring about an agricultural technology revolution, which can spillover in the form of a related agricultural productivity revolution. These broader policy lessons emerged from the first Eastern and Southern Africa Region Sharefair on rural women’s technologies, which shed light on the many contributions that

1 Countries in Eastern and Southern Africa region include Burundi, Djibouti, D.R. of Congo, Eritrea, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Somalia, South Africa, South Sudan, Sudan, Tanzania, Uganda, Zambia, Zimbabwe.

2 These findings are from an upcoming UN Women report on costing the gender gap in agriculture in Malawi, Tanzania, and Uganda.
African women farmers make that consequently benefit their families and communities (See Box 1).

The focus of this policy brief falls primarily on two types of technologies, which also constitute the gamut of technologies that were showcased at the ESA Sharefair. First, we consider the use of machinery and equipment by women that are primarily labor-saving and reduce the time that women spend in farming activities, including post-harvest and value-addition technologies. Second, the use of purchased, production technologies by women, such as fertilizer and hybrid varieties of seed, are discussed. Depending on the nature of these technologies, these may increase the time women spend on their farms. Both types of technologies have the potential for raising agricultural productivity, reducing post-harvest losses, as well as improving food and nutrition security of women, family farmers in Africa.

POLICY ISSUES: FACTORS LIMITING TECHNOLOGY ADOPTION BY WOMEN FARMERS

Agricultural productivity differences between women and men farmers, particularly in the use and adoption of agricultural production technologies, have been broadly attributed to four main reasons (Kilic, Palacios-Lopez, & Goldstein, 2014). A sound understanding of these issues and constraints confronting women farmers is key to framing a rigorous policy debate.

WOMEN LACK ACCESS TO AGRICULTURAL TECHNOLOGIES

Women farmers typically use lower levels of purchased technological inputs, such as fertilizer and high-yielding seed varieties (Peterman, Behrman, & Quisumbing, 2014). Even if they were to use the same level of productive inputs as men, women farmers are still found to have lower returns from using these inputs (O’Sullivan et al., 2014). In Burkina Faso, within the same family, female-managed plots have lower yields in all the crops cultivated due to lower quantity of fertilizer and labor used as compared to the plots managed by the male farmers in the household (Udry, Hoddinott, Alderman, & Haddad, 1995). Similarly, female-headed households have a lower probability of adopting high-yielding varieties of maize in Ghana (C. R. Doss, 2002). That women lack access to these key technological inputs explains a significant portion of the productivity gap. Often these productivity

BOX 1 INSPIRING AGRICULTURAL CHANGE: SHAREFAIR ON RURAL WOMEN’S TECHNOLOGIES

“The hand-hoes must go, invest in women farmers”

To boost attention to rural women as drivers of rural progress and change, a Sharefair was held in Kenya as a 2014 flagship event for the Regional Network on Gender and Rural Livelihoods for Eastern and Central Africa – in primary collaboration with the UN Women, the African Union Commission (AUC), the Food and Agricultural Organization (FAO), the International Fund for Agricultural Development (IFAD), and the World Food Programme (WFP). The event brought together more than 100 rural technology innovator exhibitors from more than 14 African nations. The Sharefair was a platform for policymakers, academics, farmers, primary food processors, food processing industries, investors, and technology innovators to directly interact with women farmers and young technology exhibitors.

Although the event showcased diverse agricultural technologies developed for women, by women, and with women, key issues relating to scaling up technology availability, accessibility and adoption by women also shaped many of the discussions. Exhibits showcased not only the technologies developed by women, but also established that Africa’s women are a tremendous untapped resource of agriculture production and innovation.

Violet Malama, a family farmer from Kafue district in Southern Zambia and a technology innovator, captured the essence and message of the ESA Sharefair in her own words. She is an innovator of a greenhouse made up of used onion and tomato sacks, bamboo, and tree bark. The greenhouse is helping farmers in her village produce seedlings in four weeks instead of two months. She asked, “The machines the government introduced to us were very expensive, they want us to get a loan, but as a woman who does not have collateral, how are you going to get a loan?” Malama added, “You end up losing out. That is where I thought, there must be a way, and this green house is a stepping stone for a family farmer and a villager.”

