

**Agricultural Extension, Promoter Farmers, and Nudges to Encourage
Technology Adoption among Smallholders in sub-Saharan Africa: A Gendered
Analysis**

Janet Mwende Mutiso

Student registration number: 100369331

Thesis submitted for the degree of Doctor of Philosophy

School of Global Development

University of East Anglia

September 2025

This copy of the thesis has been supplied on condition that anyone who consults it is understood to recognise that its copyright rests with the author and that use of any information derived there from must be in accordance with current UK Copyright Law. In addition, any quotation or extract must include full attribution.

Access Condition and Agreement

Each deposit in UEA Digital Repository is protected by copyright and other intellectual property rights, and duplication or sale of all or part of any of the Data Collections is not permitted, except that material may be duplicated by you for your research use or for educational purposes in electronic or print form. You must obtain permission from the copyright holder, usually the author, for any other use. Exceptions only apply where a deposit may be explicitly provided under a stated licence, such as a Creative Commons licence or Open Government licence.

Electronic or print copies may not be offered, whether for sale or otherwise to anyone, unless explicitly stated under a Creative Commons or Open Government license. Unauthorised reproduction, editing or reformatting for resale purposes is explicitly prohibited (except where approved by the copyright holder themselves) and UEA reserves the right to take immediate 'take down' action on behalf of the copyright and/or rights holder if this Access condition of the UEA Digital Repository is breached. Any material in this database has been supplied on the understanding that it is copyright material and that no quotation from the material may be published without proper acknowledgement.

Table of Contents

List of Tables	iv
List of Figures	v
Acknowledgements.....	vi
Abstract	vii
Chapter One	1
1.0 Introduction.....	1
1.1 Gender, agriculture and the seed system in sub-Saharan Africa.....	4
1.2 Gender and agricultural extension in sub-Saharan Africa.....	6
1.3 Promoter farmers nudging and being nudged	8
1.4 Farmer diversity and the willingness to pay for quality seeds.....	11
1.5 Synthesis and objectives	12
1.6 Methodology and data overview.....	14
Chapter Two	16
2.1 Introduction.....	17
2.2 Literature review	19
2.2.1 Promoter-peer dyad gender and information diffusion	19
2.2.2 Information nudges in farmer-to-farmer models	21
2.2.3 Gender and technology adoption	22
2.3 Methods.....	24
2.3.1 Study site, village, and sampling	24
2.3.2 Recruitment of promoter farmers.....	25
2.3.3 Information nudge intervention.....	26
2.3.4 Data collection	28
2.3.5 Outcome variables and key term definitions.....	30
2.3.6 Empirical Methods	32
2.4 Results	34
2.4.1 Descriptive statistics	34
2.4.2 Gender, information nudge, and word-of-mouth communication.....	36
2.4.3 Gender, word of mouth, and information nudge in seed dissemination ..	38
2.5 Discussion	42
2.5.1 Gender, information nudge, and word-of-mouth communication.....	42
2.5.2 Gender, word of mouth, and information nudge in seed dissemination ..	43
Appendices A: Chapter Two	47
Chapter Three	65
3.1 Introduction.....	66
3.2 Literature review	69
3.2.1 Principal-agent theory, information asymmetry, and recording.....	69
3.2.2 Farmer-to-farmer models, uneven effort, and gendered reporting behaviour	69
3.2.3 Public visibility and recording behaviour	71
3.3 Methods.....	72
3.3.1 Study site, village, and sampling	72
3.3.2. Implementation of the intervention	73
3.3.3 Data collection	74
3.3.4 Outcome variables and key term definitions.....	75
3.3.5 Empirical method.....	76
3.4 Results	78
3.4.1 Descriptive statistics.....	78

3.4.2 Reporting behaviour	79
3.4.3 Mechanisms explaining under-reporting of quality seed buyers.....	81
3.5 Discussion	86
3.5.1 Gender and reporting to support project monitoring	86
3.5.2 Visibility, substitution effects, and heterogeneous reporting behaviour ..	87
3.5.3 Incentives, infrastructure, and the limits of visibility	88
Appendices B: Chapter Three	90
Chapter Four.....	101
4.1 Introduction	102
4.2 Literature review.....	104
4.2.1 The commercial seed system challenge for RTB crops.....	104
4.2.2 Gender and willingness to pay premiums for quality sweetpotato seed	105
4.2.3 Gender, endowment and structural effect in willingness to pay.....	106
4.2.4 Farmer heterogeneity and the willingness to pay for quality seeds.....	107
4.3 Methods.....	109
4.3.1 Study setting.....	109
4.3.2 Sampling	109
4.3.3 Outcome Variable: Willingness to pay elicitation	110
4.3.4 Empirical methods	111
4.3.4.1 Exogenous Switching Treatment Effect Regression	111
4.3.4.2 Recentered Influence Function Decomposition	112
4.3.4.3 Fuzzy Rough Set Theory	115
4.4 Results.....	116
4.4.1 Descriptive findings.....	116
4.4.2 Effect and impact of gender on farmers' premium for quality seed	118
4.4.3 Intercategorical difference in the willingness to pay for quality seeds ...	119
4.4.4 Anticategorical intersection of gender, socioeconomic factors and risk attitudes	121
4.5 Discussion	124
4.5.1 Gender and premium payment for quality seed	124
4.5.2 Intercategorical intersectionality gender gap decomposition	125
4.5.3 Anticategorical intersectionality: which farmers are constrained and why	126
Appendices C: Chapter Four.....	128
Appendices D: Willingness to pay questionnaire.....	161
5.0 Overall Conclusion	164
5.1 Introduction	164
5.2 Summary, lessons, and policy implications	165
5.2.1 Chapter 2: Reaching the peer farmers	165
5.2.2 Chapter 3: Reaching the Promoters	166
5.2.3 Chapter 4: Inclusive quality seeds commercialisation	167
5.3 Limitation	169
References	170

List of Tables

Table 1: Methods and data mapping	14
Table 2: Descriptive statistics for buyer intensity, peer purchase, and information outcomes by promoter gender and poster assignment (N=1108)	35
Table 3: Gender, poster nudges, and word-of-mouth communication outcomes	37
Table 4: Gender, poster nudges, and word-of-mouth communication as predictors of buyer intensity and peer purchase.....	39
Table A1: Source and level of measurement for key variables	48
Table A2: Descriptive characteristics of the promoter and peers by treatment	51
Table A3: Descriptive characteristics of the promoter and peers by promoter gender	52
Table A4: Difference in promoter farmers and buyers of quality seed characteristics	53
Table A5: Information diffusion through word-of-mouth communication (N= 1108)	54
Table A6: Logit regression models for advice and publicity with county fixed effects.....	55
Table A7: Number of female and male buyers and peer purchase outcome (N= 1108)	56
Table A8: Intensity of purchase models with county fixed effects	59
Table A9: Intensity of purchase models with county fixed effects with heterophily	61
Table A10: Test for spillover effects	64
Table 5: Unreported buyers by promoter gender and poster assignment (N=1108)	78
Table 6: Gender, visibility, and recording of quality seed buyers.....	79
Table B1: SEM results for intensity of unreported purchases.....	90
Table B2: Heckman for recorded purchase and inverse mill ratio for the intensity of unreported female and male buyers	93
Table B3: Probit and Poisson regression for unrecorded purchases	98
Table 7: Mean premium for the study varieties	117
Table 8: Effect of gender on farmers' premium for quality seed	118
Table 9: Impact of gender on farmers' willingness to pay for quality seeds	119
Table 10: Decomposition of premium for quality seeds by gender	120
Table C1: Socioeconomic characteristics Full-sample N=276	128
Table C2: Descriptives by gender of the farmer	129
Table C3: Socio-economic characteristics by gender of the farmer (frequencies)	130
Table C4: Asset ownership by gender of the farmer	131
Table C5: Willingness to pay reduced payment card categories.....	131
Table C6: Willingness to pay replacing > 1001 with actual bid values	131
Table C7: T-test for gender differences with actual WTP N= 276.....	131
Table C8: Wilcoxon signed-rank test for difference in premiums between varieties.....	132
Table C9: Exogenous switching regression extended model	133
Table C10: <i>RIF Mean decomposition</i>	135
Table C11: <i>RIF 40th Quantile decomposition</i>	138
Table C12: <i>RIF 50th Quantile decomposition</i>	141
Table C13: <i>RIF 60th Quantile decomposition</i>	144
Table C14: <i>RIF 70th Quantile decomposition</i>	147
Table C15: <i>RIF 80th Quantile decomposition</i>	150
Table C16: Fuzzy Rough set theory 40 farmers groups	153
Table C17: Willingness to pay for quality seeds elicitation	160

List of Figures

Figure 1: Layout of treatment and control villages in the district.....	25
Figure A1: Promoter selection criteria.....	47
Figure A2: Poster	47
Figure 2: Layout of treatment and control villages in the district.....	72
Figure 3: Evaluation and data collection challenges from promoter farmers' feedback	82
Figure 4: Incentive structures described by promoter farmers	85
Figure 5: Anticategorical intersectionality showing gender-conditional WTP profiles.....	122
Figure C1: Factors segmenting WTP local varieties Tanzania and New dimbuka.....	158
Figure C2: Factors segmenting improved varieties WTP NAROSPOT P and NAROSPOT T	158
Figure C3: Characteristic that make farmers more likely to have a high WTP	159

Acknowledgements

I would like to sincerely thank my supervisors, Professor Maren Duvendack and Professor Arjan Verschoor, for their support, feedback, patience, and constructive guidance throughout my PhD studies. I am grateful for the financial support provided throughout the studentship and beyond. Without the funding they provided, it would have been impossible to pursue the PhD. I also extend my sincere thanks to Dr. Julius Okello Juma for facilitating access to the data used in this thesis. I am very lucky and forever grateful to have had Dr. Okello's mentorship since my undergraduate studies. His mentorship has been transformative and reflected a belief in me greater than I often had in myself. I am grateful to Dr. Hugo Campos for funding the primary study. Data collection was supported through the Bill and Melinda Gates Foundation project on Root, Tubers and Bananas Breeding, CGIAR Initiative on Market Intelligence and Program for Seed Systems Innovation in Africa. I am also thankful to Sylvester Ojwang, who facilitated the fieldwork and helped me understand the data. I thank the research assistants Juliet and Robert, and all the sweetpotato farmers who took the time to participate in the surveys. I am most appreciative of Dr. Sarah Mayanja's introduction to gender studies. I also thank Dr. Mugo, Zipporah, and Director Richard for facilitating travel documentation.

I am also indebted to Regina Lo, Christine Olukhanda, and Lucy Njogu for their support. Christine's unwavering presence and guidance eased my transition to a new system during tough early days. Lucy's conversations and check-ins provided helpful encouragement. I'm grateful to Brian Nagila for the conversations we shared during this journey. I appreciate Isaiah Okuku for helping me think through my ideas. My heartfelt thanks go to Mercy Onyango, one of the kindest people I know; her many calls have supported my mental well-being over the past four years. My family has played an invaluable role: my cousins Keziah Katunge, Alice Mbenge, Titus Muswii, Haddasa Mwikali, and Gloria Wanza. Keziah was very reliable and went above and beyond, shopping at the last minute to find any missing items I needed to survive in Norwich. Alice kept checking on my progress. I also thank my aunties, Ruth Mutuli, for checking in and encouraging me during this journey and Anna Mutunga for supplying my nduma. I am grateful to Daniel, Virginia, and Tracy Muthama for hosting me back home. My sister Jacqueline Nduku and brother Evans Mwini have been my supporters. I am indebted to Josphat and Hellen Nyingi, who have walked alongside me throughout my educational journey, celebrating every milestone. My parents, Jonathan and Esther Mutiso, are my foundation, encouraging me from a very young age to always work hard. This PhD reflects the collective effort of many, and I am eternally grateful to all. I attribute all the glory to God, who has graciously guided my steps throughout my life.

Abstract

This thesis examines gender and the use of information nudges to encourage smallholder farmers in sub-Saharan Africa to adopt new technologies. The nudges are tested in a context of inadequate formal extension services as complementary tools within farmer-to-farmer extension models. Limited available evidence suggests that promoter farmers and nudges are promising approaches for encouraging farmers to adopt new technologies. However, the effects of the approaches are heterogeneous and depend on the gender composition of the promoter-peer farmer dyad. Therefore, the thesis assessed how the gender of promoters and their peers, along with informational nudges, influences the dissemination of information and technology, project monitoring, and farmers' willingness to pay (WTP) for quality seeds. It used experimental and non-experimental methods and data from a randomised controlled trial intervention in 120 villages in Amuria District, eastern Uganda, in which quality sweetpotato seed was disseminated. One promoter farmer was purposively selected from each village to disseminate quality seed to peer farmers. Villages were randomly assigned to a treatment group, in which the promoter received a poster information nudge to display at their sales point, and a control group, in which no poster was provided.

The results showed that promoter farmers who were assigned to the information nudge were more likely to engage in publicity. Similarly, farmers who read the poster were more likely to receive advice on quality seeds. However, the interaction between male promoters and assignment to the information nudge group reduced the likelihood of engaging in publicity. The information nudge was associated with a decrease in the number of female quality seed buyers. Moreover, the results showed that promoter farmers' support for monitoring tasks is susceptible to moral hazard. Female farmers were less likely than male farmers to have their purchases recorded, while male promoters were significantly associated with more unreported female buyers. The WTP analysis showed that male farmers have higher premiums for quality seed than female farmers. Structural effects drive the gender gap in WTP. The results suggest that equal resources do not translate into the same WTP for male and female farmers. Fuzzy Rough Set results further demonstrated that high- and low-WTP profiles vary within and beyond the gender category. The thesis results indicate the need for a gender-sensitive and transformative lens in farmer-to-farmer models and in the use of nudges for information and quality seed dissemination.

Chapter One

Introduction

In sub-Saharan Africa (SSA), formal extension services are constrained by insufficient resources, bureaucratic inefficiencies, and a lack of responsiveness to changing demands (Lecoutere, Spielman and Van Campenhout, 2020; Takahashi, Muraoka and Otsuka, 2020). The majority of smallholder farmers consequently are slow to adopt agricultural technologies that could improve productivity, reduce risks, or make farming more profitable (Takahashi, Mano and Otsuka, 2019; Wiggins *et al.*, 2021; Suri and Udry, 2022). Information failure disproportionately affects female farmers, who constitute a large share of smallholder producers but often have less secure access to land, credit, information, mobility, and household decision-making power (Doss, 2018; FAO, 2025). For this reason, complementary extension channels have been explored to support technology diffusion and increase reach to female farmers and other marginalised groups (Textbox 1 summarises extension models' strengths and limitations). One approach involves the use of promoter farmers from local communities (also called lead farmers, model farmers, contact, or progressive farmers) to disseminate the information and services that extension officers would ordinarily provide (Ragasa, 2020).

Promoters are a cost-effective way to address information failures and have demonstrated greater success than extension agents in technology dissemination. They leverage social ties with their peers to share information and disseminate innovations, either out of altruism, a desire to create network externalities or incentives. Nevertheless, their efficacy is constrained by the very social hierarchies they are meant to overcome (Vasilaky and Leonard, 2018). Sociodemographic heterophily between promoters and their peers persists and produces variable outcomes in terms of information link formation and technology adoption (Shikuku, 2019; Ragasa *et al.*, 2021). Three interrelated constraints limit promoter farmers' efficacy. First, their reach depends on social and gender norms governing who can approach whom, with implications for information and innovations transfer (Kondylis *et al.*, 2016; Agarwal, 2022; Lecoutere, Spielman and Van Campenhout, 2023). Farmer-managed seed systems can inadvertently perpetuate inequality as they tend to favour male or wealthier farmers (Beaman *et al.*, 2021; Puskur *et al.*, 2021). Second, information is lost or distorted as it passes from researchers through extension agents to promoter farmers and onward to peers, with evidence of knowledge gaps despite training

(Niu and Ragasa, 2018). Third, technology diffusion within social networks can be suboptimal; communicators exert less effort and drive lower adoption rates when incentives do not align or are absent (BenYishay and Mobarak, 2019; Okello *et al.*, 2023).

Promoter farmers are engaged in multiple roles, including training, demonstrating innovations, selling or distributing inputs and supporting monitoring tasks such as maintaining beneficiary records. These roles require different forms of social connectedness, effort, and accountability. A promoter who is effective at peer communication may not have favourable outcomes when assigned a demonstration. Similarly, a promoter who reaches many farmers may not translate reach into demand for innovations at market prices. Therefore, this thesis examines gender across three linked functions of the farmer-to-farmer model: information diffusion, quality seed dissemination, and monitoring support. It also conducts a gender analysis of farmers' willingness to pay for quality seeds. First, the gender composition of promoter-peer interactions is associated with information and seed dissemination. Second, promoter farmers' beneficiary recording is insufficiently monitored by the project. Third, gender intersects with other identities and socio-economic characteristics to determine willingness to pay for quality seeds.

In SSA, market imperfections and information asymmetries hinder farmers' ability to appreciate the benefits of welfare-enhancing technologies, such as improved seed inputs (Okello *et al.*, 2025). For example, germination, seed health and vigour are credence attributes. Farmers only know whether they bought a good-quality product after the seed has germinated. In functional markets, recognisable brands and price attributes are cues for quality. In the absence of these cues, nudges could provide such signals. Moreover, in many important agricultural decisions, it is common for farmers to consult various sources. For this reason, the thesis also examines whether low-cost information nudges can complement farmer-to-farmer models. Information nudges are low-cost interventions based on insights from behavioural economics that can lead to behavioural changes that are in the best interests of people¹. It is an *information* nudge because it combines

¹ In Thaler and Sunstein (2008)'s account, nudging uses two fundamental principles, libertarian paternalism and choice architecture. Liberal paternalism supports people in making decisions they would make if they were fully informed and free of temptation; and choice architecture is the environment in which decisions are made. Thus, choice architects influence people's decisions and behaviors simply by leading them to better options for themselves (Sunstein and Thaler, 2003).

behavioural economics insight with the provision of information that helps farmers make correct decisions regarding their farms. In this thesis, the nudge takes the form of a poster that makes the costs of using poor-quality seed salient, drawing on loss aversion to prompt more careful decisions. Public visibility of the poster may also serve as an accountability signal, nudging promoters toward greater diligence in their roles.

Textbox 1: Evolution of agricultural extension models

The Transfer of Technology is one of the earliest agricultural extension models and involves top-down information flow from researchers to farmers using extension agents. While information and technology diffusion are standard, the model has a limited scope for farmer feedback or local adaptation and tends to target male household heads. Another approach is the Training and Visit, aiming to improve managerial efficiency and accountability through structured supervision and scheduled agent visits. While it strengthens organisational control, it is costly, rigid, and poorly suited to remote areas. Information is lost or distorted as it passes across multiple levels and is unresponsive to farmer diversity, including gender.

The emergence of participatory approaches that include farmers in problem-solving and experiential learning aims to address earlier models' gaps. For example, Farmer Field Schools (FFS) use trained facilitators to build local capacity and be responsive to local conditions. FFS work well when delivered in women-only groups. However, the cost per participant is high, it faces limited scalability, and there is a risk that benefits do not persist beyond direct participants.

Farmer-to-farmer models that leverage social networks using selected community members to disseminate information and technologies are gaining considerable attention. Due to capitalising on existing social capital, they have the potential for a broad reach, including women when female promoters are recruited. However, their effectiveness depends on the strength of social ties, promoter effort, incentives and biases in who is selected and who is reached. Recent pluralistic extension systems combine public, private, and community actors to increase reach and inclusiveness. While promising, they introduce significant coordination and monitoring challenges.

(Source: Davis, Franzel and Spielman, 2016, 2019; Davis, Makhija and Spielman, 2021)

The thesis is organised into three empirical chapters. Chapter 2 examines whether promoter gender, peer gender and poster assignment are associated with information and quality-seed dissemination. Chapter 3 assesses the role of promoter-peer-dyad gender and public visibility in promoter farmers' reporting behaviour. Chapter 4 undertakes a gender analysis of WTP for quality seed. It explores the gender gap in WTP and farmer profiles within and beyond gender categories. Section 1.1 discusses why gender is a salient issue in agriculture and seed systems in SSA. Section 1.2 goes into gender and access to agricultural extension. Section 1.3 reviews the promoter-farmer model and the potential of information nudges to address it. Section 1.4 looks into farmer diversity and willingness to pay for quality seeds. Section 1.5 provides a synthesis and the research objectives. Section 1.6 details the data and methodology, including a brief description of the intervention.

1.1 Gender, agriculture and the seed system in sub-Saharan Africa

Gender-responsive seed delivery is a priority area for SSA because of low adoption and turnover rates of improved crop varieties (CGIAR Initiative on Seed Equal, 2023). Women constitute a large share of smallholder farmers yet face structural constraints in accessing land, inputs, information, and markets (FAO, 2025). Female farmers tend to adopt improved varieties later and are, on average, less willing to pay for improved seed (Agossou *et al.*, 2023). Key barriers for female farmers in the seed systems include insecure land tenure, limited access to credit, and limited access to quality seeds and other inputs such as fertilisers (Brearley and Kramer, 2020). Female-headed households adopt quality seeds at lower rates than male-headed households (Gebre *et al.*, 2019). In Uganda, female-headed households were 14% less likely to decide the intensity of modern maize varieties use (Teklewold, Adam and Marennya, 2020). Consequently, quality seed adoption depends not only on information exposure but also on whether farmers can mobilise land, cash, labour, and authority to act on that information. These multidimensional constraints motivate the assessment of willingness to pay for quality seeds in Chapter 4.

Gender also intersects with other identities, such as age and marital status, to structure women's position in agricultural systems and marginalisation in seed interventions. Societal norms determine what is considered appropriate for women across different life stages, while marital status interacts with age and gender to influence economic activities and agriculture-related occupations (Elias *et al.*, 2018; Sumberg *et al.*, 2020). Rietveld *et al.* (2020) note that these limitations reflect established patterns of

exclusion over generations. Male and female farmers are not homogeneous categories; therefore, it is necessary to control for how age, marital status, education, credit and risk attitudes create different seed demand profiles.

Domestic responsibilities shape female farmers' engagement with institutions that support participation in improved input markets and extension programmes. Variations in preferences stem from the organisation of labour, where gender norms assign women unpaid roles in specific agricultural tasks, such as planting and weeding. The dual burden of reproductive and domestic responsibilities alongside farm work influences female farmers' variety preferences on small-scale farms (Blackden and Wodon, 2006). Limited mobility and time poverty due to household duties prevent women from attending dissemination activities or benefiting from seed market interventions. When interventions are out of reach, the household head or nominee from the home, normally a male representative, attends (Yegbemey *et al.*, 2021). Reproductive responsibilities, as a result, can determine extension reach and seed demand. For instance, female farmers may value traits that reduce labour demands, and they may miss information or economic opportunities when distribution activities conflict with domestic responsibilities.

Limited formal education and economic disadvantages constrain women's ability to access the information and resources needed to adopt improved seed varieties. Female farmers often have lower education levels than their male counterparts, which can restrict their participation in seed interventions and their understanding of the benefits of new crop varieties (FAO, 2023; Abdisa, Mehare and Wakeyo, 2024). The limited access of female farmers to financial resources and credit makes it difficult to afford certified seeds, which are more expensive than uncertified varieties (World Bank, 2023). Credit terms and repayment structures that do not align with seasonal agricultural calendars disadvantage women who need credit. Addressing these financial barriers is necessary but not sufficient to support equal access to quality seeds.

The gender gap in the adoption of innovation shows that an increase in access to financial inclusion is not enough to deal with gender inequalities in agricultural settings (Roy and Patro, 2022; FAO, 2023). For example, microfinance group lending models failed to uproot the discriminatory gender norms at the source, resulting in women becoming vehicles for receiving and repaying loans with little or no control over their use (Shohel, Niner and Gunawardana, 2021). In addition, some household dynamics are such that when

women have access to credit, decision-making power over expenditures may still rest with male household members (Ngo and Wahhaj, 2012; Ghosh and Vinod, 2017; Njuki *et al.*, 2022). To overcome this barrier, women rely on informal seed exchanges, labour exchanges, loans, gifts, and deferred payment plans (Blackmore, Ringler and Meinzen-Dick, 2022). Thus, for quality seed commercialisation, nominal access to credit may not translate into control over seed investment. Gender exclusion also operates within the formal institutions that shape what seeds are available in the first place. In Ghana, for example, participatory plant breeding programs recruit educated, well-connected men and marginalise poorer farmers and women (Poku, Birner and Gupta, 2018). This exclusion leads to an overemphasis on crops preferred by men and neglects varieties and landraces favoured by women (Nyantakyi-Frimpong and Bezner-Kerr, 2015).

1.2 Gender and agricultural extension in sub-Saharan Africa

About half of the farmers without access to agricultural extension services in SSA are women from low-income households, restricting their ability to make informed decisions regarding technology adoption and farming practices (FAO, 2023). Women are less likely to access and benefit from extension services because they are designed for and targeted at male household heads (Ragasa *et al.*, 2013). Differential access to extension services is therefore a significant contributor to women's lower adoption of improved seeds (Puskur *et al.*, 2021). Female farmers prefer associations with female extensionists, citing ease of communication, approachability and better understanding. The problem is not only unequal reach by extension activities, but also unequal information transmission in the household. Information received by male household members is not always communicated to women, even when women are responsible for applying the information in production decisions (Lecoutere, Spielman and Van Campenhout, 2019). Extension services neglect gender-divided labour, women's mobility, time allocation, and norms that dictate the relationships they can form. Gender norms limit women's capacity to pursue and apply agricultural training (Mudege *et al.*, 2016; see Textbox 2 for details). If women are less likely to receive information through formal extension, then community-based promoters and low-cost information materials may help widen reach. However, whether these approaches overcome or reproduce gender biases remains an open question, which this thesis addresses by examining who delivers information, who receives it, and how gender shapes these relationships and their outcomes.

Textbox 2: Gender norms and access to extension

Agricultural extension is assumed to lead to better farmer decision-making, improved agricultural performance and better outcomes. These services help farmers unpack the technical information about an innovation, whether a technology - as in the case of an improved crop variety or livestock breed - or complementary practices, required to optimise gains from using it. They also help reduce the risk and uncertainty associated with adopting new innovations. The authors find that women and men differ significantly in their access to extension services and training. They also find that selection of the type of farmers (i.e., whether woman or man) who participate in field days and workshops where agronomic training is provided is done by extension agents in collaboration with village headmen.

Hosts of demonstration plots were lead farmers, and predominantly men. Thus, participation in training events was skewed heavily towards men. The authors attribute this to gender norms. For instance, when invitations to the training events did not specify the number of women and men to attend, it was men who did so, in the guise of representing women. In some cases, women were forbidden by husbands from attending training. Village headmen who oversaw the training recruitment did not want to inform women directly. They argued that “it was difficult [socially] to approach women to inform them about impending meetings and training opportunities without informing their husbands” (pg. 298, paragraph 1, line 6-7). Sometimes invitation to training events came at short notice giving women no time to prepare (by rescheduling domestic chores) to attend. In other cases, gender and power relations worked against women preventing them from being selected as information disseminators to other women, a practice that has been found more useful in reaching women with new information. Gender role expectations and stereotypes in communities reinforced these biases. Men, it was believed, understood new things better and are the “knowers” with women as recipients of knowledge from men. This practice the authors argue, strengthens the stereotypic view that women are not intelligent and is “disempowering to women because it erodes their agency and self-esteem...” (pg 303, paragraph 3, line 5-6). (Source: Mudege *et al.*, 2016)

1.3 Promoter farmers nudging and being nudged

A nudge is not delivered in isolation but is embedded in a social interaction between the promoter farmer and the peer farmer. For this reason, the gender identity of the promoter can become part of how the nudge is received. Exploring when and for whom a nudge is effective, therefore, requires explicit attention to who is doing the nudging and how that identity facilitates or impedes information exchange across gender lines. Advocates of the promoter farmer model argue that peer learning can trigger significant social multiplier effects in the dissemination of agricultural technologies, which are essential complements to formal extension systems (Beaman *et al.*, 2021; Davis, Makhija and Spielman, 2021; Okello *et al.*, 2023; Kabirigi *et al.*, 2024). Despite challenges (see Textbox 3), promoter farmer extension can harness the existing social ties in the farming community to complement the goal of agricultural development.

Textbox 3: The use of promoters to complement agricultural extension

The use of promoter farmers in agricultural extension within sub-Saharan Africa has attracted considerable attention. However, De Janvry *et al.* (2016) point out that this approach has yielded unsatisfactory results. Underfunded extension systems and the selection of unsuitable promoter farmers are among the primary reasons for poor outcomes (Holden *et al.*, 2018; Takahashi *et al.*, 2019; Ragasa, 2020). A strand of literature identifies the role of providing performance incentives to promoter farmers (BenYishay and Mobarak, 2019) for a representative example. Balew *et al.* (2023) show the importance of incentivising group leaders within farmer communities to promote knowledge sharing. In their study, incentivizing group leaders with rewards and loss-framed messaging increased the effort of knowledge dissemination among these leaders. However, the study observed a lack of significant experimentation among follower farmers. Okello *et al.* (2023) provided public recognition to promoter farmers to disseminate information about improved seeds, and found that this does not affect receiving farmers' knowledge or willingness to pay for seeds. Performance-based incentives need to be tailored to the specific motivations of promoter farmers (Fisher *et al.*, 2018).

In root and tuber crop projects such as sweetpotato, promoter farmers fill multiple roles because private-sector participation in seed multiplication and distribution is limited. Sweetpotato production in SSA is also characterised by constrained formal extension services and dispersed rural communities. Under these conditions, the Transfer of Technology and Training and Visit models are neither affordable nor capable of reaching female farmers at scale. Farmer Field Schools are too resource-intensive for widespread implementation. Promoters operate as community extension workers, seed multipliers and sellers (Adam, Badstue and Sindi, 2018). Promoter farmers receive information, new agronomic techniques and quality sweetpotato seed to disseminate to their peers (Mandal, 2023). Promoter farmers are well-suited because they leverage existing community trust and social networks and can, in principle, reach female farmers. The promoter-peer dyad gender composition governing reach in practice is central to this thesis.

Relying solely on interpersonal interaction may limit the reach of seed interventions in large or dispersed communities. Extension services, therefore, need to be complemented by alternative strategies to meet the challenge of reaching dispersed smallholder communities (Amoussouhoui *et al.*, 2023). Akbarpour *et al.* (2020) emphasise the importance of simple contagion, a sufficiently long adoption period, and frequent social interaction within the network through which diffusion occurs. If information depends only on repeated interpersonal contact, farmers outside the promoter's immediate social network may remain unreached. Integrating promoter efforts with information nudges, therefore, holds potential to widen exposure (see examples in Textbox 4).

The farmer-to-farmer model also struggles to account for the multiple sources of agricultural information. Knowledge tends to remain localised and may fail to extend beyond the initially targeted individuals (Beaman *et al.*, 2021). For example, Berg *et al.* (2019) observed that health information shared by unincentivised agents tends to circulate within specific social groups, such as castes. In this context, information nudges can complement promoter-peer interactions by serving as conversation starters, reminders, or prompts for further dialogue. Information transmitted from promoter farmers to end-user farmers may introduce distortions, omissions, or misinterpretations, increasing uncertainty about the benefits of adopting a new technology (Khaila *et al.*, 2015; Tjernstrom, 2016; Niu and Ragasa, 2018; Ragasa, 2020; Takahashi, Muraoka and Otsuka, 2020). Information nudges may partly address this problem by making key messages more visible and less dependent on the promoter's recall, effort, or interpretation.

Textbox 4. Role, impact and reach of information nudges

Information nudges have been used to encourage the adoption of water-saving technologies and innovative practices, with large effect sizes (Chabé-Ferret *et al.*, 2019); nudge attendance to farmers' markets, which was found to be ineffective (Didero, Costanigro and Jablonski, 2021); improve environmental and health outcomes by increasing compliance with pesticide use regulations (Buchholz and Musshoff, 2021; Michels *et al.*, 2023); show how others change behaviour in order to influence uptake of eco-friendly practices (Boenke *et al.*, 2022); allow social comparison to encourage sustainable rice farming (Sasaki *et al.*, 2024) and encourage investment in organic farming (Boun My *et al.*, 2022). In developing countries, widespread initiatives primarily involve the use of ICT, especially SMS and videos, with mixed results. The popularity of these two approaches can be attributed to their affordability and broad reach.

An evidence synthesis of six SMS-based information campaigns in East African countries, designed to promote agricultural lime adoption, suggests that it is possible to influence farmer behaviour by delivering SMS reminders that encourage experimentation with certain fertilisers. Although adoption is not sustained in subsequent seasons, these interventions increased knowledge (Fabregas *et al.*, 2025). Though the programs differed in design, target populations, and information content, the meta-analysis yielded a modest effect size relative to intervention costs, with little evidence of fatigue or crowding out. Similarly, there is evidence of the positive effects of mobile phone-based information nudges, which have been shown to be helpful in promoting new technology adoption in Burkina Faso compared to traditional extension methods, among low-literacy farmers (Maredia *et al.*, 2018). Van Campenhout, Spielman, and Lecoutere (2021) show videos increase maize farmers' knowledge and adoption of recommended practices, with little indication that SMS reminders or interactive voice responses have an incremental effect.

Posters used in this thesis are information nudges. They are choice-preserving because they do not compel or restrict behaviour. They are low-cost, and they rely on the salience and framing of information rather than financial incentives. They differ from nudges based on defaults, social comparison, or commitment devices because they work through information salience and loss framing. The poster nudge is also embedded within

interpersonal communication. The promoter farmer is present at the sales point when the poster is displayed. For promoters, the poster can also serve as a reminder of the information conveyed during training. For peer farmers, it can provide a visible prompt that reinforces or initiates discussion about quality seed.

Gender matters because the promoter who carries the message is not socially neutral. Kondylis, Mueller, and Zhu (2017) show that female trainers can increase outreach intensity, awareness, adoption, and the mitigation of gender bias. In Uganda, pairing female cotton farmers who had not previously interacted increased productivity, highlighting the value of connecting female farmers who operate outside traditional agricultural information networks (Vasilaky and Leonard, 2018). Network effects are more pronounced among female farmers than among male farmers (Mekonnen, Gerber and Matz, 2018). These findings suggest that promoter identity may shape who receives information and how credible the message is perceived to be. Nonetheless, the ideal candidate for the promoter role is not fixed. Some interventions may benefit from socially central or higher-status promoters, while others may benefit from ordinary farmers whose gender and socio-economic characteristics are homophilous with the target peers. Matching the characteristics of promoter farmers with those of peers can produce favourable outcomes under the homophily theory (Lazarsfeld and Merton, 1954). The unexplored empirical question is how promoter gender interacts with peer gender and with the nudge itself.

1.4 Farmer diversity and the willingness to pay for quality seeds

The discussion thus far suggests that the identity of promoter farmers is likely to matter when a nudge is being used alongside them to encourage farmers to adopt new technologies. In this section, the focus shifts to the identity of farmers targeted for seed dissemination. Promoter identity shapes information reach, but the identity of the farmers targeted for seed dissemination matters equally for scaling up innovation. However, little is documented about willingness to pay (WTP) for technology post-exposure through promoter farmer dissemination. Farmers may not value innovation at market prices required for sustainable scaling. Agricultural innovation may not be important to smallholders at market prices (Morgan, Mason and Maredia, 2020). Existing knowledge on smallholders' adoption of agricultural technology highlights four crucial conditions (FAO, 2024; Huyer *et al.*, 2024). First, technology must be of high quality and cater to the specific needs and preferences of individuals from diverse demographic and socioeconomic

backgrounds. Second, the technology should be readily available to all smallholder female and male farmers in the appropriate locations and at the right time. Third, accessibility of the technology is vital, meaning that farmers, irrespective of gender and socioeconomic characteristics, should have access to reliable information about the technology, be able to afford it, and physically obtain it. Finally, women and men must be able to use and control technology to ensure equity and empowerment.

Several studies (e.g., Mwititi *et al.*, 2020; Okumu *et al.*, 2021; Okello *et al.*, 2023) have explored the differences in WTP for sweetpotato; however, none have focused on gender-related disparities in the WTP for quality seeds. These studies primarily used gender as a control variable. This thesis, therefore, seeks to assess the gender differences in the WTP for the quality of seeds. Female and male farmers are not a uniform group and analysing the gender gap while considering their heterogeneity can provide valuable insights for policy. This thesis aims to determine the extent to which the observed gender discrepancies in modern input use are attributable to factor endowments (e.g. access to farming resources) and structural factors (e.g. social norms and institutions).

Assessing the effect of gender is a necessary first step, though it reduces the complex realities of social attributes into a binary model (Colfer, Sijapati and Ihalainen, 2018). Farming households are not the same and may require different technologies and delivery methods to suit their unique circumstances (Hazell, 2019). Treating farmers as homogeneous groups without considering these factors oversimplifies the relationship between technology adoption and their demographic profiles (Mausch *et al.*, 2021). The third empirical chapter undertakes a gender analysis of WTP, examining its intersection with information, socioeconomics, and risk preferences. It uses a sample of farmers from villages where the quality seed dissemination intervention was previously conducted. After exposure to information, the uncertainty surrounding technology returns may be reduced, influencing farmers' willingness to pay (Morgan, Mason and Maredia, 2020).

1.5 Synthesis and objectives

Inadequate formal agricultural extension services limit smallholder farmers' adoption of new agricultural technologies in SSA. Consequently, even when these technologies are risk-reducing, more productive, or more profitable, adoption does not occur. Faced with this challenge, the use of promoter farmers (or model or lead farmers),

who demonstrate to peer farmers that new technologies may be in their best interest, has become common. The promoter-farmer model is attractive because it is locally embedded and low-cost, but it also creates three implementation challenges. First, information may be lost or distorted as it moves from projects to promoters and then to peer farmers. Second, promoter effort is difficult to observe, especially when promoters are expected to support monitoring tasks such as record-keeping.

Third, even when information reaches peer farmers, demand for quality inputs depends on farmers' ability to pay, which is shaped by gender, resources, risk, information, and household decision-making power. Gender cuts across all three challenges. Female farmers face inequalities in access to quality inputs, information, extension services, credit, land, and household decision-making power. Social interactions also follow gendered norms that shape who can approach whom, who is trusted as an information source, and whose economic activity becomes visible in project records. When information nudges are delivered through promoters, the promoter's identity may shape how the nudge is received. Information and seed dissemination, reporting behaviour, and willingness to pay may therefore depend on the gender of both the promoter and the peer farmer, and on whether information nudges complement or weaken these interactions.

Chapter 2 addresses a gap in the literature on farmer-to-farmer extension and information nudges. Specifically, little is known about how promoter gender, peer gender, and information nudges interact to shape information exposure and quality-seed dissemination. It asks: how are these factors associated with word-of-mouth communication in the promoter-peer dyad and gendered quality seed dissemination?

Chapter 3 explores promoter reporting behaviour in delegated monitoring tasks. While the literature has focused on information diffusion, training, and adoption, less is known about how promoter farmers support the monitoring function. The chapter asks how promoter gender, peer gender, and their interaction shape reporting behaviour in delegated quality-seed sales, and the role of public visibility through posters.

Chapter 4 addresses a gap in WTP studies, which often treat gender as a control variable or report average male-female differences without examining whether endowment differences or structural effects drive the gap. It asks: what is the causal effect of gender on

the willingness to pay for quality sweetpotato seed, and which high- and low-WTP farmer groups emerge within and beyond gender?

1.6 Methodology and data overview

The thesis draws on both quantitative and qualitative data. Table 1 maps the data used across the chapters. Secondary data were obtained from a randomised controlled trial survey implemented in a collaborative effort led by the International Potato Centre. The study was conducted in Amuria District, Eastern Uganda, covering two counties, all 15 sub-counties, and 91 parishes/wards. A baseline survey was conducted in November-December 2021, interviewing 1,200 randomly sampled households from 120 villages and promoter baselines in February 2022, after their recruitment. Villages were randomised into treatment (64 villages) and control (56 villages) groups.

Table 1: Methods and data mapping

Data collection phase	Timeline and purpose	Sample and method	Chapters
Baseline & Promoter Survey	Nov–Dec 2021 & Feb 2022 Demographic baseline & promoter characteristics	1,200 households (10 randomly selected per village) 120 promoters (purposively selected; promoter survey)	2, 3, 4
RCT Implementation & Sales	Apr–May & Jul–Aug 2022 Seed distribution with nudge intervention	64 treatment villages (seeds + posters) 56 control (seeds only) Sales receipt collection	2, 3
Follow-up & Qualitative	Oct–Nov 2022 Adoption outcomes & decision-making	1,108 farmers (7.7% attrition); 276 FGD participants	2, 4
Willingness to Pay (WTP)	Oct–Nov 2022	276 farmers (15 villages, 92% response) WTP elicitation and background information	4
Key Informant Interviews	Jul 2024 Implementation experiences	24 promoters (12 male, 12 female; 12 treatment, 12 control); Semi-structured interviews	3

A follow-up survey was conducted in October-November 2022 to measure adoption, information-sharing, and experimentation with a final sample of 1,108 households (7.7% attrition rate). During the follow-up period, another random sample of 276 farmers (target 300, 92% response rate) was selected from the original list of farmers in the 120 villages. The 276 participants participated only in the WTP for quality seed

elicitation in October-November 2022 and Focus Group Discussions in 20 purposively selected villages.

As part of the information nudges, intervention promoters sold four sweetpotato varieties (Tanzania, Ejumula, NAROSPOT 1, NAROSPOT 13) at UGX 2000 per bundle of vine cuttings, with treatment villages receiving loss aversion posters. In addition to the promoter survey, key informant interviews with 24 promoter farmers were conducted in July 2024. The secondary use of data received ethical approval from the School of Global Development Research Ethics Subcommittee of the University of East Anglia. The approval reference number is UEA ETH2223-1600. The primary study adhered to the ethical standards outlined in the Declaration of Helsinki. It was collaboratively carried out by the International Potato Center, Cornell University, the National Agricultural Research Organisation of Uganda, the Norwich Institute for Sustainable Development, and Uganda's Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), with ethics approval from the Cornell University Institutional Review Board (IRB) under ID 2110010648.

Chapter Two

Gender, information nudges, and agricultural technology dissemination in the farmer-to-farmer model: A dyadic analysis

Abstract

This chapter examines the role of promoter–peer gender combinations and informational nudges in the dissemination of information and quality seed in rural Uganda. It draws on data from a cluster randomised controlled trial in Uganda, with 120 purposively selected promoter farmers and a random sample of 1,108 peer farmers. The villages were randomly assigned to a treatment group, in which the promoter received an information poster to display at their sales point, and a control group, in which no poster was provided. One promoter farmer was purposively selected in each village to facilitate quality seed dissemination. The results showed that promoter farmers assigned to the information nudge were more likely to report that their peers learned about the availability of quality seed from them. Farmers who read the posters were more likely to seek advice from the promoter farmers. Regarding gender, male promoters were associated with fewer female buyers. Contrary to expectations, the information nudge was associated with a decrease in the number of female buyers. Male promoters assigned to the poster treatment showed a positive association with the number of female buyers. The findings underscore the importance of gender-sensitive design and the targeting of information nudge interventions in farmer-to-farmer models to strengthen interpersonal communication and improve the participation of female farmers.

2.1 Introduction

Improved, certified, and quality-declared seeds for root and tuber crops (RTB) have low adoption rates in sub-Saharan Africa (SSA), with a variety turnover of 14 years (Thiele *et al.*, 2021). Lack of information on their availability and benefits, and the associated perceived risk of poor performance, is one explanation for the low adoption of improved inputs (Takahashi, Muraoka and Otsuka, 2020; Suri and Udry, 2022; FAO, 2025). Formal extension systems are strained and struggle to reach all smallholder farmers who need advice (Van Campenhout, Spielman and Lecoutere, 2021). In this respect, the use of promoter farmers to tackle the information failure that impedes technology diffusion to other farmers (henceforth peers) has gained considerable popularity in SSA. The use of promoter farmers is promising. However, studies testing the features of the farmer-to-farmer model focus on structured training and demonstrations for knowledge transfer in conservation agriculture. Word-of-mouth communication between promoter farmers and their peers, and its correlation with quality seed dissemination, is underexplored.

In marketing quality seeds, word-of-mouth communication is important because these are credence goods. Although they are inspected and declared disease-free, their superiority over recycled seeds is not observable at the point of sale. Farmers rely on external signals of quality, including the credibility of the seller, advice received, or publicity about the product. One of the chapter's contributions is that word-of-mouth is conceptualised and measured as dyadic interpersonal communication in the promoter-peer dyad. This contrasts with the common focus on one side of the dyad, either the promoter or the peer. In the dyadic relationship, the gender of the information source and the receiver shapes interpersonal communication. Findings from farmer-to-farmer extension models in other contexts show that female farmers often feel uncomfortable seeking information from male extension workers (Witinok-Huber *et al.*, 2021). Shikuku (2019) shows that female model farmers exert higher knowledge transfer effort than their male counterparts. Nonetheless, farmers perceive female promoters as less credible despite equal competence (BenYishay *et al.*, 2020). Therefore, the study assesses the role of promoter-peer dyad gender and homophily (same-gender dyads) in word-of-mouth communication and seed dissemination.

In addition to interpersonal communication, information nudges are low-cost tools that can be harnessed to influence farmers' interpretation of quality signals and encourage

behavioural responses. Nonetheless, the effect of nudges can range from positive change to apathy, resistance, or even backlash, making their effectiveness context-dependent (Congiu and Moscati, 2022). For example, in an agricultural setting, video nudges increased maize farmers' knowledge and adoption of recommended practices in Uganda (Van Campenhout, Spielman and Lecoutere, 2021). Another study found that SMS reminders increased lime adoption across Kenya and Rwanda, though effects were modest and did not persist beyond the intervention season (Fabregas *et al.*, 2025). Most closely related to this study, Okello *et al.* (2025) tested the impact of poster nudges combining nostalgia and loss aversion framing on quality seed purchase and found that information and quality signals were weak or ambiguous. This study extends this work to explore whether information nudge effects operate through actual engagement rather than assignment alone in word-of-mouth communication and seed dissemination. Seed dissemination is measured by the intensity of male and female peer buyers as reported by the promoter. The chapter addresses two research questions:

- (i) How are promoter–peer dyad gender, gender homophily, and information nudges associated with dyadic word-of-mouth communication about quality seed?
- (ii) How do promoter–peer dyad gender, gender homophily, information nudges, and word-of-mouth communication interact to influence the gendered dissemination of quality seed?

Overall, the findings showed that poster nudges and gender were associated with interpersonal communication and seed dissemination through actor, partner, and dyadic interaction pathways. The main finding regarding gender is that male promoters were associated with fewer female buyers but more male buyers. Nevertheless, male promoters assigned to the information nudge treatment show a positive association with female buyers' intensity. The nudge partly reduces the gender disadvantage in reaching female farmers. However, these effects are not robust when the promoter-peer dyad outcomes are modelled separately. With respect to information nudges, the results showed that peer farmers who read the nudge were more likely to report receiving advice. On seed dissemination, assignment to the nudge was negatively associated with the intensity of female seed buyers. In contrast, promoter publicity was associated with a decrease in the intensity of male buyers. For promoters assigned to the information nudge, however, publicity was positively associated with the number of male buyers, suggesting it

strengthens the association between interpersonal communication and seed dissemination.

These results contribute to three strands of literature. First, they contribute to farmer-to-farmer extension studies on information diffusion (Vasilaky and Leonard, 2018; Shikuku, 2019). Second, the findings contribute to the literature on gender, agricultural extension and seed systems by investigating the role of promoter–peer gender composition in information exchange and market seed dissemination (Kondylis *et al.*, 2016; Kondylis, Mueller and Zhu, 2017; Van Campenhout, Spielman and Lecoutere, 2018; Shikuku, 2019; BenYishay *et al.*, 2020; Balew *et al.*, 2023). Third, they extend studies assessing how nudges can be harnessed in agriculture by analysing poster-based information nudges embedded in a market intervention and farmer-to-farmer models (Fabregas *et al.*, 2019, 2023; Van Campenhout, Spielman and Lecoutere, 2021; Okello *et al.*, 2025). The rest of the chapter is organised as follows. Section 2.2 presents the literature review. Section 2.3 describes the study design, promoter recruitment, and estimation strategy. Section 2.4 presents the results. The last section presents the discussion.

2.2 Literature review

2.2.1 Promoter- peer dyad gender and information diffusion

In the farmer-to-farmer model, gender plays a role in information diffusion in at least four ways, with implications for interpersonal communication in seed markets. The first is restricted access to cross-gender information sources, due to social norms, including patriarchal norms that restrict cross-gender interaction. Female farmers report feeling uncomfortable with male extensionists and a lack of confidence that they are interested in supporting them (Witinok-Huber *et al.*, 2021; Nyberg *et al.*, 2025). The second is reluctance in advice seeking, pronounced where female farmers operate in a male-dominated agricultural setting and vice versa. Proactive help-seeking behaviour may signal incompetence, inferiority, or dependence, and farmers may avoid seeking information to appear more informed (Chandrasekhar, Golub and Yang, 2018; Banerjee *et al.*, 2019, 2024). The third, the identity of the information source, rather than the content of the message, determines receptivity. Female promoters exert more effort in dissemination activities than their male counterparts (Kondylis *et al.*, 2016; Shikuku *et al.*, 2019). However, peer discrimination and social perception limit their influence. BenYishay *et al.* (2020), in a randomised experiment in Malawi, find no gender gap in promoters' objective ability to

acquire, retain, or use agricultural knowledge. Male lead farmers were more likely to receive engagement from peers. Peers, whether female or male, were less likely to attend the training of female lead farmers even when knowledge outcomes were identical.

