



Women's empowerment, agricultural extension, and digitalization

Disentangling information and role-model effects in rural Uganda

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Women often have less access to agricultural information than men, constraining their participation in decision-making on crops, technologies, and practices. In the design of agricultural extension programs, women may be viewed as insignificant actors in agricultural production. Moreover, even if their role is recognized, valuable information on production does not flow freely within the household from men to women.

Among groups of maize-farming households in eastern Uganda, we explore the impacts on women's empowerment from the use of gender-responsive information and communication technologies to provide extension services, specifically videos that feature women as information providers. The research tests the relative impact of the videos, contrasting their informational effects versus their role model effects, on women's knowledge, their agency, and their achievements in farming.

The results show that targeting women with information increases their achievements in farming. However, the results for the role-model effects are mixed. Two key policy recommendations follow from the results of this study:

- If agricultural extension efforts are to empower women by improving their agricultural livelihoods, then giving necessary information directly to women addresses intra-household information asymmetries.
- However, if the aims of such programs are geared toward more subtle empowerment pathways, then other, possibly more intensive designs are required.

Background

In many developing countries, agricultural extension services are generally biased towards men, with information targeted mainly to male members of a farming household and in formats that are rarely tailored to female members. Nevertheless, female farmers may also benefit from such

services as the services may affect their ability to make informed decisions, resulting in increased farm productivity, household income, and welfare. And with the introduction of digital extension approaches, there is potential scope to increase these benefits by tailoring digital services to female farmers.

In fact, the intrinsic value of empowering women farmers is recognized as a fundamentally important element in the process of social and economic development. Women play a critical role in decision-making on the allocation of scarce resources for household consumption, investment, and production. In a farm household, these investment and production choices include decisions on what crops to cultivate, what inputs and technologies to use, and how to manage these crops throughout the season. Taken together, women's multiple roles in decision-making have important consequences for labor, food, nutrition, health, and many other facets of a household's livelihood strategies.

Despite this, women often have less access to information about productivity-enhancing agricultural technologies and practices than men, constraining women's informed participation in decision-making on crops, technologies, and practices. Often, this is a consequence of the fact that male farm-household heads are targeted by agricultural extension programs. At least two phenomena explain the persistence of this form of discrimination: women are viewed as insignificant actors in agricultural production and, even if they do play a role, valuable information on production does not flow freely within the household from men to women.

Research design

We explore these phenomena with a gendered field experiment conducted among maize-farming households in eastern Uganda. The experiments explore the impacts on women's empowerment from the use of gender-responsive information and communication technologies (ICT) in the provision of extension services. We focus on the use of informational videos to assess the impact of both providing women with direct access to video-based extension information and featuring women as information providers in the videos. We think of this as a test of impacts through an informational effect versus a role model effect, and measure the impacts on women's knowledge, their agency, and their achievements in farming.¹

The experiment specifically tests whether ICT-enabled extension messaging affects outcomes related to maize cultivation. The intervention used in this experiment consisted of short informational and aspirational videos that were screened on tablet computers to provide farmer-participants with verbal recommendations and visual demonstrations of appropriate input use, management practices, and investment strategies to obtain higher maize yields.

Included in these recommendations was information about several hybrids and open-pollinated varieties of maize that are commercially available in Uganda. The majority of participants in the experiment use one of two varieties: Longe 10H, a hybrid adapted for mid-altitude cultivation that is resistant to drought, maize streak virus, grey leaf spot, and northern corn leaf blight (*Turcicum*) and matures in 120 days; or Longe 5, an open-pollinated variety for low- to mid-altitudes with quality

¹ This policy note is developed from more detailed reports on this research:

Van Campenhout, B., D.J. Spielman, and E. Lecoutere. 2018. *Information and Communication Technologies (ICTs) to Provide Agricultural Advice to Smallholder Farmers: Experimental Evidence from Uganda*. IFPRI Discussion Paper no. 1778. Washington, DC: International Food Policy Research Institute. URL: <http://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/133022/filename/133231.pdf>

Lecoutere, E., D.J. Spielman, and B. Van Campenhout. 2019. *Women's Empowerment, Agricultural Extension, and Digitalization: Disentangling Information and Role Model Effects in Rural Uganda*. IFPRI Discussion Paper 1889. Washington, DC: International Food Policy Research Institute. URL: <http://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/133523/filename/133733.pdf>

protein and drought-tolerance traits, similar disease resistance to Longe 10H, and a maturity of 115 days.²

In the rollout of the experiment, men, women, and couples were shown randomly assigned videos about improved maize management practices in which male, female, or both male and female actors are featured. We first varied exposure to the videos by gender to test the effects of changes in intra-household information asymmetries, investigating whether involving women as recipients of information increases their ability to participate in household decision-making, and, thus, their involvement in household production choices. We then varied the gender of the actors in the videos to test for role-model effects, exploring whether involving women as information messengers challenges the idea that decision-making is a predominantly male domain, in turn affecting women’s outcomes.