A key output of the ESA Sharefair is a database of diverse agricultural technology innovations, such as those made by Violet Malama. For more information, see empowerwomen.org/sharefair2014.

NOTE: This box draws heavily from “The Hand-Hoe Must Go, Invest in Women Farmers” written by Sophie Mbugua.
differences disappear when women farmers have equal access to these technologies. For example, significant gender differences exist in the use of fertilizer in Malawi amongst maize cultivating farmers. However, differences in the use of fertilizer between women and men farmers disappeared when a field experiment supplied these inputs to female and male farmers (Gilbert, Sakala, & Benson, 2013).

In a recent assessment of the gender agricultural productivity gap in Malawi and Tanzania, the results suggested that women's access to agricultural implements and machinery is significantly lower than that of men. Differences in use of machinery explain 18 percent of the gender gap in Malawi and 8 percent in Tanzania. Often times differences in use of agricultural inputs are due to lack of access to markets or because women receive lower price for their crop output, lack of access to land, and women's lower education levels. Moreover, women also face unique challenges, due to their lifecycle and reproductive roles, which may further influence their participation on- and off-farm (Peterman et al., 2014).

Technology developers do not always design technologies keeping women's interests and limitations in mind. Appropriate technologies designed to address labor constraints in key production activities carried out by women, and which address technology requirements across the whole value chain and production system are required. Removing structural, systematic factors and scaling up technologies that are both accessible and affordable to women is key for achieving higher returns from women's time and resource investments. For instance, the ESA Sharefair showcased the Portable Electro-Chemical Aflatoxin Testing Kit that helps in the analysis of aflatoxin contamination in cassava and facilitates compliance to trade and other regulatory food and feed safety requirements, thereby enabling women in Uganda to access markets. Such technologies have the potential of narrowing the structural constraints that women farmers face, and also help improve the quality and volume of a main ingredient used in human diet and livestock feed.

LOW HUMAN CAPITAL AND WOMEN’S NON-WAGE HOUSEHOLD PRODUCTION WORK MAY PREVENT THEM FROM USING TECHNOLOGIES

Women shoulder the bulk of household and childcare responsibilities in many countries in Eastern and Southern Africa. Such unpaid household production tasks may limit technology adoption, especially if they require greater time involvement by women. In Ethiopia, adoption of sustainable agricultural practices depend on household size and labor as adoption of such techniques increases women's workload (Teklewold, Kassie, Shiferaw, & Köhlin, 2013). Women may also be hesitant to adopt technologies if they do not control the benefits that accrue from adopting such technologies (Dolan, 2002). The ESA Sharefair showed the example of a village where designing technologies for women and ensuring control of benefits to women transformed the village into a “green sustainable village” (See Box 2).

Poor levels of human capital, health, and nutrition also significantly constrain women’s ability to work as efficient agricultural producers. Low levels of human capital may influence women’s productivity in two ways. First, they may take longer to perform the same agricultural task. Second, they may not use certain technologies if they lack the information and knowledge required to use it.

BOX 2 TRANSFORMING INTO A ‘GREEN SUSTAINABLE VILLAGE’ WITH THE HELP OF WOMEN’S TECHNOLOGIES

The UNDP-UNEP Poverty and Environment Initiative (PEI), in collaboration with Rwanda Environment Management Authority (REMA), assisted people in Kabeza village in northern Rwanda to adopt technologies, such as rainwater harvesting systems, use of biogas residue as fertilizer, tree planting for climate proofing, and terracing, that put the villagers on a pro-poor sustainable development path. The initiative was spearheaded by women-led cooperatives, which allowed these women to share any technology adoption risks. The intervention so far has had about 200 beneficiaries, out of which 62 percent are women. Having greater access to water at a closer location and biogas for cooking saved significant time for both women and children. The initiative has also led to higher agricultural productivity, which has allowed selling a greater portion of the agricultural output to the markets. Ms. Solange, the head of the village cooperative, proudly shares that “before at this site, the poor people were the poorest among the poor but if you see them now, they look better off.”