Turning to gender homophily, studies show varied results, owing to differences in the promoter-to-peer information-sharing and training methods. Using a randomised experiment in Mozambique, Kondylis et al. (2016) show that information about sustainable land management did not reach female farmers as effectively as male farmers. They also show that an increase in training for more female messengers resulted in a positive impact on awareness among female farmers. Other studies show that social distance reduces information reach to female farmers. Beaman and Dillon (2018) showed that female farmers are less likely to receive information when targeting in prioritised central social network nodes due to underrepresentation. From these results, gender homophily effects are in part structural. Promoter-peer gender dissimilarity may therefore reduce information reach not only because farmers prefer same-gender advice, but also because female farmers are less represented in these networks.

Another strand of the gender homophily literature shows that effects on information diffusion may depend on promoter effort, household targeting, and access to peer farmers. Van Campenhout et al. (2018) demonstrate that while female farmers learn more from female promoters and vice versa, this does not improve knowledge transfer. However, targeting spouses jointly within a household improved uptake of technical knowledge such as optimal plant spacing. Shikuku (2019), by contrast, found that information diffuses more when disseminated by a female farmer who puts more effort into reaching peers. Thus, the gender effect may vary by the crop, the social setting, the promoter's effort and may differ in the quality seed market. In a quality seed market, promoter farmers communicate unverifiable product attributes such as variety purity, germination rate, and yield potential, making source credibility and trust more salient determinants of information uptake than in settings where technology outcomes are directly observable. The study, therefore, tests whether, and through what dyadic mechanisms, gender is associated with word-of-mouth. In this study, word-of-mouth communication is measured at the promoter–peer dyad level using two indicators: peer-reported advice receipt and promoter-reported publicity.

H1a: Promoter gender is associated with word-of-mouth communication.

H1b: Peer gender is associated with word-of-mouth communication.

H1c: Gender homophily in the promoter–peer dyad is associated with word-of-mouth communication.

2.2.2 Information nudges in farmer-to-farmer models

Agricultural extension primarily relies on interpersonal knowledge transfer through extension agents and promoter farmers, who conduct visits, provide training, and offer demonstrations. Beaman et al. (2021) indicate that technology diffusion is characterised by complex contagion, with most farmers needing to learn from multiple people and sources before adopting new technology. In efforts to address information failures in agricultural extension, there is growing interest in testing information nudges, low-cost and choice-preserving tools (Benartzi et al., 2017). However, the effects of information nudges are inconsistent, and sometimes they are associated with unintended responses (Hummel and Maedche, 2019; Mertens et al., 2022). Fabregas et al. (2025) synthesised six randomised controlled trials (RCTs) in Kenya and Rwanda that utilised SMS to increase the use of agricultural lime, thereby reducing soil acidity and enhancing yields. Their results show modest but consistent positive effects at low cost. They also show that urgency message framing produced effects no larger than a simple message, and SMS effects do not persist beyond the intervention season.

Dzanku and Osei (2023), in a study in Mali, found that SMS combined with training improved knowledge of harvesting and selling by approximately 18%, but that this knowledge gain translated only weakly into behaviour change in areas with weak input markets. For the present study, the key limitation of SMS-based nudges is that they require mobile phone access and direct message delivery. This study extends the literature by examining a poster medium, a seed market context, and the role of intermediaries in nudge delivery. Poster-based nudges offer a different information channel because they can be displayed at the point of sale. They may influence farmers across three levels of exposure: those who saw the poster, those who read it, and those who additionally received information through promoter-peer communication. The effect will possibly vary by promoter-peer dyad gender composition. De Groote et al. (2016) show that posters increase farmers' familiarity with biofortified maize but do not increase awareness of its benefits or adoption rates. The passive visual exposure can create recognition without sufficient comprehension, which has implications in credence goods markets where

farmers must not only notice but trust and act on quality signals. The study, therefore, addresses the following hypotheses:

H2a: Poster-nudge assignment increases promoters' publicity on quality seeds.

H2b: Peer-reported poster engagement increases the likelihood of receiving advice from a promoter.

H2c: The association between poster assignment and word-of-mouth communication is moderated by promoter gender.

2.2.3 Gender and technology adoption

Evidence on promoter and peer gender is mixed, reflecting differences in the technologies tested and promoter farmers' selection methods, training and demonstration approaches. Kondylis et al. (2016) found that male promoters had a negligible influence on female farmers' adoption; the introduction of female extension agents significantly improved adoption among female farmers. The results indicated that gender homophily was not the only contributing factor; female agents' greater effort in reaching women and cultural norms restricting cross-gender interaction also mattered. However, the study is set in a single country, and it is unclear whether the cultural norms argument applies to other settings where gender relations and extension systems differ.

Vasilaky and Leonard (2018) tested a different approach where female farmers were randomly paired during a training session with unfamiliar peers and encouraged to share information about a recently adopted cash crop throughout the growing season. The intervention significantly increased the productivity of all but the highest-quintile farmers, with spillovers to male farmers. Their results suggest that even heterophilous ties (between previously unacquainted women) can generate learning signals when the pairing is exogenously structured. Moving beyond structured interaction, it remains unclear how these gender relations form in informal market settings where promoter-peer contact is voluntary, spontaneous, and unscripted. By contrast, Ragasa (2020) reaches a contrasting conclusion in a nationally representative panel study of 531 lead farmers linked to 2,800 peer households in Malawi's conservation agriculture extension system. Lead farmer gender had no measurable effect on diffusion. In a conservation agriculture technology package, complexity constrains training frequency, so promoter characteristics such as gender matter less than the quality and regularity of training received. However, using correlated random effects on observational data, the study cannot establish that gender

caused no effect, only that it was not associated with diffusion in that context, which limits the strength of the null finding.

An important challenge in technology transfer is the default assumption that male promoters who tend to be high-status network actors are the most effective diffusers. Matous (2023) used a randomised experiment across cocoa farming communities in Sulawesi, Indonesia, drawing on a social network survey of 1,885 farmers. Eighteen central opinion leaders, predominantly senior men identified by in-degree network scores, were compared against 18 randomly selected low-centrality farmers. The male opinion leaders significantly influenced fewer peers (9.8) than the low-centrality group (17.1). Underrepresented female opinion leaders achieved greater uptake even after controlling for education, age, and network centrality. However, the sample was too small to support broad generalisations about gender and network centrality in other contexts or agricultural market settings, such as quality seed markets. The present study addresses this gap by examining how promoter gender, peer gender, and gender homophily shape the number of male and female quality seed buyers in a seed market context:

H3a: Promoter gender is associated with the number of male and female quality seed buyers.

H3b: Peer gender is associated with the number of male and female quality seed buyers.

H3c: Gender homophily is positively associated with the number of male and female quality seed buyers.

The evidence reviewed in section 2.2.2 shows that nudges produce inconsistent effects in isolation, raising the question of how their effect differs by the gender of the promoter deploying them and the peer engaging with them. Social role theory suggests that men and women may differ in their responses to persuasive communication: men tend towards instrumental, task-focused processing while women engage in more detailed cognitive processing and are more sensitive to relational message framing (Chang, 2007; Eagly, 2013; Eagly *et al.*, 2020). Consequently, in agricultural settings, a nudge may produce different effects on seed dissemination outcomes depending on who deploys it and who receives it. When posters are embedded within a broader interpersonal or media system, their effects are more consistently positive. Barooah *et al.* (2023) find positive effects on climate practice adoption in India when posters were combined with a video extension.

Similarly, Ojwang et al. (2021) find that posters combined with SMS reminders improved retention of improved sweetpotato seed more than either tool alone, pointing to complementarity between print and digital channels. The findings suggest that the effectiveness of poster nudges is contingent on channel combination and user literacy. However, these studies test the channels simultaneously, making it impossible to isolate whether complementarity operates because each channel reaches different farmers. It is unclear if repetition across channels reinforces the same message or if interpersonal and poster information nudges activate different cognitive pathways.

This study examines if poster nudges and promoter publicity individually and jointly increase seed purchase intensity. It uses a randomised control design to detect complementarity rather than channel-bundling. Okello et al. (2025) tested a poster nudge combining nostalgia and loss aversion framing in a sweetpotato seed adoption trial and found a 7% increase in the likelihood of quality seed adoption. However, the effect was not robust to village-level clustering, raising concerns about whether the estimated effect reflects direct poster exposure, social spillovers, or both. Neither this study nor the broader nudge literature examines how the gender of the promoter and the peer moderate the nudge effect on quality seed dissemination. The present study addresses these gaps through the following hypotheses:

H4a: Poster assignment is associated with the number of male and female quality seed buyers.

H4b: Poster engagement is associated with the number of male and female quality seed buyers.

H4c: The effect of poster assignment on the number of male and female quality seed buyers is moderated by promoter gender.

H4d: Poster assignment and promoter publicity are jointly associated with the number of male and female quality seed buyers.

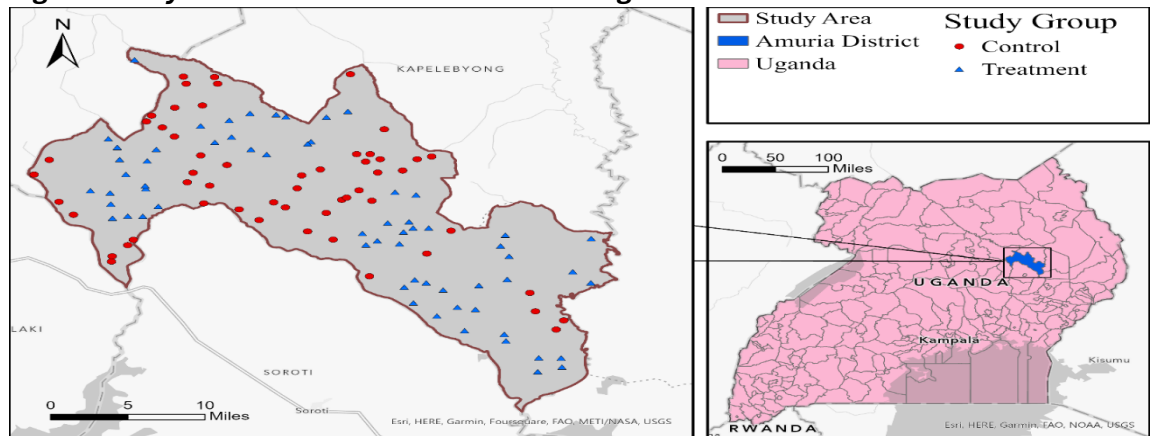
2.3 Methods

2.3.1 Study site, village, and sampling

The study draws on secondary data from a cluster-randomised controlled trial (RCT) conducted in Amuria District in Uganda, a major sweetpotato-producing area. The district had never had a sweetpotato crop improvement program prior to the RCT study. The

primary experiment was designed to examine the effect of behavioural nudges on the use of quality seed of improved sweetpotato varieties (Okello *et al.*, 2025). Sampling proceeded in two stages. First, 120 villages were randomly selected from a list of all the 91 parishes in the Amuria district. The number of villages was determined using probability-proportional-to-size (PPS) sampling. Second, from each sampled village, a complete household list was obtained from the Local Council chairperson and updated to capture households that had produced sweetpotatoes in the preceding season. A total of 10 households were then randomly picked from each village from the updated lists, thus 1,200 households, slightly more than suggested by power calculations.² The list contained both male and female farmers, but the sampling was gender neutral. As a result, the farmers' gender composition reflects the underlying household-level composition of each village.

Figure 1: Layout of treatment and control villages in the district.



The villages were randomised into treatment ($n = 64$) and control ($n = 56$) groups in Figure 1 following McCann *et al.* (2018) to minimise cross-village contamination of study

² Power calculations were conducted using the R *simR* package. The outcome variable of interest in all calculations is the adoption of improved sweetpotato varieties (a dichotomous variable). The other outcome of interest in this study is the extent of adoption measured by the quantity of seed of ISVs purchased, which is a continuous variable. Dichotomous variables generally require larger samples to detect effects than do continuous variables, hence we focused only on the binary adoption variable. A base rate of adoption of 9% was assumed, which implies a standard deviation of approximately 0.29. Estimates were based upon a mixed logit analysis, with households nested in villages. The analysis targeted a correlation of adoption within a village of 0.10. An economically significant result requires an increase in adoption of approximately 20 to 25 percentage points. It also assumed a control and one treatment condition, targeting rejection of the null that the treatment is equivalent to the control. With $n=1000$ (100 villages, 10 households per village) it would detect an increase in adoption of 20 percentage points with 97% probability and 15 percentage points with 80% probability. To allow for potential attrition and miss outs due to availability, it targeted 120 villages for the study.

participants. A 5 km minimum separation radius was identified as optimal, and post-hoc spillover tests show no significant contamination (Appendix Table A10).

2.3.2 Recruitment of promoter farmers

In consultation with local government agricultural extension workers and village administrators, 120 promoters were selected purposively, using the criteria shown in Appendix Figure A1. Promoter farmers' selection considered residency in the village, ability to read and write in English and the local language (Ateso/Luo), previous experience in supporting development activities, easily accessible to their peers and the project, trustworthy, honest, not a local leader or politician in the community and did not participate in the baseline survey in 2021 and would be available during the intervention period. A single promoter was selected for each village, and the process did not formally restrict selection by gender. Overall, 57% of promoters were male, and 43% were female. Because promoter selection occurred purposively after village randomisation, promoter characteristics were not expected to be balanced between treatment and control villages (Appendix Table A2). The imbalanced promoter characteristics are included as covariates.

The principal investigator trained the promoters with support from a local extension worker. The one-day training session covered the agronomic characteristics of the four quality-declared seed varieties and sales procedures, including pre-set prices of UGX 2,000 per bundle of 25 vine cuttings. At the end of the training, each promoter received UGX 55,000, approximately USD 15, to construct a sales point resembling those in the local market in an accessible location. Training sessions for treatment and control villages were held separately to prevent information contamination. Each promoter was also provided with a standardised booklet to capture the buyer's name, gender, quantity purchased, and telephone number. In treatment villages, field assistants also delivered a poster that the promoter was required to display daily at the sales point.

2.3.3 Information nudge intervention

In this study, the information nudge took the form of a poster displayed at the promoter's sales point. A nudge is a low-cost, choice-preserving intervention that seeks to influence behaviour by making certain information more salient at the point of decision without restricting options or adding financial incentives. Compared with other nudges used in agricultural settings, such as SMS reminders or labels, the poster was a visual

point-of-sale prompt designed to attract attention. The poster had simple messages: (i) “use quality vines for higher yield;” (ii) “plant quality sweetpotato vines;” (iii) “MORE sweetpotato harvest;” and (iv) “More food, amukeke and money.” The simple messages had accompanying images (see Appendix Figure A2). The chapter does not test the psychological mechanisms of loss aversion and nostalgia, which are examined in Okello et al. (2025) using the same RCT. It focuses on two pathways through which the poster can influence word of mouth and seed dissemination. First, on the promoter side, poster assignment could nudge the promoter to increase publicity. It could also, however, substitute for promoter interpersonal communication if promoters felt that the poster was “doing the work” of informing farmers. Second, on the peer side, reading the poster at the sales point could prompt curiosity, advice-seeking, and purchase.

In the control group villages, promoters received the same training, the same sales responsibilities, the same quality seed stock, and the same prices, but no poster. The sales points were in easily accessible high-traffic areas, such as intra-village feeder roads, footpaths, and intersections/junctions frequently used by farmers within the village to increase access to and convenience in obtaining quality seeds. Care was taken to ensure that the sales points were not located on major roads and intersections or in facilities (such as schools, churches, mosques, and dispensaries) serving multiple villages or parishes to reduce the chances of contamination.

The study used quality seeds of four sweetpotato varieties, namely, Tanzania, Ejumula, NAROSPOT 1 and NAROSPOT 13. Ejumula and Tanzania are widely grown in the study district. Still, locally available seeds have a heavy load of pests and diseases, especially the sweetpotato weevils and sweetpotato virus diseases (SPVD). The seed used was cleaned in the laboratory, inspected by a trained government inspector, and certified to be free of sweetpotato weevil and SPVD³. At the onset of the first season rains (i.e., late

³ Besides the government inspection, samples of sweetpotato vines/seed from the vine multipliers were also collected by the research team and tested for SPVD. They were found to be free of SPVD. Further, the research team maintained close control of starter material used by the multipliers to produce supplied seed to ensure that seed were traceable to clean certified source (a lab based in Kampala).

April and early May 2022), quality seeds of the four sweetpotato varieties were delivered to the sales points. Each sales point received two bags of each variety, hence a total of eight bags. Two weeks later, four additional bags (one bag per variety) were delivered to each sales point. Therefore, 12 bags of quality seeds from the four varieties were delivered to the sales points. Seeds were sold at UGX 2,000 per bundle of 25 vine cuttings, a price jointly set by promoters and extension agents to recover costs while remaining comparable to the prevailing market price for vines at the season onset, when seed is typically scarce. The intervention ran across two seasons, the first and second rainy seasons of the 2021–2022 cropping year.

This study was conducted in accordance with the ethical research guidelines laid down in the Declaration of Helsinki. It was implemented jointly by the International Potato Center, Cornell University, the National Agricultural Research Organisation of Uganda, the Norwich Institute for Sustainable Development, and Uganda's Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) under the Cornell University Institutional Review Board (IRB) ethics approval ID# 2110010648.

2.3.4 Data collection

The chapter is based on data from various sources, which include the baseline survey, follow-up survey, a promoter farmer survey, sales records, and focus groups. The baseline survey was conducted in November and December 2021, led by the International Potato Centre. The survey covered a random sample of 1200 farmers in Amuria. The survey modules covered demographic characteristics, education, assets, income sources, agricultural practices, information sources, and prior experience with pests, diseases, and rainfall shocks. A follow-up survey of peer farmers was conducted in October 2022, after the intervention. This survey recorded whether the peer farmer purchased quality seed, whether they saw and read the poster information, received advice from the promoter when they approached the sales point, and other post-intervention outcomes. It is important to note that the peer farmers' sample size used in the analyses is 1108, not 1200. The drop in sample size can be attributed to the absence of 92 respondents from the baseline survey in the follow-up round, resulting in an attrition rate of 7.7%. Most of these absences were due to migration, travel, or illness, rather than refusal to participate in the study.

Promoter surveys were administered after the intervention period. Their questionnaire collected information on demographics, assets, income sources, publicity

behaviour, and information networks. The field assistants also collected the sales booklets, which were used to construct promoter-level outcomes, including the counts of male and female buyers. Focus groups were conducted in 20 purposively selected villages during the follow-up period in October 2022. Villages were chosen to capture variation by treatment status, promoter gender, and seed dissemination outcomes. Separate discussions were held for male and female farmers, and each group included both buyers and non-buyers.

Focus group discussions covered six main domains: seed and vine access, awareness and perceptions of the promoted vines, purchase and non-purchase decisions, responses to the poster intervention, production and market risks, and information sources and social networks. These domains captured how farmers evaluated vine quality, trusted different seed sources, learned about the sales point, responded to poster messages, and used social networks when making seed-purchase decisions. Transcripts were first coded deductively using the discussion-guide domains and then read inductively to identify recurring explanations, contradictions, and gendered differences in responses. The coded material was then organised with guidance from Glover et al. (2019) framework of propositions, encounters, dispositions, and responses. This allowed the analysis to connect what the intervention offered, how farmers encountered it, how they interpreted it, and how they responded in purchase or non-purchase decisions. Quotes were selected when they clearly illustrated a recurrent theme, explained a quantitative result, or showed an important contrast between male and female farmers, buyers and non-buyers, or treatment and control villages.

The unit of analysis throughout the chapter is the promoter–peer dyad. Each promoter is linked to the peer farmers sampled in that promoter’s village, yielding a one-to-many dyadic structure. On average, each promoter is linked to about 9 peer farmers, producing 1,108 observations. Promoter-level variables, such as promoter gender, promoter publicity, and the number of male and female buyers, are therefore constant across all peers linked to the promoter in their village. Peer-level variables, such as poster reading, advice receipt, and purchase, vary within the promoter’s set of linked peers. The empirical structural equation models jointly handle these linked levels of observation.

2.3.5 Outcome variables and key term definitions

(i) Poster assignment (village-level treatment, 1 = Yes) is the village-level treatment determined by the RCT randomisation. Promoters in each treatment village were required to display posters at their sales points, and the assignment provides the only exogenous source of causal identification in the study.

(ii) Peer read poster (individual exposure, 1 = Yes) captures self-reported poster engagement by the peer farmer. In the follow-up survey, peer farmers were first asked: “*Do you remember coming across a poster at a sales point of sweetpotato vines with information about those vines?*” They were then asked: “*Did you read and understand the message on the poster?*” The variable equals 1 if the peer farmer reported reading and understanding the poster message, and 0 otherwise. It assesses peer farmers’ actual engagement with the information nudge. Poster reading was 19% in treatment villages and 1% in control villages. The small proportion in control villages reflects normal movement within the district during the intervention period, since farmers could visit relatives, markets, churches, social events, or other villages where treatment posters were displayed. The project could not fully restrict such movement. Post-hoc spillover tests show that proximity to treatment villages had no significant effect on purchase likelihood among control villages ($\beta = 0.022$, $p > 0.10$).

(iii) Promoter publicity (word-of-mouth on seed availability, 1 = Yes) indicates whether the promoter reported engaging in word-of-mouth outreach by proactively informing farmers in the village about seed availability. In the promoter survey, promoters were asked: “*How did most buyers know about you selling the vines?*” The response option was “*I had told them.*” The variable equals 1 if the promoter selected this option, and 0 otherwise. Promoters were not required to engage in word-of-mouth publicity as part of the intervention. Publicity was voluntary and could occur in both treatment and control villages. Therefore, promoter publicity is treated as a word-of-mouth outcome on the promoter side and a behavioural mechanism associated with seed dissemination outcomes. Its coefficient is therefore interpreted as an association rather than a causal effect. Interpersonal communication is an important spontaneous pathway through which seed availability can be promoted.

(iv) Peer received advice at sales point (1 = Yes) captures whether the peer farmer reported receiving advice from the promoter farmer about the quality-declared vines. In the

follow-up survey, peer farmers were asked: *“If you approached a sales point, did the seller provide you with information about the vines?”* The variable equals 1 if the peer farmer answered yes, and 0 otherwise.

(v) Number of female and male buyers (promoter-reported count) is the number of farmers who purchased seeds from each promoter, as recorded in the sales booklet. This measure is important because it captures whether the intervention reached women and men differently. Female farmers in sweetpotato production often face greater barriers to accessing improved seeds in Uganda (Mudege and Heck, 2019; Bayiyana *et al.*, 2025).

Throughout this thesis, peer farmers refer to all 1,108 respondents randomly sampled in the baseline survey. Buyers refer to farmers who made a purchase of quality seeds, and may include farmers who were not part of the follow-up survey sample. The intensity of female and male buyers is derived from the sales records submitted by the promoter farmers, not a count of individual-level survey responses from the peer farmer follow-up survey. When these promoter-level counts are merged into the peer dataset, the same count is repeated for 1108 respondents linked to the same promoter in their respective villages.

(vi) Peer purchased seed (peer-reported, 1 = Yes) captures whether the peer farmer purchased any quality-declared seed from the village sales point set up by promoters. In the follow-up survey, peer farmers were asked: *“Did you buy any of the improved vines that were being sold in your village in the last two seasons?”* The variable equals 1 if the peer farmer answered yes, and 0 otherwise. This is a dyad-level outcome. Overall, 42% of peer farmers purchased seed. The binary purchase decision is included in the SEM as a third outcome to provide a complete picture of adoption behaviour following the actor–partner interdependence model. The primary substantive focus is on promoter seed dissemination intensity, and the chapter interprets the buyer-count outcomes.

(vii) Control variables: the study also controls for several other factors connected to employment, personal demographics, household composition, income, asset ownership, prior vine-purchase experience and sweetpotato production experience that shape farmers' seed purchase behaviour (Appendix Table A1).

2.3.6 Empirical Methods

The Actor–Partner Interdependence Model (APIM) guides the use of Structural Equation Modelling (SEM) to examine promoter-peer dyad outcomes while accounting for the covariance among dyadic independent variables (Kenny, Kashy and Cook, 2020). In dyadic analysis, APIM distinguishes between actor effects, which capture the influence of an individual's own characteristics, and partner effects, which capture the influence of the dyadic partner's characteristics (Kenny et al., 2020). If empirically distinguishable dyad members are treated as indistinguishable, models become conceptually inappropriate and may produce misleading estimates. The first analysis, therefore, used SEM to test complete indistinguishability. The test yielded a poor fit ($\chi^2/df = 57.625$, $p < 0.001$), confirming that promoters and peers are empirically as well as conceptually distinguishable and must be modelled dyadically.

The first SEM model addresses RQ1 and hypotheses H1a–H2c by jointly estimating two word-of-mouth communication outcomes: whether a peer farmer received advice from the promoter and whether the promoter engaged in publicity. The model fit was acceptable: ($\chi^2/df = 3.71$, $p = .156$, root mean square error of approximation (RMSEA) = 0.00, comparative fit index (CFI) = 1.00, Tucker–Lewis index (TLI) = 0.971, Normed Fit Index (NFI) = 1.00). The SEM model was a multivariate regression, expressed:

$$\begin{cases} Y_{pej} = \mu_{Y_{pe}} + \alpha_{pe}male_{pej} + \alpha_{pe}Rps_{pej} + \rho_{pro}male_{proj} + \\ \rho_{pro}Ups_{proj} + \alpha_{pe}X_{pej} + \rho_{pro}X_{proj} + dH_{peproj} + \varepsilon_{pej} \\ Y_{promj} = \mu_{Y_{prom}} + \alpha_{pro}male_{proj} + \alpha_{pro}Ups_{proj} + \rho_{pe}male_{pej} + \\ \rho_{pe}Rps_{pej} + \alpha_{pro}X_{proj} + \rho_{pe}X_{pej} + dH_{peproj} + \varepsilon_{promj} \end{cases} \quad (1)$$

Where:

- Y_{pej} = is the peer farmer outcome, equal to 1 if the peer farmer received advice from the promoter in dyad j, and 0 otherwise.
- Y_{promj} = the promoter farmer outcome, equal to 1 if the promoter engaged in publicity in dyad j, and 0 otherwise.
- $male_{pej}$, $male_{proj}$ = gender indicators (1=male) for peer and promoter
- Rps_{pej} = indicates whether the peer farmer read the poster. In the study, this is an individual-level exposure or mechanism variable, not the randomised treatment.
- Ups_{proj} = indicates poster assignment at the promoter or village level
- α_{pe} = the actor effects of peer farmer characteristics on the peer advice receipt

- ρ_{pro} = partner effects of promoter characteristics on the peer advice receipt
- α_{pro} = the actor effects of promoter characteristics on the promoter publicity
- ρ_{pe} = partner effects of peer characteristics on the promoter publicity
- X_{pej}, X_{proj} = are vectors of peer and promoter control variables, including age, education, income, assets, land, and information sources
- H_{peproj} = captures heterophily between promoter and peer farmers, measured as absolute differences in education, age, income, land, and bicycle ownership
 - $\varepsilon_{pej}, \varepsilon_{promj}$ = are error terms allowed to covary, capturing unobserved interdependence between the peer and promoter outcomes

To address the second research question and hypotheses H3–H4d, the second SEM model examines what determines peer purchase and the intensity of female and male buyers reported by each promoter. It simultaneously estimates three outcomes using 1,108 observations using equation 2 below. SEM fit after setting the parameter constraints was excellent ($\chi^2/df = 5.749$; $p=.331$, root mean square error of approximation (RMSEA) = 0.01, comparative fit index (CFI) = 1.00, Tucker–Lewis index (TLI) = 0.995, Normed Fit Index (NFI) = 1.00) with RMSEA <0.012 and CFI, TLI, and NFI > 0.90. The SEM is expressed as a multivariate regression below:

$$\left\{ \begin{array}{l} Y_{pej} = \mu_{Ype} + \alpha_{pe}male_{pej} + \alpha_{pe}Rps_{pej} + \rho_{pro}male_{proj} \\ \quad + \rho_{pro}Ups_{proj} + \alpha_{pe}X_{pej} + \rho_{pro}X_{proj} + dH_{peproj} + \varepsilon_{pej} \\ Y_{promj} = \mu_{Yprom} + \alpha_{pro}male_{proj} + \alpha_{pro}Ups_{proj} + \rho_{pe}male_{pej} \\ \quad + \rho_{pe}Rps_{pej} + \alpha_{pro}X_{proj} + \rho_{pe}X_{pej} + dH_{peproj} + \varepsilon_{promj} \\ Y_{profj} = \mu_{Yprof} + \alpha_{pro}male_{proj} + \alpha_{pro}Ups_{proj} + \rho_{pe}male_{pej} \\ \quad + \rho_{pe}Rps_{pej} + \alpha_{pro}X_{proj} + \rho_{pe}X_{pej} + dH_{peproj} + \varepsilon_{profj} \end{array} \right. \quad (2)$$

Where:

- Y_{pej} is the purchase outcome of the sampled peer farmer in dyad j, equal to 1 if the peer purchased quality seed and 0 otherwise
- Y_{promj} is the intensity of male buyers from the sales booklet of the promoter linked to dyad j
- Y_{profj} is the intensity of female buyers from the sales booklet of the promoter linked to dyad j
- μ_{Ype}, μ_{Yprom} and μ_{Yprof} are intercepts for the peer purchase, male buyer intensity, and female buyer intensity equations
- $male_{pej}, male_{proj}$ = gender indicators (1=male) for peer and promoter

- Rps_{pej} = indicates whether the peer farmer read the poster. In the study, this is an individual-level exposure or mechanism variable, not the randomised treatment.
- Ups_{proj} = indicates poster assignment at the promoter or village level
- α_{pe} = the actor effects of peer farmer characteristics on the peer advice receipt
- ρ_{pro} = partner effects of promoter characteristics on the peer advice receipt
- α_{pro} = the actor effects of promoter characteristics on the promoter publicity
- ρ_{pe} = partner effects of peer characteristics on the promoter publicity
- X_{pej}, X_{proj} = are vectors of peer and promoter control variables, including age, education, income, assets, land, and information sources
- H_{peproj} = captures heterophily between promoter and peer farmers, measured as absolute differences in education, age, income, land, and bicycle ownership
- $\varepsilon_{pej}, \varepsilon_{promj}, \varepsilon_{profj}$ = are allowed to covary, capturing unobserved interdependence across purchase and buyer-intensity outcomes

Supplementary fixed-effects logistic regressions for binary outcomes and negative binomial regressions for count outcomes were estimated with standard errors clustered at the village level (Appendix Tables A6, A8 and A9). Some treatment effects that are significant in the SEM become weaker once village clustering is imposed, but the substantive pattern of results remains similar.

2.4 Results

2.4.1 Descriptive statistics

Table 2 shows that female promoters reported a higher number of male and female quality seed buyers, with an average of 7.82 compared to 5.96 for male promoters, a difference significant at the 1% level. In the treatment group, the number of female quality seed buyers was 5.25, and that of male quality seed buyers was 6.85. Female promoters reported being more involved in publicity than their male counterparts. Promoters in the control group reported higher publicity than those in the treatment group. The results suggest that poster assignment may have substituted for interpersonal communication.

The Mann-Whitney U test revealed heterophilic ties between promoter farmers and quality seed buyers (Table A4 in the Appendix). The results show that, compared to peer farmers who purchased quality seeds, promoter farmers exhibit characteristics such as being older, having higher levels of education, operating larger farms, and possessing

higher farm and off-farm employment income. These characteristics indicate that promoter farmers have higher socioeconomic status than their peer farmers across multiple dimensions. The results are consistent with the heterophilic promoter profiles documented by Fisher et al. (2018).

Table 2: Descriptive statistics for buyer intensity, peer purchase, and information outcomes by promoter gender and poster assignment (N=1108)

Variable	Female promoter Mean (SD)	Male Promoter Mean (SD)	T-stat	Control Mean (SD)	Treatment (poster) Mean (SD)	T-stat
Number of female buyers per sales record	7.82 (4.33)	5.96 (3.84)	7.01***	7.87 (4.15)	5.25 (3.57)	11.31***
Number of male buyers per sales record	7.48 (4.04)	7.51 (4.20)	0.08	8.22 (3.97)	6.85 (4.21)	5.54***
Total buyers per sales record	18.59 (6.59)	17.00 (7.62)	3.24***	18.59 (6.59)	15.67 (7.67)	8.78***
Peer purchased seed (peer-reported, binary)	0.49 (0.50)	0.41 (0.49)	2.36**	0.42 (0.49)	0.41 (0.49)	0.68
Peer read poster (yes = 1)	0.10 (0.30)	0.11 (0.31)	0.41	0.01 (0.09)	0.11 (0.31)	10.45***
Peer received advice at sales point (yes = 1)	0.37 (0.48)	0.34 (0.48)	0.70	0.34 (0.47)	0.34 (0.48)	0.77
Promoter publicity (word-of-mouth on seed availability, 1 = Yes)	0.62 (0.49)	0.56 (0.50)	1.89*	0.67 (0.47)	0.56 (0.50)	6.34***

*Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The female and male columns compare outcomes by promoter gender. The control and treatment columns compare village-level poster assignment. Number of buyers outcomes are promoter-level sales-record counts and include buyers outside the peer survey sample; these counts are repeated for all sampled peer farmers linked to the same promoter.*

Peer farmers reported limited prior exposure to quality sweetpotato seeds. Farmers typically use seeds saved from their own harvest, obtained from neighbours, or purchased from local markets, favouring local varieties they consider high-yielding. The qualitative findings show that the perceptions and motivations regarding quality seeds differ for male and female farmers. Female farmers prioritise food security and perceive the relational framing of quality seeds in the information nudges as solutions to the declining productivity of local seeds. They also noted from the information that quality seeds are pest-resistant and early maturing, and could help them manage hunger during drought periods. Conversely, men tended to relate the information on quality seeds presented in the nudges

to economic benefits, such as market returns from larger and healthier yields. Male farmers viewed posters as a reliable source of information.

The posters reinforced the farmers' trust in the quality seeds' performance, and they were clear about the expected outcome of higher yield and food security. A female participant noted, *“These photos of the improved roots have given us hope.”* Images indicating high yields in large bags resonated with farmers' economic aspirations, connecting the quality seeds to marketability and profitability. Women valued relatable imagery on posters depicting successful and happy female farmers. These visuals provided both inspiration and a sense of relatability, aligning with their aspirations for improved food security and welfare. Despite their utility, female farmers made observations that posters lacked practical agronomic details. One participant highlighted this limitation, stating, *“The poster shows results, but not how to achieve them.”*

2.4.2 Gender, information nudge, and word-of-mouth communication

Table 3 provides SEM estimates testing H1a–H1c and H2a–H2c using Equation 1. The model jointly estimates word-of-mouth communication outcomes: advice receipt (peer received advice at sales point, 1 = Yes) and promoter publicity (word-of-mouth on seed availability, 1 = Yes). The main finding is that gender is not significantly associated with word-of-mouth communication, while peer-reported poster reading is associated with advice receipt.

Neither promoter gender, peer gender, nor gender homophily is significantly associated with peer advice receipt or promoter publicity, controlling for dyadic characteristics. Hypotheses H1a, H1b, and H1c are therefore not supported. This null result suggests that gender homophily does not drive word-of-mouth communication in the quality seed dissemination market. However, other dyadic socioeconomic differences are significant (Appendix Table A5), including farm income, education, and bicycle ownership. Turning to the information nudge, poster assignment is positively associated with promoter publicity ($\beta = 0.10$, $p < 0.10$), providing weak support for H2a. However, the result shows some fragility and is not robust across specifications. The models assessing publicity and advice receipt separately did not yield statistically significant results in the clustered logit models reported in Appendix Table A6. The clustered logit models adjust standard errors for clustering at the village level. In contrast, SEM estimates the advice and publicity equations jointly and allows their error terms to covary.

Table 3: Gender, poster nudges, and word-of-mouth communication outcomes

	Received advice, peer-reported (1 = Yes)		Promoter publicity, promoter-reported (1 = Yes)	
	B(SE)	Std. β	B(SE)	Std. β
Promoter-level variables				
Poster assignment (village-level treatment, 1 = Yes)	-0.04 (0.06)	-0.05	0.10† (0.05)	0.10
Promoter gender (1 = male)	-0.03 (0.06)	-0.02	0.07 (0.06)	0.06
Promoter male $\times$ poster assignment	0.02 (0.06)	0.02	-0.33*** (0.06)	-0.33
Peer-level variables				
Peer read poster (individual-level exposure, 1 = Yes)	0.35*** (0.08)	0.22	0.04 (0.08)	0.02
Peer gender (1 = male)	0.06 (0.06)	0.06	-0.04 (0.05)	-0.04
Peer male $\times$ peer read poster	-0.11 (0.10)	-0.062	-0.06 (0.09)	-0.03
Gender homophily				
Peer male $\times$ promoter male	0.02 (0.06)	0.02	0.07 (0.06)	0.07
N	1,108		1,108	

† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. SEM estimates are from Equation 1. Full estimates with controls are reported in Appendix Table A5. Robustness checks using clustered logit models are reported in Appendix Table A6. In the peer-reported advice column 1, promoter-level variables are partner effects, and peer-level variables are actor effects. In the promoter-reported publicity column 2, promoter-level variables are actor effects, and peer-level variables are partner effects. Promoter publicity was voluntary and is interpreted as an association rather than a causal effect.

Peer farmers' poster reading is positively associated with advice receipt ($\beta = 0.22$, $p < 0.001$), supporting H2b. The results are consistent across the other specifications used. FGDs indicate that poster reading generated curiosity and triggered peer farmers' interactions with promoters. Male farmers identified the promoter qualities most valued during interpersonal communication as “hard-working,” “trustworthy,” and “knowledgeable,” showing a preference for reliability and competence. They also mentioned qualities like “good character,” “approachable,” and “supportive nature,” underscoring the importance of integrity and assistance in building trust: “Yes, he has good communication skills and knows how to coordinate with many people.” Female farmers mentioned similar attributes, with trust extending beyond technical explanations to include interpersonal qualities such as humility and approachability. A female respondent remarked, “I trusted the salesperson because he is a humble person and will tell you something that benefits you too.” Inadequate knowledge and poor storage practices reduced farmers' confidence in promoters. A female farmer noted, “I went to ask the salesperson about the vines; he told me he also doesn't know much about them.” This suggests that promoters should be well-informed and credible to facilitate effective encounters with peer farmers.

The interaction between being a male promoter and poster assignment is negative and statistically significant ($\beta = -0.33$, $p < 0.001$), supporting H2c. However, the direction of the effect indicates that poster assignment is associated with lower publicity among male promoters. The results suggest that, for male promoters, posters may substitute for interpersonal communication rather than complement it.

2.4.3 Gender, word of mouth, and information nudge in seed dissemination

Table 4 presents SEM estimates for hypotheses H3a–H4d using Equation 2. The female and male quality seed buyers outcomes are promoter-level sales record counts allocated to all sampled peers linked to the same promoter within each village. The key finding is that gender and the information nudge are associated with purchase intensity differently across female and male quality seed buyers' outcomes. Male promoters are negatively associated with female buyers' intensity ($\beta = -0.23$, $p < 0.001$) and positively associated with the intensity of male buyers ($\beta = 0.11$, $p < 0.10$), supporting H3a. The qualitative evidence suggests that trust and familiarity may help explain this gender pattern. Some female farmers expressed lower trust in male promoters when they did not know them. A participant commented, *“I didn’t trust him because I didn’t know the person who was selling the vines.”* In contrast, female promoters were described as more approachable in female farmers' FGDs: *“It was easier for me to reach and talk to her and by the fact that the organisation had chosen to entrust her with the vines, we also had no issues trusting her.”*

Peer gender is not significantly associated with the intensity of male and female buyers, so H3b is not supported. Promoter–peer gender homophily is also insignificant, and H3c is not supported. These null results are consistent with the word-of-mouth findings; gender homophily does not predict information and seed dissemination outcomes. However, other dyadic differences matter. Socioeconomic distance in farm income, sweetpotato land, education, bicycle ownership, and information access from neighbours is associated with buyer intensity (Appendix Table A7 and Table A9). The results, therefore, point to gendered promoter effects and socioeconomic heterophily, rather than gender homophily, as the relevant variables in seed dissemination.

Table 4: Gender, poster nudges, and word-of-mouth communication as predictors of buyer intensity and peer purchase

Variable	Number of Female buyers		Number of Male buyers		Peer purchased seed	
	B(SE)	Std. β	B(SE)	Std. β	B(SE)	Std. β
Promoter-level variables						
Poster assignment (village-level treatment, 1 = Yes)	-4.70*** (0.73)	-0.58	-1.13† (0.68)	-0.14	0.10 (0.09)	0.11
Publicity (promoter-reported), 1 = Yes)	0.70 (0.56)	0.09	-3.28*** (0.58)	-0.39	0.01 (0.07)	0.01
Promoter gender (1 = male)	-2.04*** (0.62)	-0.23	1.04† (0.62)	0.11	0.04 (0.08)	0.04
Promoter male × poster assignment	2.99*** (0.75)	0.36	-2.08** (0.63)	-0.25	-0.16† (0.09)	-0.16
Poster assignment × promoter publicity	-0.05 (0.49)	-0.01	2.09*** (0.52)	0.22	-0.11† (0.06)	-0.10
Promoter male × promoter publicity	-1.26** (0.49)	-0.15	1.20* (0.51)	0.14	-0.07 (0.06)	-0.07
Peer-level variables						
Peer read poster (individual exposure, 1 = Yes)	-1.07 (2.24)	-0.08	-5.76* (2.36)	-0.42	0.03 (0.28)	0.02
Peer gender (1 = male)	-0.09 (0.62)	-0.01	-0.20 (0.61)	-0.03	-0.02 (0.08)	-0.02
Peer received advice at the sales point (1 = Yes)	0.48 (0.63)	0.06	-0.83 (0.66)	-0.10	0.14† (0.08)	0.14
Peer male × peer read poster	0.05 (0.77)	0.00	-0.28 (0.81)	-0.02	0.00 (0.10)	0.00
Peer received advice × peer male	-0.82† (0.46)	-0.09	0.60 (0.49)	0.06	-0.12* (0.06)	-0.10
Peer received advice × peer read poster	0.34 (0.74)	0.02	0.73 (0.77)	0.04	-0.08 (0.09)	-0.04
Gender homophily						
Peer male × promoter male	-0.12 (0.66)	-0.02	-0.73 (0.56)	-0.09	-0.11 (0.08)	-0.11
Information exposure dyad						
Poster assignment × peer read poster	1.37 (1.86)	0.10	4.64* (1.95)	0.34	0.26 (0.23)	0.16
N	1,108		1,108		1,108	

† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Full estimates with controls are reported in Appendix Table A7. Clustered and fixed-effect robustness checks are reported in Appendix Tables A8–A9. The peer purchase outcome is a peer-reported binary indicator from the follow-up survey. The number of female and male buyer outcomes are promoter-level sales-record counts and may include buyers outside the peer survey sample; these counts are repeated for each sampled peer linked to the same promoter. Promoter variables are actor effects in the number of buyers equations and partner effects in the peer-reported purchase equation. Peer variables are partner effects in the number of buyers equations and actor effects in the peer-reported purchase equation. Promoter publicity is voluntary and is interpreted as an association.

Contrary to hypothesis H4a, information nudge using posters was negatively associated with the number of female buyers ($\beta = -0.58$, $p < 0.01$) and the number of male buyers ($\beta = -0.14$, $p < 0.10$). The results support an association between poster assignment and buyer intensity, but in the opposite direction to the expected positive effect. This

negative association is consistent with the fixed effect models reported in Appendix Tables A8 and A9. Several themes emerged from the qualitative discussions that may explain the large, negative, and counterintuitive nudge effects on female quality seed buyers' intensity. Female farmers indicated a preference for detailed instructions and one-on-one discussions. Promoters' guidance was important in helping peer farmers make informed decisions regarding the correct use of fertilisers, spacing, and other agronomic practices to accompany the quality seeds. Female farmers also noted the difficulty of balancing household needs with investment in improved seed varieties. As one respondent stated, "Many do not have money to buy the vines." This financial strain limits female farmers' ability to translate the interest generated by the information nudges into action.

Risk perception and experience were other determinants of farmers' dispositions. Concerns regarding drought, pests, and soil compatibility were recurring in female farmers' statements. Farmers viewed these factors as threats to the benefits promised by improved vines, which influenced their purchase decisions. A farmer remarked, "*If the rain fails, it's a big loss with these vines.*" Past experiences have also shaped these perceptions, with farmers recounting trials with improved seeds that did not meet expectations. For instance, one participant shared, "*I planted once and didn't get results, so I am skeptical.*"

Peer poster reading is negatively associated with the intensity of male quality seed buyers ($\beta = -0.42$, $p < 0.05$) and is not statistically significant in the intensity of female quality seed buyers' outcomes. H4b is therefore partially supported. This finding should be interpreted alongside the peer purchase outcome in column 3, where advice received at the sales point is positively and statistically significantly associated with the probability of peer farmers reporting purchase ($\beta = 0.14$, $p < 0.05$). Poster engagement also increased advice-seeking, but did not translate into an increase in the intensity of male buyers. One interpretation is that poster engagement encouraged questions and scrutiny rather than an immediate purchase decision among male peer farmers. FGD participants expressed some scepticism about the poster message, such as "*I did not also believe it because posters are like cameras and computers; they exaggerate by selecting only healthy and big, beautiful potatoes and leaving out ugly ones.*" Concerns about source credibility and incomplete information were also evident. Participants noted "*the poster did not tell us where the organisation was located. We did not know the organisation, nor where they stay,*" and "*I first need to see the similarity between what is on the poster and the real vines produced.*" These responses suggest that posters may stimulate engagement, but trust in

the seed source and verification of the promoted vines remain important for purchase decisions.

The interaction between being a male promoter and poster assignment is significant; H4c is therefore supported, but the moderation differs by buyer gender. For the intensity of female quality seed buyers, the interaction term is positive ($\beta = 0.36$, $p < 0.001$). The net effect suggests that poster assignment reduces, but does not reverse, the negative association between poster assignment and female quality seed buyers intensity when the promoter is male. It is plausible that posters provide a visible information cue that partly reduces the communication barrier in cross-gender dyads' interactions. For male peers, the interaction term is negative ($\beta = -0.25$, $p < 0.01$). Poster assignment is associated with a stronger reduction in male buyer intensity when the promoter is male.

Before turning to H4d, it is useful to interpret the individual association of promoter publicity and its interaction with promoter gender. Publicity is not significantly associated with the intensity of female quality seed buyers ($\beta = 0.09$, $p > 0.10$) but is negatively associated with male buyers' intensity ($\beta = -0.39$, $p < 0.001$). This suggests that interpersonal communication by the promoter alone did not increase male quality seed buyers. One explanation is that promoter publicity made some male farmers more attentive to the risks and costs of purchasing quality seed, including concerns about deception, recycled vines, and the need for complementary inputs. One male farmer explained: *"They bring huge losses because these vines anyone else can bring and say the vines are improved, and yet it is recycled several times and brings losses. I also accept that it needs insecticides and such things, and yet we do not have money for such; they will bring losses, and yet for us the local ones do need fertilisers and insecticides."* The interaction between publicity and male promoter gender is positive for male buyer intensity ($\beta = 0.14$, $p < 0.05$). For female quality seed buyers' intensity, the interaction between promoter publicity and male promoter gender is negative ($\beta = -0.15$, $p < 0.05$).

Moving to H4d, the interaction between poster assignment and publicity is positive and significant for male quality seed buyers' intensity ($\beta = 0.22$, $p < 0.001$). The results suggest that the joint presence of posters and publicity in part offsets these negative associations. The finding is consistent with evidence that multi-channel exposure enhances agricultural technology uptake (Beaman et al., 2021). However, no complementarity is observed for female buyers. H4d therefore receives mixed support and

is supported only for male quality seed buyers. Robustness models are more consistent with complementarity between interpersonal communication and poster engagement. In the county fixed-effect models, advice received at the sales point is negatively associated with male buyer intensity alone. The interaction between advice receipt and poster reading is positive and significant ($\beta = 0.212$, $p < 0.05$). The results suggest that posters and interpersonal advice may work better together than separately for male farmers.

Beyond the hypothesised effects, the dyadic SEM reveals an additional finding for male buyer intensity. Poster assignment alone is negatively associated with male buyer intensity ($\beta = -0.14$, $p < 0.10$), and peer poster reading is also negatively associated with male buyer intensity ($\beta = -0.42$, $p < 0.05$). However, the interaction between poster assignment and peer poster reading is positive ($\beta = 0.34$, $p < 0.05$). The results imply that poster assignment and actual exposure to the nudge work differently when modelled together. Assignment captures the intention-to-treat estimate of the poster nudge, while peer poster reading captures actual exposure to the nudge. Models that use treatment assignment alone as a proxy for nudge exposure would miss this distinction. A male farmer quote captures how this process unfolded: "*There was a poster showing sweetpotatoes, so even if you passed on the main road, you could see it, and it would attract you. You go and read, then ask the salesperson, then he told me about all the vines, then after that you select the vines. So, I decided to buy the vines*".