For the purposes of this experiment, we define women’s empowerment as the state in which women have greater ability to make and act upon choices both individually and jointly with their male co-head within the household.

Our field experiment uses a factorial design, illustrated in the figure below. The first “factor” that we vary in the experiment corresponds to the gender of the person(s) who delivers the information in the video. One video features a male actor only, another features a female actor only, and a third featuring both actors together. Otherwise, each video contains the exact same informational content and follows the same script. These different versions of the video were shown randomly to participants in the experiment. Varying the gender of the information provider(s) allowed us to test our hypothesis about the importance of female role models to women’s empowerment.

The second “factor” corresponds to the gender of the person(s) who receives the extension information in the video. The videos were randomly shown by our enumerators to either the male co-head of the household, the female co-head, or the male and female co-head together as a couple. Varying the gender of the information recipient(s) allows us to test our hypothesis about the importance of changing intra-household information asymmetries to women’s empowerment.

By crossing these two factors, participants in the experiment were assigned to one of nine possible treatment combinations (Figure 1).

Figure 1: Experimental design and sample sizes in each treatment arm

		Messenger		
		Man	Woman	Couple
Recipient	Man	385	385	369
	Woman	385	385	369
	Couple	342	342	369

Source: Authors

² The intervention also contained recommendations for UH 5354 (“Bazooka”), a recently released hybrid that is resistant to both drought and maize lethal necrosis, as well as the other diseases mentioned above; and Longe 4, an OPV for low- to mid-altitudes with similar disease resistance traits, and maturity in 110 days.

We conducted the experiment in five districts of eastern Uganda where maize is both a staple and marketable crop. We showed the video to participants in July 2017, prior to maize planting, and again in August 2017, during planting time. Data on household, gender, and farm characteristics were collected at baseline; endline data was collected following the harvest in January 2018.

To examine the impact of providing women with direct access to extension information on different measures of women’s empowerment in agriculture – our intrahousehold information asymmetry hypothesis, we compared outcomes of the households where the female co-head was involved in watching the video, either alone or as part of a couple and regardless of which version of the video was shown, to outcomes of the households where only the male co-head watched the video (Figure 2, Model 1).

To examine the impact of providing women and men with information provided by women as messengers—our hypothesis on role model effects—we compared outcomes of the households where a female actor featured in the video, either alone or as part of a couple and regardless of whom the video was shown to within the household, to outcomes of the households where only a male actor featured in the video (Figure 2, Model 2).

Figure 2: Hypotheses tested on the effects of involving women in receiving and conveying information

		Messenger		
		M	W	C
Recip- ient	M			
	W			
	C			

		Messenger		
		M	W	C
Recip- ient	M			
	W			
	C			

Source: Authors
 Note: Light gray cells represent the treatment group used to test the specific hypothesis, while dark grey cells represent the control group.
 M=man; W=woman; C=couple

Results

The results of this investigation show that targeting women with information increases their knowledge about improved maize management practices, their role in agricultural decision-making, the adoption of recommended practices and inputs, production-related outcomes, and the quantity of maize women sell to the market. However, the results for the role-model effects are mixed, and are evident more in joint household outcomes than in outcomes for individual women. In short, the findings of our experiment are complex and nuanced, but provide potentially important insights for better ICT-enabled extension programs.

First, we found that involving women in receiving information (instead of involving only the male co-head) had positive effects on women’s knowledge outcomes. We also found that men’s knowledge outcomes were negatively affected when the information was only given to the female co-head, indicating that women do not necessarily share information with their spouse either.