Note: Drawn from “PEI Africa showcases Rwandese success story at UN organized Sharefair.” <http://www.empowerwomen.org/~imedia/files/un%20women/knowledge%20gateway/resourcefiles/pei%20africa%20showcases%20rwandese%20success%20story%20at%20un%20organized%20sharefair.ashx>
(Foster & Rosenzweig, 1995). In fact, a significant portion of the on-farm productivity gap in Malawi is explained by the labor productivity gap, which is larger than the land productivity gap. Women are found to spend more time working on the farm, which diminishes the size of the overall productivity gap, but increases the labor productivity gender gap because women take longer to perform the same task as compared to men (Palacios-López & Lopez, 2014). Most empirical studies report that, on average, women have lower access to extension as compared to their male counterparts (A. Quisumbing et al., 2014), which may compound the problem of lower education levels of women. In certain activities, however, women have been found to have more access to extension, such as livestock extension in Ghana (World Bank/IFPRI, 2010). The good news is that when women actually have access to extension, they have a higher likelihood of adopting technologies (Davis et al., 2012). The issues of off-farm time burden and low levels of knowledge and human capital are closely correlated, as lack of time may be preventing women from improving their agricultural know-how (see Box 3).

**BOX 3  REMOVE THE TIME BURDENS OF WOMEN FARMERS FOR A MORE PRODUCTIVE, IMPROVED LIFESTYLE**

As highlighted in the ESA Sharefair, women are often involved in tedious, repetitive, burdensome tasks. Development of technologies that mechanize such repetitive processes, especially those involved in the post-harvest segment of the value chain have proven to be very useful for women. Some of these showcased technologies at the ESA Sharefair included the Rocket Stove, which is quite affordable, easy to build and provides strong heat without smoke. The stove uses 50 percent less fuel, compared to traditional stoves and is about twice as efficient as an open fire, thereby reducing the time women spending in cooking activities. The ESA Sharefair also highlighted many other examples of cheap yet timesaving cooking stoves. Adoption of cheap post-harvest technologies is yet another area of simple solutions proving to be very useful and relevant for women. Innovation and development of post-harvest pit storage bag in Ethiopia or the hydraulic presser that processes cassava into high quality flour are excellent examples of technologies, showcased at the ESA Sharefair, that could be scaled up to allow large numbers of women to adopt such productivity-enhancing technologies. The key to expanding the reach of such technologies is a conducive, pro-women, policy environment.

Note: A precursor to the rocket stove was the argand lamp, which was patented in 1780. The lamp was a major development over the traditional oil lamp as it introduced a glass chimney above the flame to increase airflow. The lamp is used for lighting, cooking, and heating water purposes. Drawn from <https://en.wikipedia.org/wiki/Rocket_stove>.