2.5 Discussion

2.5.1 Gender, information nudge, and word-of-mouth communication

Gender homophily in farmer-to-farmer extension has been shown to be important for information diffusion in conservation agriculture (Kondylis *et al.*, 2016; BenYishay *et al.*, 2020). However, this study found no evidence that promoter–peer dyad gender was associated with word-of-mouth communication after accounting for socioeconomic heterophily in advice receipt and publicity in quality seed dissemination. Farm and non-agricultural income dissimilarity were associated with peer advice receipt, while education and bicycle-ownership heterophily were weakly associated with promoter publicity. This implies that selecting promoters based on gender matching alone may be insufficient if heterophily in socioeconomic characteristics of the dyad is not considered.

Farmer-to-farmer interpersonal communication is important in areas with limited access to government extension agents and language barriers (Martini, Roshetko & Paramita, 2017). This chapter shows that poster exposure encouraged peer farmers to seek advice from promoters at the sales point, while poster assignment was associated with promoter publicity, albeit weakly. Behavioural nudges can therefore widen information reach in social learning networks at low cost. However, male promoters who used posters were less likely to engage in publicity. BenYishay et al. (2020) identified gender differences in promoter effort but did not examine the role of information tools such as nudges. Social role theory offers a plausible explanation: men's communication tends to be instrumental and task-focused rather than relational (Eagly, Wood and Diekmann, 2000; Eagly, 2013). Male promoters may have interpreted the poster as fulfilling part of their promotional role, reducing the need for additional publicity. The association between poster assignment and male promoter publicity was not fully robust across all model specifications, consistent with the mixed and null effects documented in the agricultural nudge literature. (Balew et al., 2023; Fabregas et al., 2025; Okello et al., 2023).

The study found that peer farmers reading the information nudge is associated with a higher probability of reporting that they received advice. Qualitative data indicate that information nudges trigger curiosity, facilitating interpersonal interactions. For example, farmers reported that visual comparisons of healthy versus diseased crops prompted them to ask promoters specific questions about seed quality and management practices. Peer farmers reported that they value support and advice from promoters in understanding the technologies. Poster nudges may therefore serve as low-cost, non-coercive tools for strengthening advice-seeking behaviour in social learning.

2.5.2 Gender, word of mouth, and information nudge in seed dissemination

This chapter also assesses the role of promoter-peer gender, nudges, and their interactions in the dissemination of quality seed. Contrary to expectations, information nudges reduced purchase intensity by a large and statistically significant margin among female farmers, with implications for policy and practice in improving access to quality inputs. Information nudges, as policy tools, do not always yield the expected results. For example, in another context, Sasaki, Saito and Ohtake (2022) found that comparison and influence-loss nudges support COVID-19 vaccination uptake among older adults but have no effect on young adults. The point is not that nudges fail universally, but that their

outcomes depend on the audience, context, and the pathway through which the message is received.

The negative result can be explained by qualitative evidence showing that female farmers perceived quality seeds as costlier and requiring more care than recycled seeds. First, structural constraints limited female farmers' exposure to and engagement with the nudge. Female farmers reported sending family members to purchase seeds on their behalf, meaning posters at sales points may not have reached them directly. Restrictive gender norms continue to shape women's economic roles, restricting their mobility and interactions in public spaces and thereby constraining their opportunities (Farnworth *et al.*, 2024). Although women constitute the majority of the agricultural producers, their access to information on modern farming innovations is limited due to movement and interactions outside the home (Mudege *et al.*, 2017; Kramer and Trachtman, 2024). The pattern suggests that posters alone could not overcome the structural constraints that shape women's participation in seed markets.

A second explanation is that the poster's framing may have produced a cautious response among female farmers. Female farmers expressed a preference for detailed instructions and one-on-one discussions with extension officers, indicating that simplified visual messages cannot substitute for personalised guidance before adoption decisions. The poster's comparative message framing, contrasting healthy and diseased crops, may have triggered caution rather than purchase motivation, especially where farmers were already familiar with weevil damage in Uganda (Yada *et al.*, 2023). Third, female farmers reported limited decision-making autonomy over seed purchases, including husbands and children in the process. This aligns with evidence on intra-household bargaining in agricultural contexts, where male-controlled budgets constrain women's agricultural decisions (Quisumbing *et al.*, 2021). The mechanisms suggest that the negative nudge effect on female farmers is not simply a matter of information deficit but reflects deeper structural and cognitive barriers that information-only interventions cannot address.

Male promoters were associated with a decrease in the intensity of female buyers. Female farmers often described female promoters as more approachable and easier to trust, while accounts of interaction with male promoters were more guarded. Some sales points were also located at promoters' homes, which may have increased the social costs of cross-gender interaction. In many contexts, sweetpotato cultivation is traditionally

associated with women. Thus, the findings may signify male promoters' low effort in reaching female farmers. Shikuku (2019) noted that female promoters made more sustained efforts to connect with peers. Male farmers participating in the FGDs provided detailed descriptions of the assistance they received from the promoter farmers, contrasting with the brief accounts by female farmers. They received detailed explanations of the varieties, with communication styles adapted to convey technical information, including written variety names and pricing strategies. The accounts show that farmer-to-farmer extension may be inconsistently applied, with female farmers receiving less intensive professional interactions than their male counterparts. Indeed, male and female farmers' perceptions of access to and use of agricultural advisory services differ, underlining the need for gender-inclusive approaches (Lamontagne-Godwin *et al.*, 2019).

For female buyer intensity, the interaction between male promoter status and poster assignment partly offsets the negative association between male promoters and female buyer intensity. The results do not imply that poster-based nudges solved the cross-gender dissemination challenge. Rather, posters may have provided a neutral information anchor that made conversation easier where direct trust in the promoter was limited. While posters alone may lead to quick, heuristic responses, discussion with the promoter enables more deliberative information processing, consistent with dual-process theory (Strack and Deutsch, 2004; Kahneman, 2011). Following the literature, the poster may have served as a conversation starter rather than a standalone persuasion tool. This suggests that low-cost information tools may support female farmers' decision-making when they are embedded in cross-gender interpersonal interactions.

For male buyer intensity, the pattern is different. Peer poster reading is negatively associated with male buyer intensity, and promoter publicity alone is also negatively associated with male buyer intensity. However, the interaction between poster assignment and promoter publicity is positive and significant for male buyer intensity. Neither channel works well on its own for male buyer intensity, but the combination of visual information and interpersonal communication is more promising. Male farmers may have responded more positively when a promotional explanation reinforced the poster's broad awareness function. A further finding relates to the distinction between treatment assignment and actual engagement with the nudge. Treatment assignment alone, where the promoter displayed a poster, and actual peer engagement, where the peer read the poster, were both negatively associated with male buyer intensity. However, when both sides of the dyad

engage with the poster, the interaction term is positive, partially compensating for these negative associations. This distinction has rarely been examined in agricultural nudge studies, where treatment assignments are often used as a proxy for exposure.

The result suggests that assignment to a poster village does not necessarily mean that farmers engage with the poster. It also demonstrates why distinguishing between treatment assignment and actual exposure matters in seed dissemination settings. Poster nudges provide broad awareness through a low-richness channel, while interpersonal encounters provide nuanced persuasion through a high-richness channel. When both channels operate together within the dyad, they complement each other. This is also consistent with innovation diffusion theory, where different communication channels perform separate roles, and interpersonal sources are especially important for persuasion (Rogers, 1995). Learning through multiple channels enhances adoption (Beaman *et al.*, 2021). The implication is that interventions combining poster information nudges with interpersonal communication should distinguish between assignment and actual engagement, rather than assuming that treatment exposure automatically translates into behavioural response.

Appendices A: Chapter Two

Figure A1: Promoter selection criteria

- A salesperson must meet the following selection criteria. A salesperson should:
- Be a resident of the given village
 - Be able to read and write English and the popular local language (Ateso/Luo) of the respective villages
 - Have participated in development activities in the community and/or collaborated with agricultural office at any level
 - Be interested in agriculture-related activities
 - Be easily reachable by community members and have higher levels of trust and honesty.
 - Not be employed at any level and not a leader/politician in the community.
 - Have not taken part in the baseline survey conducted earlier in November 2021.

Figure A2: Poster



Note: The poster emphasised that using quality seeds will reverse the sharp decline in yield (exemplified by thin roots) that farmers reported experiencing during the study design phase, and the bumper harvest would result in surplus (after domestic use and sale) that is converted into amukeke (the dried chips) for off-season use. At the time of designing the study, farmers were dealing with an outbreak of whitefly pests in the district and therefore could relate to what the poster portrayed. These losses combined were designed to activate feelings of loss aversion.

Table A1: Source and level of measurement for key variables

Variable/group of variables	Example variables	Source	Level of measurement	Interpretation/use in thesis
Peer farmer demographics	Peer gender, age, education, literacy, marital status, relationship to household head	Peer farmer follow-up survey	Individual peer farmer	Describes the sampled peer farmer/respondent. Used as peer-level actor characteristics in dyadic models.
Promoter demographics	Promoter gender, age, education, literacy, marital status, primary occupation	Promoter farmer questionnaire	Individual promoter farmer	Describes the promoter farmer. Used as a promoter-level actor or partner characteristics, depending on the outcome.
Household composition	Household size, household head gender, household members living/eating together	Peer farmer survey and promoter farmer questionnaire	Household	Describes the household context of the peer or promoter, not only the individual respondent.
Household land resources	Total cultivable land, land under sweetpotato, own/rented/borrowed sweetpotato land	Peer farmer survey and promoter farmer questionnaire	Household/farm household	Measures land resources available to the farmer's household. Used as socioeconomic controls and heterophily measures.
Household income	Agricultural employment income, non-agricultural employment income, farm income, business income	Peer farmer survey and promoter farmer questionnaire	Household	Refers to household income sources, not only the personal income of the respondent. Used as resource-position controls and socioeconomic heterophily measures.
Household assets	Bicycle, radio, phone, motorcycle, ox plough, spray pump, wheelbarrow, water pump	Peer farmer survey and promoter farmer questionnaire	Household	Captures household asset ownership. Bicycle ownership is also used as an access/resource variable.
Sweetpotato production experience	Sweetpotato growing frequency, varieties planted, sweetpotato land, years growing sweetpotato	Peer farmer survey and promoter farmer questionnaire	Farmer/household farm	Captures production experience and sweetpotato involvement of the farmer or promoter household.

Variable/group of variables	Example variables	Source	Level of measurement	Interpretation/use in thesis
Prior vine-purchase experience	Ever purchased vines, frequency of purchase, quantity normally purchased	Peer farmer survey	Individual peer farmer/household farming decision	Measures previous exposure to purchased planting material, used as a peer-level control.
Peer awareness of vine sales	Awareness of vines sold in one's own village or another village is a source of awareness	Peer farmer survey	Individual peer farmer	Measures whether and how the peer farmer learned about seed availability.
Peer purchase outcome	Peer reported buying improved vines in the last two seasons	Peer farmer survey	Individual peer farmer/dyad-level outcome	Used as the peer-reported binary purchase outcome in Chapter 2 and as the basis for identifying recorded versus unrecorded purchases in Chapter 3.
Peer transaction details	Whether the buyer left contact/details at the sales station	Peer farmer survey	Individual buyer	Used in Chapter 3 to distinguish buyer willingness/information from promoter-side recording behaviour.
Peer poster exposure	Remembered seeing the poster, and read and understood the poster message	Peer farmer survey	Individual peer farmer	Measures actual peer engagement with the information nudge, distinct from village-level assignment.
Peer advice receipt	The seller provided information about vines when the peer approached the sales point.	Peer farmer survey	Individual peer farmer/dyad-level communication outcome	Used as the peer-side word-of-mouth outcome in Chapter 2 and as an explanatory variable in purchase models.
Promoter publicity	The promoter reported that buyers knew about sales because “I had told them”	Promoter farmer questionnaire	Individual promoter farmer	Measures voluntary promoter-side word-of-mouth outreach. Interpreted as an association, not a causal treatment effect.
Poster assignment	The village is assigned to the poster treatment	Project/intervention assignment	Village/promoter sales point	Measures randomised treatment assignment. Interpreted as the intention-to-treat poster nudge.
Promoter sales-record buyer intensity	Number of female buyers, number of male buyers, total buyers	Sales booklet	Promoter-level count	Captures total buyer reach per promoter. Counts may include buyers outside the 1,108 sampled peer farmers and are repeated for peers linked to the same promoter.
Unreported buyer counts	Unreported female buyers, unreported male buyers, total unreported buyers	Cross-check of peer self-reports	Promoter-level count	Measures purchases reported by sampled peers but missing from the promoter sales record. Used as Chapter 3 monitoring/recording outcomes.

Variable/group of variables	Example variables	Source	Level of measurement	Interpretation/use in thesis
		and promoter sales records		
Purchase recorded	Whether a peer-reported purchase appears in the promoter sales record	Peer survey matched to sales record	Buyer/dyad-level binary	Measures whether a sampled buyer's transaction was recorded. Estimated only among peer farmers who reported purchasing vines.
Gender homophily	Peer male × promoter male	Constructed from peer and promoter gender	Dyad-level	Captures same-gender male dyad interaction.
Socioeconomic heterophily	Differences in education, income, land, bicycle ownership, and information-source use	Constructed from peer and promoter variables	Dyad-level	Measures socioeconomic distance between peer and promoter farmers.
Information-exposure dyad variables	Poster assignment × peer read poster; promoter publicity × peer read poster; peer advice × poster assignment	Constructed interaction terms	Dyad-level	Captures whether information exposure or communication operates jointly across the promoter–peer dyad.

Table A2: Descriptive characteristics of the promoter and peers by treatment

Variable	Overall	Control	Treatment	t-stat
Promoter publicity (word-of-mouth on seed availability, 1 = Yes)	0.72 (0.45)	0.67 (0.47)	0.49 (0.50)	6.34***
Education (years), promoter	8.13 (3.51)	8.58 (3.52)	7.72 (3.44)	4.13***
Age (years), promoter	44.04 (12.98)	44.29 (12.73)	43.81 (13.20)	0.61
Agricultural employment income (000000), promoter	0.29 (0.46)	0.26 (0.40)	0.32 (0.51)	2.05**
Farm income (000000), promoter	0.90 (0.83)	0.99 (0.83)	0.83 (0.83)	3.18***
Non-agricultural income (000000), promoter	0.42 (0.66)	0.55 (0.80)	0.30 (0.46)	6.63***
Sweetpotato land (acres), promoter	0.99 (0.50)	1.00 (0.50)	0.98 (0.50)	0.57
Bicycle ownership (1 = Yes), promoter	0.79 (0.41)	0.81 (0.40)	0.78 (0.41)	1.05
Neighbours as agricultural information source (1 = Yes), promoter	0.78 (0.42)	0.73 (0.44)	0.82 (0.39)	3.40***
Distance to road (minutes), promoter	17.82 (19.29)	19.17 (21.17)	16.61 (17.36)	2.21**
Peer read poster (individual exposure, 1 = Yes)	0.10 (0.31)	0.01 (0.09)	0.19 (0.39)	10.45***
Peer gender (1 = male)	0.59 (0.49)	0.61 (0.49)	0.58 (0.49)	0.78
Peer received advice at sales point (1 = Yes)	0.35 (0.48)	0.34 (0.47)	0.36 (0.48)	0.77
Learned seed availability from villagers (1 = Yes)	0.55 (0.50)	0.53 (0.50)	0.57 (0.50)	1.27
Learned seed availability from LC chair (1=Yes)	0.11 (0.31)	0.12 (0.32)	0.10 (0.30)	0.85
Age (years), peer	41.87 (16.26)	41.78 (16.06)	41.94 (16.46)	0.16
Education (years), peer	5.88 (3.75)	5.91 (3.84)	5.86 (3.67)	0.19
Bicycle ownership (1 = Yes), peer	0.62 (0.48)	0.64 (0.48)	0.61 (0.49)	0.97
Agricultural employment income (000000), peer	0.10 (0.32)	0.10 (0.26)	0.11 (0.37)	0.61
Farm income (000000), peer	0.86 (1.39)	0.85 (1.54)	0.87 (1.25)	0.30
Non-agricultural income (000000), peer	0.30 (1.17)	0.29 (1.27)	0.30 (1.08)	0.02
Neighbours as agricultural information source (1 = Yes), peer	0.29 (0.45)	0.27 (0.45)	0.30 (0.46)	1.07
Sweetpotato land (acres), peer	0.60 (3.02)	0.70 (4.38)	0.50 (0.43)	1.08
Ever purchased vines (1=yes), peer	0.75 (0.43)	0.75 (0.43)	0.76 (0.43)	0.30
Past disease experience (factor), peer	0.03 (1.01)	0.07 (1.02)	0.00 (1.00)	1.06
Past erratic rain experience (factor), peer	-0.03 (1.01)	-0.04 (1.01)	-0.02 (1.01)	0.35

*p<0.1, **p<0.05, ***p<0.01

Table A3: Descriptive characteristics of the promoter and peers by promoter gender

	Female	Male	T-stat
Promoter publicity (word-of-mouth on seed availability, 1 = Yes)	0.62 (0.49)	0.56 (0.50)	1.89*
Education (years), promoter	6.60 (3.79)	8.73 (3.19)	9.46***
Age (years), promoter	41.85 (12.03)	44.90 (13.24)	3.54***
Agricultural employment income (000000), promoter	0.25 (0.44)	0.31 (0.47)	1.93*
Farm income (000000), promoter	0.85 (0.71)	0.92 (0.88)	1.28
Non-agricultural income (000000), promoter	0.60 (0.97)	0.35 (0.47)	5.94***
Sweetpotato land (acres), promoter	0.94 (0.37)	1.01 (0.55)	1.98**
Bicycle ownership (1 = Yes), promoter	0.68 (0.47)	0.84 (0.37)	5.86***
Neighbours as agricultural information source (1 = Yes), promoter	0.67 (0.47)	0.82 (0.39)	5.57***
Distance to road (minutes), promoter	18.99 (18.34)	17.36 (19.64)	1.27
Peer read poster (individual exposure, 1 = Yes)	0.10 (0.30)	0.11 (0.31)	0.41
Peer gender (1= male)	0.57 (0.50)	0.60 (0.49)	1.15
Peer received advice at the sales point (1 = Yes)	0.37 (0.48)	0.34 (0.48)	0.70
Learned seed availability from villagers (1 = Yes)	0.61 (0.49)	0.52 (0.50)	2.74***
Learned seed availability from LC chair (1 = Yes)	0.09 (0.29)	0.12 (0.32)	1.19
Age (years), peer	42.46 (16.15)	41.63 (16.31)	0.76
Education (years), peer	5.85 (3.76)	5.90 (3.75)	0.19
Bicycle ownership (1 = Yes), peer	0.63 (0.48)	0.62 (0.49)	0.30
Agricultural employment (000000), peer	0.11 (0.33)	0.10 (0.32)	0.41
Farm income (000000), peer	0.82 (1.19)	0.88 (1.47)	0.61
Non-agricultural income (000000), peer	0.29 (1.11)	0.30 (1.19)	0.12
Neighbours as agricultural information source (1 = Yes), peer	0.28 (0.45)	0.29 (0.46)	0.39
Sweetpotato land (acres), peer	0.47 (0.39)	0.65 (3.56)	0.89
Ever purchased vines (1 = Yes), peer	0.77 (0.42)	0.75 (0.44)	0.98
Past disease experience (factor), peer	0.06 (1.06)	0.02 (0.99)	0.59
Past erratic rain experience (factor), peer	-0.10 (1.05)	0.00 (0.99)	1.51

*p<0.1, **p<0.05, ***p<0.01

Table A4: Difference in promoter farmers and buyers of quality seed characteristics

	Mean n=503	Mean n=117	Mann-Whitney U
Individual characteristics			
Gender of respondent (1 = Male)	0.62	0.70	26937.5*
Can read or write in Ateso or English	1.65	2.26	21784.5***
Marital status of the respondent	2.42	2.14	26147.5***
Relationship to household head	1.42	1.32	28513.5
Gender of household head (1 = Male)	0.78	0.97	452**
Primary occupation	1.37	1.88	28075
Member of a farmer/social organisation	0.62	0.50	25643.5**
Age of respondent	41.55	44.24	25220**
Years of schooling	6.39	8.09	21209.5***
Household size	7.37	8.90	22582.5***
Income			
Agricultural employment income	90558.65	301316.24	20359***
Non-agricultural employment income	319196.83	394589.74	19562.5***
Farm income (livestock and crops)	1032609.91	917521.37	28308
Other business income	511312.13	124615.38	22770***
Cultivable land owned (acres)	3.59	6.97	14499***
Sweetpotato land (acres, season 1 2022)	0.58	5.08	985***
Asset ownership			
Ox plough	0.53	0.61	27188.5
Water Pump	0.03	0.03	29302.5
Motorcycle	0.14	0.17	28549
Wheelbarrow	0.19	0.25	27748
Spray pump	0.30	0.38	27134.5
Bicycle	0.67	0.79	25692***
Radio	0.52	0.73	23258***
TV	0.05	0.03	29027.5
Information sources			
Local input dealers	0.01	0.19	24185***
NAADS	0.00	0.41	17470.5***
NGO projects	0.21	0.29	27017*
Researchers (e.g., NARO/IGOLA)	0.03	0.12	26723.5***
Traders	0.11	0.08	28530
Neighbours, family/friends	0.27	0.78	14553.5***

Table A5: Information diffusion through word-of-mouth communication (N= 1108)

	Received advice		Promoter publicity	
	B(SE)	Std. β	B(SE)	Std. β
Promoter-level variables				
Poster assignment (village-level treatment, 1 = Yes)	-0.04 (0.06)	-0.046	0.10† (0.05)	0.098
Promoter gender (1 = male)	-0.03 (0.06)	-0.024	0.07 (0.06)	0.063
Promoter male $\times$ poster assignment	0.02 (0.06)	0.019	-0.33*** (0.06)	-0.329
Age (years), promoter	-0.00 (0.00)	-0.033	-0.00† (0.00)	-0.058
Bicycle ownership (1 = Yes), promoter	-0.04 (0.04)	-0.032	0.24*** (0.04)	0.198
Education (years), promoter	0.00 (0.01)	0.013	0.01 (0.00)	0.049
Agricultural employment income (000000), promoter	0.10* (0.05)	0.094	0.13** (0.04)	0.125
Farm income (000000), promoter	-0.06** (0.02)	-0.109	-0.06** (0.02)	-0.101
Non-agricultural income (000000), promoter	0.02 (0.02)	0.026	0.10*** (0.02)	0.134
Sweetpotato land (acres), promoter	-0.06* (0.03)	-0.060	0.06* (0.03)	0.063
Distance to road (minutes), promoter	0.00* (0.00)	0.067	0.01*** (0.00)	0.355
Peer-level variables				
Peer read poster (individual exposure, 1 = Yes)	0.35*** (0.08)	0.224	0.04 (0.08)	0.023
Peer gender (1 = male)	0.06 (0.06)	0.057	-0.04 (0.05)	-0.043
Peer male $\times$ peer read poster	-0.11 (0.10)	-0.062	-0.06 (0.09)	-0.032
Age (years), peer	-0.00 (0.00)	-0.033	-0.00 (0.00)	-0.031
Education (years), peer	0.01† (0.01)	0.070	-0.01* (0.00)	-0.080
Bicycle ownership (1 = Yes), peer	-0.06 (0.04)	-0.056	0.04 (0.04)	0.034
Agricultural employment income (000000), peer	-0.13* (0.07)	-0.087	0.07 (0.06)	0.042
Farm income (000000), peer	0.03† (0.02)	0.096	0.01 (0.02)	0.026
Non-agricultural income (000000), peer	-0.08*** (0.02)	-0.204	-0.03 (0.02)	-0.064
Sweetpotato land (acres), peer	-0.00 (0.03)	-0.010	-0.03 (0.03)	-0.156
Past disease experience (factor), peer	0.00 (0.01)	0.009	—	—
Past erratic rain experience (factor), peer	0.00 (0.01)	0.006	—	—
Gender homophily				
Peer male $\times$ promoter male	0.02 (0.06)	0.020	0.07 (0.06)	0.065
Socioeconomic heterophily				
Sweetpotato land dissimilarity	0.00 (0.00)	-0.010	0.00 (0.00)	0.156
Age dissimilarity	0.00 (0.00)	0.021	0.00 (0.00)	0.040
Agricultural employment dissimilarity	0.01 (0.01)	0.039	0.00 (0.01)	0.011
Bicycle ownership dissimilarity	-0.07† (0.04)	-0.072	0.06† (0.03)	0.056
Education dissimilarity	0.00 (0.00)	-0.025	-0.00† (0.00)	-0.059
Farm income dissimilarity	-0.00* (0.00)	-0.094	-0.00 (0.00)	-0.021
Non-agricultural income dissimilarity	0.01*** (0.00)	0.174	0.00 (0.00)	0.019

Note: Significance levels: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. SEM results for dependent variables are advice - Peer received advice at the sales point, and publicity-Promoter publicity (word-of-mouth on seed availability).

Table A61: Logit regression models for advice and publicity with county fixed effects

Variables	Received advice Coeff (SE)	Promoter publicity Coeff (SE)
	Partner Effects	Actor Effects
Promoter gender (1 = male)	-0.189 (0.299)	0.174 (1.214)
Poster assignment (village-level treatment, 1 = Yes)	-0.383 (0.277)	-0.157 (0.910)
Promoter male × poster assignment	0.327 (0.369)	-1.597 (1.237)
Education (years), promoter	0.012 (0.026)	0.107 (0.100)
Age (years), promoter	-0.004 (0.006)	-0.013 (0.019)
Agricultural employment income (000000), promoter	0.537** (0.224)	1.327† (0.747)
Farm income (000000), promoter	-0.309* (0.130)	-0.422 (0.409)
Non-agricultural income (000000), promoter	0.074 (0.129)	0.074 (0.370)
Sweetpotato land (acres), promoter	-0.176 (0.167)	0.479 (0.572)
Bicycle ownership (1 = Yes), promoter	-0.048 (0.233)	1.825** (0.760)
Neighbours as agricultural information source (1 = Yes), promoter	0.315 (0.197)	1.085 (0.813)
Distance to road (minutes), promoter	0.002 (0.004)	0.067*** (0.020)
	Actor Effects	Partner Effects
Peer read poster (individual exposure, 1 = Yes)	1.426*** (0.393)	0.300 (0.356)
Peer gender (1 = male)	0.374* (0.149)	-0.109 (0.159)
Peer male × peer read poster	-0.440 (0.445)	-0.526 (0.492)
Age (years), peer	-0.005 (0.005)	-0.004 (0.004)
Education (years), peer	0.039† (0.024)	-0.060** (0.023)
Bicycle ownership (1 = Yes), peer	-0.019 (0.144)	-0.045 (0.156)
Agricultural employment income (000000), peer	-0.562* (0.279)	0.669† (0.395)
Non-agricultural income (000000), peer	0.004 (0.046)	0.057 (0.064)
Sweetpotato land (acres), peer	-0.164 (0.125)	-0.129* (0.064)
Ever purchased vines (1 = Yes), peer	-0.028 (0.028)	-0.009 (0.016)
Past disease experience (factor), peer	0.664*** (0.175)	-0.110 (0.202)
Past erratic rain experience (factor), peer	-0.029 (0.066)	0.131† (0.075)
Peer read poster (individual exposure, 1 = Yes)	-0.022 (0.063)	0.015 (0.059)
Model Statistics		
Observations	1,108	1,072
Wald chi2	109.89	102.46
Prob > chi2	0.0000	0.0000
Pseudo R ²	0.0853	0.3027
County FE	Yes	Yes
Clusters	120	116

Notes: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Intention to treat using the Logistic regression $N=1108$: Standard errors in parentheses; publicity model test joint significance of actor effects $\chi^2(10) = 19.98$; Prob > $\chi^2 = 0.029$ and partner effects $\chi^2(10) = 36.63$; Prob > $\chi^2 = 0.000$; advice model test joint significance of actor effects $\chi^2(12) = 19.19$; Prob > $\chi^2 = 0.038$ and partner $\chi^2(12) = 50.27$; Prob > $\chi^2 = 0.000$

Table A7: Number of female and male buyers and peer purchase outcome (N= 1108)

	Number of female buyers		Number of male buyers		Peer purchased seed	
	B(SE)	Std. β	B(SE)	Std. β	B(SE)	Std. β
Promoter-level variables						
Poster assignment (village-level treatment, 1 = Yes)	-4.70*** (0.73)	-0.576	-1.13† (0.68)	-0.136	0.10 (0.09)	0.105
Promoter publicity (word-of-mouth on seed availability, 1 = Yes)	0.70 (0.56)	0.085	-3.28*** (0.58)	-0.390	0.01 (0.07)	0.013
Promoter gender (1 = male)	-2.04*** (0.62)	-0.227	1.04† (0.62)	0.113	0.04 (0.08)	0.036
Promoter male × poster assignment	2.99*** (0.75)	0.360	-2.08** (0.63)	-0.245	-0.16† (0.09)	- 0.156
Poster assignment × promoter publicity	-0.05 (0.49)	-0.005	2.09*** (0.52)	0.219	-0.11† (0.06)	- 0.095
Promoter male × promoter publicity	-1.26** (0.49)	-0.152	1.20* (0.51)	0.141	-0.07 (0.06)	- 0.071
Education (years), promoter	0.24*** (0.04)	0.203	0.09* (0.04)	0.078	0.01† (0.00)	0.052
Age (years), promoter	0.07*** (0.01)	0.219	0.06*** (0.01)	0.178	0.00 (0.00)	- 0.011
Agricultural employment income (000000), promoter	-0.85* (0.35)	-0.097	-0.15 (0.37)	-0.016	-0.09* (0.04)	- 0.082
Farm income (000000), promoter	-0.04 (0.17)	-0.007	-0.02 (0.18)	-0.004	-0.02 (0.02)	- 0.030
Non-agricultural income (000000), promoter	0.34† (0.18)	0.056	0.92*** (0.19)	0.146	0.01 (0.02)	0.011
Sweetpotato land (acres), promoter	-0.27 (0.22)	-0.033	0.45† (0.23)	0.054	-0.01 (0.03)	- 0.012
Bicycle ownership (1 = Yes), promoter	-2.41*** (0.30)	-0.240	-3.55*** (0.31)	-0.346	-0.06† (0.04)	- 0.052
Neighbours as agricultural information source (1 = Yes), promoter	-0.85** (0.30)	-0.087	-1.62*** (0.32)	-0.162	0.01 (0.04)	0.005
Distance to road (minutes), promoter	0.02* (0.01)	0.072	-0.02** (0.01)	-0.084	0.00* (0.00)	0.070
Peer-level variables						
Peer read poster (individual exposure, 1 = Yes)	-1.07 (2.24)	-0.080	-5.76* (2.36)	-0.424	0.03 (0.28)	0.015
Peer gender (1 = male)	-0.09 (0.62)	-0.011	-0.20 (0.61)	-0.023	-0.02 (0.08)	- 0.018
Peer received advice at sales point (1 = Yes)	0.48 (0.63)	0.056	-0.83 (0.66)	-0.096	0.14† (0.08)	0.136
Peer male × peer read poster	0.05 (0.77)	0.003	-0.28 (0.81)	-0.018	0.00 (0.10)	0.002
Peer received advice × peer male	-0.82† (0.46)	-0.085	0.60 (0.49)	0.061	-0.12* (0.06)	- 0.101
Peer received advice × peer read poster	0.34 (0.74)	0.020	0.73 (0.77)	0.043	-0.08 (0.09)	- 0.040
Learned seed availability from villagers (1 = Yes)	0.15 (0.22)	0.019	-0.28 (0.23)	-0.033	0.12*** (0.03)	0.117
Learn seed availability from LC chair (1=Yes)	0.39 (0.34)	0.030	-0.40 (0.36)	-0.030	0.20*** (0.04)	0.124

	Number of female buyers		Number of male buyers		Peer purchased seed	
	B(SE)	Std. β	B(SE)	Std. β	B(SE)	Std. β
Age (years), peer	-0.00 (0.01)	-0.011	-0.00 (0.01)	-0.015	0.00 (0.00)	0.045
Education (years), peer	0.04 (0.04)	0.032	-0.06 (0.04)	-0.051	0.01 (0.00)	0.045
Bicycle ownership (1 = Yes), peer	0.55* (0.28)	0.066	0.61* (0.29)	0.071	-0.00 (0.03)	- 0.001
Agricultural employment income (000000), peer	0.52 (0.50)	0.041	-0.11 (0.52)	-0.009	-0.09 (0.06)	- 0.061
Farm income (000000), peer	-0.25† (0.13)	-0.084	-0.07 (0.13)	-0.024	0.01 (0.02)	0.038
Non-agricultural income (000000), peer	-0.01 (0.15)	-0.003	-0.08 (0.16)	-0.021	0.01 (0.02)	0.015
Neighbours as agricultural information source (1 = Yes), peer	0.08 (0.27)	0.009	-0.22 (0.29)	-0.024	0.01 (0.03)	0.008
Sweetpotato land (acres), peer	-0.17 (0.24)	-0.123	-0.44† (0.25)	-0.316	0.13*** (0.03)	0.770
Ever purchased vines (1=yes), peer	-0.26 (0.25)	-0.028	-0.22 (0.26)	-0.022	0.34*** (0.03)	0.293
Past disease experience (factor), peer	0.03 (0.05)	0.006	0.05 (0.06)	0.013	-0.02† (0.01)	- 0.049
Past erratic rain experience (factor), peer	0.01 (0.05)	0.002	0.06 (0.06)	0.013	0.01 (0.01)	0.028
Gender homophily						
Peer male × promoter male	-0.12 (0.66)	-0.015	-0.73 (0.56)	-0.087	-0.11 (0.08)	- 0.108
Information exposure dyads						
Poster assignment × peer read poster	1.37 (1.86)	0.102	4.64* (1.95)	0.337	0.26 (0.23)	0.160
Peer male × poster assignment	0.97 (0.81)	0.110	-0.30 (0.61)	-0.033	0.07 (0.10)	0.065
Promoter male × peer read poster	-0.22 (0.84)	-0.015	0.51 (0.89)	0.033	0.03 (0.10)	0.014
Peer male × promoter publicity	0.13 (0.44)	0.015	0.28 (0.46)	0.032	0.05 (0.05)	0.044
Peer received advice × poster assignment	0.44 (0.48)	0.042	-0.04 (0.50)	-0.004	-0.10† (0.06)	- 0.082
Promoter male × peer male × poster assignment	-0.62 (0.95)	-0.065	0.68 (0.55)	0.069	0.06 (0.12)	0.047
Promoter publicity × peer read poster	-0.68 (0.75)	-0.036	1.08 (0.79)	0.055	0.05 (0.09)	0.021
Peer received advice × promoter publicity	-0.04 (0.46)	-0.004	-0.44 (0.48)	-0.042	0.01 (0.06)	0.009
Peer received advice × promoter male	-0.26 (0.49)	-0.027	0.96† (0.52)	0.100	0.16* (0.06)	0.135
Socioeconomic heterophily						
Agricultural employment dissimilarity	-0.04 (0.10)	-0.019	0.03 (0.10)	0.011	0.02 (0.01)	0.070
Age dissimilarity	0.00 (0.00)	0.029	0.00 (0.00)	0.015	0.00 (0.00)	- 0.008

	Number of female buyers		Number of male buyers		Peer purchased seed	
	B(SE)	Std. β	B(SE)	Std. β	B(SE)	Std. β
Sweetpotato land dissimilarity	0.00 (0.00)	0.112	0.00† (0.00)	0.309	-0.00*** (0.00)	- 0.762
Bicycle ownership dissimilarity	-0.06 (0.27)	-0.007	0.51† (0.28)	0.061	-0.04 (0.03)	- 0.036
Education dissimilarity	0.00 (0.00)	0.022	-0.01* (0.00)	-0.065	0.00 (0.00)	- 0.034
Farm income dissimilarity	0.02† (0.01)	0.081	0.00 (0.01)	0.001	-0.00 (0.00)	- 0.020
Non-agricultural income dissimilarity	0.00 (0.01)	0.000	0.02 (0.01)	0.059	-0.00 (0.00)	- 0.057
Neighbour information-source dissimilarity	0.37 (0.27)	0.045	-0.06 (0.29)	-0.006	0.02 (0.03)	0.017

Note: Significance levels: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; SEM joint estimates.

Table A8: Intensity of purchase models with county fixed effects

VARIABLES	Number of female buyers	Number of male buyers
Poster assignment (village-level treatment, 1 = Yes)	-0.462** (0.221)	-0.221 (0.186)
Promoter publicity (voluntary word-of-mouth, 1 = Yes)	0.086 (0.141)	-0.351** (0.147)
Promoter gender (1= male)	-0.255 (0.181)	0.094 (0.147)
Promoter male × poster assignment	0.317 (0.232)	-0.028 (0.184)
Poster assignment × promoter publicity	-0.123 (0.211)	0.185 (0.187)
Promoter male × promoter publicity	-0.220 (0.181)	0.020 (0.168)
Education (years), promoter	0.044*** (0.016)	-0.004 (0.014)
Age (years), promoter	0.010** (0.004)	0.007** (0.003)
Agricultural employment income (000000), promoter	-0.246 (0.151)	0.019 (0.125)
Farm income (000000), promoter	0.042 (0.065)	0.022 (0.066)
Non-agricultural income, promoter (000000)	-0.043 (0.065)	-0.009 (0.063)
Sweetpotato land (acres), promoter	0.052 (0.112)	0.120 (0.096)
Bicycle ownership (1 = Yes), promoter	-0.300** (0.118)	-0.364*** (0.095)
Neighbours as agricultural information source (1 = Yes), promoter	-0.098 (0.153)	-0.207 (0.142)
Distance to road (minutes), promoter	0.000 (0.003)	-0.000 (0.003)
Partner effects (peer farmer)		
Peer read poster (individual exposure, 1 = Yes)	-0.161 (0.118)	-0.111 (0.092)
Peer gender (1= male)	0.000 (0.032)	-0.063 (0.034)
Peer received advice at the sales point (1 = Yes)	0.004 (0.048)	-0.114*** (0.040)
Peer male × peer read poster	0.099 (0.106)	-0.056 (0.097)
Peer received advice × peer male	-0.070 (0.059)	0.116** (0.048)
Peer received advice × peer read poster	0.227* (0.121)	0.212** (0.084)
Learned seed availability from villagers (1 = Yes)	0.054* (0.029)	-0.043** (0.021)
Learned seed availability from LC chair (1 = Yes)	0.050 (0.046)	-0.062 (0.038)
Age (years), peer	0.000 (0.001)	-0.000 (0.001)

VARIABLES	Number of female buyers	Number of male buyers
Education (years), peer	0.005 (0.005)	-0.003 (0.004)
Bicycle ownership (1= yes), peer	0.051* (0.027)	0.003 (0.023)
Agricultural employment income (000000), peer	0.016 (0.032)	-0.013 (0.027)
Farm income (000000), peer	-0.006 (0.013)	-0.013 (0.010)
Non-agricultural income (000000), peer	-0.007 (0.009)	0.010 (0.008)
Neighbours as agricultural information source (1 = Yes), peer	0.043 (0.028)	0.014 (0.022)
Sweetpotato land (acres), peer	-0.000 (0.003)	-0.002 (0.002)
Ever purchased vines (1=yes), peer	-0.012 (0.035)	-0.000 (0.028)
Past disease experience (factor), peer	-0.021* (0.012)	0.005 (0.010)
Past erratic rain experience (factor), peer	0.005 (0.011)	0.025** (0.010)
Subcounty Fixed Effects	Yes	Yes
Constant	0.929** (0.470)	1.935*** (0.375)
Inalpha	-2.612*** (0.445)	-3.378*** (0.857)
alpha	0.073 (0.033)	0.034 (0.029)
Observations	1,108	1,108
Wald chi2	182.01	245.22
Pseudo R2	0.0988	0.0954

Notes: Basic intention to treat using the Negative binomial regression model, N=1108: Standard errors in parentheses, clustered at village level (120 clusters). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; Male model test joint significance of actor effects $\chi^2(14) = 58.56$; Prob > $\chi^2 = 0.0000$ and partner effects $\chi^2(19) = 23.73$; Prob > $\chi^2 = 0.207$; female model test joint significance of actor effects $\chi^2(14) = 33.82$; Prob > $\chi^2 = 0.002$ and partner $\chi^2(19) = 18.66$; Prob > $\chi^2 = 0.479$

Table A9: Intensity of purchase models with county fixed effects with heterophily

VARIABLES	(1) Overall intensity of buyers	(2) Number of Male buyers	(3) Number of Female buyers
Promoter gender (1= male)	-0.186 (-1.04)	0.116 (0.80)	-0.043 (-0.40)
Poster assignment (village-level treatment, 1 = Yes)	-0.534** (-2.16)	-0.191 (-1.04)	-0.389*** (-2.61)
Promoter publicity (voluntary word-of- mouth, 1 = Yes)	0.057 (0.38)	-0.383** (-2.57)	-0.160 (-1.50)
Promoter male × poster assignment	0.313 (1.31)	-0.083 (-0.47)	0.138 (0.98)
Poster assignment × promoter publicity	-0.095 (-0.44)	0.146 (0.79)	0.030 (0.19)
Promoter male × promoter publicity	-0.229 (-1.30)	0.034 (0.21)	-0.105 (-0.83)
Education (years), promoter	0.043** (2.55)	-0.001 (-0.07)	0.018 (1.59)
Age (years), promoter	0.010** (2.22)	0.007** (2.39)	0.008*** (3.22)
Agricultural employment (000000), promoter	-0.227 (-1.51)	0.010 (0.08)	-0.077 (-0.77)
Farm income (000000), promoter	0.036 (0.56)	0.018 (0.27)	0.014 (0.33)
Non-agricultural income (000000), promoter	-0.045 (-0.70)	-0.010 (-0.18)	-0.022 (-0.55)
Sweetpotato land (acres), promoter	0.061 (0.56)	0.127 (1.37)	0.097 (1.57)
Bicycle (1= yes), promoter	-0.308*** (-2.64)	-0.355*** (-3.79)	-0.338*** (-4.50)
Neighbours as an agricultural information source (1=Yes), promoter	-0.133 (-0.87)	-0.226 (-1.63)	-0.169* (-1.78)
Distance to road (minutes), promoter	0.000 (0.18)	-0.000 (-0.04)	0.000 (0.05)
Partner effects (peer farmer)			
Peer read poster (individual exposure, 1 = Yes)	-0.363 (-1.08)	-1.036*** (-3.37)	-0.752*** (-2.82)
Peer gender (1= male)	0.026 (0.44)	-0.055 (-0.88)	-0.024 (-0.53)
Peer received advice at the sales point (1 = Yes)	-0.061 (-0.84)	-0.155** (-2.31)	-0.101** (-2.20)
Peer male × peer read poster	0.059 (0.52)	-0.041 (-0.43)	0.000 (0.00)
Peer received advice × peer male	-0.059 (-0.99)	0.111** (2.35)	0.029 (0.75)
Peer received advice × peer read poster	0.144 (1.12)	0.201** (2.12)	0.183** (2.02)

VARIABLES	(1) Overall intensity of buyers	(2) Number of Male buyers	(3) Number of Female buyers
Learn the availability of seeds from Villagers (1=yes)	0.056*	-0.042*	0.002
	(1.93)	(-1.84)	(0.10)
Learn the availability of seeds from the LC chair (1=yes)	0.049	-0.061	-0.013
	(1.05)	(-1.61)	(-0.41)
Age (years), peer	0.000	0.000	0.000
	(0.06)	(0.07)	(0.04)
Education (years), peer	0.006	-0.005	-0.001
	(1.10)	(-1.21)	(-0.16)
Bicycle ownership (1= yes), peer	0.052**	0.034	0.045**
	(2.02)	(1.28)	(2.44)
Agricultural employment (000000), peer	0.086	-0.021	0.018
	(1.28)	(-0.31)	(0.32)
Farm income (000000), peer	-0.046**	-0.026**	-0.036***
	(-2.06)	(-2.05)	(-2.70)
Non-agricultural income (000000), peer	-0.007	-0.016	-0.010
	(-0.38)	(-1.02)	(-0.81)
Neighbours agriculture information source (1=Yes), peer	0.076**	0.019	0.045**
	(2.38)	(0.68)	(2.14)
Sweetpotato land (acres), peer	0.015	-0.052*	-0.021
	(0.36)	(-1.75)	(-0.72)
Ever purchased vines (1=yes), peer	-0.006	-0.007	-0.004
	(-0.16)	(-0.26)	(-0.16)
Past disease experience (factor), peer	-0.024*	0.006	-0.007
	(-1.88)	(0.61)	(-0.81)
Past erratic rain experience (factor), peer	0.006	0.029***	0.018**
	(0.50)	(2.93)	(2.42)
Gender homophily			
Peer male × promoter male	-0.103	-0.059	-0.076
	(-1.46)	(-0.81)	(-1.47)
Information exposure dyad			
Poster assignment × peer read poster	0.300	0.805***	0.585***
	(1.17)	(3.34)	(2.73)
Peer male × Poster assignment	0.070	0.038	0.053
	(0.83)	(0.50)	(0.90)
Promoter male × Peer read poster	0.061	0.161*	0.122
	(0.51)	(1.79)	(1.60)
Peer male × promoter publicity	0.026	0.033	0.031
	(0.48)	(0.69)	(0.80)
Peer received advice × poster assignment	0.075	-0.018	0.014
	(1.02)	(-0.29)	(0.26)
Promoter male × peer male × poster assignment	-0.004	-0.006	-0.002
	(-0.03)	(-0.06)	(-0.02)
Promoter publicity × peer read poster	-0.126	0.104	0.007
	(-0.93)	(1.20)	(0.08)
Peer received advice × promoter publicity	0.063	0.022	0.043
	(0.84)	(0.45)	(0.95)

VARIABLES	(1) Overall intensity of buyers	(2) Number of Male buyers	(3) Number of Female buyers
Peer received advice × promoter male	-0.007 (-0.13)	0.054 (1.00)	0.023 (0.58)
Agricultural employment dissimilarity	-0.016 (-1.31)	0.002 (0.14)	-0.004 (-0.33)
Age dissimilarity	0.000 (1.06)	0.000 (0.14)	0.000 (0.76)
Sweetpotato land dissimilarity	-0.000 (-0.36)	0.001* (1.76)	0.000 (0.73)
Bicycle ownership dissimilarity	-0.029 (-1.08)	0.046* (1.75)	0.016 (0.73)
Education dissimilarity	0.000 (0.06)	-0.001 (-0.79)	-0.000 (-0.56)
Farm income dissimilarity	0.005*** (2.64)	0.002 (1.42)	0.003*** (3.13)
Non-agricultural income dissimilarity	0.000 (0.13)	0.002** (2.22)	0.001* (1.89)
Neighbour information-source dissimilarity	0.078** (2.41)	0.025 (0.90)	0.053** (2.39)
lnalpha	-2.681*** (-5.78)	-3.515*** (-3.67)	-3.357*** (-6.48)
Constant	0.896* (1.92)	1.93*** (3.86)	2.176*** (6.96)
County FE	Yes	Yes	Yes

Notes: Robust z-statistics in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; Negative binomial regression model for intention to treat, controlling for information exposure and socioeconomic heterophily; clustered at village level (120 clusters).

Table A10: Test for spillover effects

VARIABLES	(1) Purchased	(2) Purchased
Distance to Nearby Treatment	0.022 (1.38)	0.022 (1.25)
Every season	0.039 (0.44)	0.039 (0.40)
Every two seasons	0.197** (2.34)	0.197** (2.52)
Sometimes	0.045 (0.80)	0.045 (0.82)
Absolute risk aversion	0.003 (1.01)	0.003 (1.01)
Respondent sex	-0.099* (-1.83)	-0.099* (-1.78)
Respondent age	-0.001 (-0.83)	-0.001 (-0.71)
Years of Schooling	0.015** (2.15)	0.015* (1.78)
Household size	0.013 (1.60)	0.013 (1.44)
Own cultivable land	0.020** (2.03)	0.020** (2.36)
Constant	0.146 (0.93)	0.146 (0.89)
Observations	436	436
Adjusted R-squared	0.049	0.049
County FE	Yes	Yes

Columns (1) show the results with robust standard error, and columns (2) show the results with village-level clustered standard error. Asterisks indicate the following: ***= $p < 0.01$, **= $p < 0.05$, and *= $p < 0.1$. It first calculated the distance between each control village and its nearest treatment village. In the next step, only control villages were kept, and the purchase dummy was regressed on the distance calculated in the first step, with controls and fixed effects added. The results show that there is no negative effect of the distance variable. This indicates that for control villages, being closer to the treatment village does not increase the likelihood of purchasing the improved vines, indicating no spillover effects.

Chapter Three

Gender and moral hazard in farmer-to-farmer models: Challenges in monitoring and learning

Abstract

This chapter examines the role of gender in promoter farmers' support for monitoring and learning activities in agricultural projects. It draws on data from a cluster randomised controlled trial in Uganda, with 120 purposively selected promoter farmers and a random sample of 1,108 peer farmers. Promoter sales records were cross-validated against peer farmer self-reports to identify unreported quality seed buyers. The results show that promoter farmers' reporting behaviour is gendered. Female farmers were less likely than male farmers to have their quality seed purchases recorded. Male promoters were also associated with more unreported female quality seed buyers, although this association was reduced when they were assigned a poster to display in their sales point. Poster assignment alone was associated with more unreported male quality seed buyers, but the combination of poster assignment and promoter publicity reduced unreported male buyers. Qualitative findings show that under-reporting reflected promoter farmers' discretion and operational constraints, including time pressure and limited writing materials. The chapter shows that when unincentivised agents generate the data used for monitoring, the reach and impact of interventions among female beneficiaries may be underestimated. The implication is that agricultural projects should verify agent records against independent beneficiary data, and treat record-keeping as part of implementation rather than as a secondary administrative task.