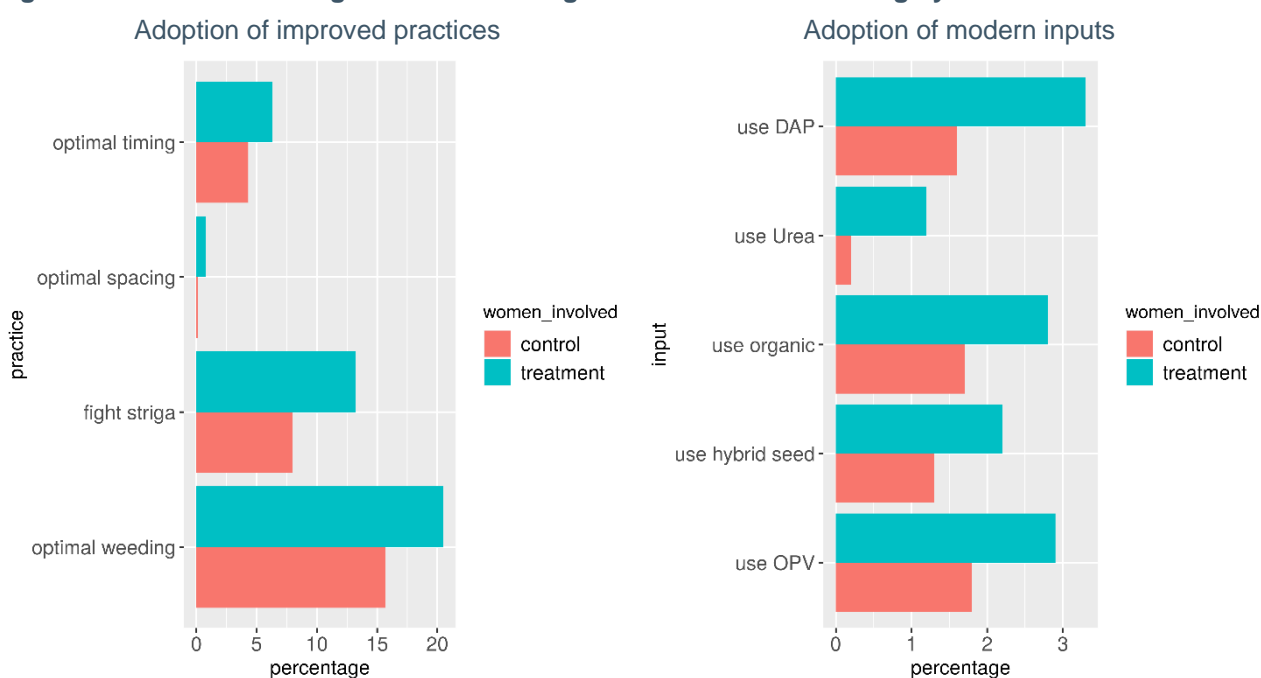
Second, we found that women experienced gains in their participation in decision-making when they were involved in receiving information, particularly when they received the information alone. Joint decision-making, however, remained unchanged. Conversely, men’s individual decision-making was reduced as a result of involving women in receiving information.

Third, not only did we find that involving women in receiving information affected decision-making, they are also effects on actual adoption of recommended management practices (Figure 3, left) and inputs (Figure 3, right), particularly on plots where women make decisions alone.

Fourth, as a result of providing only women with information, the total area of maize plots in the household that was managed by women increased and maize production on female-managed plots more than doubled. But there is no evidence of an increase in maize production, productivity, or area under cultivation under joint management as result of involving women in receiving information, not even when the female and male co-heads received information together.

Fifth, women were also more likely to independently sell maize and to sell in larger quantities if they alone received the information. Sales of maize individually by men were less likely, while joint sales of maize remained unaffected by involving women receiving information, even as part of a couple.

Figure 3. Effect of receiving information on agricultural decision making by women co-heads



Source: Authors

Policy implications

Overall, the findings suggest that, in the context of our study, extension efforts aimed at directly addressing intra-household information asymmetries may be a first-best means of empowering women in agriculture. Other more subtle means that seek to influence perceptions and norms about gendered roles in the household may not generate expected effects or work via expected impact pathways, though they remain worth further exploration.

Two key policy recommendations follow from the results of this study. First, if the aims of extension programs and policy are to empower women by increasing their agronomic knowledge, their independent decision-making, and their adoption of maize intensification practices, then giving the necessary information directly to women (thereby directly addressing intra-household information asymmetries) may be a first-best solution. Second, if the aims of extension programs and policy are geared toward more subtle empowerment pathways, such as those that seek to influence perceptions and norms about gendered roles in the household, then other, possibly more

intensive designs are required. This opens the door to further exploration of alternative pathways and mechanisms.

Importantly, these findings also suggest scope for further investigation of pathways and mechanisms to promote new maize hybrids and varieties being released in Uganda to address a wide range of biotic and abiotic stresses. For example, our results offer potentially useful insights for the design of ICT-enabled gender-sensitive extension programs to promote stress-tolerant varieties released in Uganda under the auspices of the Stress Tolerant Maize for Africa (STMA) and similar initiatives led by the International Maize and Wheat Improvement Center (CIMMYT). While the success of digital extension approaches may vary by context, even small, gendered design attributes may influence the effectiveness and inclusivity of agricultural extension in measurable ways.

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