Rural women are less likely to have land under their control than rural men (C. Doss, Kovarik, Peterman, Quisumbing, & Van den Bold, 2013). Traditionally, women's rights to land were primarily governed by their marital status and confined only to having tenure rights on land that they cultivate. In Ethiopia, women's land rights do not extend beyond accessing or owning land outside the context of marriage (Aguilar, Carranza, Goldstein, Kilic, & Oseni, 2014). Not only are women discriminated in the realm of formal land laws, but such inequalities also exist in family and inheritance laws, consequently influencing the ability of women to claim and transfer land at the household level (Hallward-Driemeier, Hasan, & Bogdana Rusu, 2013). Expanding and formalizing land laws leads to increased land-related long-term investments, as women may be unwilling to invest in land they are cultivating, if there are risks to controlling land over time and they are afraid that their land can be taken away from them. A land certification program in Ethiopia that reduced tenure insecurity and risk improved productive investments and rental market activity (Deininger, Ali, & Alemu, 2011). Improving tenure security and access to land has direct consequences for bolstering investments in long-term, financial capital demanding technologies. Tenure security in nine West African countries led to improved tree planting and investments in land significantly, but did not affect short-term investments such as use of purchased, productive inputs (Fenske, 2013). Insecure tenure made women in southern Ghana leave their land fallow for a shorter duration as compared to men because of the fear of having their land expropriated if they leave it fallow for too long. Difference in cultivation trends explains the lower yield observed on female farms (Goldstein & Udry, 2008). In Malawi, Mali, and Tanzania, even joint ownership of land between man and woman in a household is associated with higher influence on agricultural decisions as compared to when woman do not own any land. The influence that women have on agricultural
decision-making is even higher when women own land individually (C. Doss et al., 2013) (see Box 4 for more on household dynamics of technology adoption and agricultural decision-making).

**STRUCTURAL FACTORS, SUCH AS LACK OF FINANCIAL PRODUCTS, INFLUENCE TECHNOLOGY ADOPTION**

Several factors, such as collateral requirements, mobility constraints, significant transaction costs, and cultural barriers, prevent women from accessing financial products and credit. In some contexts, women may not receive information about financial products, such as credit or weather insurance availability from informal lending sources, or information may not be fully transmitted amongst spouses within a household (A. R. Quisumbing & Pandolfelli, 2010). Not only are women limited in having access to financial products, they may also have less demand for credit in the first place if seeking financial products in formal systems and being entrepreneurial implies stepping outside the boundaries of prevalent social and cultural norms (Fletschner & Carter, 2008). In such contexts, interventions that provide access to financial products to women farmers through familiar structures, such as rural savings and credit cooperative organizations (RuSACCOS), may inspire women to seek credit due to the prevalence of strong peer effects, such as that found amongst women in rural Paraguay. However, the impact of improved access to financial products may have a lagged impact for women. Lack of access to credit is one of the many constraints that women face in adopting technologies. Providing a range of financial products – outside the already existing social practice of pooling money (Rotating Savings and Credit Association or ROSCA) — may have limited productivity impact as changing behavior to invest in adopting new technologies takes more than improved access (Kabeer, 2005).

**PAVING THE WAY FORWARD: POLICY ACTIONS**

Despite recent attention and hype surrounding women issues in agriculture, policy reform has continued to be subdued, partly because of the broader challenges facing the agricultural sectors in many Sub-Saharan African countries for women and men farmers alike such as stagnant overall agricultural productivity growth, low use of purchased inputs, and small land size. Yet, the promise and potential of gender-based agricultural policies in lifting agricultural families out of poverty, while also strengthening rural and urban economies, is tremendous, as was astoundingly agreed upon by various participating representatives of governments, donor agencies, domestic and international civil society organizations at the ESA Sharefair. We give a few policy options for scaling up technology adoption, with a gender-based lens for promoting agricultural gender equity while also catalyzing food and nutrition security. Box 5 sheds further light on the current state of integrating gender in agricultural policies in Sub-Saharan Africa, which is a starting point for designing and implementing pro-women agricultural policies.

**PROMOTE TECHNOLOGIES FOR WOMEN, TO WOMEN, WITH WOMEN**

Policymakers should specifically target the gamut of technologies that are culturally and socially familiar to women. Such technologies neutralize the known risks in production flows, are divisible so that they can serve small-, medium-, and large-scale operations, and combine various segments of the supply chain. A particularly helpful way of shortening the link between technology innovation and adoption by women, is to make them center stage in the
In many African nations, promoting gender equity is increasingly becoming a part of the policy framework, yet there is a gap between the gendered dimensions of agriculture as a conceptual organizing framework and actual policy implementation. The Comprehensive Africa Agricultural Development Programme (CAADP), jointly supported by the African Union Commission’s Department of Rural Economy and Agriculture and African Union’s New Partnership for Africa’s Development, bundles women farmers, along with youth and the disabled, into a group labeled “vulnerable” in the policy document. Although CAADP encourages national governments to commit 10 percent of their national budgets to agriculture, and while many countries lag in achieving the 10 percent goal, CAADP may consider having a specific share of agricultural budgets dedicated to women in agriculture and agribusiness to tap into the tremendous potential of African women farmers.