3.1 Introduction

Formal agricultural extension systems in SSA face significant pressure from limited human resources and funding shortfalls (Takahashi, Muraoka and Otsuka, 2020). As a result, development projects have increasingly delegated the dissemination of information, innovations, and monitoring tasks to promoter farmers. Promoter farmer performance influences the quality of extension services and, ultimately, agricultural productivity outcomes. While several studies address promoter farmer selection, a persistent constraint on their efficacy is that they often behave differently than expected once engaged. Documented problems include applying low effort in information and technology transfer (Dar *et al.*, 2024); shirking training duties (Holden *et al.*, 2018; Ragasa, 2020); and working without adequate accountability mechanisms (Khaila *et al.*, 2015; Ochieng, Silvert and Diaz, 2022). Another challenge is that incentives result in variable and sometimes unintended outcomes (Balew *et al.*, 2023; Okello *et al.*, 2023). Yet despite the pivotal role of promoter farmers, no study has examined their reporting behaviour in delegated monitoring tasks, or if this behaviour is gendered.

Delegation of monitoring tasks to local agents has the advantage of lowering program costs as compared to employing external field staff, given the spread of target beneficiaries. At the same time, however, these local agents are embedded in local power structures that govern their conduct and introduce bias in who gets reported. Understanding whose transactions are reported to the project, therefore, has implications for the use of local agents. This chapter examines promoter farmers' reporting behaviour as an indicator of how the delegated monitoring role was fulfilled in a quality seed dissemination project in Uganda. Promoters were required to record buyers' details in sales booklets. These records served as the project's monitoring tool, the basis for financial reconciliation, and the data source for beneficiary tracking and follow-up activities. Failure to record transactions therefore undermines financial accountability, measurement of project reach, and intervention continuity. The project could not observe every transaction, so incomplete records revealed the information gap between the project and the promoter. Consistent with Ashraf, Bandiera and Jack (2014), who use logbook completion as a behavioural proxy for agent effort in a pro-social sales setting, this chapter treats sales booklet completion as a signal of the promoter's fulfilment of the delegated monitoring task.

Under-reporting and misclassification can affect the accuracy and reliability of project beneficiaries' data. In principal-agent relationships, incomplete records may reflect moral hazard, time constraints, weak monitoring, or limited client cooperation. Principal-agent theory predicts that when agents' actions are costly to observe, reporting may vary with the perceived costs and benefits of performing the delegated task (Holmström, 1979; Jensen and Meckling, 1979). Where financial incentives are absent, agents may act on intrinsic motivation, social capital, and reputational concerns shaped by social and gender norms. Gendered expectations can create unequal pressure in voluntary roles (Heilman and Eagly, 2008; van Dijk and van Engen, 2019). Gender also influences which economic actions are recognised, attributed, and made visible, particularly where transactions occur within unequal household and social relations. In contexts where women's economic activity is subject to social scrutiny or where market participation is undervalued, female beneficiaries may be omitted or misclassified in transaction records. Such misreporting distorts estimates of programme reach and gender equity in access to quality inputs. This suggests that reporting behaviour in delegated monitoring tasks varies not only by agent gender, but also by the gender composition of the agent–client transaction. The chapter, therefore, first asks: How does promoter–peer dyad gender shape reporting in delegated quality seed sales?

Engagement of local agents is typically voluntary due to difficulties in observing behaviour, measuring outcomes, and resource constraints to provide financial incentives. Extrinsic rewards are also kept low to draw in agents who have intrinsic motivation, are altruistic, or are sufficiently committed to delivering services to their peers. Under a principal-agent framework, where financial incentives are absent, projects can use public visibility as a second-best accountability mechanism. Agents are embedded in the social fabric of communities from which they are recruited, and making their role publicly visible may increase the reputational cost of poor performance. Social-image and reputational-signalling models show that public observability can shape behaviour because agents care about how others judge their actions (Nye, 1990; Cialdini and Goldstein, 2004; Bursztyn and Jensen, 2017). People exhibit heightened performance when they anticipate being observed by an audience. Evidence on visibility and recognition effects is mixed (Bradler *et al.*, 2016; Ashraf and Bandiera, 2018; Shikuku *et al.*, 2019; Cotofan, 2021; Balew *et al.*, 2023; Fracchia, Molina-Millán and Vicente, 2023; Okello *et al.*, 2023; Bertelli and Fall,

2024): public praise, social recognition and signposting can improve performance or produce weaker or even negative effects, including reduced local agents' efforts.

Unlike studies where public recognition is explicitly promised as a reward, this chapter examines a public visibility effect created through a large point-of-sale poster. Nudge theory proposes that subtle changes in one's environment can alter behaviour without restricting choice or imposing sanctions (Thaler and Sunstein, 2008). Promoters were instructed to display the poster at their sales point, making their official quality-seed seller role visible to the community. The study hypothesis is that the poster may make the promoter's official role more visible, creating reputational pressure to be seen as performing the sales role properly. This visibility may be associated with a higher likelihood of recording transactions. Therefore, the second question the chapter addresses is: Is public visibility associated with higher reporting?

The unique feature of this study is the design of the project, which provides dyadic evidence for explaining information asymmetry. It constructs an independent measure of reporting outcomes by cross-validating promoter sales booklet records against their peer farmer self-reports. This is a dyadic application of the extended principal-agent framework, in which the project acts as a supervisor tier that verifies agent performance through submitted records (Tirole, 1986). The main results are as follows: overall, promoter farmer reporting behaviour is gendered. Male buyers were significantly more likely than female buyers to have their purchases recorded. Turning to public visibility, assignment to the poster treatment group is associated with a higher number of unreported male buyers. This association is weaker when the promoter is male. Third, male peers who read the poster are more likely to have their purchases recorded, suggesting that informed buyers may strengthen reporting from the demand side.

These results expand the discussion on social learning, which has focused on information diffusion, knowledge transfer, and technology adoption (Ragasa, 2020), to include monitoring roles. They show that delegating recording responsibilities to local agents is vulnerable to moral hazard. Second, the chapter contributes to gender and development research by showing that project records may not capture women's economic transactions equally when monitoring is delegated to local agents. Third, the chapter complements growing literature on the role of non-financial incentives and nudges (Okello et al., 2023) by examining whether visibility through a point-of-sale poster is

associated with promoter farmer reporting behaviour. The rest of the chapter is organised as follows. Section 3.2 presents the literature review. Section 3.3 describes the study design and estimation strategy. Section 3.4 presents the results, followed by the discussion.

3.2 Literature review

3.2.1 Principal–agent theory, information asymmetry, and recording

An agency relationship is formed when one party relies on another to act on its behalf (Jensen & Meckling, 1979). In the sweetpotato seed dissemination project, the project is the principal, and the promoter farmer is the agent. The project delegates seed dissemination, sales, and the recording of transactions. However, the project is unable to observe all transactions at the sales point. Promoters observe sales and hold private information on how transactions are recorded, while the project relies on submitted sales booklets. Salesperson–supervisor relationships provide a useful parallel, showing that supervisors need information not only on outcomes but also on the methods and procedures agents use to achieve them. Much of this behavioural information is difficult to capture because sales agents work away from supervisors and decide what to report. Information asymmetry may therefore arise even when a transaction has taken place, because the principal cannot observe how the transaction was handled or documented. In the present chapter, the project could observe submitted sales records, but not the recording behaviour behind them. This makes record-keeping a behavioural margin through which hidden action can be studied. Since effort is costly and agents may pursue their own interests, a gap can arise between the principal’s objectives and the agent’s behaviour. The chapter focuses on post-contractual moral hazard by examining whether promoters, once in role, record all transactions of quality seed buyers. Failure to record is therefore not treated as a narrow clerical omission, but as a measurable shortfall in the promoter’s fulfilment of the delegated monitoring role. Proper recording is the administrative trace through which the project reconciles sales, monitors implementation, evaluates reach, and conducts follow-up.

3.2.2 Farmer-to-farmer models, uneven effort, and gendered reporting behaviour

Farmer-to-farmer models rely on socially embedded local agents, which can result in selective reach. Rockenbach and Sakdapolrak (2017) show that network centrality

among male actors can conceal unequal access. They demonstrate that reliance on well-connected opinion leaders can entrench existing hierarchies rather than ensuring equal reach. Brown, Nuberg and Llewellyn (2018) document persistent informational gaps arising not from lack of farmer interest, but from passive information-seeking cultures and perceptions of exclusivity, leaving socially distant female farmers unreached. Holden et al. (2018) find that only 2.9% of lead farmers in Malawi adopt the practices they promote. Ragasa (2020) documents a related gap between reported engagement with promoters and plot-level adoption. These studies suggest that underperformance may follow social lines. Effort can flow toward peers who are socially proximate, reciprocally valuable, or likely to enhance the promoter's standing, and away from those who are distant, female, or administratively inconvenient. Such patterns are compatible with moral hazard, but may also reflect capacity limits, social distance, or weak incentives. The chapter examines whether similar selectivity appears in transaction recording.

The peer-side gender relations introduce a second layer of reporting risk. Taylor and Bhasme (2018), in ethnographic case studies in India, show that male-dominated extension networks produce gatekeeping behaviours that exclude women from knowledge flows and subsidised inputs. Babcock et al. (2017) show that low-promotability tasks are disproportionately assigned to and accepted by women, reflecting social expectations about communal obligation. Applied to delegated monitoring, recording female peer transactions may be treated as a low-visibility task, especially when recording the transaction offers limited social reward or reciprocal benefit to the promoter. Kondylis et al. (2016) and BenYishay et al. (2020) further suggest that cross-gender interactions in agricultural settings can carry higher social costs. Female peer transactions, especially in cross-gender dyads, may therefore be more likely to be under-reported, not through deliberate discrimination alone, but through the path of least resistance in socially costly interactions. Based on the discussion, the following hypotheses are proposed:

H1a: Recording of quality seed buyers varies by peer gender.

H1b: Recording of quality seed buyers varies by promoter gender.

H1c: Recording of quality seed buyers varies across promoter–peer gender combinations.

3.2.3 Public visibility and recording behaviour

Evidence on public recognition is also mixed. Shikuku et al. (2019) and Balew et al. (2023) find that recognition increases experimentation and peer engagement among disseminating farmers in Uganda and Ethiopia. In contrast, Okello et al. (2023) find that public recognition combined with goal setting reduced outreach effort among lead farmers in Uganda. The evidence suggests that recognition does not operate uniformly. Its effects depend on the task, the agent type, and the way recognition is experienced: as encouragement, accountability, or reputational pressure. Alam and Kijima (2024), examining extension officers in Bangladesh, find that inspection threats improve compliance, with stronger gains among initially low-performing agents and among female agents. The finding suggests that accountability tools may interact with baseline performance and agent gender. Formal extension officers, however, operate under institutional role identities and supervision structures that differ from those of weakly compensated promoter farmers. Public visibility through a sales-point poster may therefore produce different reporting effects.

Recent experimental evidence reveals that well-intentioned design modifications may inadvertently reinforce existing biases. Bertelli and Fall (2024) undertook a field experiment in Uganda's Farmer Trainer (FT) model, showing that dissemination practices overwhelmingly favoured the trainer's immediate social circle. Dairy farming advice spread to relatives and peers already known to farmer trainers. The study tested the value of linkage to professional extension agents through vouchers, public visibility through signposts, and tailored training using a needs assessment tool. The signpost and needs assessments directed FTs' efforts towards proximate contacts and social connections and, inadvertently, strengthened network-based exclusion. The findings suggest that structural reforms, instead of incremental design adjustments, are needed to reach socially distant farmers. For the present chapter, the poster is conceptualised as a public visibility intervention rather than a conventional reward. It does not remove information asymmetry or impose direct sanctions. Instead, it makes the promoter's project role visible at the sales point and may create reputational pressure to perform the role properly, including reporting transactions. Its effect may vary across promoters depending on their baseline motivation, social visibility in the community, and the gender of their peer. Where promoters already report transactions reliably, additional visibility may be redundant.

Where reporting behaviour is responsive to reputational pressure, the poster may improve recording.

H2a: Public visibility is associated with a lower number of unrecorded quality seed buyers.

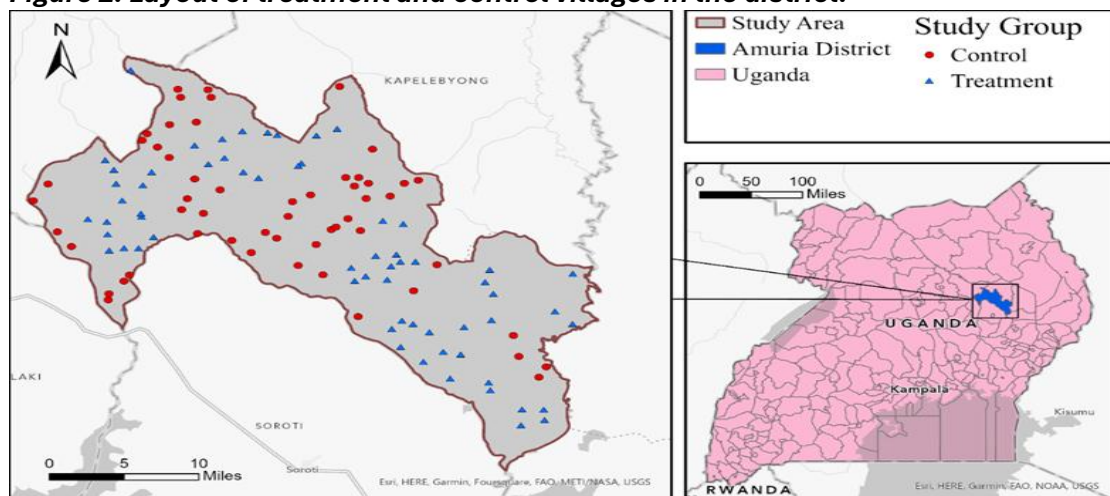
H2b: The association between public visibility and the number of unrecorded quality seed buyers varies by promoter gender.

3.3 Methods

3.3.1 Study site, village, and sampling

The study was conducted in Amuria District, eastern Uganda, a major sweetpotato-producing area covering two counties, 15 sub-counties, and 91 parishes (Figure 2). Full details of the study site and sampling design are reported in Chapter 2 (Section 2.3.1) and in Okello et al. (2025). Sampling proceeded as follows: 120 villages were randomly selected proportional to parish size; within each village, 10 farmers who had cultivated sweetpotatoes in the preceding year were randomly selected from a household list provided by the local council chairperson. The lists included male- and female-headed households; no gender stratification was applied. This yielded 1,200 farmers at baseline. The 120 villages were randomly assigned to treatment ($n = 64$) or control ($n = 56$) groups, following McCann et al. (2018) to minimise cross-village contamination. Treatment villages received poster nudges at the promoter's sales point. Control villages were identical in all other respects. Balance tests showed no significant baseline differences between arms in peer farmer characteristics.

Figure 2: Layout of treatment and control villages in the district.



3.3.2. Implementation of the intervention

The intervention assesses whether low-cost visibility can improve reporting behaviour without financial incentives. A nudge is a choice-preserving informational intervention that alters the decision-making environment without restricting options or changing economic incentives (Thaler and Sunstein, 2008). The poster assigned to treatment villages is the nudge in this chapter. It may have functioned as a visibility nudge by making the promoter's official project role publicly salient, thereby activating reputational concerns around role performance, including record-keeping.

In this study, the poster was a large point-of-sale information poster displayed at the promoter's sales point. Promoters were instructed to display the poster; they were not told that it was an information nudge, that it was expected to attract buyers, or that it could influence their own behaviour. In rural quality-seed markets, where vine sales are informal and rarely accompanied by large, branded materials, the poster nevertheless made the promoter's project-linked seller role more visible to the community. The intervention design creates an opportunity to test whether public visibility, introduced through an information poster, affects compliance with delegated monitoring duties. All 120 promoters received one day of training delivered by the principal investigator, with treatment and control group promoters trained on separate days to prevent information contamination. Training was identical across groups and covered the agronomic characteristics of the four certified seed varieties, sales procedures, including pre-set prices of UGX 2,000 per bundle of 25 vine cuttings, and record-keeping using a standardised sales booklet. The booklet required promoters to record each buyer's name, gender, phone number, quantity purchased, and variety for every transaction. No financial incentives or penalties were attached to recording compliance, isolating the effect of the visibility nudge on voluntary effort.

At the onset of the first season rains, from late April to early May 2022, twelve bags of certified quality seeds across four varieties were delivered to each sales point: two bags per variety initially, followed by one additional bag per variety two weeks later. Promoters sold vines at the project-set price and were responsible for all record-keeping. Treatment village promoters ($n = 64$) were required to display a poster at their sales point announcing vine availability. The poster included images of the four varieties and planting benefits in both English and Ateso. Promoters were trained on prominent display and monitored for

compliance periodically by two field assistants. Control village promoters (n = 56) received identical vines, sales booklets, and recording instructions but no posters.

3.3.3 Data collection

A baseline survey was conducted in November–December 2021 with a random sample of 1,200 farmers prior to vine distribution, capturing household demographics, land ownership, agricultural practices, previous vine purchases, information sources, and risk preferences. Two trained research assistants collected sales booklets from all promoter farmers after the sales period. They also entered the data into a structured Excel database capturing buyer name, gender, phone number, quantity, and variety sold by the promoter.

A follow-up survey was conducted with 1,108 of the original 1,200 peer farmers, representing a 92.3% follow-up rate. Attrition was primarily due to temporary migration and did not differ significantly between treatment and control groups. The survey asked peer farmers who purchased vines: “*Did you leave your contact details at the sales station when you bought the vines?*” Those who answered no were asked why, with response options including: (1) the salesperson did not ask; (2) the salesperson asked, but we could not find time; and (3) the salesperson asked, but I declined. Comparing these peer self-reports with promoter sales records provides the primary method for identifying unreported transactions. Among the 1,108 peer farmers who completed follow-up surveys, 478, or 43.1%, reported purchasing vines from a promoter farmer. The full 1,108 dyadic observations were used in the analysis, with promoter-level count outcomes merged to each peer observation linked to their village.

Key informant interviews were conducted in July 2024 with 24 promoter farmers purposively selected by sales performance (high, medium, low) and gender (12 female, 12 male), nested within treatment and control groups (6 female and 6 male in treatment; 7 female and 5 male in control). Key informant interviews examined the mechanisms behind incomplete reporting and under-recording. The interview guide focused on circumstances that made accurate and complete transaction reporting difficult, including decision-making processes, perceived benefits, external pressures, time constraints, training, effort requirements, difficulty obtaining buyer information, and challenges linked to gender, age, education, or income differences between promoters and buyers. Promoters were also asked about improvements to the sales booklet, support needed for accurate reporting, transparency and monitoring mechanisms, supervision, the project’s ability to observe

promoter effort, perceived consequences of incomplete reporting, and reward structures that could improve effort. For promoters in treatment villages, additional questions examined whether the poster helped or hindered the collection of buyer information. They were conducted in Ateso, audio-recorded with consent, transcribed, and translated into English. Interview transcripts were first coded deductively using the domains in the key informant guide. They were then read inductively to identify patterns related to moral hazard, recording barriers, and gender-specific constraints. The analysis focused on explaining why transactions were omitted despite promoters reporting that they understood the sales booklet and project expectations. Quotes were selected when they illustrated a recurrent theme, clarified a quantitative pattern, or showed how promoters understood the costs, consequences, and incentives associated with accurate reporting.

3.3.4 Outcome variables and key term definitions

(i) Purchase recorded (binary, dyad level; 1 = recorded, 0 = not recorded): A transaction is classified as recorded when a peer farmer self-reports purchasing seed, and the purchase appears in the promoter sales booklet. A transaction is classified as unrecorded when the peer self-reports a purchase but does not appear in the promoter's sales record. In the follow-up survey, buyers of quality seeds were asked: *“Did you leave your contact details at the sales station when you bought the vines?”* Those who answered no were asked why, with response options including: (1) they never asked, and I did not know about the need; (2) they asked, I was willing to do so, but we could not find time; and (3) they asked, but I declined to give my details. This outcome is estimated at the dyad level using the 478 buyer observations and addresses the principal–agent framework: a recorded transaction is the minimum observable signal that the agent fulfilled the delegated monitoring task for that interaction.

(ii) Unreported female and male buyers (count, promoter level): These outcomes are derived by cross-checking the booklet submitted to the project against peer self-reports of purchase. A buyer is classified as unreported when they self-report purchasing vines, but their name does not appear in the promoter's booklet. Because the booklet is the mechanism through which the project counts beneficiaries and reconciles payments, an absent entry means the transaction was neither counted nor financially reconciled at the project level. This is a promoter-level outcome, constant for all 1,108 peer farmers linked

to the same promoter in a study village. It captures the magnitude of the gender-specific gap in promoter reporting to the project.

(iii) Poster assignment (village-level treatment, 1 = Yes) is the exogenous village-level randomised treatment. In this chapter, the poster assignment is interpreted as the public visibility condition because treatment village promoters were required to display a large point-of-sale poster.

(iv) Promoter publicity (voluntary word-of-mouth, 1 = Yes) is voluntary word-of-mouth outreach by the promoter and is treated as potentially endogenous. Peer poster reading (1 = Yes) is individual-level engagement with the poster, conditional on being in a treatment village; it is a mechanism variable, not the treatment itself.

3.3.5 Empirical method

The study uses structural equation modelling (SEM) to jointly estimate three outcome equations: the binary recording outcome at the dyad level and the two gender-specific unreported buyer counts at the promoter level. It addresses two questions. First, how do promoter gender, peer gender, and promoter–peer gender composition shape recording and the intensity of unreported transactions (RQ1)? Second, is public visibility through the point-of-sale poster associated with higher recording of quality seed buyers (RQ2)? SEM allows the analysis to model the interdependence of the error terms across these outcomes. The SEM is expressed as follows:

$$\left\{ \begin{array}{l} Y_{pej} = \mu_{Ype} + \alpha_{pe}male_{pej} + \alpha_{pe}Rps_{pej} + \rho_{pro}male_{proj} \\ \quad + \rho_{pro}Ups_{proj} + X_{pej} + X_{proj} + dH_{peproj} + \varepsilon_{pej}, \\ Y_{promj} = \mu_{Yprom} + \alpha_{pro}male_{proj} + \alpha_{pro}Ups_{proj} + \rho_{pe}male_{pej} \\ \quad + \rho_{pe}Rps_{pej} + X_{proj} + X_{pej} + dH_{peproj} + \varepsilon_{promj}, \\ Y_{profj} = \mu_{Yprof} + \alpha_{pro}male_{proj} + \alpha_{pro}Ups_{proj} + \rho_{pe}male_{pej} \\ \quad + \rho_{pe}Rps_{pej} + X_{proj} + X_{pej} + dH_{peproj} + \varepsilon_{profj}, \end{array} \right. \quad (1)$$

Where:

- Y_{pej} = whether the peer farmer's purchase was recorded in dyad j (1= yes); modelled at the dyad level among peer-reported buyers (n = 478)
- Y_{promj} = number of unreported male peer buyers for the promoter linked to dyad j; modelled at the promoter level (This outcome is measured at the promoter

level, giving 120 unique promoter-level values, and is repeated for each peer dyad linked to the same promoter in the 1,108-row dyadic dataset)

- Y_{profj} = number of unreported female peer buyers for the promoter linked to dyad j ; modelled at the promoter level (This outcome is measured at the promoter level, giving 120 unique promoter-level values, and is repeated for each peer dyad linked to the same promoter in the 1,108-row dyadic dataset.)
- α_{pe} = actor effects: peer characteristics predicting the peer-level recording outcome.
- ρ_{pro} = partner effects: promoter characteristics predicting the peer-level recording outcome.
- α_{pro} = actor effects: promoter characteristics predicting promoter level unreported buyer counts
- ρ_{pe} = partner effects: peer characteristics predicting promoter level unreported buyer counts
- Rps_{pej} = peer-reported poster reading (mechanism variable; individual-level exposure)
- Ups_{proj} = Public visibility, poster assignment (exogenous village-level treatment)
- X_{pej}, X_{pro} = peer and promoter socioeconomic control variables (Table A2)
- H_{peproj} = captures heterophily between promoter and peer farmers, measured as absolute differences in education, age, income, land, and bicycle ownership
- $\varepsilon_{pej}, \varepsilon_{promj}, \varepsilon_{profj}$ = error terms with non-zero covariance

The SEM is estimated on the 1,108 observations. The promoter-level count outcomes have 120 unique values and are repeated for each peer dyad linked to the same promoter. The SEM accounts for the joint structure of the outcomes by allowing error terms across equations to be correlated. It also allows covariances among observed exogenous variables because promoter characteristics, peer characteristics, and treatment-related variables may be correlated. Model fit was strong: $\chi^2/df = 2.597$ ($p = 0.627$); RMSEA = 0.01; CFI = 1.00; TLI = 1.00; NFI = 1.00. Before SEM estimation, selection bias was tested using a two-stage Heckman model to assess whether the sample of buyers ($n = 478$) was a selected subset that could bias recording estimates. The selection equation predicted who became a buyer using instruments including poster reading, vine awareness methods, sweetpotato

land acreage, and previous vine purchases. The estimated correlation between the selection and outcome error terms was $\rho = -0.1179$ (SE = 0.2286); the Wald test yielded $\chi^2(1) = 0.26$, $p = 0.609$. This indicates no statistically significant selection effect and supports estimating the recording model without a Heckman correction (Appendix Table B2).

3.4 Results

3.4.1 Descriptive statistics

Table 5 presents descriptive statistics on unreported quality seed buyers by promoter gender and treatment assignment. Female promoters had higher absolute counts of unreported buyers: unreported female buyers averaged 1.67, and unreported male buyers averaged 2.52. This pattern should not be interpreted as evidence that female promoters had weaker reporting. Female promoters were linked to a higher proportion of farmers reporting they had purchased quality seed, 49% compared to 41% reported by the male promoters.

Table 5: Unreported buyers by promoter gender and poster assignment (N=1108)

Variable	Female Promoters Mean (SD)	Male Promoters Mean (SD)	T-stat	Control Mean (SD)	Treatment (Poster) Mean (SD)	T-stat
Unreported Female buyers	1.67 (1.43)	1.40 (1.11)	3.24** *	1.45 (1.23)	1.50 (1.20)	0.70
Unreported Male buyers	2.52 (1.51)	2.26 (1.72)	2.37**	2.20 (1.70)	2.45 (1.63)	2.37**
Total Unreported buyers	4.19 (1.96)	3.66 (2.15)	3.74** *	4.19 (1.96)	3.95 (2.02)	2.28**
Poster assignment	0.46 (0.50)	0.56 (0.50)	2.92** *	–	–	–
Peer farmer reported a purchase (Yes/no)	0.49 (0.50)	0.41 (0.49)	2.36**	0.42 (0.49)	0.41 (0.49)	0.68
Purchase recorded (Yes/no)	0.62 (0.49)	0.61 (0.49)	0.18	0.61 (0.49)	0.61 (0.49)	0.06

*Note: Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. N = 1,108 promoter -peer dyads. Unreported counts are promoter-level outcomes derived by cross-checking promoter sales booklets against peer follow-up survey self-reports; these counts are repeated for all peers linked to the same promoter. “Peer farmer reported a purchase” and “Purchase recorded” are dyad-level peer-reported variables. A transaction is classified as unreported when a peer self-reports a purchase that does not appear in the promoter's sales record. T-statistics test differences between female and male promoters and between control and treatment villages.*

3.4.2 Reporting behaviour

Table 6 presents the results for hypotheses H1a–H2b. It reports three outcomes estimated jointly using SEM: (i) the peer farmer’s purchase was recorded (dyad-level), (ii) the count of unreported female buyers per promoter (promoter level), and (iii) the count of unreported male buyers per promoter (promoter level). The main finding is that recording is statistically significantly associated with peer gender. Meanwhile, public visibility through the poster has mixed and gender-conditional associations with under-reporting.

Table 6: Gender, visibility, and recording of quality seed buyers

	Purchase recorded (1=Yes) (dyad-level binary)		Unreported female buyers		Unreported male buyers	
Variables	B(SE)	Std. β	B(SE)	Std. β	B(SE)	Std. β
Promoter-level						
Poster assignment (village-level treatment, 1 = Yes)	-0.13 (0.14)	-0.05	0.08 (0.23)	0.03	1.53*** (0.29)	0.46
Promoter publicity (voluntary word-of- mouth, 1 = Yes)	0.10 (0.11)	0.04	-0.03 (0.17)	-0.01	0.73** (0.22)	0.22
Promoter gender (1 = male)	0.08 (0.12)	0.03	0.52** (0.19)	0.19	-0.08 (0.25)	-0.02
Promoter male × poster assignment	-0.05 (0.15)	-0.02	-0.72** (0.24)	-0.29	-0.58† (0.30)	-0.17
Poster assignment × promoter publicity	0.09 (0.10)	0.03	0.54*** (0.15)	0.19	-1.59*** (0.20)	-0.42
Promoter male × promoter publicity	-0.15 (0.10)	-0.06	- 0.72*** (0.15)	-0.29	-0.07 (0.20)	-0.02
Peer-level						
Poster read by peer (individual exposure, 1 = Yes)	0.69 (0.44)	0.17	-1.08 (0.70)	-0.27	1.53† (0.91)	0.28
Peer gender (1 = male)	0.21† (0.12)	0.08	-0.41* (0.20)	-0.16	0.46† (0.25)	0.14
Peer male × poster read by peer	-0.29† (0.15)	-0.06	-0.25 (0.24)	-0.05	0.38 (0.31)	0.06
Gender homophily						
Peer male × promoter male	-0.01 (0.13)	-0.00	0.14 (0.21)	0.06	-0.06 (0.26)	-0.02
N	478		1,108		1,108	

† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Note: Three outcomes are estimated simultaneously in a single SEM. Full results with all control variables are reported in Appendix Table B1 and are the primary estimates. Tables B2 and B3 provide robustness checks using Heckman selection correction and probit/Poisson specifications, respectively. The binary recorded-purchase outcome is estimated only among peer farmers who reported purchasing vines ($n = 478$). The two unreported-buyer count outcomes are promoter-level counts, with 120 unique promoter values repeated across the 1,108 peer dyads linked to those promoters.

Male peer farmers are more likely to have their quality seed purchase transaction details recorded by the promoter farmers than their female counterparts ($\beta = 0.08$, $p < 0.10$), providing marginal support for H1a. This suggests that promoter farmer reporting behaviour is structured by the gender of the peer farmer being served. The chi-square test confirms this pattern at the aggregate level ($\chi^2 = 32.134$, $p < 0.001$): 54.3% of female peer farmers' purchases were unrecorded compared with 28.4% of male peer farmers' purchases. Peer gender is also associated with the intensity of gender-specific under-recording. Male peer farmers are associated with a reduction in the number of unreported female buyers ($\beta = -0.16$, $p < 0.05$) but are marginally associated with an increase in unreported male buyers ($\beta = 0.14$, $p < 0.10$). At the level of the transaction partner, female farmers appear more vulnerable to omission. This pattern is consistent with selective reporting under information asymmetry.

Male promoters are associated with an increase in unreported female buyers ($\beta = 0.19$, $p < 0.01$). This association is conditional: it is substantially modified by poster assignment and promoter publicity, as shown by the interaction terms. The gender homophily (peer male $\times$ promoter male) is not significant, so H1c is not supported. The result suggests that male promoter status is associated with under-recording of female peer transactions in the baseline condition. At the same time, this association is reduced when male promoters are assigned to the poster treatment or engage in publicity.

Poster assignment is associated with an increase in unreported male buyers ($\beta = 0.46$, $p < 0.001$). This does not support the expectation that public visibility is associated with improved promoter farmer reporting. Instead, it suggests that visibility through the poster does not produce a general improvement in monitoring behaviour and may be associated with substitution away from less visible administrative effort. The interaction between promoter gender and poster assignment is significant for both female and male unreported buyer counts, supporting H2b. For female buyers, the interaction term is negative ($\beta = -0.29$, $p < 0.01$), indicating that poster assignment reduces the positive association between male promoters and unreported female transactions. For male buyers, the interaction term is also negative, though only marginally significant ($\beta = -0.17$, $p < 0.10$), suggesting that the positive association between poster assignment and unreported male buyers is weaker when the promoter is male.

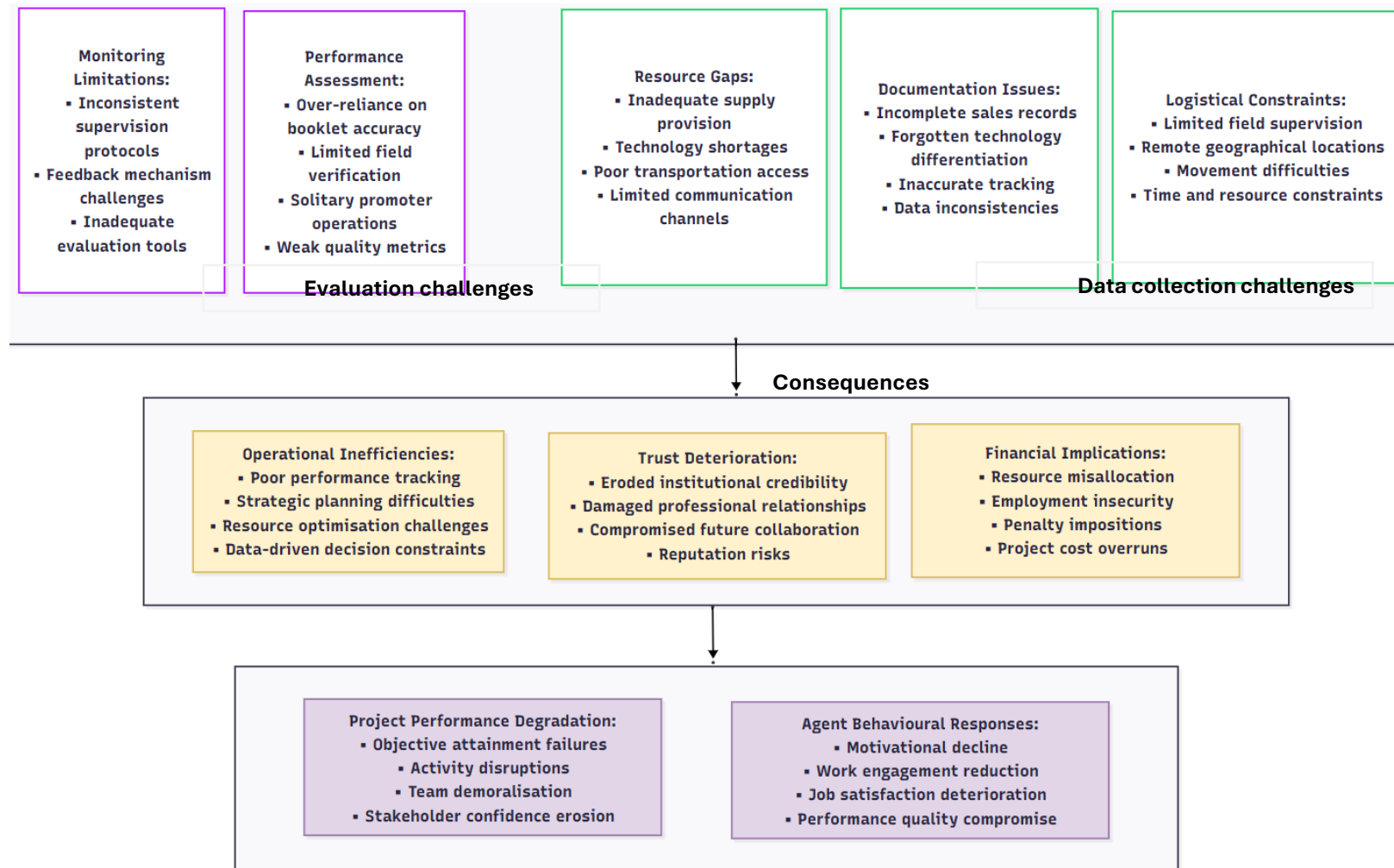
The interaction between poster assignment and promoter publicity warrants attention. Although no specific hypothesis was formulated for this interaction, the estimates are among the most robust across specifications. The interaction is positive for unreported female buyers ($\beta = 0.19$, $p < 0.001$) and negative for unreported male buyers ($\beta = -0.42$, $p < 0.001$). The opposite signs across female and male buyer outcomes suggest that the combined effect of poster assignment and promoter publicity is gender-differentiated. The result reinforces the finding that visibility and publicity operate conditionally rather than as general accountability tools.

3.4.3 Mechanisms explaining under-reporting of quality seed buyers

The qualitative interviews help explain the mechanisms behind the under-reporting by the promoter farmers. The majority of the promoters reported no challenges in using the sales book. They indicated that the project's expectations and guidelines during training were clear. The use of local languages (for example, Ateso) increased the comprehension of the material for recording sales. A participant stated, *"I understood every concept because the booklet was translated into our language"*, and another promoter observed, *"The information is well designed and very easy to understand."* The results show that promoters were aware of the consequences of poor reporting, even though the quantitative patterns suggest that recording was not consistently prioritised in practice. However, the under-reporting may be explained by three overlapping aspects: administrative constraints, social norms, and incentive misalignment.

First, promoters faced administrative constraints. Although most promoters reported that the sales booklet was clear and that training was well delivered, interviews revealed that recording competed with the practical realities of selling. Figure 3 shows that, first, promoters struggled when farmers lacked some details, such as telephone numbers. This was confirmed by some peer farmers, who stated that they had no phones or SIM cards at the time of the study. Transactions often continued, but they were not recorded, indicating that incomplete buyer information could prevent documentation even when the sale took place. This underscores a gap in the implementation, despite promoters reporting that training and materials were clear and available in local languages. Second, some promoters reported difficulty recalling a variety of details, including flesh and skin colour, which led to transactions being omitted from the booklet.

Figure 3: Evaluation and data collection challenges from promoter farmers' feedback



Third, some female promoters reported that recording multiple variety bundles per transaction was tedious. Others noted that farmers visited the sales point briefly, making it difficult to capture their details before they left. These responses support the interpretation of record-keeping as an effort-intensive administrative task rather than a neutral clerical step. These constraints indicate that transaction documentation is an effort-intensive task, even when training and materials are adequate. The results suggest that the task administrative effort is costly and therefore not uniformly applied across transactions.

The interviews also suggest that some omissions were socially patterned. Some transactions with farmers close to the promoter were not captured. Peer farmers described informal transactions rooted in familiarity and trust, making statements such as “*the seller knew me,*” “*we are friends,*” or “*he is my relative.*” In these cases, formal record-keeping appears to have been displaced by informal trust. Interviews also revealed that vines sold on credit were sometimes omitted from the booklet to avoid accounting errors. A few male promoter farmers also admitted that sales made when away from the sales point and purchases made by children were not captured in the data. Peer farmers noted that they sent children, husbands, or in-laws to buy vines or purchased them from someone who had already bought them, introducing untraceable secondary transactions. These findings are consistent with the quantitative result that recording is selective and relationally embedded rather than uniformly applied across all transactions. Transactions embedded in social relationships are less likely to be formally recorded, suggesting that promoters differentiate between transactions that require administrative documentation and those that do not. The finding provides a plausible explanation for the observed gender differences, as cross-gender or socially distant interactions may be more likely to fall outside routine recording practices.

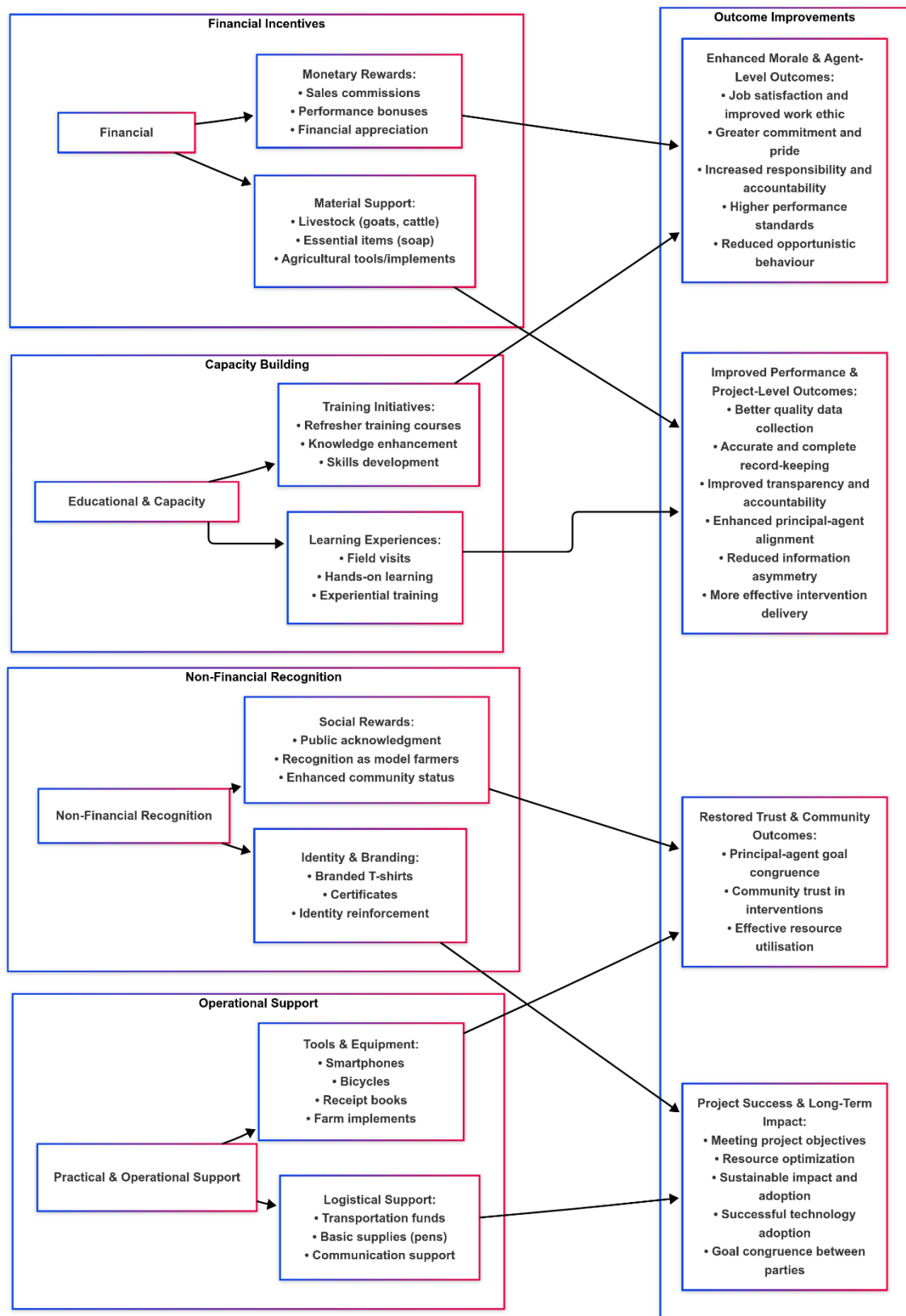
Importantly, the peer farmers survey points out that the responsibility for recording lies with the promoters. Approximately 73% of the unrecorded peers indicated that they did not leave their details simply because they were never asked or informed about the need to do so. A smaller number of peer farmers (three respondents) mentioned time constraints, and two indicated they declined to provide details. Under-reporting reflects promoter behaviour rather than buyer unwillingness. In principal–agent terms, the hidden action lies not in whether peers cooperated, but in whether promoters chose to exert the effort required to document the transaction.

Figure 3 shows that promoters were aware that record-keeping supported project functions. At the personal level, promoter interviews describe the erosion of trust in organisations and communities if they shirk on their duties. According to the interviews, this manifests through damaged professional relationships, loss of credibility, and doubts regarding the promoter's integrity. This loss extends to the activities that they are assigned, where promoters are at risk of being perceived as incompetent or uncommitted, leading to failed deals and exclusion from future opportunities. On a broader scale, the promoters observe project-level impacts, including the deterioration of data quality and tracking mechanisms, which compromise the accuracy of outcome evaluations. These failures have financial and operational consequences, including direct penalties, loss of income, and the inability to account for distributed materials. Moreover, they mentioned that weak implementation hinders accurate monitoring of sales and adoption rates, undermining the effectiveness and credibility of the intervention.

Promoter farmers identified several complementary incentives needed to sustain their engagement (Figure 4). First, they called for financial incentives in the form of stipends, livestock provisions, and agricultural tools to improve morale and heighten commitment and satisfaction. Simultaneously, recognition and social rewards (including public acknowledgement, branded apparel, and elevation to the status of the model farmer) are associated with a sense of pride and social validation, thereby reinforcing personal accountability and enhancing the community's reputation. These responses indicate that promoters attached greater value to incentives that are socially visible or materially tangible than to the administrative demands of accurate reporting.

Promoters also indicate capacity building to amplify their motivation and equip them with essential knowledge and skills through refresher training and educational field visits, which, in turn, elevate their confidence and technical expertise. Training is key to reducing inefficiencies in some agencies. They request reminders or refresher courses on how to complete the receipt booklet (some admitted that they forgot to differentiate between the two technologies). Occasional refreshers could maintain awareness of the varieties being disseminated and ensure that correct advice is given to peer farmers. Logistical support, such as transportation funds and media outreach (including radio announcements on the availability of seeds), is needed to reach farmers successfully.

Figure 4: Incentive structures described by promoter farmers



Finally, practical support mechanisms, such as smartphones and free seeds, were signalled to boost operational productivity by reducing logistical constraints and improving data collection practices. Female respondents emphasised the importance of basic supplies, such as pens and writing materials, to ensure accurate data recording. These results suggest the necessity of both extrinsic and intrinsic motivators in driving promoter farmers' agricultural engagement and sustaining participation. Overall, promoter farmers understood incentives as combining financial support, recognition, refresher training, and basic logistical tools. In relation to the quantitative results, promoters value incentives that are either socially visible or materially tangible. Recording is neither. This helps explain why the poster nudge, which provides a visibility signal without reducing the administrative cost of documentation, did not reliably improve reporting behaviour.

3.5 Discussion

3.5.1 Gender and reporting to support project monitoring

This chapter assessed how gender and public visibility were associated with promoter farmers' reporting behaviour. Recording is treated as the observable proxy for the promoter supporting the project's monitoring and learning function. Overall, the results show a high underreporting of quality seed buyers. Qualitative evidence suggests that the agents' failure to report all buyers is partly due to operational constraints such as obtaining contact information from peer farmers, recalling vine variety details, and recording transactions during busy sales periods. However, the under-reporting of buyers is not an administrative problem; reports are biased downward, understating project reach and misrepresenting the distribution of benefits across gender groups. Interestingly, about 73% of farmers who purchased seed reported that their transactions were not captured because the promoter farmer did not ask for their details. Thus, the reporting behaviour is consistent with moral hazard under delegated monitoring with limited observability.

According to the results, female farmers were less likely than their male counterparts to have their purchases recorded. The under-recording suggests that female farmers are likely to be excluded from follow-up activities that depend on the list submitted to the project by the promoter farmers. The recording gap, therefore, became an access gap. It affects project monitoring and farmers' future access to project benefits. Female farmers in SSA are still largely subordinate to their male counterparts due to the complexity of gender norms. Male farmers are more readily viewed as market-facing in the agricultural

sector. In agricultural extension, female farmers often receive less systematic attention from service providers (Duffy *et al.*, 2021). The exclusion also persists despite policy commitments at both national and international levels to address gender inequalities in the agricultural sector. Prevailing gender stereotypes obscure women's disadvantaged positions in agricultural work (Quisumbing *et al.*, 2020). The implication is that project records should not be treated as neutral evidence of who was reached. Where female transactions are more likely to be omitted, monitoring systems may underestimate women's engagement and weaken the basis for gender-responsive programme learning.

Male promoters were associated with more unreported female peer buyers in the reference condition. Several mechanisms may explain the pattern. Statistical discrimination may lead promoters to treat female peer transactions as lower priority. Differences in gendered role expectations may also matter. Women are often expected to perform socially attentive and detail-oriented tasks, while men may face less pressure to demonstrate administrative diligence (Eagly, 2013). Social norms may also make documentation more difficult where women purchase through children, spouses, or other intermediaries. Male promoters may treat such transactions as ambiguous, less formal, or less urgent to record. These mechanisms point to selective reporting under information asymmetry. They do not imply that every omission reflects deliberate discrimination. The qualitative evidence shows that capacity constraints, time pressure, and informal sales practices also matter.

3.5.2 Visibility, substitution effects, and heterogeneous reporting behaviour

The poster assignment was associated with higher unreported male buyer counts. The finding provides the chapter's most counterintuitive answer to public visibility. Visibility did not translate into higher reporting. One possible explanation is that the poster did not activate reputational pressure around record-keeping specifically, as promoters may have perceived their sales role as already publicly visible. Promoters may therefore have perceived their implementation effort as already observable to the community and the project, reducing the salience of detailed transaction recording. In this interpretation, under-recording does not necessarily reflect deliberate concealment. Instead, the poster may have created a visible signal of project affiliation without reducing the effort cost of record-keeping. The result is consistent with a substitution mechanism. The poster publicly signalled the promoter's project role. That visible signal may have satisfied part of the

reputational demand for performing the role visibly. The less visible task of recording transactions may then have received less attention. The finding relates to Okello et al. (2023), who show that public recognition reduced outreach effort among lead farmers. The mechanism in the present chapter is different. The poster was not a reward. It was a public sign of the promoter's role. The possible substitution was therefore between visible role performance and the less visible administrative task of recording buyer details.