At the country level, the evidence of gender integration in agricultural policies continues to be mixed. In most countries, the issue of gender equality is addressed in the development agenda, but the implementation and delivery mechanisms to ensure plans and activities are implemented may not necessarily be in place. For example, gender is omitted in the Note de Politique Agricole of the Democratic Republic of Congo. In Ethiopia, Kenya, Malawi, and Uganda, the primary agricultural policies are much more gender-inclusive and recognize the needs and constraints of women farmers in a comprehensive manner. Gender is mentioned as a crosscutting issue in the National Investment Plan for Agriculture of Tanzania, in Mozambique’s Agricultural Development Strategy, and Malawi’s Agriculture Sector Wide Approach, amongst others. However, most mention of technology and women is in the context of agricultural extension. A key prerequisite for closing the gender technology gap is to narrow the gender policy gap, especially at the specific programmatic and implementation level.

Note: This box draws information from an upcoming UN Women report on gender integration in agricultural policies of various African countries.

In another intervention, women were provided training in homestead gardening, irrigation, and animal rearing in Burkina Faso. An experimental evaluation of the program found that women gained higher control over agricultural assets and small animals. Moreover, women were found to have a higher chance of making the decision on using garden products as well as proceeds from these homesteads (van den Bold, Pedehombga, Ouedraogo, Quisumbing, & Olney). Similarly, in Tanzania, a solar powered irrigation pump has been developed that is capable of irrigating approximately one acre of land in 6 to 12 hours a day. The pump, which was also showcased at the ESA Sharefair, is portable and can be easily transported between fields, offering an opportunity for developing custom hiring irrigation service businesses for women entrepreneurs and women-led cooperatives. Besides considering cultural appropriateness, policy should also take into account that women have multiple objectives while working on the farm and may be particularly inclined to adopt technologies that prioritize their household food and nutrition security (see Box 6).

技术创新和产品设计过程，其中也包括了对中央政策的主旨。在肯尼亚和坦桑尼亚，一个促进购买灌溉泵的项目未能成功，因为灌溉泵要求两个人来操作并要求他们使用他们的腿来进行踏板，这违背了传统的文化规范（Njuki et al., 2014）。
CONSIDER THE NATURE OF TRANSFERS: CASH VERSUS IN-KIND TRANSFER OF TECHNOLOGY

Cash vouchers or direct asset transfers are an attractive policy option to encourage farmers to adopt particular technologies and agricultural inputs. Recently, many African countries have introduced cash voucher coupons to encourage the adoption of fertilizer. The impact, including the gender-disaggregated results, of the use of such vouchers is still being evaluated. In Mozambique, an experimental evaluation of the fertilizer subsidy program reveals a relatively low uptake of fertilizer and improved seed varieties by farmers, potentially due to other credit or information limitations. Moreover, adoption of such technologies leads to differential benefits in yield and income (Carter, Laajaj, & Yang, 2013). The relatively low uptake of fertilizer and improved seed suggests that poor farmers are likely facing constraints other than credit availability, such as prior knowledge about use that may prevent them from adopting new technologies. In a complementary intervention along with voucher coupons, farmers were also encouraged to open savings accounts and some farmers were also selected to receive matched 50 percent of the savings left between harvest and the time to purchase fertilizer. Using a matched saving intervention improved the planning horizon of these farmers and was used as an instrument to encourage the use of technologies beyond the intervention period (Laajaj, 2012). In Mali, when women were given free fertilizer, they increased their use of this input and invested their own resources in purchasing other inputs such as herbicides and hired labor. Although the program improved agricultural output, it did not improve their agricultural profit significantly (Beaman, Karlan, Thuyshbaert, & Udry, 2013). Encouraging adoption of new technologies by women farmers may, therefore, entail a set of complementary policies such as innovative financing mechanisms along with providing actual knowledge about technologies and bringing the technologies to the door-step. When combined and simultaneously implemented, such complementary policies have the potential of delivering the desired outcome of enhanced technology adoption by women. Scaling up use and knowledge of local technology solutions, such as those highlighted in the ESA Sharefair, along with appropriate transfers may be particularly attractive.

SMALL NUDGES CAN GO A LONG WAY

In Western Kenya, farmers were encouraged to use fertilizer by providing them with time-limited fertilizer discounts in the form of free delivery, right after the harvest season. The evaluation of the program suggests that such small nudges were much more effective in encouraging fertilizer use instead of much larger price subsidies during the planting season (Duflo, Kremer, & Robinson, 2009). Similar policies that carefully consider women’s time, information, and financial constraints, such as periods when women may be particularly busy or times when women are particularly resource limited, may potentially improve technology adoption by women. For example, if field training and extension activities are performed when women are particularly busy due to household and childcare work, then they are unlikely to attend and participate in such events. Encouragement and nudges through social networks of women can also significantly improve adoption as women rely on their informal social networks more than men (see Box 7). Nudges and knowledge offered through innovative methods, including picture-based extension services via 3G mobile phones, is another cost-effective way of reaching out to women farmers about technology use and information. For example, in a program that randomly provided mobile phones to enable access to market information, women farmers with mobile phones were found to have a higher likelihood of cultivating high-value crops such as peanuts and okra after the program in Niger (Aker, Ksoll, & Lybbert, 2012). Similarly, the ESA Sharefair showcased 3G based innovations such as I-Farm Kenya, which is an online platform that enables farmers to access video documentaries of best farming practices. Livestock Info Management System is another example of a 3G mobile-based platform in Tanzania. Such innovations are great candidates for greater investments and their content can be customized for women family farmers.

STRENGTHENING WOMEN’S LAND RIGHTS IS A LONG-RUN GAME CHANGER

Strengthening women’s land rights, starting from shifts in inheritance laws to land rental laws, is essential to women trusting that their investments in agricultural technologies will support their long-term personal, household, and community level goals. The AUC-AfDB-UNECA Land Policy Initiative (LPI) has developed and published guiding principles on large scale land based investments in Africa, which
addresses the needs for providing secure access to land by women, family farmers. Evaluation of South Africa’s Land Redistribution for Agricultural Development program suggests that beneficiaries experienced a 25 percent increase in their consumption expenditures. Moreover, while their living standards initially dropped, after over three years, the beneficiaries experienced benefits of the order of 150 percent in their living standards (Keswell & Carter, 2013). Similarly, the Land Tenure Regularization program in Rwanda allowed for registering every landholder in the country with the explicit goal of recognizing married wives as co-owners of land. As a result of the program, investments in conserving land quality, such as construction of terraces and check dams, increased. These investment responses were particularly stronger for female-headed households (Ali, Deininger, & Goldstein, 2014). With much larger and long-lasting welfare impacts, the empirical evidence strongly supports securing land rights as an effective asset transfer program as compared to other cash or asset transfer programs (Keswell & Carter, 2013). While much work needs to be done in understanding the gender impacts of land distribution and grant programs, the average impact of such programs is itself proof of the effectiveness of such policies in encouraging long-run agricultural investments and in enhancing food and nutrition security.