The interaction between promoter gender and poster assignment adds precision. For female peer transactions, poster assignment reduced the positive association between male promoters and unreported female buyers. For male peer transactions, poster assignment increased unreported male buyer counts overall, although the association was weaker when the promoter was male. Public visibility, therefore, did not work as a general accountability tool. Its association with recording varied by promoter gender and peer gender. The interaction between poster assignment and promoter publicity also matters. No separate hypothesis was formulated for that interaction, but the estimates are strong. The interaction increased unreported female buyer counts and reduced unreported male buyer counts. While the key informant interviews did not directly address this mechanism, it is consistent with the qualitative patterns described in Section 3.4.3, where informal and delegated transactions were frequently omitted. Female transactions, delegated purchases, or purchases through relatives may be treated as less formal or less recordable. The practical implication is clear. Visibility interventions can widen gendered recording gaps when the design does not account for how recording effort is differentially allocated across male and female clients.

3.5.3 Incentives, infrastructure, and the limits of visibility

Key informant interviews show that promoters experienced recording as an effort-intensive task. It competed with selling, managing buyers, identifying varieties, and handling incomplete buyer information. Common barriers included buyers without telephone numbers, difficulty recalling seed variety details, and time pressure during sales. Female promoters also cited a lack of basic writing materials, including pens and paper. These constraints were not only motivational but also logistical. The findings challenge a common assumption in farmer-to-farmer models. Voluntary agents are often expected to absorb administrative duties with little material support. The results suggest that the

assumption is weak. Promoters can understand the task and still fail to complete it when the task is costly, poorly supported, and weakly monitored.

Promoters described a broad set of desired incentives. These included financial support, tools, livestock, public acknowledgement, model farmer status, branded apparel, refresher training, transport, smartphones, and stationery. The pattern is important. Promoters valued incentives that were socially visible or materially useful. Record keeping was neither. The poster made the promoter's role visible, but it did not reduce the cost of documentation. That helps explain why visibility produced mixed results. The reputational benefit of visibility could be captured without lowering the effort required for recordkeeping. Improving reporting, therefore, requires reducing the cost of the task itself. Useful options include simplified booklets, basic stationery, periodic checks, and clearer procedures for buyers without phone numbers.

The chapter, therefore, shows a monitoring limitation within farmer-to-farmer models. Delegating sales also delegates record-keeping. If recording is unsupported, weakly monitored, and gendered in practice, project records may misrepresent who participated. The implication is not to abandon promoter-based delivery. The implication is to redesign monitoring. Recording tools should reduce effort costs. Promoter selection should account for administrative competence as well as dissemination ability. Monitoring systems should create real observability rather than symbolic visibility.

Appendices B: Chapter Three

Table B1: SEM results for intensity of unreported purchases

	Purchase recorded (1=Yes) (dyad-level binary)		Unreported female buyers (promoter- level count)		Unreported male buyers (promoter-level count)	
	B(SE)	Std. β	B(SE)	Std. β	B(SE)	Std. β
Promoter-level variables						
Poster assignment (village- level treatment, 1 = Yes)	-0.13 (0.14)	-0.053	0.08 (0.23)	0.034	1.53*** (0.29)	0.457
Promoter publicity (voluntary word-of-mouth, 1 = Yes)	0.10 (0.11)	0.039	-0.03 (0.17)	-0.014	0.73** (0.22)	0.215
Promoter gender (1 = male)	0.08 (0.12)	0.030	0.52** (0.19)	0.192	-0.08 (0.25)	-0.021
Promoter male $\times$ poster assignment	-0.05 (0.15)	-0.018	-0.72** (0.24)	-0.291	-0.58† (0.30)	-0.170
Poster assignment $\times$ promoter publicity	0.09 (0.10)	0.031	0.54*** (0.15)	0.192	- 1.59*** (0.20)	-0.416
Promoter male $\times$ promoter publicity	-0.15 (0.10)	-0.062	-0.72*** (0.15)	-0.288	-0.07 (0.20)	-0.019
Education (years), promoter	-0.01 (0.01)	-0.014	-0.00 (0.01)	-0.010	0.10*** (0.01)	0.214
Age (years), promoter	-0.00 (0.00)	-0.027	0.01† (0.00)	0.053	-0.01* (0.00)	-0.074
Agricultural employment income (000000), promoter	0.00 (0.07)	0.001	-0.46*** (0.11)	-0.177	0.29* (0.14)	0.082
Farm income (000000), promoter	0.02 (0.03)	0.011	-0.27*** (0.05)	-0.186	- 0.32*** (0.07)	-0.161
Non-agricultural income (000000), promoter	-0.05 (0.04)	-0.029	0.10† (0.06)	0.055	0.03 (0.07)	0.011
Sweetpotato land (acres), promoter	0.04 (0.04)	0.016	-0.45*** (0.07)	-0.188	-0.22* (0.09)	-0.065
Bicycle ownership (1 = Yes), promoter	0.00 (0.06)	0.001	-0.34*** (0.09)	-0.112	- 0.57*** (0.12)	-0.138
Neighbours as agricultural information source (1 = Yes), promoter	-0.07 (0.06)	-0.023	0.07 (0.10)	0.025	- 0.44*** (0.12)	-0.110
Distance to road (minutes), promoter	0.00 (0.00)	-0.007	-0.01** (0.00)	-0.098	0.02*** (0.00)	0.201
Peer-level variables						
Peer read poster (individual exposure, 1 = Yes)	0.69 (0.44)	0.172	-1.08 (0.70)	-0.273	1.53† (0.91)	0.281
Peer gender (1 = male)	0.21† (0.12)	0.084	-0.41* (0.20)	-0.164	0.46† (0.25)	0.135
Peer received advice at the sales point (1 = Yes)	-0.01 (0.12)	-0.004	-0.01 (0.20)	-0.006	0.04 (0.26)	0.010
Peer male $\times$ peer read poster	-0.29† (0.15)	-0.061	-0.25 (0.24)	-0.052	0.38 (0.31)	0.059

	Purchase recorded (1=Yes) (dyad-level binary)		Unreported female buyers (promoter- level count)		Unreported male buyers (promoter-level count)	
	B(SE)	Std. β	B(SE)	Std. β	B(SE)	Std. β
Peer received advice × peer male	0.08 (0.09)	0.027	-0.27† (0.15)	-0.096	0.28 (0.19)	0.072
Peer received advice × peer read poster	0.01 (0.14)	0.002	0.12 (0.23)	0.024	-0.54† (0.30)	-0.079
Learned seed availability from villagers (1 = Yes)	0.03 (0.04)	0.010	0.05 (0.07)	0.022	0.30*** (0.09)	0.088
Learn seed availability from LC chair (1=Yes)	-0.01 (0.07)	-0.002	-0.02 (0.11)	-0.006	0.24† (0.14)	0.045
Age (years), peer	0.00 (0.00)	0.028	0.00 (0.00)	0.043	0.01* (0.00)	0.063
Education (years), peer	0.01 (0.01)	0.023	0.00 (0.01)	0.008	-0.02 (0.01)	-0.049
Bicycle ownership (1 = Yes), peer	-0.01 (0.05)	-0.003	0.07 (0.09)	0.028	-0.09 (0.11)	-0.026
Agricultural employment income (000000), peer	0.04 (0.10)	0.010	-0.29† (0.16)	-0.077	0.10 (0.20)	0.019
Farm income (000000), peer	0.06* (0.03)	0.066	-0.06 (0.04)	-0.071	0.01 (0.05)	0.005
Non-agricultural income (000000), peer	-0.04 (0.03)	-0.034	0.08† (0.05)	0.080	-0.04 (0.06)	-0.026
Neighbours as agricultural information source (1 = Yes), peer	-0.11* (0.05)	-0.042	0.18* (0.09)	0.067	0.14 (0.11)	0.037
Sweetpotato land (acres), peer	-0.01 (0.05)	-0.031	0.02 (0.07)	0.045	0.28** (0.10)	0.501
Ever purchased vines (1=yes), peer	0.05 (0.05)	0.018	0.24** (0.08)	0.084	0.22* (0.10)	0.056
Past disease experience (factor), peer	0.02 (0.02)	0.014	—	—	—	—
Past erratic rain experience (factor), peer	0.02 (0.02)	0.017	—	—	—	—
Gender homophily						
Peer male × promoter male	-0.01 (0.13)	-0.004	0.14 (0.21)	0.056	-0.06 (0.26)	-0.019
Information exposure dyad						
Poster assignment × peer read poster	-0.22 (0.36)	-0.054	0.47 (0.58)	0.115	-0.58 (0.75)	-0.105
Peer male × poster assignment	-0.01 (0.16)	-0.004	0.28 (0.25)	0.108	0.01 (0.33)	0.002
Promoter male × peer read poster	-0.15 (0.16)	-0.033	0.76** (0.27)	0.167	0.13 (0.34)	0.020
Peer male × promoter publicity	-0.06 (0.09)	-0.025	0.10 (0.14)	0.039	-0.15 (0.18)	-0.044
Peer received advice × poster assignment	-0.03 (0.09)	-0.011	-0.03 (0.15)	-0.011	0.01 (0.19)	0.003
Promoter male × peer male × poster assignment	0.20 (0.18)	0.068	-0.11 (0.30)	-0.038	-0.19 (0.38)	-0.047
Promoter publicity × peer read poster	-0.07 (0.15)	-0.012	0.10 (0.24)	0.017	-0.67* (0.30)	-0.085

	Purchase recorded (1=Yes) (dyad-level binary)		Unreported female buyers (promoter- level count)		Unreported male buyers (promoter-level count)	
	B(SE)	Std. β	B(SE)	Std. β	B(SE)	Std. β
Peer received advice × promoter publicity	0.18* (0.09)	0.058	0.12 (0.14)	0.038	-0.45* (0.19)	-0.107
Peer received advice × promoter male	0.02 (0.10)	0.006	0.09 (0.15)	0.033	0.26 (0.20)	0.068
Socioeconomic heterophily						
Agricultural employment dissimilarity	0.01 (0.02)	0.007	0.06† (0.03)	0.085	-0.03 (0.04)	-0.036
Age dissimilarity	0.00 (0.00)	-0.023	0.00** (0.00)	-0.091	0.00 (0.00)	0.029
Sweetpotato land dissimilarity	-0.00*** (0.00)	-0.888	0.00 (0.00)	-0.034	-0.00* (0.00)	-0.431
Bicycle ownership dissimilarity	-0.07 (0.05)	-0.028	0.11 (0.09)	0.043	0.04 (0.11)	0.012
Education dissimilarity	0.00** (0.00)	0.050	0.00 (0.00)	0.040	- 0.01*** (0.00)	-0.149
Farm income dissimilarity	-0.01** (0.00)	-0.084	0.00 (0.00)	0.036	-0.00 (0.01)	-0.011
Non-agricultural income dissimilarity	0.00† (0.00)	0.051	-0.01 (0.00)	-0.060	-0.00 (0.01)	-0.035
Neighbour information- source dissimilarity	0.05 (0.05)	0.019	0.16† (0.09)	0.063	0.11 (0.11)	0.032

Note: Significance levels: † p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table B2: Heckman for recorded purchase and inverse mill ratio for the intensity of unreported female and male buyers

VARIABLES	(1) Recorded Heckman	(2) Recorded Selection Buyer (yes)	(3) Recorded Logit	(4) Poisson Female unreported buyers Inverse Mill Ratio	(5) Poisson Female Unreported buyers Unreported Inverse Mill Ratio	(6) Poisson Male Unreported buyers Inverse Mill Ratio	(7) Poisson Male unreported buyers	(8) Poisson Overall unreported buyers Inverse Mill Ratio	(9) Poisson Overall Unreported buyers
Promoter gender (1= male)	0.03 (0.15)	-0.16 (-1.52)	0.02 (0.13)	-0.05 (-0.29)	-0.06 (-0.31)	-0.20 (-1.56)	-0.21 (-1.60)	-0.14 (-1.47)	-0.15 (-1.52)
Peer gender (1= male)	0.67*** (5.13)	-0.11 (-1.34)	0.68*** (5.16)	-0.40*** (-5.82)	-0.40*** (-5.83)	0.26*** (3.95)	0.26*** (3.93)	-0.02 (-0.39)	-0.02 (-0.40)
Poster assignment (village-level treatment, 1 = Yes)	-0.25 (-1.48)		-0.25 (-1.46)	0.11 (0.61)	0.11 (0.64)	0.15 (1.25)	0.15 (1.26)	0.14 (1.40)	0.14 (1.41)
Promoter publicity (word-of- mouth on seed availability, 1 = Yes)	0.20 (1.40)		0.21 (1.43)	0.05 (0.38)	0.05 (0.39)	-0.22** (-2.03)	-0.22** (-2.00)	-0.13 (-1.52)	-0.13 (-1.49)
Peer read poster (individual exposure, 1 = Yes)	0.72* (1.86)	1.06*** (7.20)	0.78** (2.18)	-0.27 (-1.59)	-0.22 (-1.47)	0.23* (1.92)	0.29** (2.53)	0.01 (0.06)	0.07 (0.76)
Peer received advice at sales point (1 = Yes)	0.50*** (3.01)		0.50*** (3.04)	-0.07 (-1.09)	-0.07 (-1.07)	0.05 (0.88)	0.05 (0.91)	0.01 (0.11)	0.01 (0.14)
Education (years), promoter	-0.01 (-0.62)		-0.01 (-0.64)	0.02 (0.88)	0.02 (0.86)	0.04** (2.33)	0.04** (2.33)	0.03** (2.36)	0.03** (2.33)
Non-agricultural income (000000), promoter	-0.06 (-0.77)		-0.06 (-0.78)	-0.06 (-0.57)	-0.06 (-0.56)	-0.11* (-1.76)	-0.11* (-1.75)	-0.09 (-1.63)	-0.09 (-1.60)
Bicycle ownership (1 = Yes), promoter	0.09 (0.52)		0.09 (0.51)	-0.22 (-1.42)	-0.22 (-1.42)	0.05 (0.50)	0.05 (0.48)	-0.05 (-0.63)	-0.06 (-0.64)

VARIABLES	(1) Recorded Heckman	(2) Recorded Selection Buyer (yes)	(3) Recorded Logit	(4) Poisson Female unreported buyers Inverse Mill Ratio	(5) Poisson Female Unreported buyers Unreported Mill Ratio	(6) Poisson Male Unreported buyers Inverse Mill Ratio	(7) Poisson Male unreported buyers	(8) Poisson Overall unreported buyers Inverse Mill Ratio	(9) Poisson Overall Unreported buyers
Neighbours as agricultural information source (1 = Yes), promoter	-0.24 (-1.27)		-0.25 (-1.30)	0.09 (0.36)	0.08 (0.34)	0.09 (0.61)	0.08 (0.57)	0.10 (0.77)	0.09 (0.73)
Distance to road (minutes), promoter	0.00 (1.13)		0.00 (1.11)	-0.00 (-0.90)	-0.00 (-0.92)	0.00* (1.86)	0.00* (1.85)	0.00 (0.74)	0.00 (0.73)
Peer male × peer read poster	-0.44 (-1.33)		-0.45 (-1.35)	-0.08 (-0.53)	-0.08 (-0.56)	-0.13 (-1.13)	-0.14 (-1.20)	-0.06 (-0.79)	-0.07 (-0.88)
Peer received advice × peer read poster	-0.13 (-0.32)		-0.13 (-0.32)	0.16 (0.97)	0.17 (0.99)	-0.10 (-0.89)	-0.10 (-0.87)	-0.00 (-0.02)	0.00 (0.00)
Age (years), promoter	0.01** (2.08)		0.01** (2.05)	-0.00 (-0.33)	-0.00 (-0.44)	0.00 (1.02)	0.00 (0.83)	0.00 (0.45)	0.00 (0.20)
Education (years), peer	0.01 (0.41)		0.01 (0.42)	-0.00 (-0.54)	-0.00 (-0.51)	0.00 (0.38)	0.00 (0.34)	-0.00 (-0.03)	-0.00 (-0.04)
Non-agricultural income (000000), peer	-0.04 (-0.71)		-0.04 (-0.72)	0.03 (1.02)	0.02 (0.98)	-0.02 (-1.22)	-0.02 (-1.21)	-0.01 (-0.44)	-0.01 (-0.47)
Agricultural employment income (000000), peer	-0.03 (-0.08)		-0.03 (-0.08)	0.15 (1.04)	0.15 (1.02)	-0.04 (-0.26)	-0.03 (-0.23)	0.05 (0.53)	0.05 (0.54)
Farm income (000000), peer	0.20*** (2.58)		0.20*** (2.64)	-0.01 (-0.25)	-0.01 (-0.17)	0.02 (0.78)	0.02 (0.83)	0.01 (0.51)	0.01 (0.60)
Age (years), peer	-0.01 (-1.29)		-0.01 (-1.30)	-0.00 (-0.27)	-0.00 (-0.28)	-0.00 (-0.18)	-0.00 (-0.19)	-0.00 (-0.45)	-0.00 (-0.47)
Bicycle ownership (1 = Yes), peer	0.03		0.03	0.11**	0.11**	0.00	0.01	0.05	0.06

VARIABLES	(1) Recorded Heckman	(2) Recorded Selection Buyer (yes)	(3) Recorded Logit	(4) Poisson Female unreported buyers Inverse Mill Ratio	(5) Poisson Female Unreported buyers Unreported Mill Ratio	(6) Poisson Male Unreported buyers Inverse Mill Ratio	(7) Poisson Male unreported buyers	(8) Poisson Overall unreported buyers Inverse Mill Ratio	(9) Poisson Overall Unreported buyers
Neighbours as agricultural information source, peer	(0.18) -0.48***		(0.22) -0.48***	(2.00) 0.17***	(2.04) 0.17***	(0.00) -0.03	(0.15) -0.03	(1.40) 0.04	(1.63) 0.05
Past disease experience (factor), peer	(-3.19) 0.06		(-3.17) 0.06	(3.05) 0.01	(3.11) 0.00	(-0.66) -0.03*	(-0.56) -0.03*	(1.20) -0.02	(1.34) -0.02
Past erratic rain experience (factor), peer	(0.96) 0.07		(0.95) 0.07	(0.23) -0.00	(0.19) -0.00	(-1.68) -0.01	(-1.73) -0.01	(-1.21) -0.00	(-1.29) -0.01
Agricultural employment dissimilarity	(0.99) 0.04		(0.95) 0.05	(-0.06) -0.03	(-0.20) -0.03	(-0.45) 0.01	(-0.62) 0.01	(-0.26) -0.01	(-0.48) -0.01
Age dissimilarity	(0.81) -0.00		(0.83) -0.00	(-1.15) -0.00	(-1.12) -0.00	(0.25) 0.00	(0.25) 0.00	(-0.62) -0.00	(-0.59) -0.00
Bicycle ownership dissimilarity	(-1.46) -0.13		(-1.45) -0.12	(-0.63) -0.04	(-0.62) -0.04	(0.29) 0.04	(0.29) 0.04	(-0.16) 0.01	(-0.14) 0.01
Farm income dissimilarity	(-0.92) -0.03**		(-0.89) -0.03**	(-0.63) -0.00	(-0.60) -0.00	(0.79) -0.00	(0.82) -0.00	(0.32) -0.00	(0.37) -0.00
group(subcounty) = 2	(-2.16) 0.01	0.57***	(-2.19) 0.04	(-0.34) -0.34	(-0.41) -0.31	(-0.70) 0.27	(-0.73) 0.31	(-0.65) 0.08	(-0.71) 0.11
group(subcounty) = 3	(0.03) -1.07***	(2.78) 0.37*	(0.08) -1.07***	(-0.74) -0.09	(-0.65) -0.09	(0.90) -0.34	(1.01) -0.33	(0.28) -0.22	(0.41) -0.22
group(subcounty) = 4	(-2.83) -0.63**	(1.86) 0.14	(-2.82) -0.62**	(-0.25) 0.08	(-0.23) 0.09	(-1.22) -0.10	(-1.19) -0.09	(-0.85) -0.02	(-0.82) -0.01
group(subcounty) = 5	(-2.06) -0.34	(0.57) 0.26	(-2.04) -0.34	(0.29) 0.40	(0.33) 0.40	(-0.43) -1.11***	(-0.40) -1.12***	(-0.12) -0.16	(-0.07) -0.16
group(subcounty) = 6	(-0.71) -0.91**	(0.63) 0.43*	(-0.72) -0.90**	(0.94) -0.04	(0.95) -0.02	(-3.84) 0.04	(-3.90) 0.06	(-0.45) 0.01	(-0.47) 0.02

VARIABLES	(1) Recorded Heckman	(2) Recorded Selection Buyer (yes)	(3) Recorded Logit	(4) Poisson Female unreported buyers Inverse Mill Ratio	(5) Poisson Female Unreported buyers Unreported Mill Ratio	(6) Poisson Male Unreported buyers Inverse Mill Ratio	(7) Poisson Male unreported buyers	(8) Poisson Overall unreported buyers Inverse Mill Ratio	(9) Poisson Overall Unreported buyers
group(subcounty) = 7	(-2.40) -0.62**	(1.70) 0.29	(-2.42) -0.61**	(-0.14) 0.03	(-0.09) 0.04	(0.17) -0.04	(0.24) -0.03	(0.04) -0.01	(0.12) 0.00
group(subcounty) = 8	(-2.10) -0.72	(1.43) 0.20	(-2.09) -0.72*	(0.12) 0.18	(0.17) 0.18	(-0.14) -0.31	(-0.09) -0.31	(-0.05) -0.10	(0.00) -0.10
group(subcounty) = 9	(-1.64) -0.75*	(0.84) 0.63**	(-1.65) -0.75*	(0.57) -0.12	(0.56) -0.11	(-1.18) 0.23	(-1.18) 0.24	(-0.45) 0.13	(-0.46) 0.14
group(subcounty) = 10	(-1.89) -0.95**	(2.18) 0.37*	(-1.92) -0.94**	(-0.38) -0.29	(-0.37) -0.27	(0.86) -0.28	(0.87) -0.27	(0.59) -0.28	(0.60) -0.27
group(subcounty) = 11	(-2.46) -1.04***	(1.80) 0.68**	(-2.45) -1.01***	(-0.64) 0.43	(-0.61) 0.46	(-0.95) 0.46	(-0.90) 0.50*	(-1.30) 0.46**	(-1.22) 0.49**
group(subcounty) = 12	(-2.76) -1.02**	(2.36) 0.89***	(-2.79) -0.98**	(1.36) 0.17	(1.46) 0.21	(1.59) 0.62**	(1.75) 0.65**	(1.99) 0.48**	(2.16) 0.52**
group(subcounty) = 13	(-2.47) -0.71**	(3.02) 0.57***	(-2.46) -0.70**	(0.45) 0.16	(0.55) 0.17	(2.22) 0.07	(2.39) 0.09	(2.10) 0.11	(2.27) 0.13
group(subcounty) = 14	(-2.15) -0.33	(2.95) -0.05	(-2.09) -0.33	(0.58) -0.35	(0.64) -0.35	(0.33) -0.22	(0.43) -0.22	(0.64) -0.27*	(0.75) -0.27*
group(subcounty) = 15	(-1.02) -1.00***	(-0.20) 0.57**	(-1.03) -0.98***	(-0.94) -0.21	(-0.94) -0.19	(-0.96) -0.16	(-0.97) -0.13	(-1.67) -0.17	(-1.66) -0.15
Learned seed availability from villagers (1 = Yes)	(-3.25)	(2.04) 0.41***	(-3.27)	(-0.83)	(-0.72)	(-0.58)	(-0.50)	(-0.84)	(-0.71)
Learn seed availability from LC chair (1=Yes)		(4.52) 0.73***							
Sweetpotato land (acres), peer		(5.41) 0.35***							
Sweetpotato land (acres),		(3.47) 0.23**							

VARIABLES	(1) Recorded Heckman	(2) Recorded Selection Buyer (yes)	(3) Recorded Logit	(4) Poisson Female unreported buyers Inverse Mill Ratio	(5) Poisson Female Unreported buyers Unreported	(6) Poisson Male Unreported buyers Inverse Mill Ratio	(7) Poisson Male unreported buyers	(8) Poisson Overall unreported buyers Inverse Mill Ratio	(9) Poisson Overall Unreported buyers
promoter		(2.16)							
Ever purchased vines (1=yes), peer		1.28***							
Sweetpotato land dissimilarity		(10.50)							
		-0.25***							
		(-5.00)							
athrho	-0.11 (-0.44)								
imr				-0.10 (-0.84)		-0.11 (-1.37)		-0.11* (-1.71)	
Constant	0.55 (0.97)	-2.08*** (-8.17)	0.47 (0.91)	0.91* (1.80)	0.83* (1.67)	0.55 (1.45)	0.46 (1.21)	1.39*** (4.40)	1.30*** (4.11)
Observations	1,108	1,108	478	478	478	478	478	478	478
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table B3: Probit and Poisson regression for unrecorded purchases

VARIABLES	(1)	(2)	(3)	(4)
	Recorded purchase	No unrecorded female Poisson	No male unrecorded Poisson	Total unrecorded Poisson
	probit			
Promoter gender (1= male)	0.25 (0.71)	0.41 (1.24)	0.01 (0.02)	0.19 (0.93)
Poster assignment (village-level treatment, 1 = Yes)	-0.55* (-1.93)	0.10 (0.28)	0.64** (1.98)	0.47* (1.76)
Promoter publicity (word-of-mouth on seed availability, 1 = Yes)	0.31 (1.17)	-0.01 (-0.03)	0.12 (0.50)	0.09 (0.41)
Promoter male × Use poster	-0.02 (-0.09)	-0.47 (-1.35)	-0.38 (-1.44)	-0.46** (-2.28)
Promoter Poster assignment × promoter publicity	0.46 (1.29)	0.47 (1.31)	-0.47 (-1.58)	-0.11 (-0.47)
Poster assignment × promoter publicity	-0.51* (-1.85)	-0.49 (-1.56)	-0.23 (-1.06)	-0.35* (-1.90)
Education (years), promoter	-0.04 (-1.47)	0.01 (0.28)	0.06*** (3.48)	0.04*** (3.02)
Age (years), promoter	-0.01* (-1.65)	0.00 (0.25)	-0.01 (-1.22)	-0.00 (-0.90)
Agricultural employment income (000000), promoter	0.16 (0.71)	-0.38* (-1.68)	0.23 (1.03)	-0.01 (-0.06)
Farm income (000000), promoter	0.03 (0.26)	-0.16 (-1.32)	-0.12 (-0.91)	-0.14 (-1.37)
Non-agricultural income (000000), promoter	-0.19 (-1.37)	0.06 (0.53)	-0.06 (-0.62)	-0.01 (-0.18)
Sweetpotato land (acres), promoter	-0.11 (-0.53)	-0.35** (-2.34)	-0.14 (-1.27)	-0.21** (-2.54)
Bicycle ownership (1 = Yes), promoter	0.17 (0.97)	-0.22 (-1.23)	-0.12 (-0.94)	-0.16 (-1.44)
Neighbours as agricultural information source (1 = Yes), promoter	-0.25 (-1.06)	0.12 (0.51)	0.04 (0.19)	0.07 (0.50)
Distance to road (minutes), promoter	0.00 (0.99)	-0.00 (-0.77)	0.01 (1.62)	0.00 (0.68)
Peer read poster (individual exposure, 1 = Yes)	0.84** (2.26)	-0.02 (-0.13)	0.29** (2.57)	0.16* (1.80)
Peer gender (1 = male)	0.46* (1.91)	-0.09 (-1.03)	0.16*** (3.09)	0.05 (1.07)
Peer received advice at sales point (1 = Yes)	0.33 (1.42)	0.08 (1.39)	-0.03 (-0.50)	0.02 (0.39)
Peer male × peer read poster	-0.55 (-1.52)	-0.12 (-0.81)	0.07 (0.65)	0.02 (0.28)
Peer received advice × peer male	0.29	-0.22***	0.06	-0.04

VARIABLES	(1)	(2)	(3)	(4)
	Recorded purchase	No unrecorded female Poisson	No male unrecorded Poisson	Total unrecorded Poisson
	probit			
	(1.05)	(-3.08)	(0.82)	(-0.82)
Peer received advice × peer read poster	-0.12	0.05	-0.13	-0.05
	(-0.28)	(0.36)	(-1.23)	(-0.59)
Learn the availability of seeds (Villagers, 1=yes)	0.04	0.04	0.11***	0.08***
	(0.24)	(1.05)	(3.14)	(3.27)
Learn the availability of seeds (LC chair, 1=yes)	-0.10	0.02	0.08	0.06
	(-0.53)	(0.24)	(1.45)	(1.26)
Age (years), peer	0.01*	0.00*	0.00**	0.00***
	(1.70)	(1.66)	(2.02)	(2.72)
Education (years), peer	0.03	-0.00	-0.01	-0.01
	(1.07)	(-0.29)	(-1.32)	(-1.21)
Bicycle ownership (1 = Yes), peer	0.02	0.06	0.01	0.03
	(0.11)	(1.51)	(0.24)	(1.11)
Agricultural employment income (000000), peer	0.05	-0.09	0.14	0.04
	(0.12)	(-0.65)	(1.46)	(0.47)
Farm income (000000), peer	0.25***	-0.04	0.01	-0.01
	(2.91)	(-1.43)	(0.44)	(-0.68)
Non-agricultural income (000000), peer	-0.20	0.04*	-0.01	0.01
	(-1.51)	(1.90)	(-0.46)	(0.71)
Neighbours as agricultural information source (1 = Yes), peer	-0.37*	0.09*	-0.01	0.02
	(-1.85)	(1.82)	(-0.26)	(0.85)
Sweetpotato land (acres), peer	-0.15	0.00	0.11**	0.07*
	(-0.78)	(0.09)	(2.15)	(1.90)
Ever purchased vines (1=yes), peer	0.09	0.18***	0.07	0.11***
	(0.34)	(3.22)	(1.53)	(3.17)
Past disease experience (factor), peer	0.07	0.01	-0.02*	-0.01
	(0.97)	(0.59)	(-1.66)	(-1.17)
Past erratic rain experience (factor), peer	0.08	-0.02	-0.02**	-0.02**
	(1.02)	(-1.38)	(-2.10)	(-2.14)
Peer male × promoter male	0.27	0.03	-0.06	-0.02
	(1.12)	(0.27)	(-1.04)	(-0.48)
Agricultural employment dissimilarity	0.03	0.02	-0.04	-0.01
	(0.47)	(0.73)	(-1.24)	(-0.57)
Age dissimilarity	-0.00	-0.00**	0.00	-0.00
	(-1.50)	(-2.32)	(1.11)	(-0.68)
Sweetpotato land dissimilarity	0.05	-0.00	-0.00**	-0.00*
	(0.46)	(-0.07)	(-2.02)	(-1.73)
Bicycle ownership dissimilarity	-0.12	0.05	0.03	0.04*
	(-0.84)	(1.17)	(1.13)	(1.66)
Education dissimilarity	0.01**	0.00	-0.00**	-0.00
	(2.53)	(0.86)	(-2.41)	(-1.48)
Farm income dissimilarity	-0.04**	0.00	-0.00	-0.00
	(-2.25)	(0.79)	(-1.08)	(-0.45)
Non-agricultural income dissimilarity	0.03	-0.00*	-0.00	-0.00*

VARIABLES	(1)	(2)	(3)	(4)
	Recorded purchase	No unrecorded female Poisson	No male unrecorded Poisson	Total unrecorded Poisson
	probit			
	(1.27)	(-1.85)	(-0.71)	(-1.91)
Neighbour information-source dissimilarity	0.18	0.08	0.02	0.04
	(0.92)	(1.40)	(0.64)	(1.40)
group(subcounty) = 2	0.16	0.06	0.30	0.23
	(0.29)	(0.14)	(0.85)	(0.74)
group(subcounty) = 3	-1.03***	0.08	0.05	0.08
	(-2.79)	(0.23)	(0.18)	(0.34)
group(subcounty) = 4	-0.84**	0.08	0.24	0.18
	(-2.40)	(0.22)	(0.84)	(0.74)
group(subcounty) = 5	-0.62	0.26	-0.89**	-0.14
	(-1.22)	(0.61)	(-2.18)	(-0.40)
group(subcounty) = 6	-1.12***	0.02	0.16	0.09
	(-2.92)	(0.04)	(0.51)	(0.32)
group(subcounty) = 7	-0.67**	0.34	0.13	0.22
	(-2.47)	(1.21)	(0.45)	(1.03)
group(subcounty) = 8	-0.83**	-0.08	-0.33	-0.24
	(-1.99)	(-0.23)	(-1.09)	(-1.01)
group(subcounty) = 9	-0.84**	0.18	0.42	0.34
	(-2.10)	(0.47)	(1.26)	(1.24)
group(subcounty) = 10	-1.07***	-0.15	-0.12	-0.14
	(-2.85)	(-0.32)	(-0.32)	(-0.50)
group(subcounty) = 11	-0.99***	0.33	0.53*	0.45*
	(-2.71)	(0.76)	(1.68)	(1.67)
group(subcounty) = 12	-0.86**	0.33	0.71**	0.58**
	(-2.11)	(0.75)	(2.22)	(2.06)
group(subcounty) = 13	-0.68**	0.02	0.22	0.14
	(-2.00)	(0.05)	(0.88)	(0.66)
group(subcounty) = 14	-0.36	-0.12	-0.11	-0.10
	(-1.03)	(-0.33)	(-0.39)	(-0.49)
group(subcounty) = 15	-1.04***	-0.05	-0.16	-0.11
	(-3.85)	(-0.14)	(-0.55)	(-0.41)
Constant	0.49	0.50	0.21	1.00**
	(0.65)	(0.78)	(0.42)	(2.22)
Observations	478	1,108	1,108	1,108
County FE	Yes	Yes	Yes	Yes

Chapter Four

Gender and intersectionality in smallholder farmers' willingness to pay for quality agricultural inputs

Abstract

This chapter explores the gender differences in smallholder farmers' willingness to pay (WTP) for quality seeds in Uganda. It uses data collected from a random sample of 276 farmers and 20 gender disaggregated focus group discussions. It uses Exogenous Switching Treatment Effect Regression to assess the effect of gender and estimate the WTP gap. The Recentered Influence Function decomposition was employed to decompose the WTP gap by gender into endowment and structural effects. To identify farmer profiles associated with high and low WTP without treating gender as the organising category, the Fuzzy Rough Set Theory was applied. The results showed that male farmers report significantly higher WTP than female farmers. The gap in WTP is associated with a significant structural effect for female farmers, meaning that comparable resources do not translate into the same WTP as for male farmers. The Fuzzy Rough Set analysis identifies three profiles of female farmers with low WTP: educated women without mechanisation or savings and credit groups, caregivers with limited land, and older women excluded from savings and credit groups. The findings suggest that inclusive quality seed marketing requires more than resource transfers to female farmers. Seed sector development and marketing strategies should be tailored to address the structural disadvantages associated with returns to resources, savings and credit arrangements, and unpaid care responsibilities constraining female farmers' seed investment decisions.

4.1 Introduction

In sub-Saharan Africa, improved agricultural input markets aggravate gender disparities due to female farmers' unequal access to land, credit, information, and decision-making authority (Brearley and Kramer, 2020; FAO, 2020; Njuki *et al.*, 2022). For example, female farmers play major roles in seed selection and management but benefit less from improved seed markets (Farnworth *et al.*, 2024). Commercial seed systems are intended to accelerate the uptake of improved varieties, increase productivity and enhance food security. However, the high cost of quality seeds, real or perceived, contributes to their low adoption (Bayiyana *et al.*, 2025). Female farmers fail to enjoy the same level of adoption and benefits as their male counterparts because seed system development and marketing strategies rarely target their needs (Mudege and Walsh, 2016; Pyburn, Slavchevska and Kruijssen, 2023; Galiè *et al.*, 2025). Therefore, this chapter undertakes heterogeneity analyses to understand the factors associated with willingness to pay (WTP) for quality seed across and within gender. It also accounts for gender intersections with other identities and socioeconomic factors to profile which farmers are constrained and why.

Intersectionality provides a lens for studying intra-gender heterogeneity. However, applied quantitative intersectional analysis in agriculture remains rare, and its connections with seed demand are largely unexplored (exceptions include Bacud *et al.*, 2024). The chapter incorporates categorical and anticategorical intersectionality views to extend knowledge about factors associated with WTP within and across gender categories. Categorical intersectionality uses gender to analyse how interlocking systems of disadvantage in demographic identities and socioeconomic status drive disparities (Hancock, 2007, 2019). On the other hand, the anticategorical approach critiques the use of social categories, which may contribute to the creation, perpetuation, or essentialisation of differences between groups (McCall, 2005; Hancock, 2007; Bauer and Scheim, 2019). Following the anticategorical view, identity axes such as gender, age, education, and marital status cannot be separated (McCall, 2005; Hancock, 2019). However, the same identity position can produce different seed demand depending on structural disadvantages in the agricultural setting. Therefore, the chapter extends the intersectional inquiry beyond the study of identities toward consideration of the socioeconomic factors and risk attitudes through which seed demand is realised. It answers three questions:

- (1) What is the causal effect of gender on WTP for quality sweetpotato seeds, controlling for other demographic identities, socioeconomic characteristics and risk attitudes?
- (2) To what extent is the gender gap in WTP attributed to endowment differences versus structural effects, and does this inequality intensify across the WTP distribution?
- (3) How does gender, intersecting with other demographic identities and socioeconomic characteristics, controlling for risk attitudes, profile farmers with low and high WTP for quality seeds?

The chapter integrates three methods moving from categorical identification of the gender gap in WTP, through intercategorical decomposition of its determinants, toward an anticategorical profiling of heterogeneity within and across gender groups. It first investigates the causal effect of gender on WTP premiums using Exogenous Switching Treatment Effect Regression (ESTER). The ESTER treats gender as an exogenous determinant, estimates the WTP gap and provides separate coefficients for male and female farmers. Second, the Recentred Influence Function (RIF) is employed to decompose the gap in WTP for an intercategorical intersectionality perspective. The decomposition separates the gap by gender into endowment effects (differences in the resources farmers hold) and structural effects (differences in the returns those resources generate). Third, the chapter applies Fuzzy Rough Set Theory (FRST) to identify farmer profiles associated with different WTP without imposing fixed categorical boundaries. In addition to investigating how male and female farmers differ in WTP, it integrates qualitative evidence from focus group discussions to contextualise findings from the three analytical approaches. This mixed-methods approach links estimated WTP heterogeneity to the social and market conditions in which seed-purchase decisions are made.

Section 4.2 presents the literature review and conceptual framework. Section 4.3 describes the methods and study setting. Section 4.4 presents results. Section 4.5 discusses findings and concludes.

4.2 Literature review

4.2.1 The commercial seed system challenge for RTB crops

The study uses sweetpotato as an empirical example of a Root Tuber and Banana (RTB) crop. Efforts to produce improved, certified, and quality-declared seeds for RTB crops through breeding and virus cleaning are commendable. However, despite these advancements, the uptake of improved varieties and quality seeds by farmers for most RTB crops has not been entirely successful. Many farmers in developing countries recycle their saved seeds and use improved and quality seeds only when subsidised or freely available from government and non-government projects (Low *et al.*, 2017; Okello *et al.*, 2025). Adoption of improved and certified varieties for RTB crops remains below 50%, with farmers averaging a variety turnover of 14 years (McEwan *et al.*, 2021; Thiele *et al.*, 2021). Over the past decade, dissemination has mostly occurred through free and subsidised seeds under emergency programs in SSA. Free and subsidised seeds temporarily increase availability but create dependency, suppress commercial WTP, and weaken market-based delivery systems (McGuire and Sperling, 2016; Almekinders *et al.*, 2019; Donovan *et al.*, 2021; Spielman, 2021). A problem with the free distribution model is that while it provides adoption, farmers may not pay to replace them once external support ends. Understanding who will pay, and what they will pay, is therefore a precondition for any commercially viable seed system.

Three features of RTB crops, in contrast with cereals and vegetables, make gender particularly salient. First, vegetative propagation means the seed is genetically identical after multiplication, reducing farmers' incentive to purchase regularly and lowering private sector interest (Almekinders *et al.*, 2019). Second, perishability complicates distribution and quality assurance in ways that create asymmetric information between sellers and buyers. The problem falls disproportionately on female farmers, who have less access to formal quality signals through extension services (Mudege and Walsh, 2016; Brearley and Kramer, 2020; Pircher and Almekinders, 2021; Bacud *et al.*, 2024). Third, formal seed systems prioritise the preferences and purchasing power of wealthier male farmers (Brearley and Kramer, 2020). The result is a seed market in which female smallholders are the least likely to be reached by commercial channels and the least likely to pay premiums that make those channels viable.

4.2.2 Gender and willingness to pay premiums for quality sweetpotato seed

Existing studies on WTP for sweetpotato quality seed show mixed results on the effect of gender (Labarta, 2009; Nakanyike, 2014; Adesina *et al.*, 2017; Mwiti *et al.*, 2020; Okumu *et al.*, 2021; Mwangi *et al.*, 2022; McEwan *et al.*, 2023; Okello *et al.*, 2023). The inconsistency in the evidence is partly methodological. Most studies use regression or standard probit models that treat gender as a dummy variable, producing a single conditional mean effect. This specification assumes that the determinants of WTP are the same for male and female farmers. This assumption is inconsistent with the structural differences in resource access and decision-making authority discussed in Section 1.1 of this thesis. For instance, where the model cannot allow coefficients to differ by gender, a null result may reflect model constraint rather than a real absence of gender effects, as may be the case in Labarta (2009) and Mwiti *et al.* (2020). A further problem is that studies that estimate a single conditional mean cannot reveal the causal effect of gender on WTP. Therefore, this chapter uses ESTER, which allows the determinants of WTP to differ between male and female farmers and accounts for selection on unobservables and estimates the causal impact of gender.

A second, contrasting body of literature demonstrates that gender association with WTP depends on the information farmers receive and who holds household decision-making authority. In Nigeria, Adesina *et al.* (2017) found, using contingent valuation, that male farmers were more willing to pay for quality seed, which was consistent with their better resource endowments and extension access. Okumu *et al.* (2021) reach the opposite conclusion in Rwanda, using a second-price experimental auction in which farmers were randomised to receive different types of information. Male farmers and access to information from neighbours were positively associated with WTP, while female decision-making was negatively associated with WTP among those receiving nutrition information. This finding implies that omitting information treatment as a moderating variable will misidentify or suppress the gender effect on WTP. The present study draws from a sample randomly exposed to information nudges, which allows the gender effect to be estimated net of information asymmetry.

A third source of heterogeneity operates through risk aversion, women's higher exposure to financial shocks and limited credit access, which predict greater risk aversion (Holden and Quiggin, 2017; Magnan *et al.*, 2020). Risk attitudes may suppress WTP for

unfamiliar varieties (Tibamanya, Henningsen and Milanzi, 2022). However, purchasing quality seeds can also reduce production risk, creating a counteracting incentive. The net effect of risk aversion on the gender gap in WTP is therefore hypothetically ambiguous. Resolving this ambiguity requires simultaneously controlling for gender, risk attitudes, and information provision. This chapter, therefore, controls for risk attitudes, allowing their contribution to the gender gap in WTP to be isolated from the effects of information and resource endowments. This chapter's first research question is:

1: What is the causal effect of gender on WTP for quality seeds, and what are the determinants for male and female farmers, controlling for other demographic identities, socioeconomic characteristics and risk attitudes?

4.2.3 Gender, endowment and structural effect in willingness to pay

Endowment effects capture observable differences in the resources and inputs available to male and female farmers. Structural effects capture the unequal returns female farmers receive from equal inputs, entrenched in social norms, discrimination, and institutional barriers. Studies exploring the relevant contributions of the endowment effect versus the structural effect of the gender gap in WTP are rare; however, the growing evidence in studies of agricultural productivity outlines mixed results. In an agricultural setting where land tenure insecurity, access to agricultural tools and input access are the primary binding constraints, endowment effects play an important role in explaining the gender gap between female and male farmers' productivity. Female farmers' endowment parity in land access, high-value crop use, and household labour would reduce the gender gap (Kilic, Palacios-López and Goldstein, 2015; Valea and Noufé, 2024). Structural effects are associated with a considerable proportion of the variation in the agriculture productivity gap, where cultural norms, child dependency ratio, extension segregation, and labour market discrimination are significant. For example, Abdisa, Mehare and Wakeyo (2024) in Ethiopia attribute most of the productivity gap to unequal access to machinery and extension services. Singbo et al. (2021) in Mali find 56% of the gap attributable to social norms and market access barriers.

Other studies find that the relative contribution of endowment versus structural effects varies by region. Makate and Mutenje (2021) show that in Malawi, dependency ratios and wealth constraints suppress seed adoption, while in Tanzania, cultural norms and

gender-segregated extension are the primary barriers. In southern Nigeria, Uganda, Tanzania, and Kenya, the endowment effect plays a significant role in explaining the differences in productivity between women and men (Kilic, Palacios-López and Goldstein, 2015; Oseni *et al.*, 2015; Slavchevska, 2015; Ali *et al.*, 2016). In Ethiopia, northern Nigeria and South West Nigeria, the structural effect explains a considerable proportion of the variation in the gender productivity gap (Aguilar *et al.*, 2015; Oseni *et al.*, 2015; Bello *et al.*, 2021). Turning to Uganda, female farmers hold a net endowment advantage of 12.9% through cultivating small, highly productive plots (Ali *et al.*, 2016). The advantage is conditional on plot size and productivity and does not account for the lower absolute returns that smaller plots generate, regardless of productivity ratios. However, female farmers' structural disadvantages in child dependency ratio, cash crop access, and improved seed access offset the advantage. This cross-country variation suggests that decomposition results are sensitive to the institutional environment. The study setting influences whether the gender gap is associated with the endowment or structural effect, or both. Thus, it is necessary to apply decomposition in the context of seed demand in Uganda.

Several previous studies have used the Oaxaca–Blinder decomposition technique (Oaxaca, 1973) to estimate the portion of the endowment effect and the structural effect. However, the Oaxaca–Blinder decomposition technique is prone to specification errors, lacks a counterfactual, and the choice of the reference group may affect the ratio of the endowment effect to the structural effect of the gap (Rios-Avila, 2020; Tufa *et al.*, 2024). This study uses RIF decomposition to correct for model specification and reweighting errors and to construct a suitable counterfactual for estimating the gender WTP gap. RIF regression disaggregates the sources of gender differences in WTP and contributes to the intercategorical intersectionality literature.

2: To what extent is the gender gap in WTP attributed to endowment differences versus structural effects, and does this inequality intensify across the WTP distribution?

4.2.4 Farmer heterogeneity and the willingness to pay for quality seeds

Assessment of farmer heterogeneity can assist in tailoring seed marketing interventions for specific groups of farmers in order for them to have effective and

beneficial outcomes. When determinants of WTP are modelled as additive and independent, the analysis assumes that the effect of each factor is constant. This assumption is violated whenever being female and land-poor compound into a position qualitatively more constrained than any single disadvantage alone. Treating farmers as a homogeneous group obscures the relationships between demographic profiles that matter most for intervention design (Mausch *et al.*, 2021). Uniform seed system interventions are optimal only for the group around which they are implicitly designed (Kilwinger *et al.*, 2021). Consequently, making variability within and across socially defined groups visible is a precondition for equitable intervention design.

The anticategorical intersectionality view in this chapter makes variability visible by incorporating two layers. The first consists of identity axes: gender, age, education, and marital status. These are socially constituted characteristics that position individuals within hierarchies of power and recognition, and that shape what roles, resources, and opportunities are deemed appropriate for them (Crenshaw, 1989; Kabeer, 1999; Ridgeway, 2006). The second layer consists of structural conditions farmers operate under: risk attitudes, socioeconomic characteristics (income, land, credit access), and information access. These are the material and cognitive backgrounds through which identity-based inequalities are realised in seed markets. A young, unmarried woman with limited land and no prior exposure to improved varieties occupies a different position in the seed market than an informed female farmer of the same age, risk-loving with land access, and the average effect captures neither.

The anticategorical approach goes further, confronting the possibility that the categories “female farmer” or “male farmer” conceal multiple distinct positions rather than one, and that the most vulnerable subgroups are invisible to analyses that treat them as homogeneous. The gender gap in agricultural productivity in SSA attributable to unequal access to inputs is well-documented (Ali *et al.*, 2016; BenYishay *et al.*, 2020; Tufa *et al.*, 2024). Female farmers have higher risk aversion because of their greater exposure to financial shocks and limited access to buffers, such as credit or savings (Holden and Quiggin, 2017). Informational asymmetry, where women and marginalised groups have less access to agricultural knowledge, hinders their ability to recognise the value of improved seeds (Mobarak and Saldanha, 2022). Existing stratification risks may be entrenched as the commercialisation of agriculture expands in SSA. Gender, therefore, is the primary frame to understand heterogeneity in WTP in the present study, and the anticategorical approach

aims to map the full distribution of market positions beyond the binary male-female comparison. The third research question is:

3: How does gender, intersecting with other demographic identities and socioeconomic characteristics, controlling for risk attitudes, profile farmers with low and high WTP for quality seeds?

4.3 Methods

4.3.1 Study setting

Uganda is an East African nation with a population of 45.9 million people (UBOS, 2024a). The agricultural sector is important to its economy, contributing 24.8% to the GDP (UBOS, 2024b). Tubers, including sweetpotato, are considered female crops (Echodu *et al.*, 2019). More than 70% of the population is engaged in agriculture, making the sector the largest employer of female labourers (FAO, 2018b). However, the sector primarily relies on smallholder farming, which faces significant challenges such as low access to technology and agricultural inputs. Small family farms represent 89% of farmers, average 0.97 hectares in size, and are for subsistence consumption (FAO, 2018a). Small farms use 91 kg of seeds per hectare, which is significantly higher than that of larger farms at 27 kg/ha, yet only 19% of smallholders use improved seeds (*ibid*).

4.3.2 Sampling

The sampling used a multistage approach. First, Amuria district was purposively selected. Then, 120 villages clustered using a 5 km radius to minimise contamination were randomly selected and allocated to the control and treatment arms. In the treatment villages, promoters displayed informational posters in the local language at their sales points to nudge farmers about the benefits of quality seeds. The quality seeds in the control and treatment villages were sold at a subsidised price of UGX 2000 in two seasons: May and September 2022. In the second stage, after two intervention seasons, 15 villages were selected purposively. Eight villages represented areas that responded positively to the intervention, with approximately 26 buyers of quality seeds per village. The remaining villages represented areas where the number of buyers was fewer than 4. In the third stage, the study selected 10 women and 10 men from a list of sweetpotato farming households generated with the help of the village chairperson. Before the interview day, the village

chairperson would list all the sweetpotato-producing households living around the identified interview venue. The research assistant then randomly selected households from the list and sent interview invitations.

Individual interviews lasted approximately 45 minutes, and 276 farmers participated, representing a 92% response rate. As the survey team went to one village once, it was impossible to conduct replacement interviews. The questionnaire used in the survey consisted of five main parts: (i) demographic characteristics, (ii) membership in the farm organisation, (iii) details of the farm, (iv) risk elicitation, and (v) WTP elicitation. The survey was carried out upon the participants' arrival at the venue, followed by focus groups. Two trained research assistants (RAs) facilitated each discussion (two female RAs for the female focus groups and two male RAs for the male focus groups) in October and November 2022. The study objectives and ethical conduct were detailed to RAs during their training. As part of their training, they conducted mock interviews and a pilot study with farmers who did not participate in the survey. Secondary use of the data received ethical approval from the School of Global Development Research Ethics Subcommittee of the University of East Anglia No. ETH2223-1600. The primary study adhered to the ethical standards outlined in the Declaration of Helsinki, with ethics approval from the Cornell University Institutional Review Board (IRB) under ID No. 2110010648.

4.3.3 Outcome Variable: Willingness to pay elicitation

The main outcome variable is the premium farmers are willing to pay for quality sweetpotato seeds above the price of local seeds. WTP was elicited using a payment card contingent valuation method, in which respondents select their maximum WTP from a set of predetermined values. This approach reduces anchoring bias relative to open-ended bidding while providing richer distributional information than binary choice. Four varieties were presented: NAROSPOT P (improved, high Vitamin A, 44 tons/ha), NAROSPOT T (improved, cream-fleshed, 35 tons/ha, blackens when boiled), New Dimbuka (local landrace, introduced 2009), and Tanzania (local landrace, long-established in Amuria). For each variety, farmers selected a payment card value representing the premium they would pay above the local market price. The average premium across varieties is used as the primary outcome.

4.3.4 Empirical methods

First, the study uses Exogenous Switching Treatment Effect Regression to assess the causal effect of gender on WTP while allowing male and female farmers to have different WTP regimes in one model. Second, the Recentered Influence Function decomposition separates the WTP gap into endowment and structural effects across the WTP distribution and identifies factors associated with the gap. Third, Fuzzy Rough Set Theory identifies profiles of characteristics associated with high and low WTP without imposing a category.

4.3.4.1 Exogenous Switching Treatment Effect Regression

This study employs Exogenous Switching Treatment Effect Regression (ESTER) to analyse the causal effect of gender on the premium for quality seeds among female and male farmers. The study estimated two separate equations, one for each group, to assess interactions with other explanatory variables.

$$\begin{cases} y_{male} &= x_{male}\beta_{male} + u_{male} & \text{If Gender} = 1 \\ y_{female} &= x_{female}\beta_{female} + u_{female} & \text{If Gender} = 0 \end{cases} \quad (1)$$

The y variable represents the premium farmers are willing to pay. Gender is a dummy variable set to 1 for male farmers and 0 otherwise; the x vector represents the demographic and socioeconomic variables that influence farmers' WTP premiums for quality seeds; β captures the effect of the demographic and socioeconomic variables; and u is the error term.

$$\begin{cases} E(y_{male} | \text{Gender} = 1) = x_{male}\beta_{male} & (1a) \\ E(y_{female} | \text{Gender} = 0) = x_{female}\beta_{female} & (1b) \\ E(y_{female} | \text{Gender} = 1) = x_{male}\beta_{female} & (1c) \\ E(y_{male} | \text{Gender} = 0) = x_{female}\beta_{male} & (1d) \end{cases}$$

In the above equations, E is the expectation that 1(a) and 1(b) represent the observed premium prices for quality seeds for male and female farmers, and 1 (c) and 1 (d) represent the counterfactual premiums for seeds. The use of conditional expectations combined with consideration of the gender variable allows the calculation of the causal effect of gender on the premium for quality seeds. Suppose that male farmers' characteristics have the same coefficient (returns) as female farmers' characteristics. In this case, the effect of gender on male farmers' premium MP is the difference between equations (1) and 1c as follows:

$$MP = E(y_{male} | Gender = 1) - (y_{female} | Gender = 1) = x_{male}(\beta_{male} - \beta_{female}) \quad (2)$$

Analogously, the effect of gender on female farmers' premium FP, if their characteristic had the same coefficients (returns) as the female returns, is the difference between equations 1d and 1b

$$FP = E(y_{male} | Gender = 0) - E(y_{female} | Gender = 0) = x_{female}(\beta_{male} - \beta_{female}) \quad (3)$$

$$BH_{male} = E(y_{male} | Gender = 1) - E(y_{male} | Gender = 0) \quad (3a)$$

$$BH_{female} = E(y_{female} | Gender = 1) - E(y_{female} | Gender = 0) \quad (3b)$$

4.3.4.2 Recentered Influence Function Decomposition

Following Firpo, Fortin, and Lemieux (2018), this study employs the Recentered Influence Function (RIF) decomposition model to assess the contribution of structural and endowment effects to the gender gap in the willingness to pay premium prices for quality seed. The joint distribution of quality seed premium price (Y) and observable demographic and socioeconomic characteristics (X), conditional on gender category, is:

$$f_g(Y, X) = f(Y|X, T = g) \cdot f(X|T = g) \quad (4)$$

Where: $f_g(Y, X)$ is the joint probability density of Y and X for gender (with g = 0 for male farmers and g = 1 for female farmers); T is the group indicator. The cumulative distribution function for premium Y within each group is denoted as $F_g(Y)$; and $df(X|T = g)$ is probability measure for characteristics X given group T=g

$$F_g(Y) = \int f(Y|X, T = g) df(X|T = g) \quad (5)$$

The overall difference in premium Δv between male and female farmers can be expressed as:

$$\Delta v = v(F_1(Y)) - v(F_0(Y)) \quad (6)$$

Where v represents a specific distributional statistic (e.g., mean or quantile) and $F_1(Y)$ and $F_0(Y)$ are cumulative distributions of Y for female and male farmers,

respectively. The decomposition of the observed difference into endowment and structural effects is as follows.

$$\Delta v = v(\int F_1(Y|X)d(F_1(X))) - v(\int F_0(Y|X)d(F_0(Y))) \quad (7)$$

Where the first term $(\int F_1(Y|X)d(F_1(X)))$ reflects the expected premium for female farmers based on their characteristics, while the second term $(\int F_0(Y|X)d(F_0(Y)))$ reflects the expected premium for male farmers based on their characteristics.

To analyse the counterfactual distribution, consider the following equation:

$$v_C = v(\int F_0(Y|X)d(F_1(Y))) \quad (8)$$

v_C Counterfactual premium statistic for female farmers if they had male characteristics. $\int F_0(Y|X)d(F_1(Y))$; the expected premium for female farmers assumes the distribution of male characteristics. The detailed gap components are as follows:

$$\Delta v = (v_1 - v_C) + (v_C - v_0) \quad (9)$$

Where v_1 and v_0 are the observed mean or quantiles; $v_1 - v_C$ represents the structural effect (difference in returns on characteristic); $v_C - v_0$ endowment effect (difference in characteristics)

Pure endowment effect: measuring premium differences due to observable characteristics.

$$\Delta v_E = v(\int F_0(Y|X)d(F_1(X)) - \int F_0(Y|X)d(F_0(X))) \quad (10)$$

Then, there is a pure structural effect that measures the premium difference due to return differences.

$$\Delta v_S = v(\int F_1(Y|X)d(F_1(X)) - \int F_0(Y|X)d(F_1(X))) \quad (11)$$

Reweighting error due to sampling variability, $\tilde{F}_1(X)$ Adjusted characteristics distribution for sampling

$$RE_1 = v(\int F_0(Y|X)d(F_1(X))) - v(\int F_0(Y|X)d(\tilde{F}_1(X))) \quad (12a)$$

due to model assumptions

$$RE_2 = v(\int F_1(Y|X)d\tilde{F}_1(X)) - v(\int F_1(Y|X)dF_1(X)) \quad (12b)$$

Consider the specification error in the functional form

$$SE_1 = v(F_1(Y)) - v(\int F_1(Y|X)dF_1(X)) \quad (13a)$$

$$SE_2 = v(\int F_1(Y|X)dF_1(X)) - v(\int R\hat{I}F(Y)dF_1(X)) \quad (13b)$$

$R\hat{I}F$ Approximate recentered influence function

$$RIF(y_i, \mu) = y_i \quad (14)$$

Where y_i is the observed premium for quality seeds, and μ represents the mean premium. The Oaxacarif function separates the total difference between male and female farmers into explained (endowment) and unexplained (structural) components.

The RIF quantile distribution used to assess the gender gap across different points in the premium distribution was specified as:

$$RIF(y_i, q_p) = q_p + \frac{p-1\{y_i \leq q_p\}}{fY(Q_p)} \quad (15)$$

Where: q_p is the p^{th} quantile of the distribution and $fY(Q_p)$ is the density of the outcome variable at the p^{th} quantile

Finally, the overall difference in premium for quality seeds between male and female farmers is expressed as:

$$\Delta v = (\mathbb{E}(X_m) - \mathbb{E}(X_f))\beta_f + \mathbb{E}(X_f)(\beta_m - \beta_f) \quad (16)$$

Δv is the total difference in the premium for quality seeds between male and female farmers.

$\mathbb{E}(X_m)$ and $\mathbb{E}(X_f)$ are the average characteristics of male and female farmers, respectively.

β_m and β_f are the coefficients for the male and female farmers. The first term represents the endowment effect, and the second term represents the structural effect.

4.3.4.3 Fuzzy Rough Set Theory

In this study, Fuzzy Rough Set Theory (FRST) is applied not as a predictive tool but as a method for identifying combinations of characteristics associated with high or low WTP within and across gender groups. (Raza and Qamar, 2019). This approach examines variations within a single social category (e.g. within a group of women) by handling imprecise and overlapping data. The fuzzy sets capture variables within the anticategorical intersectionality framework (McCall, 2005; Hancock, 2007). The FRST analysis is not presented as an intersectional theory by itself. Rather, it is used as an empirical tool to operationalise an anticategorical question: do high- and low-WTP groups emerge only around gender, or do other profiles of social position and material conditions also matter? Gender, age, marital status, and education are treated as social positions. Land, credit, assets, information, risk, and production conditions are treated as material environments through which those social positions shape WTP. This distinction avoids treating every predictor as an identity while still allowing the analysis to show how identity and structural conditions combine. The intersectionality framework suggests how distinct aspects of a person's identity overlap and affect their experiences, thus providing a basis for research. From this perspective, intersectionality does not need to meet the requirement of being easily tested from a positivist perspective (Hancock, 2019). The analysis was conducted in R using the Roughsets package.

Using the FRST method, we first checked whether any two selected farmers are indistinguishable based on a set of characteristics (i.e., socioeconomic, demographic, and variety preferences) as follows:

$$R_B(x,y)=\{(x,y) \in U^2 \mid \forall a \in B, a(x)=a(y)\} \quad (17)$$

where x and y individual farmers; B is the set of characteristics, and $a(x)$ Value of characteristic a for profile x .

Two farmers x , and y are indistinguishable if their characteristics (socioeconomic, demographic, and variety preferences) are the same.

We then integrated the Fuzzy and Rough Sets using the expression:

$$R_B \downarrow X = \{x \in U \mid [x]_B \subseteq X\} \quad (18)$$

where X is the subset of farmers willing to pay more than 1000 UGX for seeds. Farmers willing to pay more than the maximum price of UGX 1000 in the payment card used to collect payment bids were classified as having 'high WTP' following standard contingent valuation methodology, following (Welsh and Poe, 1998).

$R_B \downarrow X$ Farmers with high WTP are based on characteristics such as gender and socioeconomic status.

The upper approximation was modelled the same way, while farmers whose bids fell in the positive region were modelled as:

$$POS_B = \bigcup_{x \in U} R_B \downarrow [x]_B \quad (19)$$

4.4 Results

4.4.1 Descriptive findings

Most of the female farmers (67.4 %) had primary school education, averaging 4.69 years of schooling. Female farmers who were married and living with their spouse comprised 70.9% of the sample, widowed 13.5%, and divorced 10.6%. On average, male farmers had 7.42 years of education and 28.1% attained secondary school. About 54.8% of male farmers participated in farmers' groups active in social support and market-related activities. In comparison, 34% of female farmers engaged in farmer groups with savings and credit, group farming, technical information, and seed production functions. This difference is important because group participation not only indicates social capital. Social capital is associated with access to credit, information, and collective groups for input use. Seed sourcing also differs by gender. Female farmers were more likely than male farmers to source vines from distant markets (14.9% vs 0.7%) and local markets (9.9% vs 4.4%). Female farmers' greater reliance on market sources suggests that access to own or neighbour-sourced vines was not equally available across gender.

The participants were smallholders with 3.18 acres of farmed land and 0.61 sweetpotato acreages. Male farmers indicated larger farmland, 3.65 acres and 0.66 acres

of sweetpotato land, compared to female farmers, 2.72 acres and 0.57 acres, respectively. Yields on female-controlled plots were remarkably lower than those on male-controlled plots. In season 1, sweetpotato yields in bags were 2.72 for female farmers and 5.78 for male farmers, while in season 2, the yields were 0.28 for female farmers and 1.23 for male farmers. Male farmers reported shorter travel times to markets, 93.89 minutes, compared to female farmers, 112.87 minutes.

There are differences in mechanised farming, which can contribute to reducing drudgery for women farmers. Most male compared to female farmers owned ox ploughs (55% vs 36.17%) and spray pumps (34% vs 22.7%). With respect to transportation, about 67.4% of male and 56% of female farmers owned a bicycle. For communication, 58.5% of male and 32.6% of female farmers owned a radio. A higher percentage of male farmers (80.7 %) owned mobile phones compared to 57% of female farmers. Overall, the descriptive results show that male and female farmers enter the WTP analysis from different resource, information, production, and market positions. These differences motivate the gender-specific and distributional analyses that follow. Further gender-disaggregated descriptive statistics are presented in Appendix Tables C1 to C4.

The overall sample average premium was UGX 897.1. The results show that compared to male farmers, female farmers' premiums are below the sample average for all four varieties. Friedman's test showed a significant difference in the overall premium for quality seed between male and female farmers. $X^2 = 264.06$, $p < 0.001$.

Table 7: Mean premium for the study varieties

Varieties	Mean	Std. Dev.
<i>Narospot P</i>	1180.8	1280.41
<i>Narospot T</i>	858.33	1031.66
<i>New Dimbuka</i>	645.65	800.24
<i>Tanzania</i>	903.62	1182.84
<i>Average premium</i>	897.1	910.12

Note: N=276; further descriptive statistics by reduced payment card categories and actual value are presented in Appendix Table C4 to C7.

4.4.2 Effect and impact of gender on farmers' premium for quality seed

Table 8 presents pooled regression estimates (column 1) that show female farmers are willing to pay UGX 596.31 less than male farmers, after controlling for observed socioeconomic characteristics, risk attitudes and information treatment. However, it gives only an average gender effect and does not show how the determinants of WTP differ between male and female farmers.

Table 8: Effect of gender on farmers' premium for quality seed

Variable	Pooled	Female	Male
	(1)	(2)	(3)
Gender (Female=1)	-596.31*** (142.114)		
Risk attitude (scale 1-10)	20.44 (21.671)	45.86*** (16.946)	-12.52 (38.320)
Farming experience (years)	3.60 (5.924)	1.084 (5.340)	21.22* (12.776)
Child aged 6–18 (no.)	-48.54** (19.412)	-2.64 (16.997)	-56.14 (38.571)
Agriculture employment income (000000)	143.98*** (44.828)	44.43 (484.786)	219.15*** (63.992)
Farm sales income (000000)	-147.99*** (56.246)	-27.67 (58.614)	-260.71*** (97.815)
Season 2 production (Yes = 1)	6.96 (55.909)	101.63* (52.528)	-20.72 (73.029)
Distance road (minutes)	8.72** (3.774)	4.00 (3.079)	11.33 (7.076)
Distance market (minutes)	1.68* (0.957)	-0.19 (0.708)	5.15** (1.956)
Motorcycle ownership (Yes= 1)	-180.62 (153.530)	-306.80** (120.334)	225.23 (367.982)
Phone ownership (Yes= 1)	47.34 (105.353)	16.53 (82.722)	459.80* (264.497)
Source vines is neighbours (Yes= 1)	96.00 (133.581)	-207.13* (110.239)	254.86 (237.889)
constant	737.19 (456.564)	425.44 (371.674)	496.61 (746.032)
N	276	141	135

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses. Column 1 (Pooled) adds socioeconomic controls without gender interactions. Columns 2 and 3 (Female, Male) present gender-specific estimates using ESTER (Exogenous Switching Treatment Effects Regression), which allows the determinants of WTP to differ by gender. For a table showing all the explanatory variables included in the analysis, refer to Table C9 in the Appendices.

The ESTER results in Columns 2 and 3 show that the determinants of WTP differ by gender. For male farmers, agricultural employment income, farming experience, distance to market, and mobile phone ownership are significant. In contrast, for female farmers, risk attitudes, season two production, motorcycle ownership, and sourcing vines from neighbours are significant variables reflecting risk management under constrained

conditions. The results suggest male farmers respond to market opportunity signals; female farmers respond to risk management conditions.

Table 9: Impact of gender on farmers' willingness to pay for quality seeds

Gender	Observed	counterfactual	ATET
Female (N=141)	591.31	1217.348	-626.8632 ***
Male (N=135)	1216.48	751.37	464.63**
Base heterogeneity	-656.48	601.51	

* p<0.10, ** p<0.05, *** p<0.01; N=276

Table 9 presents the gender treatment effects from the ESTER model. The observed premium is each group's actual mean WTP. Female farmers have an observed average premium of UGX 591.31, compared with UGX 1,216.48 for male farmers. The counterfactual estimates what each group would pay under the other group's conditions (female farmers under male conditions, male farmers under female conditions). The negative female ATET indicates that female farmers' observed WTP is lower than their counterfactual WTP under the male regime. The positive male ATET indicates that male farmers' observed WTP value is higher than their counterfactual WTP under the female regime. The ESTER results, therefore, motivate the decomposition analysis in the next section, which examines whether the gender gap is driven by differences in resources or by differences in the returns to those resources.

4.4.3 Intercategorical difference in the willingness to pay for quality seeds

Table 10 presents the intercategorical gender difference in WTP. The mean gap is UGX 625.17, which corroborates the ESTER results that male farmers report higher premiums than female farmers. The counterfactual result shows that even if female farmers had the observed characteristics of male farmers, their estimated premium would remain lower at UGX 783.35. The pure endowment effect is UGX -116.09 and is not statistically significant. The pure structural effect is UGX -450.33 and is statistically significant. This means that the gender WTP gap is driven by differences in the returns to characteristics, rather than by women simply holding fewer resources. The decomposition across the WTP distribution shows that the gender gap is not constant. The gap widens from the 30th decile and is largest at the 90th, where male farmers have a 157.97% advantage over female farmers.

Table 10: Decomposition of premium for quality seeds by gender

	<i>RIF Mean</i>	<i>RIF lower deciles</i>				<i>RIF median</i>	<i>RIF higher deciles</i>			
	Mean	10 th	20 th	30 th	40 th	50 th	60 th	70 th	80 th	90 th
<i>Female</i>	591.314*** (39.131)	150.922*** (32.815)	289.179*** (29.733)	369.154*** (30.886)	427.277*** (33.137)	483.813*** (34.939)	585.897*** (39.866)	671.717*** (44.603)	835.757*** (64.652)	1154.398*** (119.807)
<i>Counterfactual</i>	783.345*** (148.017)	234.496*** (62.983)	381.936*** (123.584)	579.193*** (96.577)	654.484*** (106.197)	752.756*** (105.914)	802.252*** (141.447)	925.028*** (153.187)	1104.488 (801.581)	1879.133*** (279.414)
<i>Male</i>	1216.481*** (96.898)	268.630*** (41.142)	350.000*** (57.360)	569.636*** (69.065)	772.993*** (65.121)	895.001*** (77.586)	1025.000*** (96.384)	1492.334*** (117.694)	1833.616*** (199.864)	2978.020*** (556.082)
<i>Total difference</i>	-625.168*** (104.502)	-117.708** (52.626)	-60.821 (64.608)	-200.482*** (75.657)	-345.716*** (73.067)	-411.188*** (85.090)	-439.103*** (104.304)	-820.616*** (125.862)	-997.859*** (210.060)	-1823.622** (568.842)
<i>Total Explained</i>	-192.031 (147.044)	-83.573 (67.936)	-92.756 (121.200)	-210.039* (99.240)	-227.207** (110.111)	-268.943** (111.375)	-216.355 (146.303)	-253.310 (158.373)	-268.731 (797.754)	-724.735* (296.446)
<i>Total Unexplained</i>	-433.137** (184.899)	-34.134 (78.592)	31.936 (139.882)	9.557 (125.078)	-118.509 (129.819)	-142.245 (137.928)	-222.748 (179.077)	-567.306*** (203.552)	-729.129 (833.164)	-1098.887 (696.849)
<i>Pure explained</i>	-116.097 (121.378)	64.713 (73.377)	-24.685 (62.929)	-23.496 (67.730)	-64.642 (78.310)	-62.170 (90.090)	-120.197 (110.636)	-128.399 (129.445)	-305.410 (197.642)	-295.259 (414.619)
<i>Specification error</i>	-75.934 (121.008)	-148.286 (91.700)	-68.071 (113.612)	-186.543* (105.424)	-162.565 (119.391)	-206.772 (139.375)	-96.158 (162.939)	-124.912 (181.151)	36.679 (747.612)	-429.475 (348.188)
<i>Reweighting error</i>	17.194 (186.967)	-15.667 (149.138)	275.733 (230.580)	166.604 (153.442)	159.001 (147.535)	143.655 (140.304)	58.720 (173.189)	28.329 (186.027)	566.355 (995.315)	-288.527 (304.171)
<i>Pure Unexplained</i>	-450.331***	-18.467	-243.798	-157.047	-277.510**	-285.900**	-281.469*	-595.635***	-1295.483*	-810.360

*Note: Standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. $N = 276$. The complete RIF models are reported in Appendix Tables C10 to C15. This table decomposes the gender premium gap at the mean and across the 10th to 90th deciles of the WTP distribution. Female and male rows report observed premiums. Counterfactual shows the estimated female WTP distribution after reweighting female farmers to male observed characteristics. Total difference is female WTP minus male WTP; negative values indicate that male farmers report higher premiums. Pure explained reports the portion of the gap attributable to observed endowment differences. Pure unexplained reports the portion attributable to differences in the returns to those characteristics. The structural component is policy-relevant because it shows how much of the gap remains after accounting for observed endowment differences.*

A Kolmogorov-Smirnov test confirms that the male and female WTP distributions differ significantly ($D = 0.368$, $p < 0.001$), consistent with male WTP first-order stochastically dominating female WTP. This means that a randomly selected male farmer is more likely than a randomly selected female farmer to report a higher premium for quality seed. This widening suggests that as seed markets scale up, the highest-WTP farmers are more likely to benefit from improved seed varieties to be male. Marital status is associated with the endowment effect at the 60th and 70th deciles. The results imply that marital status determines what resources female farmers hold, while having children under two years old suppresses WTP across the mean and from the 40th to the 70th deciles. Children aged 6–18 contribute to structural disadvantage at the 40th and 50th deciles. In addition to unpaid care responsibilities, household priorities around school-age children reduce seed investment capacity. Notably, socioeconomic characteristics, farming experience, land area, distance to market, motorcycle ownership, rented land, and neighbour seed access reduce female farmers' structural disadvantage.

The structural effect is significant from the 40th to the 80th deciles. At these deciles, the primary structural contributors are childcare responsibilities, farm sales income, and business income diversification, which generate larger returns to WTP for male farmers even when female farmers hold equivalent resources. At the 80th decile, VSLA credit access also contributes to the structural effect. This result requires careful interpretation because VSLAs are often designed to support women, yet the estimates suggest that men may be better positioned to convert credit access into higher WTP.

4.4.4 Anticategorical intersection of gender, socioeconomic factors and risk attitudes

The FRST analysis takes an anticategorical view rather than assuming gender is the axis of difference. It allows the data to identify combinations of demographic, socioeconomic characteristics, information, and risk attitudes associated with quality seed premiums below UGX 1,000 and high WTP when the premium is at or above UGX 1,000. The analysis generated 40 overlapping farmer profiles, reported in Appendix Table C16. Gender is associated with some farmer profiles, but not others. Thus, the anticategorical view shows that average gender categories are useful for identifying broad inequality, but insufficient for identifying overlapping constraints faced by farmers. The demographic identity-only analysis finds one low WTP farmer profile of older, educated female farmers.

Figure 5: Anticategorical intersectionality showing gender-conditional WTP profiles

- [1] "IF Uneducated is No and Oxlough is No and Season 2 production is No, and Used VSLA for Credit in 2022 is No and Radio is No, and **Gender** is **Female**
THEN Quality seed premium $\geq$ 1000 is **No**;
 (supportSize=33; laplace=0.9714)"
- [2] "IF **Gender** is **Male** and Secondary education is No and Farmed land and acres between 3 and 3.99 acres is Yes, and Sweetpotato land below 1 acre is Yes and Exposure to information nudges is No, and Source Vine's from own plot is Yes
THEN Quality seed premium $\geq$ 1000 is **No**;
 (supportSize=5; laplace=0.8571)"
- [3] "IF Prefer NAROSPOT T is No and Child in 2- 5 years is Yes and Risk averse is No and Farmed land unit acres is No and Variety preference is indifferent is No and **Gender** is **Female**
THEN Quality seed premium $\geq$ 1000 is **No**;
 (supportSize=32; laplace=0.9706)"
- [4] "IF Member group with savings and credit function is No and **Gender** is **Female** and Age 35 years below is No and Prefer NAROSPOT T variety is No, and Risk loving is No
THEN Quality seed premium $\geq$ 1000 is **No**;
 (supportSize=27; laplace=0.9655)"
- [5] "IF Risk neutral is No and Age category 60 years is No and, **Gender** is **Male** and Variety preference is indifferent is No and Season 2 production unit bag is No and Business Income UGX 50000 is Yes
THEN Quality seed premium $\geq$ 1000 is **No**;
 (supportSize=21; laplace=0.9565)"
- [6] "IF Income Non-agriculture employment UGX 50000 is Yes and Source vines own plot is No and Farming experience 20 - 29 is Yes and **Gender** is **Male** and Radio is No
THEN Quality seed premium $\geq$ 1000 is **No**;
 (supportSize=9; laplace=0.9091)"
- [7] "IF member group with saving and credit function is No and Income farm sales UGX 50001- 9999 is Yes and Season 2 production unit bag is No and Variety preference is indifferent is Yes and **Gender** is **Male**, and Farming experience of more than 30 years is No and Farmed land acres 3-3. 99 acres are No and Income agriculture employment 50000- 99999 is No, and Income non-agriculture employment UGX 50000 is No
THEN Quality seed premium $>$ 1000 is **Yes**;
 (supportSize=9; laplace=0.9091)"
- [8] "IF Risk loving is Yes and Source vines own plot is No and Farmed land unit 0.25 acre is No and Age category 35-59 years is Yes, and **Gender** is **Male** and Income Agriculture employment under UGX 50000 is No, and Income other business UGX 50000 is Yes and Married lives with spouse is Yes
THEN Quality seed premium $>$ 1000 is **Yes**;
 (supportSize=4; laplace=0.8333)"
- [9] "IF Farmed land above 4 acres is No and Income agriculture employment under 50000 is Yes and Distance market less than 30 minutes is No and Season 2 production unit basin is No and Farmed land acres 3- 3.99 acres is No and Oxlough is No and Income farm sales UGX 50001_9999 is Yes, and **Gender** is **Female** and Risk averse is No and Farmed land unit 0. 25 acre is No, and Variety preference is indifferent is No
THEN Quality seed premium $>$ 1000 is **Yes**;
 (supportSize=4; laplace=0.8333)"
- [10] "IF Member group function savings and credit is Yes and variety preference is indifferent is Yes and Season 2 production unit bag is Yes, and **Gender** is **Female**
THEN Quality seed premium $>$ 1000 is **Yes**;
 (supportSize=3; laplace=0.8)"

Note: The FRST generated 40 profiles in total, reported in Appendix Table C16. Figure 10 presents only the subset of profiles in which gender appears as one condition. The omitted profiles are not irrelevant. They show that WTP is also structured by non-gender farmer profiles such as group membership, production season, information access, risk, and asset constraints.

Extending to the intersection with socioeconomic characteristics further finds three female farmer profiles. The largest group consists of 33 educated women, representing 23.4% of female farmers. These women lack an ox plough, have no season two production, use non-VSLA credit, and lack a radio. Education does not translate into higher WTP when female farmers face operational and information constraints. Without mechanisation, land preparation is labour-intensive for female farmers. Without season two production, farmers may have less room to recover in the event of losses in the first season. The results also suggest that even with education, without VSLA credit aligned to agricultural production cycles, WTP for quality seeds is low. Female farmers in this study are more likely than their male counterparts to use farmer groups for saving and credit and rely on the radio for farming information. One farmer captured this directly: *“Those without radios have no way to hear about farming advice.”*

A second group consists of 32 women who care for children aged 2–5 years. These women have limited land and do not prefer NAROSPOT T. FGDs show that the female farmers prioritise local early maturing varieties to reduce food insecurity and high-yielding varieties to support children’s education. NAROSPOT T’s blackening when boiled also matters for this group because it increases food preparation time for women already facing unpaid labour demands. A third group consists of 27 women aged 35 and above. These older women are excluded from savings and credit groups, are not risk-loving, and do not prefer NAROSPOT T. Without group credit, they have less capacity to absorb the downside risk of improved seed investment. Without risk tolerance, they are less likely to seek alternative credit. The FGDs support this explanation: *“Improved vines can bring losses if instructions for spraying or fertiliser are not followed. We fear taking these risks because they may lead to total loss.”*

The next group with low WTP consists of 21 younger and middle-aged men under 60 years. These men are not risk-neutral, produce less than one bag in season two, have specific variety preferences, and earn at least UGX 50,000 from non-farm business. This group shows that the male advantage in WTP for quality seeds is not universal. Some male farmers noted the financial risks associated with improved vines when planted without complementary inputs. Another smaller group consists of men without a secondary education. These men have 3 to 3.99 acres of farmed land, less than one acre under sweetpotato, no exposure to information nudges, and rely on their own seed. These results

show that some male farmers also remain outside commercial seed systems when low production scale, lack of information exposure, and recycling seed co-exist.

Looking at gender intersectionality with other identities, the only profile associated with high WTP is unmarried, primary or secondary educated male farmers. After extending to socioeconomic characteristics, only four female farmers demonstrate high WTP. These are women in savings and credit groups who are indifferent across varieties and produce in season two. These farmers have at least two characteristics associated with high WTP (see Appendix Figure C1-C3 for factors associated with high WTP from association rule mining and conditional inference trees). This profile suggests that high WTP among female farmers materialises when financial support, varietal preferences, and production timing reduce investment risk. Nine male farmers demonstrate high WTP despite being excluded from savings and credit groups and not being risk-loving. These are men who have moderate farm sales income of UGX 50,001 to 99,999. This contrast is important because it shows that high WTP is reached through different pathways. Female farmer profiles are linked to group-based financial support, while male profiles are linked to farm sales income.

4.5 Discussion

4.5.1 Gender and premium payment for quality seed

This chapter establishes that male farmers report significantly higher WTP premiums for quality sweetpotato seed. The gender gap in WTP persists after controlling for demographic and socioeconomic characteristics and risk attitudes. The findings that male farmers are willing to pay a higher premium for quality seeds than female farmers corroborate Adesina *et al.* (2017). The study results support past research showing that the willingness to pay for quality agricultural inputs is higher among male farmers than female farmers (Tufa *et al.*, 2024; Marenja *et al.*, 2021; Gebre *et al.*, 2019). First, female farmers in FGDs cited financial constraints as a primary barrier, not lack of interest in quality seed. Female farmers prefer quality seeds, but rely more on seeds from farmer-managed systems, which may offer lower-quality seeds that are more affordable, despite knowing that these seeds carry a higher risk of pests and diseases (Mudege, Mayanja and Naziri, 2016). Male farmers, positioned by local norms as primary household financial decision-makers, showed less hesitation about seed investment and often framed it as a necessary agricultural expenditure rather than a discretionary cost. Social norms positioning men as

primary decision-makers in agriculture perpetuate a gender hierarchy, which inhibits women's capacity to make comparable financial decisions (Djoudi *et al.*, 2016).

Second, female farmers' low premiums may reflect negative experiences with seed quality in informal markets, including distrust of sold seed and poor variety performance. Farmers often have low confidence in seeds from formal sector sources due to their past experiences with inconsistent seed quality and variety performance (Almekinders *et al.*, 2019). Farmers hesitate to spend on quality seeds, fearing they may be counterfeit or adulterated (Bold *et al.*, 2017). Third, risk attitudes are significant predictors of WTP only for female farmers in the ESTER model. The results are consistent with studies that show female farmers' greater exposure to financial shocks and limited access to credit buffers (Holden and Quiggin, 2017; Magnan *et al.*, 2020). When downside risk cannot be absorbed, investment in unfamiliar inputs is rational to avoid even when the expected return is positive.

4.5.2 Intercategorical intersectionality gender gap decomposition

The RIF decomposition provides the chapter's intercategorical analysis. It uses gender as the main category of comparison and asks whether the male-female WTP gap reflects endowment differences or structural effects. The RIF decomposition in Table 10 shows that female farmers experience significant structural disadvantages. Therefore, even if female farmers had similar land, income, education, and group membership as male farmers, a significant WTP gap would remain. This finding aligns with studies in other contexts showing that the structural effect is characterised by social norms and institutional barriers (Oseni *et al.*, 2015; Singbo *et al.*, 2021; Abdisa, Mehare and Wakeyo, 2024). The structural disadvantage is not evenly distributed across the WTP distribution. The gap is insignificant at the 20th quantile but widens steadily afterwards, reaching a 157.97% male advantage at the 90th quantile. This widening at the top of the distribution is consequential for commercial seed-system development. As quality seed markets scale up, the male farmers most likely to drive commercial demand are those at the top of the WTP distribution. This does not imply deliberate exclusion by seed-market actors. It means that a commercialisation strategy based only on high-WTP demand may reproduce gender inequality because the structural effects associated with high WTP are gendered.

Childcare responsibilities, limited business income, and restricted access to VSLA credit are important contributors to female farmers' structural disadvantages. Childcare

creates time pressure and reduces women's ability to intensify farming and engage in markets (Ali *et al.*, 2016; Bello *et al.*, 2021). VSLA credit requires careful interpretation. Although VSLAs are often designed to support women, the results showed that men have the structural advantage to convert credit access into higher WTP. The results suggest that membership in saving and credit groups alone is unlikely to close the WTP gap among female farmers. Sweetpotato seed markets are not gender-neutral institutions. They reproduce existing social hierarchies by rewarding higher socioeconomic characteristics that male farmers more structurally occupy. Closing the WTP gap, therefore, requires not only resource transfers but redesign of the institutions and social norms through which seed markets operate.

4.5.3 Anticategorical intersectionality: which farmers are constrained and why

The FRST analysis provides the chapter's anticategorical contribution. Unlike the ESTER and RIF decomposition, it does not begin by treating gender as the only organising category. The anticategorical perspective shows that WTP is organised by production season, group membership, credit, information access, risk exposure, assets, and varietal preferences. The largest female group consists of educated women without mechanisation, VSLA credit, season-two production, or radio access. Human capital factors, such as education, enhance farmers' ability to understand and implement innovations and support successful technology adoption (Huffman, 2020). Likewise, studies have demonstrated that educated farmers are more likely to use quality seeds (Sarkar *et al.*, 2024; Baglan *et al.*, 2020). However, this key finding demonstrates that education alone does not translate into high WTP when it intersects with labour, operational, financial, and information constraints. Without VSLA credit, the upfront cost of quality seed cannot be financed easily from seasonal income. VSLA can have transformative empowerment effects that go beyond the immediate purposes of saving and loans, such as the improvement of off-farm incomes (Karlan *et al.*, 2017). It contributes to labour pooling and other assets, as well as a sense of social support and solidarity that can help challenge oppressive gender and wider social relations (Berretta *et al.*, 2023). Radio access improves farmers' awareness of seed availability and its benefits. In FGDs, radio was described as a trusted and widely used source of farming information. Women without radios indicated they had to go and listen to agricultural information from their neighbours.

The second group consists of women who care for children aged 2–5 years old, have limited land and do not prefer NAROSPOT T. This shows how a variety that may appear agronomically neutral can become socially regressive when it interacts with gendered time poverty (Ragot, Bonierbale and Weltzien, 2018). The third group consists of women aged 35 and above. These older women are excluded from savings and credit groups, are not risk-loving, and do not prefer NAROSPOT T. Without risk tolerance, they have less capacity to absorb the downside risk of improved seed investment and are less likely to seek alternative credit. Younger and middle-aged men under 60 with low second-season production, specific variety preferences, and non-farm business income are also associated with low WTP. Similarly, male farmers without secondary education, limited sweetpotato area, no exposure to information nudges, and reliance on own-plot vines had low WTP. These profiles show that some male farmers also remain outside commercial seed demand when production scale, information exposure, and seed-sourcing practices intersect.

Despite differing challenges, small groups of female and male farmers demonstrate that diversified income sources, openness to various seed varieties, and membership in credit and saving groups can enhance agency to pay high premiums for quality seeds. For female farmers who belong to the savings and credit groups, the intersection of financial inclusion and agricultural agency is important. For female farmers in these groups, especially those with less land and low agricultural income, financial inclusion perhaps enables them to offer high premiums. As Farnworth et al. (2020) observed, women are not “locked in” to predefined roles. They actively negotiate cultural norms and engage in decision-making processes, which can empower them despite these constraints. These findings support calls that gender analysis requires attention to model specification, comparison groups, intersectionality, and the meaning of measured difference, not only the inclusion of gender as a variable (Tavenner and Crane, 2019; Small, 2025; Tavenner et al., 2022).

Appendices C: Chapter Four

Table C1: Socioeconomic characteristics Full-sample N=276

Variable	Mean	Std. dev.	Min	Max
Age (years)	42.85	15.03	18	87
Farming Experience (years)	20.73	13.13	0	62
Education (years)	6.03	3.91	0	17
Child under 2 yrs (No.)	0.56	0.75	0	3
Child under 2 - 5 yrs (No.)	1.17	1.03	0	5
Child under 6 - 18 yrs (No.)	2.76	2.12	0	12
Above 18 years (No.)	2.38	1.79	0	10
Income agriculture employment	100039.90	599113.60	0	9200000
Income non-agriculture employment	571550.70	2063995.00	0	28000000
Farm sales income	636915.60	846739.70	0	5470000
Income business	237068.80	665745.60	0	6000000
Income other	76172.16	888107.30	0	14400000
Farmed land acres	3.18	1.93	0.50	12
Sweetpotato acreage	0.61	0.40	0.06	3
Sweetpotato season 1 production (No. bags)	4.22	4.76	0	30
Sweetpotato season 2 production (No. bags)	0.74	1.22	0	6
Distance road (minutes)	18.41	22.57	0	180
Distance market (minutes)	103.59	61.45	1	250
Risk attitudes (scale 1-10)	6.13	2.59	0	10

Table C2: Descriptives by gender of the farmer

Variable	Female N=141				Male N= 135				T-test
	Mean	Std. dev.	Min	Max	Mean	Std. dev.	Min	Max	p-value
Age (years)	42.55	15.77	18	87	43.16	14.26	20	83	0.737
Farming Experience (years)	18.60	12.25	1	50	22.95	13.68	0	62	0.006
Education (years)	4.69	3.48	0	15	7.42	3.85	0	17	<.001
Child under 2 yrs	0.52	0.67	0	3	.6	.82	0	3	0.405
Child under 2 - 5 yrs	1.11	1.01	0	4	1.24	1.06	0	5	0.268
Child under 6 - 18 yrs	2.74	2.14	0	9	2.78	2.10	0	12	0.897
Above 18 years	2.62	1.89	0	10	2.13	1.66	0	10	0.021
Agriculture employment income	55134.75	85129.75	0	600000	146940.70	851302.10	0	9200000	0.204
Non-agriculture employment income	258439.70	817401.20	0	5880000	898577.80	2798879	0	28000000	0.010
Farm sales income	495046.90	683942.80	0	4000000	785089.6	969210.6	0	5470000	0.004
Business income	152929.10	378422.60	0	2400000	324948.1	862984.4	0	6000000	0.032
Other income	0.00	0.00	0	0	157537.9	1274662	0	14400000	0.143
Farmed land acres	2.72	1.38	0.5	8.25	3.65	2.280	0.5	12	<.001
Sweetpotato acreage	0.57	0.33	0.13	2.25	.66	.46	0.06	3	0.029
Sweetpotato season 1 production (bags)	2.72	2.98	0	20	5.78	5.69	0	30	<.001
Sweetpotato season 2 production (bags)	0.28	0.76	0	4	1.23	1.41	0	6	<.001
Distance road (minutes)	19.07	20.92	0	120	17.73	24.23	0	180	0.621
Distance market (minutes)	112.88	62.35	1	240	93.89	59.18	5	250	0.010
Risk attitudes (scale 1-10)	5.51	2.32	0	10	6.778	2.70	1	10	<.001

Table C3: Socio-economic characteristics by gender of the farmer (frequencies)

	%	Female N=141	Male N=135	Full sample N=276	χ^2 p-value
Marital Status	Single, never married	3.5	1.5	2.5	0.000
	Married and live together with Spouse	70.9	91.9	81.2	
	Married, but the spouse stays away)	1.4	2.2	1.8	
	Separated or Divorced	10.6	2.2	6.5	
	Widow or widower	13.5	2.2	8.0	
Highest education	None	15.6	4.4	10.1	0.000
	Primary school	67.4	52.6	60.1	
	Secondary school	14.2	28.1	21.0	
	Advanced level		3.0	1.4	
	University college		5.2	2.5	
	Others (Specify ...)	2.8	6.7	4.7	
Farmer group	Yes	34.0	54.8	44.2	0.001
Function of the group	Marketing of produce	0.0	1.4	0.8	0.003
	Savings and Credit	64.6	59.5	61.5	
	Seed production	6.3	4.1	4.9	
	Social support	2.1	27.0	17.2	
	Technical/production information	8.3	1.4	4.1	
	Livestock production	4.2	0.0	1.6	
	Group farming	10.4	6.8	8.2	
	Other(specify)	4.2	0.0	1.6	
Borrow land	Yes	44.68	29.63	37.32	0.010
Hire land	Yes	29.08	28.15	28.62	0.864
Credi 2022	Yes	38.3	31.1	34.8	0.210
Credit source					
Friends Social group	Selected	0.0	3.0	1.4	0.040
	Selected	0.0	2.2	1.1	0.075
	VSLA	33.3	21.5	27.5	0.804
	Other	5.7	5.2	5.4	
	sources				
Source of vines	Neighbour	39.7	47.4	43.5	0.000
	Relative	1.4	5.2	3.3	
	Saved/Own plot	25.5	27.4	26.4	
	Local market	9.9	4.4	7.2	
	Distant market	14.9	0.7	8.0	
	Other source of vines	8.5	14.8	11.6	
Purchase size of bundles	50 vines (25 heaps)	5.7	14.3	7.1	0.834
	100 vines (50 heaps)	20.0	14.3	19.0	
	200 vines (100 heaps)	22.9	28.6	23.8	

Table C4: Asset ownership by gender of the farmer

	Female N=141	Male N=135	Full-sample N=276	
Ox plough	36.17	54.81	45.29	0.002
Water Pump	1.42	0	0.72	0.165
Motorcycle	11.35	12.59	11.96	0.750
Wheelbarrow	9.22	14.07	11.59	0.208
Spray pump	22.7	34.07	28.26	0.036
Bicycle	56.03	67.41	61.59	0.052
Hand hoes	100	99.26	99.64	0.306
Other	13.48	9.63	11.59	0.319
Radio	32.62	58.52	45.29	0.000
TV	3.55	8.15	5.8	0.102
Mobile phone	57.45	80.74	68.84	0.000
Other	0	2.96	1.45	0.040

Table C5: Willingness to pay reduced payment card categories

	New Dimbuka*	Tanzania*	Narospot T*	Narospot P*	Average WTP*
	%	%	%	%	%
≤500	67.75362	55.43478	56.52174	41.66667	42.3913
600-900	5.072464	6.884058	5.797101	6.15942	27.17391
≥1000	27.17391	37.68116	37.68116	52.17391	30.43478

* Independent-Samples Kruskal-Wallis Test: WTP is significantly different by gender

Table C6: Willingness to pay replacing > 1001 with actual bid values

	Mean	SD	min	max
New Dimbuka	645.65	800.24	0	6000
Tanzania	903.62	1182.84	0	10000
Narospot T	858.33	1031.66	0	6000
Narospot P	1180.80	1280.41	0	10000
Average WTP	897.10	910.12	0	5750
N	276			

Table C7: T-test for gender differences with actual WTP N= 276

		Women (N=141)	Men (N= 135)
	Difference	Mean WTP	Mean WTP
New Dimbuka	-434.1*** (92.91)	433.3333	867.4074
Tanzania	-667.1*** (136.9)	577.305	1244.444
Narospot T	-481.7*** (121.0)	622.695	1104.444
Narospot P	-917.7*** (144.2)	731.922	1649.63

Standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table C8: Wilcoxon signed-rank test for difference in premiums between varieties

		vs	vs	vs	vs	vs	vs
		New Dimbuka Tanzania	New Dimbuka NAROSPOT T	New Dimbuka NAROSPOT P	Tanzania NAROSPOT T	Tanzania NAROSPOT P	NAROSPOT T NAROSPOT P
Female	Test Statistic	-0.309	0.521*	0.915***	0.213	0.606***	0.394
	Std. Test	-2.007	3.39	5.95	1.384	3.944	2.56
Male	Test Statistic	-0.5*	0.381	1.281***	-0.119	0.781***	0.9***
	Std. Test	-3.182	2.428	8.155	-0.754	4.973	5.728

Note: Each row tests the null hypothesis that the Sample 1 and 2 distributions are identical. The significance level is 5%, adjusted by the Bonferroni correction for multiple tests.