**CONCLUSION**

In the works of many national governments, domestic and international organizations, civil society organizations, and donor agencies, the issue of gender in development has had a heavy emphasis on gender as an organizing framework, especially in data collection efforts and impact evaluation of development investment projects. There is still a tremendous need to shift from using gender as a mere rhetoric, conceptual framework to gender driven development investment in practice and action (see Box 8). The ESA Sharefair was an excellent starting point, which portrayed Africa’s women as real time technology innovators, transformers, and entrepreneurs. Evidence is needed at household, national, and regional levels to understand the effectiveness of positive, gender targeted policies in action. Particular attention is needed for developing, disseminating, and scaling up technologies that are developed by women innovators and reflect the specific needs of women, family farmers. A gender lens on agricultural development is required to extend the benefits of such efforts to enhancing food and nutrition security, raising agricultural productivity, and reducing time burdens of women.

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**BOX 7 SHE WHO LEARNS, TEACHES: USING SOCIAL NETWORKS FOR TECHNOLOGY ADOPTION**

Female family farmers often rely on informal social networks more than men to access information about new agricultural technologies (Katungi, Edmeades, & Smale, 2008). Time and mobility constraints may prevent women from accessing public extension and formal agricultural information services (Kondylis, Mueller, & Zhu, 2014; A. R. Quesumbing & Pandolfelli, 2010). In such situations, women rely extensively on their female social networks to learn about new agricultural technologies. The regional ESA Sharefair also aimed to bring together these countless proof-of-concept innovations by women-led groups in Eastern and Southern Africa region, which need to be shared for attracting greater investments and scaling-up. In Mozambique, farmers in communities that had female contact farmers were more likely to teach others about environmentally sustainable land management practices (Kondylis et al., 2014). Similarly, in Ethiopia, the majority of farmers who had adopted purchased inputs, such as fertilizers, attributed their decision to having an individual of the same sex within their social network (Weir & Knight, 2000). Often, these social networks are highly segregated by gender and experience different kinds of information exchanges. Information networks of pineapple farmers in Ghana tend to be based on same gender, clan, and age groups (Conley & Udry, 2010). A study in rural India found that husbands and wives within the same household vary in their agricultural social networks and that female social networks have some influence on technology adoption by the household, even though these women receive information about the technology indirectly in a primarily patriarchal agricultural production system (Magnan, Gulati, Lybbert, & Spielman, 2014). Mobilizing social networks is essential for enhancing uptake of new technologies as they not only allow access to knowledge about production practices, agricultural machinery and equipment, and market opportunities, but also encourage adoption through peer effects.

**Note:** The phrase “she who learns, teaches” is adapted from an Ethiopian proverb.
BOX 8 WHAT DO WE STILL NEED TO LEARN ABOUT TECHNOLOGY ADOPTION BY WOMEN FAMILY FARMERS, AS HIGHLIGHTED IN THE ESA SHAREFAIR?

- What kind of technologies do women want and how are women’s needs included while co-innovating and developing agricultural technologies that improve agricultural productivity and agribusiness incomes?
- How can mutual accountability frameworks, such as Integrated Reporting and the CAADP Results Framework, attribute value to unpaid work by women in further enhancing rural development, and food and nutrition security at national and regional levels?
- How can women gain more voice in the household decision-making process, and how can men be engaged in promoting gender equity in agriculture?
- What kinds of financing mechanisms, including financial and weather risk insurance products, improve adoption of technologies in the shortest timeframe? How does adopting technologies help women provide the much-needed time for leisure and rest required for a long, productive, and healthy life?
- How do women effectively learn about and disseminate new technologies and what kind of innovative, cost-effective methods improve adoption by women, family farmers?

Note: The Pan African Federation of Accountants (PAFA) represents African professional accountants, supports Integrated Reporting where financial, social, economic and environmental sustainability reporting come together to value all assets and promote transparency and accountability. IFPRI, AUC-DREA, and NEPAD will release the indicators of the CAADP 2015–2025 Results Framework to support the Implementation Strategy and Roadmap of the Malabo Declaration of Food and Nutrition Security.

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