Table C9: Exogenous switching regression extended model

Variable	Model 0 (1)	Pooled (2)	Female (3)	Male (4)
Gender (Female =1)	-625.168*** (104.502)	- 596.312*** (142.114)	0.000 (.)	0.000 (.)
Risk attitudes (scale 1-10)		20.442 (21.671)	45.860*** (16.946)	-12.517 (38.320)
Education (years)		-1.125 (16.585)	-14.370 (15.393)	13.190 (32.730)
Farming experience (years)		3.600 (5.924)	1.084 (5.340)	21.218* (12.776)
Farmed land acres		63.358 (42.159)	13.018 (40.459)	67.057 (57.963)
Sweetpotato land acres		-178.149 (135.966)	-117.123 (114.246)	-283.638 (225.089)
Age (years)		-3.659 (5.339)	-1.483 (5.210)	-14.358 (12.136)
Child under two years (No.)		-57.371 (64.174)	54.406 (55.572)	-169.025 (110.558)
Child between six and eighteen years (No.)		-48.536** (19.412)	-2.640 (16.997)	-56.139 (38.571)
Household members above eighteen years (No.)		-12.078 (26.822)	-15.940 (23.008)	-32.371 (56.904)
Agricultural employment income (000000)		143.979*** (44.828)	44.426 (484.786)	219.146*** (63.992)
Non-agricultural income (000000)		-12.508 (15.943)	-51.877 (44.798)	-12.186 (24.831)
Farm income (000000)		- 147.991*** (56.246)	-27.669 (58.614)	- 260.712*** (97.815)
Income business (000000)		-75.954 (58.761)	46.735 (114.104)	-109.548 (105.192)
Season one production (1=Yes)		-5.354 (13.274)	1.814 (15.449)	-2.463 (19.841)
Season two production (1=Yes)		6.964 (55.909)	101.630* (52.528)	-20.723 (73.029)
Distance road (minutes)		8.719* (3.774)	4.000 (3.079)	11.326 (7.076)
Distance market (minutes)		1.683* (0.957)	-0.187 (0.708)	5.146*** (1.956)
Poster assignment (village-level treatment, 1 = Yes)		-34.789 (104.776)	-29.039 (82.960)	-49.563 (210.051)
Oxplough (1 = Yes)		144.977 (114.845)	98.083 (81.430)	133.840 (232.406)
Motorcycle (1 = Yes)		-180.616 (153.530)	-306.800* (120.334)	225.228 (367.982)
Wheelbarrow (1 = Yes)		86.071 (179.583)	116.906 (146.059)	28.816 (282.600)
Bicycle (1 = Yes)		69.283 (111.325)	120.788 (74.714)	66.204 (255.016)
Radio (1 = Yes)		154.898	54.493	171.881

Variable	Model 0	Pooled	Female	Male
		(114.984)	(85.203)	(198.292)
Phone (1 = Yes)		47.339	16.532	459.798*
		(105.353)	(82.722)	(264.497)
Member farmer group (1 = Yes)		87.419	83.051	66.906
		(115.937)	(93.964)	(201.836)
Rent land (1 = Yes)		47.802	-98.311	96.275
		(128.245)	(98.575)	(259.526)
Borrow land (1 = Yes)		125.349	-16.430	91.899
		(98.808)	(73.960)	(178.847)
Used credit in 2022 (1 = Yes)		190.771	-102.465	283.143
		(229.655)	(225.821)	(362.729)
Cultivate_swamps (1 = Yes)		123.407	145.451	279.363
		(131.126)	(112.142)	(350.216)
Marital status (married) (1 = Yes)		-71.045	58.975	-274.735
		(136.806)	(93.686)	(378.479)
Credit source VSLA (1 = Yes)		-3.304	42.142	103.952
		(228.962)	(210.110)	(355.861)
Neighbours as seed source (1 = Yes)		95.999	-	254.858
			207.126+	
		(133.581)	(110.239)	(237.889)
Saved/Own plot seed (1 = Yes)		17.290	-67.443	99.193
		(143.748)	(123.413)	(265.051)
Local market source of seed (1 = Yes)		-80.936	-59.863	55.767
		(156.615)	(135.208)	(341.492)
_cons	1216.481***	737.194	425.437	496.614
	(96.898)	(456.564)	(371.674)	(746.032)
N	276	276	141	135

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Standard errors in parentheses

RIF extended models for Mean, 40th -80th quantile

Table C10: RIF Mean decomposition

Variable	Overall	Explained	Specif_err	Pure_ Unexplained	Reweight_err
Group_Female	591.314*** (39.131)				
Group_counterfactual	783.345*** (148.017)				
Group_Male	1216.481*** (96.898)				
Total difference	-625.168*** (104.502)				
Total_Explained	-192.031 (147.044)				
Total_Unexplained	-433.137** (184.899)				
Pure_explained	-116.097 (121.378)				
Specif_err	-75.934 (121.008)				
Reweight_err	17.194 (186.967)				
Pure_Unexplained	-450.331*** (161.778)				
Risk attitudes (scale 1-10)		-49.102 (34.311)	-36.883 (137.584)	433.172 (339.500)	-9.728 (33.180)
Education (years)		29.077 (38.222)	-148.107 (128.516)	-40.764 (310.987)	-5.472 (11.838)
Farming experience (years)		-8.949 (52.938)	220.675 (233.691)	-650.571* (394.297)	-27.912 (45.508)
Farmed land acres		-8.440 (31.440)	326.211** (157.481)	-550.803* (302.419)	23.536 (25.988)
Sweetpotato land acres		-3.274 (8.214)	-213.849*** (72.947)	370.373* (208.090)	-32.760 (27.717)
Age (years)		5.579 (23.986)	-399.572 (350.884)	928.108 (716.610)	22.527 (37.138)

Variable	Overall	Explained	Specif_err	Pure_ Unexplained	Reweight_err
Child under two years (No.)		4.583 (9.663)	-10.711 (27.657)	148.645* (88.390)	-12.549 (15.871)
Child between six and eighteen years (No.)		-1.313 (10.193)	-0.650 (41.719)	149.414 (137.762)	1.247 (9.442)
Household members above eighteen years (No.)		-0.889 (4.669)	-122.526 (79.365)	136.353 (164.199)	14.054 (18.602)
Agricultural employment income (000000)		-0.260 (3.455)	8.870 (26.959)	-47.043 (98.608)	8.681 (56.146)
Non-agricultural income (000000)		7.186 (12.354)	-1.550 (18.901)	-32.157 (46.644)	24.064 (26.355)
Farm income (000000)		6.416 (16.634)	-100.043+ (52.607)	291.006*** (109.526)	-6.394 (17.880)
Income business (000000)		-2.782 (9.076)	-53.050+ (30.858)	131.927* (63.746)	-33.350 (37.848)
Season one production (1=Yes)		-1.702 (17.409)	-30.030 (51.908)	72.135 (154.450)	-21.240 (27.918)
Season two production (1=Yes)		-66.080 (65.410)	31.016 (58.745)	109.291 (116.234)	-20.312 (38.625)
Distance road (minutes)		12.447 (16.834)	-75.995+ (41.721)	-45.461 (156.420)	-15.481 (33.135)
Distance market (minutes)		-1.202 (5.931)	-10.696 (78.755)	-491.267** (231.141)	-1.090 (8.836)
Poster assignment (village-level treatment, 1 = Yes)		-1.587 (6.783)	-4.996 (133.088)	35.972 (399.195)	1.933 (7.745)
Oxplough (1 = Yes)		-30.887 (32.318)	-58.973 (61.427)	28.176 (157.714)	23.797 (23.905)
Motorcycle (1 = Yes)		-16.283 (12.766)	34.012 (21.191)	-137.904** (66.010)	56.998 (40.082)
Wheelbarrow (1 = Yes)		5.852 (9.196)	27.927 (17.885)	-80.874 (54.975)	53.817* (25.720)
Bicycle (1 = Yes)		-14.823 (18.958)	82.666 (56.881)	-44.791 (211.092)	-0.002 (0.611)
Radio (1 = Yes)		-10.200 (20.590)	-97.465* (50.557)	42.397 (148.338)	-17.536 (38.442)

Variable	Overall	Explained	Specif_err	Pure_ Unexplained	Reweight_err
Phone (1 = Yes)		-3.539 (21.219)	-64.066 (75.358)	-292.296 (263.576)	-1.846 (9.649)
Member farmer group (1 = Yes)		-6.568 (14.514)	46.671 (39.387)	-52.131 (145.543)	3.627 (14.687)
Rent land (1 = Yes)		-7.520 (12.348)	79.952* (42.126)	-159.796* (94.982)	31.678 (47.139)
Borrow land (1 = Yes)		-0.732 (4.577)	58.262 (42.743)	-75.015 (69.366)	-17.085 (26.269)
Used credit in 2022 (1 = Yes)		0.257 (14.005)	151.658 (111.911)	-242.364 (153.127)	-36.881 (74.927)
Cultivate_swamps (1 = Yes)		22.387 (21.503)	-20.105 (12.858)	8.105 (54.600)	-8.430 (17.334)
Marital status (married) (1 = Yes)		-2.437 (9.558)	43.555 (101.550)	253.216 (430.933)	-0.158 (20.128)
Credit source VSLA (1 = Yes)		0.677 (6.947)	-139.704 (96.954)	81.313 (98.608)	49.431 (71.272)
Neighbours as seed source (1 = Yes)		31.743 (35.338)	133.913* (74.153)	-334.355** (154.725)	-34.386 (69.504)
Saved/Own plot seed (1 = Yes)		0.198 (8.551)	23.135 (36.306)	-70.222 (97.631)	2.483 (21.690)
Local market source of seed (1 = Yes)		-3.929 (10.696)	4.022 (6.676)	-10.449 (19.371)	1.933 (4.783)
_cons			240.495 (336.641)	-311.672 (952.739)	

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table C11: RIF 40th Quantile decomposition

Variable	Overall	Pure_explained	Specif_err	Pure_Unexplained	Reweight_err
Group_female	427.28*** (33.14)				
Group_counterfactual	654.48*** (106.20)				
Group_male	772.99*** (65.12)				
Total difference	-345.72*** (73.07)				
ToT_Explained	-227.21** (110.11)				
ToT_Unexplained	-118.51 (129.82)				
Total	-227.21** (110.11)				
Pure_explained	-64.64 (78.31)				
Specif_err	-162.56 (119.39)				
Risk attitudes (scale 1-10)		-11.77 (20.83)	-49.25 (134.13)	-13.42 (217.87)	-3.49 (12.15)
Education (years)		-8.51 (32.71)	-36.29 (131.43)	210.99 (258.85)	-6.83 (12.61)
Farming experience (years)		15.04 (54.34)	-407.26* (233.01)	330.77 (306.06)	52.21 (68.15)
Farmed land acres		-26.34 (23.26)	320.06*** (122.18)	-274.97 (206.68)	15.26 (17.31)
Sweetpotato land acres		-4.46 (10.62)	-113.13 (75.64)	134.59 (161.36)	-5.83 (14.23)
Age (years)		5.87 (19.96)	394.00 (322.95)	-694.37 (512.66)	-31.74 (42.92)
Child under two years (No.)		4.92 (9.66)	-38.81 (31.02)	141.89* (74.30)	-23.35 (25.53)
Child between six and eighteen years (No.)		5.79 (11.06)	30.68 (41.70)	267.71** (116.59)	1.07 (8.15)

Variable	Overall	Pure_explained	Specif_err	Pure_Unexplained	Reweight_err
Household members above eighteen years (No.)		-0.16	-75.02	82.56	11.66
		(1.63)	(86.13)	(131.13)	(14.65)
Agricultural employment income (000000)		-4.19	67.27	-69.36	33.29
		(10.58)	(41.31)	(87.75)	(54.87)
Non-agricultural income (000000)		15.76	-5.43	-94.18**	50.20
		(22.43)	(18.50)	(44.66)	(37.78)
Farm income (000000)		3.00	-159.38***	319.55***	-12.00
		(13.68)	(54.67)	(94.09)	(32.95)
Income business (000000)		2.25	-46.35	75.36	-20.29
		(6.75)	(29.77)	(48.10)	(24.03)
Season one production (1=Yes)		-4.18	58.62	-173.71*	24.53
		(12.81)	(50.69)	(94.16)	(23.26)
Season two production (1=Yes)		-24.63	35.97	-72.80	0.24
		(33.27)	(49.31)	(82.69)	(9.77)
Distance road (minutes)		-3.19	-47.66	-28.90	-3.47
		(6.63)	(35.75)	(60.35)	(8.07)
Distance market (minutes)		-1.12	18.05	-115.85	-4.33
		(5.13)	(83.35)	(153.56)	(8.86)
Poster assignment (village-level treatment, 1 = Yes)		-0.16	-56.53	-103.66	-2.79
		(4.47)	(126.98)	(294.35)	(8.04)
Oxplough (1 = Yes)		-42.31	-47.33	177.03*	26.25
		(31.06)	(58.45)	(97.48)	(25.70)
Motorcycle (1 = Yes)		-16.00	12.22	-76.88*	33.01
		(12.13)	(10.65)	(43.06)	(24.28)
Wheelbarrow (1 = Yes)		14.70	27.92	-69.89	36.37*
		(9.05)	(17.11)	(43.65)	(18.94)
Bicycle (1 = Yes)		-14.89	163.60**	-261.74**	-1.06
		(18.25)	(66.16)	(130.55)	(16.44)
Radio (1 = Yes)		12.43	-124.09**	72.58	-12.58
		(18.80)	(57.27)	(100.01)	(27.63)
Phone (1 = Yes)		-25.17	40.99	46.73	-1.24
		(21.88)	(77.40)	(219.59)	(6.55)
Member farmer group (1 = Yes)		-5.63	13.21	39.86	-5.10

Variable	Overall	Pure_explained	Specif_err	Pure_Unexplained	Reweight_err
		(12.09)	(39.32)	(102.78)	(11.93)
Rent land (1 = Yes)		2.41	81.30*	-68.92	23.38
		(8.02)	(41.89)	(61.67)	(34.90)
Borrow land (1 = Yes)		-1.40	29.84	-42.43	-11.18
		(5.79)	(44.35)	(53.51)	(18.26)
Used credit in 2022 (1 = Yes)		0.43	-32.03	-29.31	-6.50
		(23.27)	(72.11)	(97.81)	(17.63)
Cultivate_swamps (1 = Yes)		7.94	-16.94	14.82	-5.36
		(14.32)	(11.73)	(37.18)	(11.11)
Marital status (married) (1 = Yes)		2.33	21.01	127.98	14.18
		(8.92)	(110.88)	(264.32)	(24.57)
Credit source VSLA (1 = Yes)		0.48	9.85	-87.26	-0.13
		(5.02)	(59.81)	(69.04)	(14.78)
Neighbours as seed source (1 = Yes)		37.77	-63.25	-130.28	-10.04
		(37.46)	(72.18)	(109.65)	(21.86)
Saved/Own plot seed (1 = Yes)		0.44	-11.26	-1.57	1.66
		(18.81)	(35.07)	(74.42)	(14.54)
Local market source of seed (1 = Yes)		-2.07	8.35	-8.90	3.02
		(9.07)	(7.15)	(18.13)	(7.28)
Reweight_err	159.00				
	(147.54)				
Pure_Unexplained	-277.51**				
	(127.63)				
_cons			-165.48	98.46	
			(379.31)	(691.34)	

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table C12: RIF 50th Quantile decomposition

Variable	Overall	Pure_explained	Specif_err	Pure_Unexplained	Reweight_err
Group_Female	483.81*** (34.94)				
Group_counterfactual	752.76*** (105.91)				
Group_Male	895.00*** (77.59)				
Total difference	-411.19*** (85.09)				
ToT_Explained	-268.94** (111.37)				
ToT_Unexplained	-142.25 (137.93)				
Total	-268.94** (111.37)				
Pure_explained	-62.17 (90.09)				
Specif_err	-206.77 (139.37)				
Risk attitudes (scale 1-10)		-17.02 (22.22)	-72.69 (133.39)	48.67 (256.25)	-5.09 (17.48)
Education (years)		1.54 (36.67)	-67.50 (140.02)	348.11 (277.14)	-6.61 (12.63)
Farming experience (years)		3.24 (57.89)	-203.64 (227.77)	130.83 (336.97)	28.14 (40.96)
Farmed land acres		-13.14 (21.98)	287.14** (130.29)	-474.16* (249.86)	18.24 (20.04)
Sweetpotato land acres		-3.01 (7.71)	-152.36* (79.94)	220.41 (178.78)	-20.49 (18.59)
Age (years)		6.71 (21.39)	101.15 (322.60)	-454.18 (600.44)	-12.51 (24.77)
Child under two years (No.)		8.61 (15.66)	-3.62 (29.94)	159.46** (80.41)	-17.60 (19.72)
Child between six and eighteen years (No.)		-1.17	6.73	302.78**	2.84

	(9.99)	(46.86)	(136.81)	(8.57)
Household members above eighteen years (No.)	-0.70	-108.65	76.55	13.13
	(3.81)	(88.11)	(141.24)	(14.76)
Agricultural employment income (000000)	-1.00	23.26	-51.08	18.06
	(3.76)	(28.80)	(77.39)	(44.86)
Non-agricultural income (000000)	10.48	-7.56	-66.80	28.41
	(15.59)	(19.34)	(41.47)	(24.52)
Farm income (000000)	7.97	-128.82**	305.90***	-8.31
	(14.85)	(53.92)	(100.18)	(22.91)
Income business (000000)	-0.36	-52.34	88.85*	-28.41
	(6.01)	(32.83)	(53.41)	(32.20)
Season one production (1=Yes)	-8.06	67.55	-194.92*	20.94
	(14.58)	(51.01)	(107.47)	(21.19)
Season two production (1=Yes)	-24.11	29.37	-79.59	-1.64
	(36.39)	(49.12)	(93.65)	(9.47)
Distance road (minutes)	-1.06	-54.39	-74.95	-5.42
	(6.30)	(36.13)	(67.72)	(11.98)
Distance market (minutes)	-1.58	11.46	-88.91	-4.44
	(5.79)	(84.33)	(170.27)	(8.47)
Poster assignment (village-level treatment, 1 = Yes)	4.53	72.66	-115.10	-2.41
	(12.58)	(132.20)	(326.54)	(7.48)
Oxplough (1 = Yes)	-51.78	-30.38	196.69*	26.89
	(34.82)	(61.36)	(117.73)	(26.24)
Motorcycle (1 = Yes)	-13.06	7.56	-46.95	24.33
	(10.97)	(9.07)	(43.48)	(18.42)
Wheelbarrow (1 = Yes)	4.65	21.10	-73.62	40.20**
	(6.52)	(13.68)	(52.43)	(19.81)
Bicycle (1 = Yes)	-6.93	79.21	-196.98	-0.53
	(12.57)	(62.19)	(148.69)	(8.29)
Radio (1 = Yes)	1.83	-76.14	3.55	-9.94
	(16.89)	(50.34)	(113.66)	(21.96)
Phone (1 = Yes)	-16.64	-10.23	-141.83	-1.71

		(21.29)	(77.54)	(245.26)	(8.96)
Member farmer group (1 = Yes)		-3.10	39.92	-79.81	7.20
		(9.40)	(44.48)	(128.02)	(13.99)
Rent land (1 = Yes)		6.55	101.54**	-68.05	26.09
		(10.74)	(49.02)	(67.62)	(38.81)
Borrow land (1 = Yes)		1.52	30.51	-65.88	-4.43
		(6.30)	(46.65)	(60.26)	(10.67)
Used credit in 2022 (1 = Yes)		0.61	17.16	-133.53	-21.40
		(33.21)	(83.27)	(111.35)	(43.96)
Cultivate_swamps (1 = Yes)		2.22	-8.70	-4.32	-2.46
		(15.64)	(11.02)	(43.47)	(5.46)
Marital status (married) (1 = Yes)		-2.13	133.14	122.27	21.14
		(8.69)	(116.67)	(279.57)	(28.38)
Credit source VSLA (1 = Yes)		2.32	-29.53	-31.75	24.32
		(19.60)	(69.54)	(77.38)	(36.87)
Neighbours as seed source (1 = Yes)		48.83	-128.60*	-41.10	-6.49
		(47.50)	(76.37)	(115.98)	(15.43)
Saved/Own plot seed (1 = Yes)		0.27	2.33	52.37	1.59
		(11.61)	(33.12)	(81.53)	(13.95)
Local market source of seed (1 = Yes)		-9.20	1.62	-0.18	2.03
		(10.83)	(6.34)	(20.41)	(4.95)
Reweight_err	143.66				
	(140.30)				
Pure_Unexplained	-285.90**				
	(127.18)				
_cons			-105.05	141.35	
			(387.60)	(805.59)	

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table C13: RIF 60th Quantile decomposition

Variable	Overall	Pure_explained	Specif_err	Pure_Unexplained	Reweight_err
Group_Female	585.90*** (39.87)				
Group_counterfactual	802.25*** (141.45)				
Group_Male	1025.00*** (96.38)				
Total difference	-439.10*** (104.30)				
ToT_Explained	-216.35 (146.30)				
ToT_Unexplained	-222.75 (179.08)				
Total	-216.35 (146.30)				
Pure_explained	-120.20 (110.64)				
Specif_err	-96.16 (162.94)				
Risk attitudes (scale 1-10)		-22.32 (26.19)	-315.85* (169.07)	370.52 (317.72)	-13.01 (44.21)
Education (years)		-11.60 (42.65)	-77.21 (147.65)	431.55 (321.05)	-12.25 (15.97)
Farming experience (years)		35.66 (71.12)	438.79 (276.54)	-978.15** (425.25)	-80.83 (101.95)
Farmed land acres		-12.86 (27.57)	123.61 (160.79)	-435.90 (279.63)	4.73 (12.21)
Sweetpotato land acres		-8.33 (18.91)	-143.60* (78.48)	154.30 (192.70)	3.93 (12.12)
Age (years)		-11.56 (26.44)	-474.75 (366.34)	1035.83 (757.10)	42.01 (55.65)
Child under two years (No.)		7.48 (14.28)	29.83 (34.52)	173.15* (93.45)	-3.36 (7.84)

Variable	Overall	Pure_explained	Specif_err	Pure_Unexplained	Reweight_err
Child between six and eighteen years (No.)		-6.70	-4.33	192.51	6.12
		(12.77)	(50.49)	(169.98)	(9.53)
Household members above eighteen years (No.)		-1.58	-178.42**	36.23	18.22
		(8.00)	(84.61)	(170.14)	(16.19)
Agricultural employment income (000000)		-2.63	-12.60	57.91	-56.34
		(7.43)	(33.27)	(67.82)	(59.85)
Non-agricultural income (000000)		12.82	-10.11	-53.96	33.64
		(19.05)	(23.90)	(45.21)	(28.32)
Farm income (000000)		-7.27	-55.00	296.48**	-6.22
		(15.73)	(53.13)	(130.34)	(17.33)
Income business (000000)		-7.05	-71.11*	180.97***	-50.98
		(12.21)	(41.92)	(66.76)	(55.53)
Season one production (1=Yes)		-13.19	110.02	-127.95	33.96
		(19.44)	(67.25)	(166.74)	(25.51)
Season two production (1=Yes)		-35.03	17.94	50.40	-10.29
		(46.66)	(54.95)	(122.17)	(21.03)
Distance road (minutes)		-5.03	-124.75**	72.33	-10.95
		(9.07)	(48.47)	(90.62)	(23.45)
Distance market (minutes)		-0.75	-59.44	-221.23	5.55
		(5.88)	(104.84)	(210.11)	(9.44)
Poster assignment (village-level treatment, 1 = Yes)		3.35	-36.04	22.97	-6.56
		(10.34)	(155.36)	(374.26)	(14.32)
Oxplough (1 = Yes)		-33.60	-74.36	130.39	27.82
		(38.05)	(80.42)	(161.65)	(26.97)
Motorcycle (1 = Yes)		-14.95	-1.32	-30.81	17.02
		(12.41)	(9.94)	(49.97)	(13.66)
Wheelbarrow (1 = Yes)		1.98	20.82	-68.55	44.82**
		(7.52)	(14.32)	(57.24)	(22.01)
Bicycle (1 = Yes)		-4.62	36.92	-161.61	-0.15
		(13.19)	(71.34)	(185.86)	(2.37)
Radio (1 = Yes)		-7.07	-139.73**	73.60	-22.25

Variable	Overall	Pure_explained	Specif_err	Pure_Unexplained	Reweight_err
		(20.65)	(67.20)	(150.97)	(48.34)
Phone (1 = Yes)		-7.90	64.05	-480.02*	0.84
		(23.08)	(89.28)	(277.54)	(4.63)
Member farmer group (1 = Yes)		-3.21	79.40	-209.86	19.13
		(10.29)	(58.13)	(139.42)	(25.66)
Rent land (1 = Yes)		0.63	72.87*	-47.47	22.30
		(9.11)	(41.17)	(77.95)	(33.38)
Borrow land (1 = Yes)		-1.10	60.37	-180.05**	-18.51
		(5.87)	(54.75)	(80.72)	(28.02)
Used credit in 2022 (1 = Yes)		0.22	24.72	-155.25	-11.34
		(12.08)	(102.12)	(119.80)	(25.50)
Cultivate_swamps (1 = Yes)		2.65	-20.13	-16.90	-5.29
		(18.32)	(14.78)	(51.79)	(11.06)
Marital status (married) (1 = Yes)		-3.25	444.71***	-285.00	86.31
		(12.35)	(136.37)	(386.81)	(77.55)
Credit source VSLA (1 = Yes)		0.31	-24.72	-35.65	9.97
		(4.62)	(83.24)	(87.50)	(21.40)
Neighbours as seed source (1 = Yes)		43.73	-93.03	-172.72	-8.88
		(44.61)	(85.13)	(144.91)	(20.16)
Saved/Own plot seed (1 = Yes)		0.55	-47.08	-40.64	0.06
		(23.58)	(48.04)	(91.58)	(2.15)
Local market source of seed (1 = Yes)		-7.97	-5.64	6.30	-0.50
		(12.28)	(8.03)	(25.02)	(1.61)
Reweight_err		58.72			
		(173.19)			
Pure_Unexplained		-281.47*			
		(147.48)			
_cons			349.03	134.83	
			(446.81)	(861.64)	

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table C14: RIF 70th Quantile decomposition

Variable	Overall	Pure_explained	Specif_err	Pure_Unexplained	Reweight_err
Group_Female	671.717*** (44.603)				
Group_counterfactual	925.028*** (153.187)				
Group_Male	1492.334*** (117.694)				
Total difference	-820.616*** (125.862)				
ToT_Explained	-253.310 (158.373)				
ToT_Unexplained	-567.306*** (203.552)				
Total	-253.310 (158.373)				
Pure_explained	-128.399 (129.445)				
Specif_err	-124.912 (181.151)				
Risk attitudes (scale 1-10)		-28.450 (30.850)	-296.281* (171.216)	514.062 (377.441)	-13.533 (45.982)
Education (years)		4.289 (49.200)	-110.948 (157.190)	450.021 (360.697)	-10.244 (14.606)
Farming experience (years)		-6.475 (74.743)	586.548** (298.464)	-991.210** (498.385)	-82.393 (104.103)
Farmed land acres		-10.822 (33.865)	51.409 (171.379)	-456.358 (329.767)	-0.406 (10.434)
Sweetpotato land acres		-5.943 (13.942)	-108.269 (84.838)	160.306 (241.277)	1.518 (12.243)
Age (years)		-3.301 (28.470)	-508.924 (355.574)	1089.400 (859.735)	37.411 (50.477)
Child under two years (No.)		6.836 (13.978)	19.092 (37.349)	202.879* (107.782)	-6.029 (9.262)
Child between six and eighteen years (No.)		-4.705	2.614	36.697	5.635

Variable	Overall	Pure_explained	Specif_err	Pure_Unexplained	Reweight_err
		(13.612)	(56.379)	(204.503)	(9.478)
Household members above eighteen years (No.)		-1.275	-164.766**	254.901	18.264
		(6.565)	(82.754)	(179.476)	(16.472)
Agricultural employment income (000000)		-0.809	-38.262	61.496	-65.788
		(4.742)	(36.671)	(78.372)	(70.249)
Non-agricultural income (000000)		8.796	0.461	-45.921	32.437
		(14.872)	(24.401)	(46.582)	(27.951)
Farm income (000000)		-10.668	-53.188	429.525***	-6.930
		(21.264)	(61.811)	(126.748)	(19.246)
Income business (000000)		-7.973	-78.758	221.219***	-56.777
		(15.704)	(49.815)	(79.505)	(61.625)
Season one production (1=Yes)		4.060	45.251	-136.239	35.382
		(20.850)	(77.496)	(207.766)	(26.599)
Season two production (1=Yes)		-17.651	-8.086	67.290	-10.659
		(54.520)	(68.505)	(146.888)	(21.749)
Distance road (minutes)		-0.213	-118.756**	69.605	-13.027
		(9.145)	(49.344)	(109.705)	(27.805)
Distance market (minutes)		-1.367	-70.633	-298.820	5.663
		(7.432)	(112.518)	(261.028)	(9.838)
Poster assignment (village-level treatment, 1 = Yes)		2.474	-113.158	369.265	-9.465
		(9.431)	(169.027)	(462.733)	(19.712)
Oxplough (1 = Yes)		-43.571	-56.953	114.815	28.587
		(44.540)	(87.580)	(197.252)	(27.680)
Motorcycle (1 = Yes)		-8.307	8.081	-54.801	19.022
		(10.887)	(11.685)	(61.350)	(15.048)
Wheelbarrow (1 = Yes)		-3.734	18.876	-46.065	51.523**
		(9.459)	(14.177)	(63.533)	(24.607)
Bicycle (1 = Yes)		8.488	-61.388	-106.834	0.185
		(16.369)	(75.504)	(234.934)	(2.934)
Radio (1 = Yes)		-15.355	-132.827*	-3.277	-24.456
		(25.838)	(68.238)	(175.998)	(53.100)
Phone (1 = Yes)		-4.693	11.837	-602.897*	-0.131
		(25.288)	(86.744)	(327.082)	(1.563)

Variable	Overall	Pure_explained	Specif_err	Pure_Unexplained	Reweight_err
Member farmer group (1 = Yes)		-8.373 (18.028)	102.141 (66.333)	-141.237 (164.343)	17.701 (24.470)
Rent land (1 = Yes)		-1.005 (10.446)	83.774* (45.568)	-77.649 (96.578)	27.153 (40.375)
Borrow land (1 = Yes)		-2.493 (9.501)	66.474 (54.989)	-156.383 (97.259)	-23.431 (34.783)
Used credit in 2022 (1 = Yes)		-0.259 (14.130)	141.665 (113.644)	-266.711* (138.092)	-19.644 (40.324)
Cultivate_swamps (1 = Yes)		12.377 (21.330)	-8.501 (12.384)	-50.805 (64.067)	-4.028 (8.489)
Marital status (married) (1 = Yes)		-0.378 (6.339)	409.641*** (142.805)	-706.204 (438.766)	90.146 (81.027)
Credit source VSLA (1 = Yes)		-2.902 (24.659)	-118.111 (98.905)	38.792 (98.270)	19.634 (31.007)
Neighbours as seed source (1 = Yes)		28.753 (35.000)	10.388 (76.212)	-284.288* (169.058)	-15.764 (32.544)
Saved/Own plot seed (1 = Yes)		0.381 (16.422)	-11.403 (42.506)	-114.248 (103.650)	1.352 (11.877)
Local market source of seed (1 = Yes)		-14.134 (14.239)	-9.067 (8.820)	-12.873 (26.931)	-0.582 (1.802)
Reweight_err	28.329 (186.027)				
Pure_Unexplained	-595.635*** (171.636)				
_cons			385.115 (452.389)	-123.089 (1001.495)	

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table C15: RIF 80th Quantile decomposition

Variable	Overall	Pure_explained	Specif_err	Pure_Unexplained	Reweight_err
Group_female	835.76*** (64.65)				
Group_counterfactual	1104.49 (801.58)				
Group_male	1833.62*** (199.86)				
Total difference	-997.86*** (210.06)				
ToT_Explained	-268.73 (797.75)				
ToT_Unexplained	-729.13 (833.16)				
Total	-268.73 (797.75)				
Pure_explained	-305.41 (197.64)				
Specif_err	36.68 (747.61)				
Risk attitudes (scale 1-10)		-58.40 (51.25)	-3368.55*** (626.56)	3779.79*** (942.31)	-107.06 (363.18)
Education (years)		-19.75 (76.34)	606.71 (424.86)	-312.93 (790.43)	57.32 (72.84)
Farming experience (years)		-64.22 (93.35)	676.31 (917.83)	-1344.07 (1156.95)	-68.11 (159.81)
Farmed land acres		-14.07 (50.25)	951.66 (581.97)	-1380.25 (939.34)	73.23 (88.76)
Sweetpotato land acres		-4.83 (12.36)	-1262.63*** (334.40)	1368.45** (605.11)	-254.69 (174.23)
Age (years)		-3.18 (38.95)	-56.93 (1492.10)	1104.28 (2106.24)	6.54 (111.85)
Child under two years (No.)		10.01 (19.58)	208.11 (132.88)	-136.04 (257.75)	56.36 (71.50)
Child between six and eighteen years (No.)		-3.35 (16.61)	-57.16 (159.77)	338.00 (390.36)	-9.93 (40.50)

Variable	Overall	Pure_explained	Specif_err	Pure_Unexplained	Reweight_err
Household members above eighteen years (No.)		-1.30 (7.06)	-659.15* (365.44)	788.60* (438.29)	103.21 (98.77)
Agricultural employment income (000000)		-3.97 (12.01)	352.76** (153.82)	-846.80 (586.31)	438.90 (448.80)
Non-agricultural income (000000)		8.55 (18.28)	-124.34 (98.79)	251.34 (172.82)	-126.17 (118.89)
Farm income (000000)		-8.96 (30.21)	291.22 (204.50)	43.95 (266.85)	21.05 (59.59)
Income business (000000)		-11.89 (23.51)	-159.62 (108.09)	411.35** (203.05)	-107.01 (125.73)
Season one production (1=Yes)		29.57 (36.77)	-182.28 (162.95)	416.78 (394.01)	-38.82 (104.30)
Season two production (1=Yes)		-89.82 (96.13)	183.03 (206.86)	-102.65 (331.51)	17.43 (66.32)
Distance road (minutes)		19.27 (22.75)	-489.57*** (150.29)	472.08* (264.35)	-65.14 (138.95)
Distance market (minutes)		-6.49 (14.85)	-104.02 (271.70)	-1044.53* (536.45)	-0.42 (36.94)
Poster assignment (village-level treatment, 1 = Yes)		-0.07 (8.73)	-903.60* (505.13)	1036.50 (998.35)	-48.10 (101.12)
Oxplough (1 = Yes)		-39.76 (55.34)	-483.57** (225.69)	544.10 (393.50)	108.03 (108.06)
Motorcycle (1 = Yes)		-1.93 (13.34)	126.91 (80.65)	-366.30** (165.58)	140.05 (103.26)
Wheelbarrow (1 = Yes)		-3.30 (14.97)	109.48 (68.41)	-394.59** (170.38)	262.68** (122.42)
Bicycle (1 = Yes)		-12.00 (21.25)	135.48 (189.58)	-370.56 (476.45)	-0.90 (14.22)
Radio (1 = Yes)		-45.16 (47.97)	-279.02 (209.61)	353.91 (410.85)	-56.32 (125.51)
Phone (1 = Yes)		25.10	-176.32	-698.52	-2.01

Variable	Overall	Pure_explained	Specif_err	Pure_Unexplained	Reweight_err
		(35.94)	(247.63)	(599.55)	(12.01)
Member farmer group (1 = Yes)		-17.20	173.42	-201.94	25.20
		(34.36)	(175.50)	(365.90)	(65.48)
Rent land (1 = Yes)		-14.56	431.25**	-560.92**	148.03
		(21.00)	(205.14)	(232.46)	(219.97)
Borrow land (1 = Yes)		-6.57	3.79	-29.54	-16.61
		(22.09)	(149.27)	(197.65)	(47.13)
Used credit in 2022 (1 = Yes)		-0.26	818.66*	-922.06**	-150.11
		(14.44)	(418.14)	(400.34)	(303.55)
Cultivate_swamps (1 = Yes)		16.45	-55.59	58.16	-16.07
		(27.91)	(47.14)	(138.16)	(34.69)
Marital status (married) (1 = Yes)		3.21	-198.18	221.31	-31.32
		(14.16)	(366.62)	(906.54)	(84.30)
Credit source VSLA (1 = Yes)		-3.85	-1058.02**	723.56**	317.13
		(32.99)	(516.12)	(285.48)	(450.87)
Neighbours as seed source (1 = Yes)		19.14	866.71**	-798.88*	-129.75
		(34.23)	(366.85)	(419.59)	(262.80)
Saved/Own plot seed (1 = Yes)		0.10	214.05	-263.90	13.64
		(4.34)	(181.77)	(254.83)	(118.80)
Local market source of seed (1 = Yes)		-1.93	17.96	22.76	6.07
		(18.80)	(21.08)	(50.53)	(15.54)
Reweight_err	566.35				
	(995.32)				
Pure_Unexplained	-1295.48**				
	(655.30)				
_cons			3487.72***	-3455.95	
			(1228.32)	(2277.24)	

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table C16: Fuzzy Rough set theory 40 farmers groups

Fuzzy Rough Set Theory anticategorical intersectionality
[1] “IF Season_2_production_unit_no_produce is 1 and Member_farmer_group_2 is 0 and edu_level_Primaryschool is 1 and Farming_experience_more 30 is 0 and Spraypump is 0 THEN Quality seed premium ≥ 1000 is No; (supportSize=40; laplace=0.9762)”
[2] “IF No Education is No and Oxplough is No and Season 2 production is No and Used VSLA for Credit in 2022 is No and Radio is No and Gender is Female THEN Quality seed premium ≥ 1000 is No; (supportSize=33; laplace=0.9714)”
[3] “IF Farmed_Land_acres__1acres_below is 0 and Cultivate_swamps_2 is 0 and Income_Non_Agri_UGS_50000 is 1 and edu_level_Primaryschool is 1 and Season_2_production_unit_bag is 0 and Farming_experience_more30 is 1 and Phone is 0 THEN Quality seed premium ≥ 1000 is No; (supportSize=11; laplace=0.9231)”
[4] “IF Gender is Male and Secondary school education is No and Farmed land and acres between 3 and 3.99 acres is Yes and Sweetpotato land below 1 acre is Yes and Exposure to information nudges is No and Source vines own plot is Yes THEN Quality seed premium ≥ 1000 is No; (supportSize=5; laplace=0.8571)”
[5] “IF Prefer NAROSPOT_P is Yes and Distance_market_minutes_less_30 is 1 and Radio is 1 and Member_farmer_group_2 is 0 THEN Quality seed premium ≥ 1000 is No; (supportSize=7; laplace=0.8889)”
[6] “IF Farmed_Land_acres_above_4_acres is 0 and Child_2_5_years_category_Yes is 1 and Radio is 0 and Treatment_group is 0 and Risk_status_loving is 0 THEN Quality seed premium ≥ 1000 is No; (supportSize=26; laplace=0.9643)”
[7] “IF Distance_market_minutes_less_30 is 0 and Income_Farm_sales_UGS_50001_9999 is 1 and Most_preferred_TANZANIA is 0 and Source_vines_ownplot is 0 and Bicycle is 1 and Group_function_SavingsandCredit is 0 and Most_preferred_ALL is 0 THEN Quality seed premium ≥ 1000 is No; (supportSize=23; laplace=0.96)”
[8] “IF Distance_market_minutes_less_30 is 0 and Sweetpotato_land_unit_0_25 is 0 and Member_farmer_group_2 is 1 and Farmed_Land_acres_3_3_99acres is 0 and Cultivate_swamps_2 is 0 and Child_Under_2_years_categories_Y is 1 THEN Quality seed premium ≥ 1000 is No; (supportSize=9; laplace=0.9091)”
[9] “IF Prefer NAROSPOT T variety is No and Child in 2- 5 years category is Yes and Risk averse is No and Farmed land unit acres is No and Variety preference is indifferent is No and Gender is Female THEN Quality seed premium ≥ 1000 is No; (supportSize=32; laplace=0.9706)”
[10] “IF Farmed_land_unit_0_25 is 0 and Distance_market_minutes_less_30 is 0 and Farmed_Land_acres_3_3_99acres is 0 and Age_category_35_years_below is 0 and Sweetpotato_land_unit_0_25 is 1 and Spraypump is 0 and Treatment_group is 1 THEN Quality seed premium ≥ 1000 is No; (supportSize=12; laplace=0.9286)”

Fuzzy Rough Set Theory anticategorical intersectionality

[11] “IF Farmed_Land_acres_3_3_99acres is 1 and Farming_experience_below_10 is 1 and Sweetpotato_land_unit_0_75 is 0
THEN Quality seed premium ≥ 1000 is No;
(supportSize=6; laplace=0.875)”

[12] “IF Member group with savings and credit function is No and **Gender is Female** and Age category 35 years below is No and Prefer NAROSPOT T variety is No and Risk loving is No
THEN Quality seed premium ≥ 1000 is No;
(supportSize=27; laplace=0.9655)”

[13] “IF Farmed_Land_acres_3_3_99acres is 0 and Sweetpotato_land_below_1_acres is 1 and Motorcycle is 0 and Farmed_Land_acres__1acres_below is 0 and Risk_status_loving is 1 and Season_1_production_unit_bag is 1 and Spraypump is 0 and Farming_experience_below_10 is 0 and Most_preferred_ALL is 0
THEN Quality seed premium ≥ 1000 is No;
(supportSize=14; laplace=0.9375)”

[14] “IF Farmed_land_unit_Acres is 0 and Sweetpotato_land_unit_3Acres is 0 and Distance_market_minutes_less_30 is 0 and Source_vines_ownplot is 0 and Farming_experience_below_10 is 0 and Season_2_production_unit_bag is 0 and Child_Under_2_years_categories_Y is 1
THEN Quality seed premium ≥ 1000 is No;
(supportSize=26; laplace=0.9643)”

[15] “IF Phone is 1 and Farming_experience_more30 is 0 and edu_level_Primaryschool is 1 and Farmed_Land_acres_above_4_acres is 0 and Income_AgriEmploy_50000_99999 is 1
THEN Quality seed premium ≥ 1000 is No;
(supportSize=15; laplace=0.9412)”

[16] “IF Risk neutral is No and Age category 60 years is No and **Gender is Male** Variety preference is indifferent is No and Season 2 production unit bag is No and Income other business UGS 50000 is Yes
THEN Quality seed premium ≥ 1000 is No;
(supportSize=21; laplace=0.9565)”

[17] “IF Distance_market_minutes_less_30 is 0 and Most_preferred_ALL is 0 and Used_credit_2022_2 is 0 and Radio is 1 and Income_Non_Agri_UGS_50000 is 1 and Farming_experience_20_29 is 0
THEN Quality seed premium ≥ 1000 is No;
(supportSize=19; laplace=0.9524)”

[18] “IF Married_live_with_spouse is 1 and Bicycle is 1 and Farming_experience_more30 is 0 and Farmed_Land_acres_2_2_99acres is 0 and Farmed_Land_acres_above_4_acres is 0 and Risk_status_averse is 0 and Group_function_SavingsandCredit is 0 and Treatment_group is 0
THEN Quality seed premium ≥ 1000 is No;
(supportSize=10; laplace=0.9167)”

[19] “IF Income Non-agriculture employment UGX 50000 is Yes and Source vines own plot is No and Farming experience 20 - 29 is Yes and **Gender is Male** and Radio is No
THEN Quality seed premium ≥ 1000 is No;
(supportSize=9; laplace=0.9091)”

[20] “IF Season_2_production_unit_basin is 0 and Farmed_Land_acres__1acres_below is 0 and Age_category_35_years_below is 0 and Season_1_production_unit_bag is 1 and Most_preferred_TANZANIA is 0 and Motorcycle is 0 and Farmed_land_unit_0_75 is 1 and Farmed_Land_acres_2_2_99acres is 0 and Oxplough is 0

Fuzzy Rough Set Theory anticategorical intersectionality
THEN Quality seed premium ≥ 1000 is No; (supportSize=15; laplace=0.9412)” [21] “IF Source_vines_ownplot is 0 and Farmed_Land_acres_3_3_99acres is 0 and Season_1_production_unit_bag is 1 and Risk_status_averse is 0 and Farming_experience_below_10 is 0 and Bicycle is 1 and Income_Non_Agri_UGS_50001_99999 is 1 and Oexplough is 1 THEN Quality seed premium ≥ 1000 is No; (supportSize=5; laplace=0.8571)” [22] “IF Season_1_production_unit_bag is 1 and Married_live_with_spouse is 1 and Farmed_Land_acres_2_2_99acres is 0 and Income_AgricEmploy_Under50000 is 1 and Motorcycle is 0 and Season_2_production_unit_basin is 0 and Cultivate_swamps_2 is 0 and Farming_experience_below_10 is 0 and Income_other__business_UGS_50000 is 1 and Phone is 1 and Most_preferred_NAROSPOT_P is 0 THEN Quality seed premium > 1000 is Yes; (supportSize=15; laplace=0.9412)” [23] “IF Sweetpotato_land_unit_0_75 is 1 and Income_other__business_UGS_50000 is 0 and Bicycle is 1 and Radio is 1 and Group_function_SavingsandCredit is 1 and Cultivate_swamps_2 is 0 THEN Quality seed premium > 1000 is Yes; (supportSize=4; laplace=0.8333)” [24] “IF Most_preferred_NEW_DIMBUKA is 0 and Distance_nearest_road_minutes_le is 1 and Sweetpotato_land_unit_0_25 is 0 and Radio is 1 and Distance_market_minutes_less_30 is 0 and Member_farmer_group_2 is 1 and Season_2_production_unit_no_produce is 0 and Farming_experience_below_10 is 0 THEN Quality seed premium > 1000 is Yes; (supportSize=16; laplace=0.9444)” [25] “IF member group with saving and credit function is No and Income farm sales UGX 50001-9999 is Yes and Season 2 production unit bag is No and Variety preference is indifferent is Yes and Gender is Male and Farming experience more 30 is No and Farmed land acres 3-3. 99 acres is No and Income agriculture employment 50000- 99999 is No and Income non-agriculture employment UGX 50000 is No THEN Quality seed premium > 1000 is Yes; (supportSize=9; laplace=0.9091)” [26] “IF Risk loving is Yes and Source vines own plot is No and Farmed land unit 0.25 acre is No and Age category 35-59 years is Yes and Gender is Male and Income Agriculture employment under UGX 50000 is No and Income other business UGX 50000 is Yes and Married lives with spouse is Yes THEN Quality seed premium > 1000 is Yes; (supportSize=4; laplace=0.8333)” [27] “IF Most_preferred_NAROSPOT is 0 and Farmed_Land_acres_2_2_99acres is 0 and Risk_status_neutral is 0 and Farmed_Land_acres__1acres_below is 0 and Age_category_60_years is 0 and Motorcycle is 0 and Season_2_production_unit_basin is 0 and Distance_market_minutes_less_30 is 0 and Farming_experience_20_29 is 0 and Group_function_SavingsandCredit is 0 and Used_credit_2022_2 is 0 and Income_AgricEmploy_Under50000 is 1 and Sweetpotato_land_unit_0_25 is 0 THEN Quality seed premium > 1000 is Yes; (supportSize=7; laplace=0.8889)”

Fuzzy Rough Set Theory anticategorical intersectionality

- [28] “IF Farmed land acres above 4 acres is No and Income agriculture employment under 50000 is Yes and Distance market less 30 minutes is No and Season 2 production unit basin is No and Farmed land acres 3- 3.99 acres is No and Oxplough is No and Income farm sales UGX 50001_9999 is Yes and Gender is **Female** and Risk averse is No and Farmed land unit 0. 25 acre is No and Variety preference is indifferent is No
THEN Quality seed premium > 1000 is Yes;
(supportSize=4; laplace=0.8333)”
- [29] “IF edu_level_Primaryschool is 1 and Oxplough is 0 and Child_Under_2_years_categories_Y is 0 and Child_2_5_years_category_Yes is 0 and Age_category_35_years_below is 0 and Farmed_land_unit_0_75 is 1 and Age_category_35_59_years is 0
THEN Quality seed premium > 1000 is Yes;
(supportSize=3; laplace=0.8)”
- [30] “IF Sweetpotato_land_unit_0_25 is 1 and Phone is 1 and Farmed_land_unit_0_75 is 0 and Oxplough is 0 and Risk_status_loving is 0 and Farmed_Land_acres_2_2_99acres is 0 and Farming_experience_below_10 is 1
THEN Quality seed premium > 1000 is Yes;
(supportSize=3; laplace=0.8)”
- [31] “IF Risk_status_neutral is 0 and Most_preferred_NAROSPOT_P is 0 and edu_level_Secondaryschool is 0 and Sweetpotato_land_unit_0_25 is 1 and Season_2_production_unit_basin is 0 and Child_2_5_years_category_Yes is 1 and Age_category_60_years is 0 and Member_farmer_group_2 is 0 and Farmed_land_unit_0_25 is 0 and Phone is 1 and Most_preferred_TANZANIA is 0 THEN Quality seed premium > 1000 is Yes;
(supportSize=3; laplace=0.8)”
- [32] “IF Married_live_with_spouse is 1 and Farmed_Land_acres_2_2_99acres is 0 and Sweetpotato_land_unit_0_25 is 0 and Spraypump is 0 and Most_preferred_ALL is 0 and Wheelbarrow is 0 and Income_Farm_sales_UGS_50001_9999 is 1 and Sweetpotato_land_below_1_acres is 1 and Season_2_production_unit_basin is 0 and Most_preferred_NAROSPOT_P is 0 and Child_Under_2_years_categories_Y is 1
THEN Quality seed premium > 1000 is Yes;
(supportSize=3; laplace=0.8)”
- [33] “IF Distance_market_minutes_less_30 is 0 and Most_preferred_NAROSPOT_P is 0 and Risk_status_averse is 0 and Oxplough is 0 and Farming_experience_more30 is 0 and Member_farmer_group_2 is 1 and Season_2_production_unit_no_produce is 0
THEN Quality seed premium > 1000 is Yes;
(supportSize=10; laplace=0.9167)”
- [34] “IF Most_preferred_NAROSPOT is 0 and Child_2_5_years_category_Yes is 1 and Farmed_Land_acres_above_4_acres is 1 and Used_credit_2022_2 is 0 and Group_function_SavingsandCredit is 0 and Child_6_and_5_years_category_Yes is 1 and Farming_experience_more30 is 0 and Season_2_production_unit_no_produce is 1 and Sweetpotato_land_below_1_acres is 1
THEN Quality seed premium > 1000 is Yes;
(supportSize=4; laplace=0.8333)”
- [35] “IF Farmed_Land_acres_3_3_99acres is 0 and Sweetpotato_land_unit_0_25 is 0 and Age_category_35_59_years is 0 and Child_6_and_5_years_category_Yes is 1 and Income_other_business_UGS_50000 is 1 and edu_level_Primaryschool is 0 and Used_credit_2022_2 is 0 and Treatment_group is 1
THEN Quality seed premium > 1000 is Yes;
(supportSize=3; laplace=0.8)”
- [36] “IF Radio is 0 and Oxplough is 1 and Farmed_Land_acres_1acres_below is 0 and Distance_market_minutes_less_30 is 0 and Motorcycle is 0 and Age_category_35_59_years is 1 and Married_live_with_spouse is 1 and Most_preferred_TANZANIA is 0 and Member_farmer_group_2 is 0

Fuzzy Rough Set Theory anticategorical intersectionality

THEN Quality seed premium > 1000 is Yes;
(supportSize=5; laplace=0.8571)”

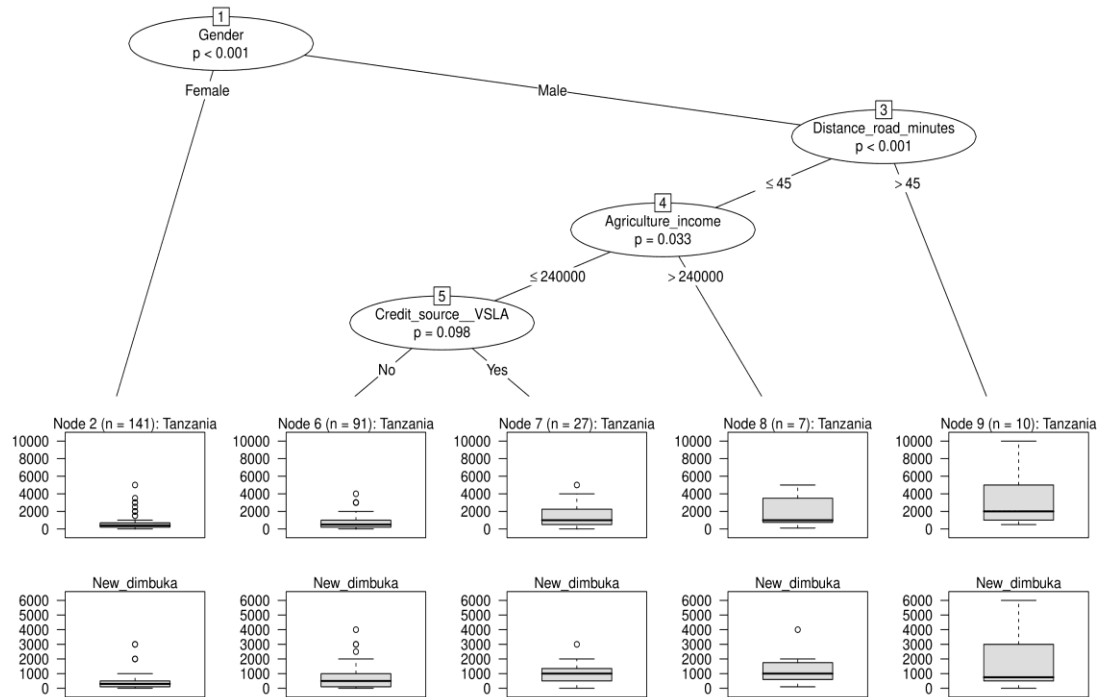
[37] “IF Farmed_Land_acres_3_3_99acres is 0 and Season_2_production_unit_basin is 0 and
Income_Farm_sales_below_50000 is 0 and Risk_status_loving is 1 and
Sweetpotato_land_unit_0_75 is 0 and Season_1_production_unit_bag is 0 and
Farmed_Land_acres_above_4_acres is 0 and Wheelbarrow is 0 and Cultivate_swamps_2 is 0
and Age_category_35_years_below is 0
THEN Quality seed premium > 1000 is Yes;
(supportSize=4; laplace=0.8333)”

[38] “IF Farmed_Land_acres__1acres_below is 0 and Phone is 1 and Risk_status_averse is 0 and
Oxplough is 1 and Member_farmer_group_2 is 1 and Sweetpotato_land_unit_3Acres is 0 and
Farming_experience_20_29 is 0 and Farmed_Land_acres_3_3_99acres is 0
THEN Quality seed premium > 1000 is Yes;
(supportSize=5; laplace=0.8571)”

[39] “IF Member group function savings and credit is Yes and Variety preference is indifferent is
Yes and Season 2 production unit bag is Yes and **Gender is Female**
THEN Quality seed premium > 1000 is Yes;
(supportSize=3; laplace=0.8)”

[40] “IF Farming_experience_20_29 is 0 and Age_category_35_59_years is 0 and
Source_vines_ownplot is 0 and Age_category_60_years is 0 and Treatment_group is 0 and
Farmed_Land_acres_3_3_99acres is 0 and Distance_nearest_road_minutes_le is 1 and
Child_6_and_5_years_category_Yes is 1 and Farmed_Land_acres__1acres_below is 0 and
Distance_market_minutes_less_30 is 0
THEN Quality seed premium > 1000 is Yes;
(supportSize=3; laplace=0.8)”

Figure C1: Factors segmenting WTP local varieties Tanzania and New dimbuka.



Note: The Conditional Inference Tree (CTree) method is a nonparametric approach that uses decision-tree algorithms to partition data based on predictor variables, resulting in groups with similar outcomes. Unlike traditional regression methods, nonparametric decision trees like CTree can accommodate multiple covariates and high levels of interaction without the need to specify them in advance. This approach is useful for intersectionality analyses because it allows the identification of distinct subgroups based on social identities or positions without presupposing relationships between variables. The CTree approach also provides an effective variable selection process, pinpointing the covariates most strongly associated with the outcome of interest.

Figure C2: Factors segmenting improved varieties WTP NAROSPOT P and NAROSPOT T

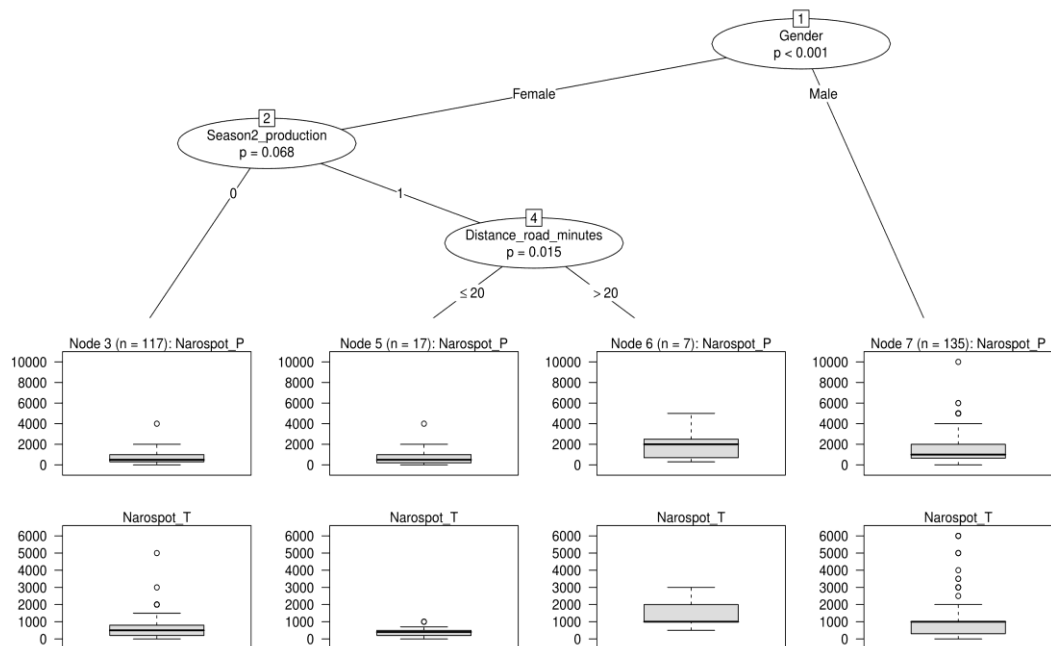
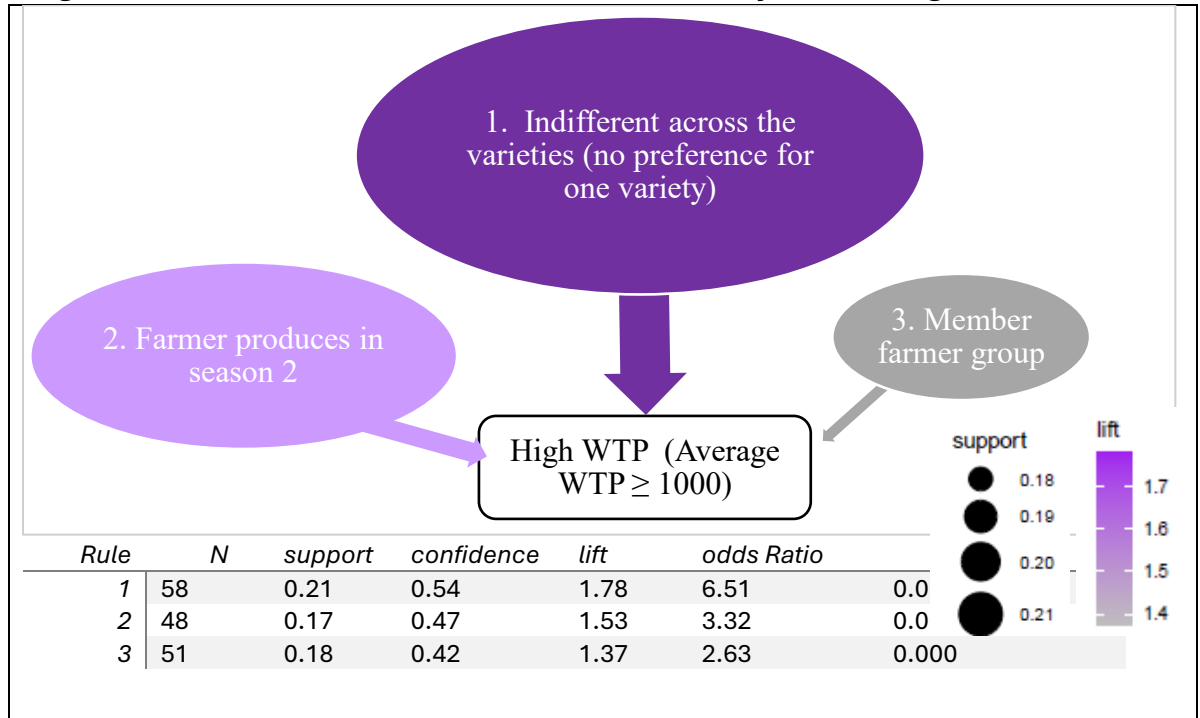


Figure C3: Characteristic that make farmers more likely to have a high WTP



Note: Association rules (AR) are a set of if-then statements that describe the relationships between variables in a dataset. The approach is used to discover patterns and trends in data and to identify relationships between variables in a dataset. In the approach, the objective is to identify a conceptual framework rather than test apriori hypotheses. AR does not provide information on causality or the direction of the relationship between variables. One advantage of the AR approach as an exploratory approach is that it identifies patterns of characteristics that may have interactions that are not easy to hypothesise from a literature review. To establish rules that characterise high WTP, the confidence level was set to 0.5 to ensure that at least 1/2 of the respondents with a particular combination of two characteristics also reported the explained outcome (high WTP ≥ 1000= Yes). The support level is 0.15, so that the rule would occur in at least 15% of the farmers who reported high WTP ≥ 1000 = Yes. Additionally, Fisher's exact test was to determine if the identified explanatory attributes were disproportionately present in explaining high WTP. To control for errors across multiple rules, the Holm-Bonferroni correction with a p-value threshold of 0.05 was used. This allowed identification of the most significant rules that could help understand the factors associated with high WTP.

Table C17: Willingness to pay for quality seeds elicitation

Scenario 0: vines from the local market/neighbour		Scenario 1: TANZANIA	Scenario 2: NAROSPOT-P	Scenario 3: NAROSPOT-1	Scenario 4: NAROSPOT-T
Indicate by ticking in the appropriate box how much <u>more/ extra</u> UGX you are willing to pay for product described in [Scenario x] as compared to product in Scenario 0 [vines sold in local]	0 UGX/bundle				
	100 UGX/bundle				
	200 UGX/bundle				
	300 UGX/bundle				
	400 UGX/bundle				
	500 UGX/bundle				
	600 UGX/bundle				
	700 UGX/bundle				
	800 UGX/bundle				
	900 UGX/bundle				
	1000 UGX/bundle				
	> 1000 UGX/bundle				

WTP question: We now want to ask you to give your assessment of *FOUR* varieties of sweetpotato. We will describe each variety to you and ask you how much money you would commit to buying **quality seeds** of these improved varieties. On this sheet are written different amounts of money from **zero** up to more than 1000 Uganda Shillings (UGX) per bundle. Starting at the top of the list and moving down kindly ask yourself: ‘Am I willing to pay [...UGX] **over and above the regular price** of about UGX 3000, I would pay for a bundle of 200 vines (for 100 heaps) of sweetpotato sold in local market/by neighbor in order to buy similar amount/bundle of **quality seeds**?’If you are certain you would pay the amounts of money to buy the quality seeds then place a tick (Ö) in the space next to the amount you will be willing to pay over above the regular price. Please tick only when you are sure you can keep paying this additional amount even in future. [Enumerator: Give cheap talk for each case and keep bidding it up till the respondent says no]

Appendices D: Willingness to pay questionnaire

Part A: Demographic characteristics

Farmer ID	
1. What is your age (yrs)?	
2. Gender?	
1. Male	
0. Female	
3. Marital status	
1. Married	
2. Married but spouse is away	
3. Separated	
4. Divorced	
5. Single (never married)	
6. Widow/widower	
4. Farming experience:	
1. For how many years have you been growing <u>sweetpotato</u> ?	
5. Schooling	
5.1. Number of (completed) years of schooling	
5.2. Level of highest attained education:	
1. Primary school	
2. Secondary school	
3. Advanced level	
4. University/college	
5. PhD/Msc	
6. Other (specify.....)	
6. Number of children in your household:	
6.1 How many children under 2 years:	
6.2 How many children in the ages 2-5 (59 months):	
6.3 How many children in the ages 6-18:	
7. Number of household members:	
7.1 How many people <u>above 18 years</u> besides yourself live in your house?.....	

8. Please complete the table below with **income earned in 2021** and assets **currently** owned

8.1. How much income did your household earn in 2021 from: (in UGX)	
a) Agricultural employment:	
b) Non-agricultural employment:	
c) Farm sales income:	
d) Other business:	

e) Other (specify)	
8.2. Ownership of farm assets	Do you own this asset? [Tick if Yes]
a) Ox plough	
b) Hoes	
c) Motorcycle (boda boda)	
d) Wheelbarrow	
e) Spray pump	
f) Bicycle	
g) Water pump	
h) Other (Specify.....)	
8.3. Ownership of non-farm assets	Do you own this asset? [Tick if Yes]
1. Radio	
2. TV	
3. Mobile phone	
4. Solar energy	
5. Posho mill	
6. Other (specify)	

Part B: Membership to Farmer Organization

1. Are you a member of any farmer group/association? 1. Yes 0. No
2. If YES to Q1, what is the function of the group (*CIRCLE all that apply*)
- | | |
|-----------------------------------|--|
| 1. Marketing of produce | 5. Technical/production information |
| 2. Savings and credit | 6. Livestock production |
| 3. Seed production | 7. Other (specify.....) |
| 4. Social support (e.g., funeral) | 8. Group farming (labor support = <i>aleya</i>) |

Part C: Details of the Farm

1. On average, what size of land do you farm in total (for all crops) in a year?..... Units
Unit codes: 1=hectares 2=acres(paces) 3=garden 4=apuleju 5=square meters 6=square yards
2. On average, what size of land do you grow sweetpotato on in a year?..... Units.....
- [Use codes in C1]
3. Do you sometimes hire land for sweetpotato production? 1. Yes 0. No
- 3.1 Do you sometimes borrow land for sweetpotato production 1=Yes 0=No
4. How many bags of sweetpotato did you produce in the last one year:
1. July/August 2021 season 2. April/May 2022 season
5. Did you use credit/ loan in 2022? 1. Yes 0. No
6. If YES, where did you obtain it from? (*Circle all that apply*)
- | | |
|--------------------------|---|
| 1. Friends/family/farmer | 4. Social group |
| 2. Neighbor | 5. Savings and credit organization (VSLA) |
| 3. Agrovet/input seller | 6. Other (specify.....) |
7. What is your current **main** source of sweetpotato vines for planting?
1. Neighbor 2. Relative 3. Saved/own 4. Local market 5. Distant market (specify.....)

8. If purchased from market: what size of bundles do you mostly buy from the market?
 1. 50 vines (25 heaps) 2. 100 vines (50 heaps) 3. 200 vines (100 heaps) 4. Other

9. How far (minutes) is your home/farm from: 1. Main road 2. Local produce/input weekly market ...

10. Do you grow some of your sweetpotato in swamps/lowlands? 1. Yes 0. No

11. On a scale of 0 to 10 where the value 0 means “not at all willing to take risks” and the value 10 means “very willing to take risks”, how do you see/rate yourself? _0, 1, 2, 3....., 10_____

Part D: Willingness to pay for quality vines

We now want to ask you to give your assessment of **FOUR** varieties of sweetpotato. We will describe each variety to you and ask you how much money you would commit to buying **quality vines** of these improved varieties.

On this sheet are written different amounts of money from **zero** up to more than 1000 Uganda Shillings (UGX) per bundle. Starting at the top of the list and moving down kindly ask yourself: ‘Am I willing to pay [...UGX] **over and above the regular price of about UGX 3000** I would pay for a **bundle of 200 vines (for 100 heaps)** of sweetpotato sold in local market/by neighbor in order to buy similar amount/bundle of **quality vines**?’ If you are certain you would pay the amounts of money to buy the quality vines then place a tick (✓) in the space next to the amount you will be willing to pay over above the regular price. Please tick only when you are sure you can keep paying this additional amount even in future. [Enumerator: Give cheap talk for each case and keep bidding it up till the respondent says no]

Scenario 0: vines from local market/neighbor		Scenario 1: TANZANIA	Scenario 2: NAROSPOT-P	Scenario 3: NAROSPOT-1	Scenario 4: NAROSPOT-T
Indicate by ticking in the appropriate box how much <u>more/extra</u> UGX you are willing to pay for product described in [Scenario x] as compared to product in Scenario 0 [vines sold in local]	0 UGX/bundle				
	100 UGX/bundle				
	200 UGX/bundle				
	300 UGX/bundle				
	400 UGX/bundle				
	500 UGX/bundle				
	600 UGX/bundle				
	700 UGX/bundle				
	800 UGX/bundle				
	900 UGX/bundle				
	1000 UGX/bundle				
	> 1000 UGX/bundle				

Chapter 5

Overall Conclusion

5.1 Introduction

Through farmer-to-farmer models, policymakers in SSA aim to increase male and female smallholder farmers' access to quality and timely information and agricultural technologies. Access to information and adoption of yield-enhancing innovations, such as quality seeds, promote adaptation to climate change, drought, and pest outbreaks, increase productivity, and improve food security (Suri and Udry, 2022). However, evidence of the efficacy of the farmer-to-farmer model focuses on training, demonstrations, and conservation agriculture practices (Fisher, Holden and Katengeza, 2017; Fisher *et al.*, 2018; Holden *et al.*, 2018; Ragasa, 2020). Further assessment of farmers' willingness to pay (WTP) for agricultural technologies after exposure through the promoter farmer model has been lacking (Morgan, Mason and Maredia, 2020). Therefore, the thesis sought to contribute to the discussion by examining the role of the farmer-to-farmer model in supporting the information and commercial dissemination of quality seeds. It focused on aspects where evidence is inconclusive, such as the role of promoter-peer dyad gender and nudging the effort of promoters. In contrast to existing evidence, it explored the dyadic role of information nudging, focusing on the promoter (information sender) and the peer farmer (information receiver). Low-cost nudges, based on applications in other contexts, have the promise to support farmers in their promotional activities. It also assessed the intersectionality of gender and socioeconomic characteristics in farmers' WTP for quality seeds.

The findings contribute to three bodies of literature. First, the thesis shows that gender homophily does not predict word-of-mouth communication in a quality seed market. Nonetheless, promoter gender is associated with dissemination outcomes independently. Second, the thesis shows that record-keeping and information dissemination are distinct agent tasks that do not co-vary. The gender of the client in this study, other farmers served by promoter farmers, is associated with the transactions that become visible in the use of local agents. This finding applies to any development project that relies on local agents to generate monitoring data. Third, the thesis demonstrates that the gender WTP gap for agricultural inputs is driven by structural rather than endowment

effects, meaning that resource transfers alone will not close it. The methodological contribution of the sequential use of ESTER, RIF, and FRST offers a replicable framework for analysing gendered demand gaps in agricultural settings where both causal effects and within-group heterogeneity matter. The next section discusses the lessons and the implications of the results.

5.2 Summary, lessons, and policy implications

5.2.1 Chapter 2: Reaching the peer farmers

Chapter 2 examined whether gender and information nudges are associated with word-of-mouth communication about quality seed, measured through peer-reported advice receipt and promoter-reported publicity. It also assessed how they are associated with the intensity of male and female buyers of quality seeds. The main lesson is that the information nudge is not a neutral channel, as it depends on who displays it and who reads it. The information nudge should complement promoter–peer interpersonal communication rather than replace it. The results show that peer-reported poster engagement is strongly associated with advice receipt. The information nudge can prompt farmers to seek advice. However, male promoters assigned to the poster treatment were less likely to report publicity, suggesting that some promoters may have treated the poster as part of the communication work. Possible explanations for this negative result include (i) Desensitisation of male peer farmers, reducing the influence of promoter marketing efforts over time; (ii) Promotional messages can lead to decision fatigue resulting in procrastination of adoption decision; (iii) Frequent promotions might lead male peer farmers to question the true value of the seed; and (iv) Psychological resistance to persuasion (Huete-Alcocer, 2017; Chae, Bruno and Feinberg, 2019; Bahadir and Pauwels, 2024). The implication is that the information nudge works best as a complementary channel that prompts peer farmers to seek advice.

Individually, the information nudge decreased by a large magnitude the intensity of female peers' purchasing of seeds. A simple information nudge produced an unintended effect that may reinforce existing gender inequalities in access to quality seed, especially in the domain of women's crops. Although they are powerful and accessible tools in terms of cost, nudges may not yield consistent or expected results across contexts or demographic segments (Sunstein, 2017). For example, although the default nudge is among the most effective, it underperforms or fails when transferred across different

domains (Congiu and Moscati, 2022). The lesson is not to abandon information nudges, but to redesign them around the information needs and constraints of the farmers they are intended to reach. Qualitative evidence suggests that the result in this thesis may reflect a mismatch between the poster design and the constraints female farmers face. Female farmers wanted more practical information on how to plant and manage the vines, faced cash and labour constraints, and made seed-purchase decisions within household bargaining arrangements. Future information nudges should therefore include clearer practical guidance. They should use framing that speaks to food security and household welfare and should be combined with agronomic explanation and demonstrations.

The findings suggest that the information nudge operates differently across gendered promoter–peer relationships. Male promoters were associated with fewer female buyers and more male buyers. Poster assignment reduced the negative association between male promoters and female buyer intensity. The results suggest that the information nudge may have helped in cross-gender interactions by giving promoters and peers a shared point of reference for discussing the vines. A key lesson is that posters may help ease some cross-gender interpersonal communication. The study shows that assignment to an information nudge and actual engagement with its content are empirically distinct and should not be conflated. Assignment captures whether the information nudge was made available in the village, while engagement captures whether the peer farmer read or interacted with the poster message. This distinction matters because poster assignment engagement was associated with advice receipt, whereas assignment alone does not show whether the nudge was encountered or understood.

5.2.2 Chapter 3: Reaching the Promoters

Chapter 3 examined promoter farmers not only as seed sellers or information agents, but as local agents responsible for supporting project monitoring. The chapter shows that this monitoring role cannot be assumed to work automatically. Male quality seed buyers were more likely than their female counterparts to have their purchases recorded. On the promoter side, male promoters were associated with more unreported female quality seed buyers in the reference condition. Importantly, many reporting failures originated on the promoter side and were disproportionately borne by female quality seed buyers. Among unreported quality seed buyers, 73% said the promoter never asked for their details. Projects using local agents should routinely verify promoter records against

independent beneficiary data, not only as an audit check but as a core component of monitoring design. This is especially important where project records are used for measuring reach and planning follow-up interventions. The key lesson is that project monitoring systems need to show whose participation is being counted and whose is being missed.

The chapter also shows that visibility tools do not automatically solve moral hazard problems in delegated monitoring tasks. The point-of-sale poster made the promoter's role more visible, but public visibility was not associated with a general improvement in reporting. The evidence from this chapter suggests that visibility may create a public signal of role performance without ensuring that the less visible task of recording transactions is completed. The policy implication, therefore, is that visibility interventions should be complemented by measures that directly lower the effort cost of recording, such as periodic field checks. Visibility alone is insufficient where the recording task itself remains costly, unsupported, and weakly monitored.

A promoter's effectiveness in seed dissemination does not guarantee administrative diligence in record-keeping, as these tasks draw on different motivations, skills, and social dynamics. Selection, training, and supervision should therefore treat recording as a separate project duty. This includes assessing willingness to complete administrative tasks key to monitoring the project outcomes and providing simple support such as stationery, simplified forms, and check-ins during the selling period. The chapter's evidence suggests that reporting failure was not only a training problem or a gender-awareness problem. It was also a monitoring-design problem.

5.2.3 Chapter 4: Inclusive quality seeds commercialisation

Gender-transformative interventions are essential to ensure that women's roles in agriculture translate into real gains in decision-making power and equitable access to quality seed. A common misconception in agricultural development is to treat female and male farmers as homogeneous groups who all share the same challenges, whilst neglecting variations pertaining to age, marital status, and socioeconomic characteristics (Tavener *et al.*, 2022). Chapter 4 showed the limitations of binary gender and the use of single demographic indicators as proxies for understanding demand profiles for quality seeds of RTB crops, such as sweetpotatoes. Isolated indicators and fixed categories are insufficient to show the farmer profiles associated with farmers' access to input.

Chapter 4 makes three contributions to the literature on gender, seed demand, and agricultural input commercialisation. The first contribution is establishing that the gender gap in WTP for quality sweetpotato seed is associated with structural disadvantages. The RIF decomposition shows that the structural effect is significant, implying that equalising observable characteristics between male and female farmers, such as land, income, education, and group membership, would close only a limited share of the gap. The policy recommendation is therefore for a reorientation of sweetpotato seed sector design to address household decision-making structures, time poverty, and credit access.

The second contribution is showing that savings and credit group membership is not sufficient unless credit terms support agricultural investment. The within-gender subgroup analysis shows that financial inclusion through savings and credit group membership is strongly associated with high WTP among female farmers. Only four female farmers demonstrate high WTP and are all VSLA members. However, the RIF results also suggest that female farmers do not convert VSLA access into WTP as effectively as male farmers. The specific recommendation that follows is that VSLA programs should be better aligned with control of women, agricultural input purchasing cycles, and linked more to the agriculture production cycles, especially the seed purchase period.

The third contribution is demonstrating that male and female farmers are not a homogeneous group, and that binary gender analysis conceals at least three distinct constraint profiles. Educated women without mechanisation and VSLA credit face operational and financial exclusion at the same time. Caregivers with small land face competing household financial priorities. Older women excluded from savings groups face the compounding of financial exclusion and risk avoidance. Female-led seed production and distribution models may be most relevant for the first group: women with education and some agricultural engagement who lack the financial and operational infrastructure to invest in quality seed. This means that one gender-targeted intervention is unlikely to address all structural constraints to female farmers' willingness to pay for quality seeds.

The methodological contribution is the sequential use of three approaches that answer distinct parts of the gender question. ESTER improves on simple gender-disaggregated regressions because it estimates the effect of gender on WTP while allowing male and female farmers to have different WTP regimes. It therefore shows both the size of the gender effect and the different pathways through which resources, risk, and market

access shape WTP for each group. RIF decomposition then separates the gender gap into endowment and structural components across the WTP distribution and identifies factors associated with the structural effect. FRST then relaxes the assumption that gender is always the main organising category by allowing the data to identify high- and low-WTP farmer profiles. This sequence moves the analysis from gender-effect estimation to intercategorical decomposition to anticategorical heterogeneity.

5.3 Limitations

Despite the contribution of the thesis, there are several limitations to acknowledge. First, while SEM can address causal hypotheses, the objectives were designed to be exploratory and cannot support temporal claims. The data captured primarily short-term behaviour and do not address the persistence of intervention effects over time. Second, while a mixed-methods approach provides rich evidence, experimental manipulation of specific incentive mechanisms (e.g., isolating identity salience from public visibility) would strengthen causal inference. Future work can also assess the persistence of behaviour change from information nudges over time. At present, it is still not clear when the effect of a nudge is likely to persist over time and when it is not. Finally, the findings may be context-specific, as the unique socioeconomic and cultural factors of the study setting could limit broader generalisability.

References

- Abdisa, T., Mehare, A. and Wakeyo, M.B. (2024) 'Analyzing gender gap in agricultural productivity: Evidence from Ethiopia', *Journal of Agriculture and Food Research*, 15, p. 100960. Available at: <https://doi.org/10.1016/j.jafr.2023.100960>.
- Adam, R.I., Badstue, L. and Sindi, K. (2018) 'The dynamics of smallholder farmers' acquisition and distribution of sweetpotato vines in the Lake Victoria Zone Region, Tanzania', *Food Security*, 10(2), pp. 339–350. Available at: <https://doi.org/10.1007/s12571-018-0776-5>.
- Adesina, B.A., Abdurrasheed, M.D., Okoye, A.C., Ekah, E.O., Anedo, E.O. and Afuape, S. (2017) 'Farmers' willingness to pay for quality orange fleshed sweetpotato (OFSP) vines in North Central Nigeria: A case of Benue and Nasarawa States', *Nigeria Agricultural Journal*, 48(1), pp. 110–121.
- Agarwal, N.K. (2022) *Exploring Context in Information Behavior: Seeker, Situation, Surroundings, and Shared Identities*. Springer Nature.
- Agossou, A.C.O., N'Danikou, S., Fassinou Hotègni, V.N., Kakpo, T.A., Coulibaly, M., Oselebe, H.O. and Achigan-Dako, E.G. (2023) 'Determinants of farmers' willingness to pay for improved cultivars of *Macrotyloma geocarpum* (harms) Maréchal and Baudet in Benin and Togo', *Frontiers in Sustainable Food Systems*, 7. Available at: <https://doi.org/10.3389/fsufs.2023.1180961>.
- Aguilar, A., Carranza, E., Goldstein, M., Kilic, T. and Oseni, G. (2015) 'Decomposition of gender differentials in agricultural productivity in Ethiopia', *Agricultural Economics*, 46(3), pp. 311–334. Available at: <https://doi.org/10.1111/agec.12167>.
- Akbarpour, M., Malladi, S. and Saberi, A. (2020) 'Just a Few Seeds More: Value of Network Information for Diffusion'. Rochester, NY. Available at: <https://doi.org/10.2139/ssrn.3062830>.
- Alam, Md.R. and Kijima, Y. (2024) 'Incentives to Improve Government Agricultural Extension Agent Performance: A Randomized Controlled Trial in Bangladesh', *Economic Development and Cultural Change*, 72(3), pp. 1295–1316. Available at: <https://doi.org/10.1086/723492>.
- Ali, D., Bowen, D., Deininger, K. and Duponchel, M. (2016) 'Investigating the Gender Gap in Agricultural Productivity: Evidence from Uganda', *World Development*, 87, pp. 152–170. Available at: <https://doi.org/10.1016/j.worlddev.2016.06.006>.
- Almekinders, C.J., Beumer, K., Hauser, M., Misiko, M., Gatto, M., Nkurumwa, A.O. and Erenstein, O. (2019) 'Understanding the relations between farmers' seed demand and research methods: The challenge to do better', *Outlook on agriculture*, 48(1), pp. 16–21.
- Almekinders, C.J.M., Walsh, S., Jacobsen, K.S., Andrade-Piedra, J.L., McEwan, M.A., de Haan, S., Kumar, L. and Staver, C. (2019) 'Why interventions in the seed systems of roots, tubers and bananas crops do not reach their full potential', *Food Security*, 11(1), pp. 23–42. Available at: <https://doi.org/10.1007/s12571-018-0874-4>.
- Amoussouhoui, R., Arouna, A., Bavorova, M., Verner, V., Yergo, W. and Banout, J. (2023) 'Analysis of the factors influencing the adoption of digital extension services: evidence from the

- RiceAdvice application in Nigeria', *The Journal of Agricultural Education and Extension*, 0(0), pp. 1–30. Available at: <https://doi.org/10.1080/1389224X.2023.2222109>.
- Ashraf, N. and Bandiera, O. (2018) 'Social Incentives in Organizations'. Available at: <https://doi.org/10.1146/annurev-economics-063016-104324>.
- Ashraf, N., Bandiera, O. and Jack, B.K. (2014) 'No margin, no mission? A field experiment on incentives for public service delivery', *Journal of Public Economics*, 120, pp. 1–17. Available at: <https://doi.org/10.1016/j.jpubeco.2014.06.014>.
- Babcock, L., Recalde, M.P., Vesterlund, L. and Weingart, L. (2017) 'Gender Differences in Accepting and Receiving Requests for Tasks with Low Promotability', *American Economic Review*, 107(3), pp. 714–747. Available at: <https://doi.org/10.1257/aer.20141734>.
- Bacud, E.S.T., Gerullis, M.K., Puskur, R. and Heckeley, T. (2024) 'Looking at gender is not enough—How diversity of farmers' marginalization relates to varietal trait preferences', *Food Policy*, 124, p. 102616. Available at: <https://doi.org/10.1016/j.foodpol.2024.102616>.
- Baglan, M., Mwalupaso, G.E., Zhou, X. and Geng, X. (2020) 'Towards Cleaner Production: Certified Seed Adoption and Its Effect on Technical Efficiency', *Sustainability*, 12(4), p. 1344. Available at: <https://doi.org/10.3390/su12041344>.
- Bahadir, S.C. and Pauwels, K. (2024) 'When does word of mouth versus marketing drive brand performance most?', *Journal of Marketing Analytics*, 12(3), pp. 473–491. Available at: <https://doi.org/10.1057/s41270-023-00267-x>.
- Balew, S., Bulte, E., Abro, Z. and Kassie, M. (2023) 'Incentivizing and nudging farmers to spread information: Experimental evidence from Ethiopia', *American Journal of Agricultural Economics*, 105(3), pp. 994–1010. Available at: <https://doi.org/10.1111/ajae.12346>.
- Banerjee, A., Breza, E., Chandrasekhar, A.G. and Golub, B. (2024) 'When Less Is More: Experimental Evidence on Information Delivery During India's Demonetisation', *The Review of Economic Studies*, 91(4), pp. 1884–1922. Available at: <https://doi.org/10.1093/restud/rdad068>.
- Banerjee, A., Chandrasekhar, A.G., Duflo, E. and Jackson, M.O. (2019) 'Using Gossips to Spread Information: Theory and Evidence from Two Randomized Controlled Trials', *The Review of Economic Studies*, 86(6), pp. 2453–2490. Available at: <https://doi.org/10.1093/restud/rdz008>.
- Barooah, P., Alvi, M. and Ringler, C. (2023) *Impact of participatory video-based extension and posters on awareness, knowledge, and adoption of climate-smart agricultural practices: Insights from women farmers in Gujarat, India*. 0 edn. Washington, DC: International Food Policy Research Institute. Available at: <https://doi.org/10.2499/p15738coll2.137022>.
- Bauer, G.R. and Scheim, A.I. (2019) 'Advancing quantitative intersectionality research methods: Intracategorical and intercategory approaches to shared and differential constructs', *Social Science & Medicine*, 226, pp. 260–262. Available at: <https://doi.org/10.1016/j.socscimed.2019.03.018>.
- Bayiyana, I., Okello, J.J., Ojwang, S., Mulwa, C., Shikuku, K., Mayanja, S., Tendo, S.R., Sam, N., Kemigisha, D. and Lagerkvist, C.-J. (2025) 'Variety use and preferences among smallholder sweetpotato farmers and how best to improve their access to quality seed: A gendered

- perspective and implications for breeding program design', *CABI Reviews*, 20(1), p. 0004. Available at: <https://doi.org/10.1079/cabireviews.2025.0004>.
- Beaman, L., BenYishay, A., Magruder, J. and Mobarak, A.M. (2021) 'Can Network Theory-Based Targeting Increase Technology Adoption?', *American Economic Review*, 111(6), pp. 1918–1943. Available at: <https://doi.org/10.1257/aer.20200295>.
- Beaman, L. and Dillon, A. (2018) 'Diffusion of agricultural information within social networks: Evidence on gender inequalities from Mali', *Journal of Development Economics*, 133, pp. 147–161. Available at: <https://doi.org/10.1016/j.jdeveco.2018.01.009>.
- Bello, L.O., Baiyegunhi, L.J.S., Danso-Abbeam, G. and Ogundeji, A.A. (2021) 'Gender decomposition in smallholder agricultural performance in rural Nigeria', *Scientific African*, 13, p. e00875. Available at: <https://doi.org/10.1016/j.sciaf.2021.e00875>.
- Benartzi, S., Beshears, J., Milkman, K.L., Sunstein, C.R., Thaler, R.H., Shankar, M., Tucker-Ray, W., Congdon, W.J. and Galing, S. (2017) 'Should Governments Invest More in Nudging?', *Psychological Science*, 28(8), pp. 1041–1055. Available at: <https://doi.org/10.1177/0956797617702501>.
- BenYishay, A., Jones, M., Kondylis, F. and Mobarak, A.M. (2020) 'Gender gaps in technology diffusion', *Journal of Development Economics*, 143, p. 102380. Available at: <https://doi.org/10.1016/j.jdeveco.2019.102380>.
- BenYishay, A. and Mobarak, A.M. (2019) 'Social Learning and Incentives for Experimentation and Communication', *The Review of Economic Studies*, 86(3), pp. 976–1009. Available at: <https://doi.org/10.1093/restud/rdy039>.
- Berg, E., Ghatak, M., Manjula, R., Rajasekhar, D. and Roy, S. (2019) 'Motivating Knowledge Agents: Can Incentive Pay Overcome Social Distance?', *The Economic Journal*, 129(617), pp. 110–142. Available at: <https://doi.org/10.1111/eoj.12544>.
- Berretta, M., Kupfer, M., Shisler, S. and Lane, C. (2023) 'Rapid evidence assessment on women's empowerment interventions within the food system: a meta-analysis', *Agriculture & Food Security*, 12(1), p. 13. Available at: <https://doi.org/10.1186/s40066-023-00405-9>.
- Bertelli, O. and Fall, F. (2024) 'Reaching out to socially distant trainees: experimental evidence from variations on the standard farmer trainer system', *European Review of Agricultural Economics*, 51(2), pp. 533–588. Available at: <https://doi.org/10.1093/erae/jbae006>.
- Blackden, C.M. and Wodon, Q. (2006) *Gender, Time Use, and Poverty in Sub-Saharan Africa*. World Bank Publications.
- Blackmore, I., Ringler, C. and Meinzen-Dick, R.S. (2022) *Gender gaps in agricultural growth and development: Opportunities for improving gender-responsive programming*. 0 edn. Washington, DC: International Food Policy Research Institute. Available at: <https://doi.org/10.2499/p15738coll2.135905>.
- Boenke, L., Panning, M., Thurow, A., Hörisch, J. and Loschelder, D.D. (2022) 'Who can nudge for sustainable development? How nudge source renders dynamic norms (in-)effective in eliciting sustainable behavior', *Journal of Cleaner Production*, 368, p. 133246. Available at: <https://doi.org/10.1016/j.jclepro.2022.133246>.

- Bold, T., Kaizzi, K.C., Svensson, J. and Yanagizawa-Drott, D. (2017) 'Lemon Technologies and Adoption: Measurement, Theory and Evidence from Agricultural Markets in Uganda', *The Quarterly Journal of Economics*, 132(3), pp. 1055–1100.
- Boun My, K., Nguyen-Van, P., Kim Cuong Pham, T., Stenger, A., Tiet, T. and To-The, N. (2022) 'Drivers of organic farming: Lab-in-the-field evidence of the role of social comparison and information nudge in networks in Vietnam', *Ecological Economics*, 196, p. 107401. Available at: <https://doi.org/10.1016/j.ecolecon.2022.107401>.
- Bradler, C., Dur, R., Neckermann, S. and Non, A. (2016) 'Employee Recognition and Performance: A Field Experiment', *Management Science*, 62(11), pp. 3085–3099. Available at: <https://doi.org/10.1287/mnsc.2015.2291>.
- Brearley, E. and Kramer, B. (2020) 'Gender and promoting quality seeds in Africa: A literature review'. Available at: https://issdafrica.org/wp-content/uploads/2020/12/gender-and-promotion-of-quality-seeds_litreview_issd-africa_-b.kramer-e.brearley_2020.pdf (Accessed: 9 September 2025).
- Brown, B., Nuberg, Ian and Llewellyn, R. (2018) 'Further participatory adaptation is required for community leaders to champion conservation agriculture in Africa', *International Journal of Agricultural Sustainability*, 16(3), pp. 286–296. Available at: <https://doi.org/10.1080/14735903.2018.1472410>.
- Buchholz, M. and Musshoff, O. (2021) 'Tax or green nudge? An experimental analysis of pesticide policies in Germany', *European Review of Agricultural Economics*, 48(4), pp. 940–982. Available at: <https://doi.org/10.1093/erae/jbab019>.
- Bursztyn, L. and Jensen, R. (2017) 'Social Image and Economic Behavior in the Field: Identifying, Understanding, and Shaping Social Pressure', *Annual Review of Economics*, 9(Volume 9, 2017), pp. 131–153. Available at: <https://doi.org/10.1146/annurev-economics-063016-103625>.
- CGIAR Initiative on Seed Equal (2023) 'CGIAR Initiative on Seed Equal: 2022 Annual Technical Report'. Available at: <https://hdl.handle.net/10568/130105> (Accessed: 29 May 2024).
- Chabé-Ferret, S., Le Coent, P., Reynaud, A., Subervie, J. and Lepercq, D. (2019) 'Can we nudge farmers into saving water? Evidence from a randomised experiment', *European Review of Agricultural Economics*, 46(3), pp. 393–416. Available at: <https://doi.org/10.1093/erae/jbz022>.
- Chae, I., Bruno, H.A. and Feinberg, F.M. (2019) 'Wearout or Weariness? Measuring Potential Negative Consequences of Online Ad Volume and Placement on Website Visits', *Journal of Marketing Research*, 56(1), pp. 57–75. Available at: <https://doi.org/10.1177/0022243718820587>.
- Chandrasekhar, A.G., Golub, B. and Yang, H. (2018) 'Signaling, Shame, and Silence in Social Learning'. National Bureau of Economic Research (Working Paper Series). Available at: <https://doi.org/10.3386/w25169>.
- Chang, C. (2007) 'The Relative Effectiveness of Comparative and Noncomparative Advertising: Evidence for Gender Differences in Information-Processing Strategies', *Journal of Advertising*, 36(1), pp. 21–35.

- Cialdini, R.B. and Goldstein, N.J. (2004) 'Social Influence: Compliance and Conformity', *Annual Review of Psychology*, 55(Volume 55, 2004), pp. 591–621. Available at: <https://doi.org/10.1146/annurev.psych.55.090902.142015>.
- Colfer, C.J.P., Sijapati Basnett, B. and Ihalainen, M. (2018) 'Making sense of "intersectionality": A manual for lovers of people and forests', *CIFOR-ICRAF*, 1 January. Available at: <https://doi.org/10.17528/cifor/006793>.
- Congiu, L. and Moscati, I. (2022) 'A review of nudges: Definitions, justifications, effectiveness', *Journal of Economic Surveys*, 36(1), pp. 188–213. Available at: <https://doi.org/10.1111/joes.12453>.
- Cotofan, M. (2021) 'Learning from praise: Evidence from a field experiment with teachers', *Journal of Public Economics*, 204, p. 104540. Available at: <https://doi.org/10.1016/j.jpubeco.2021.104540>.
- Crenshaw, K. (1989) 'Demarginalizing the Intersection of Race and Sex: A Black Feminist Critique of Antidiscrimination Doctrine, Feminist Theory and Antiracist Politics'.
- Dar, M.H., de Janvry, A., Emerick, K., Sadoulet, E. and Wiseman, E. (2024) 'Private Input Suppliers as Information Agents for Technology Adoption in Agriculture', *American Economic Journal: Applied Economics*, 16(2), pp. 219–248. Available at: <https://doi.org/10.1257/app.20220037>.
- Davis, K.E., Franzel, S. and Spielman, D.J. (2019) *Extension options for better livelihoods and poverty reduction: a selected review 2012-2015*. F1000 Research Limited. Available at: <https://gatesopenresearch.org/documents/3-386> (Accessed: 24 April 2025).
- Davis, K.E., Franzel, S. and Spielman, D.J. (2016) 'Extension options for better livelihoods and poverty reduction: A selected review 2012–2015'. Available at: <https://cgspace.cgiar.org/items/5580f61e-c915-4142-8bde-914ca0d63c02> (Accessed: 24 April 2025).
- Davis, K.E., Makhija, S. and Spielman, D.J. (2021) *Agricultural extension and rural advisory services: What have we learned? What's next?* Intl Food Policy Res Inst. Available at: https://books.google.co.uk/books?hl=en&lr=&id=B_RNEAAQBAJ&oi=fnd&pg=PA8&dq=davis+franzel+and+spielman+&ots=LqZo650XW3&sig=yCVNFLQTLGloJrRSnbaYhOT6Bf0 (Accessed: 24 April 2025).
- De Groote, H., Gunaratna, N.S., Fisher, M., Kebebe, E.G., Mmbando, F. and Friesen, D. (2016) 'The effectiveness of extension strategies for increasing the adoption of biofortified crops: the case of quality protein maize in East Africa', *Food Security*, 8(6), pp. 1101–1121. Available at: <https://doi.org/10.1007/s12571-016-0621-7>.
- de Janvry, A., Sadoulet, E., Dar, M. and Emerick, K. (2016) *The Agricultural Technology Adoption Puzzle: What Can We Learn From Field Experiments?* Working Paper P178. FERDI Working Paper. Available at: <https://www.econstor.eu/handle/10419/269459> (Accessed: 24 June 2024).
- Didero, N., Costanigro, M. and Jablonski, B.B.R. (2021) 'Promoting farmers market via information nudges and coupons: A randomized control trial', *Agribusiness*, 37(3), pp. 531–549. Available at: <https://doi.org/10.1002/agr.21688>.

- van Dijk, H. and van Engen, M.L. (2019) 'The Flywheel Effect of Gender Role Expectations in Diverse Work Groups', *Frontiers in Psychology*, 10. Available at: <https://doi.org/10.3389/fpsyg.2019.00976>.
- Djoudi, H., Locatelli, B., Vaast, C., Asher, K., Brockhaus, M. and Basnett Sijapati, B. (2016) 'Beyond dichotomies: Gender and intersecting inequalities in climate change studies', *Ambio*, 45(3), pp. 248–262. Available at: <https://doi.org/10.1007/s13280-016-0825-2>.
- Donovan, J., Rutsaert, P., Spielman, D., Shikuku, K.M. and Demont, M. (2021) 'Seed value chain development in the Global South: Key issues and new directions for public breeding programs', *Outlook on Agriculture*, 50(4), pp. 366–377. Available at: <https://doi.org/10.1177/00307270211059551>.
- Doss, C.R. (2018) 'Women and agricultural productivity: Reframing the Issues', *Development Policy Review*, 36(1), pp. 35–50. Available at: <https://doi.org/10.1111/dpr.12243>.
- Duffy, C., Toth G.C., John, M. U., and Spillane, C. (2021) 'Climate smart agriculture extension: gender disparities in agroforestry knowledge acquisition', *Climate and Development*, 13(1), pp. 21–33. Available at: <https://doi.org/10.1080/17565529.2020.1715912>.
- Dzanku, F.M. and Osei, R.D. (2023) 'Does combining traditional and information and communications technology-based extension methods improve agricultural outcomes? Evidence from field experiments in Mali', *Review of Development Economics*, 27(1), pp. 450–475. Available at: <https://doi.org/10.1111/rode.12926>.
- Eagly, A.H. (2013) *Sex Differences in Social Behavior: A Social-role interpretation*. New York: Psychology Press. Available at: <https://doi.org/10.4324/9780203781906>.
- Eagly, A.H., Nater, C., Miller, D.I., Kaufmann, M. and Sczesny, S. (2020) 'Gender stereotypes have changed: A cross-temporal meta-analysis of U.S. public opinion polls from 1946 to 2018', *American Psychologist*, 75(3), pp. 301–315. Available at: <https://doi.org/10.1037/amp0000494>.
- Eagly, A.H., Wood, W., and Amanda B. Diekmann (2000) 'Social Role Theory of Sex Differences and Similarities: A Current Appraisal', *The Developmental Social Psychology of Gender*. Psychology Press.
- Echodu, R., Edema, H., Wokorach, G., Zawedde, C., Otim, G., Luambano, N., Ateka, E.M. and Asiimwe, T. (2019) 'Farmers' practices and their knowledge of biotic constraints to sweetpotato production in East Africa', *Physiological and Molecular Plant Pathology*, 105, pp. 3–16. Available at: <https://doi.org/10.1016/j.pmpp.2018.07.004>.
- Elias, M., Mudege, N.N., Lopez, D.E., Najjar, D., Kandiwa, V., Luis, J.S., Yila, J., Tegbaru, A., Ibrahim, G. & Badstue, L.B. (2018) Gendered aspirations and occupations among rural youth, in agriculture and beyond: A cross-regional perspective. *Journal of Gender, Agriculture and Food Security*. https://cgspace.cgiar.org/bitstream/10568/99065/1/Gendered_Elias_2018.pdf.
- Fabregas, R., Harigaya, T., Kremer, M. and Ramrattan, R. (2023) 'Digital Agricultural Extension for Development', in T. Madon, A.J. Gadgil, R. Anderson, L. Casaburi, K. Lee, and A. Rezaee (eds) *Introduction to Development Engineering: A Framework with Applications from the Field*.

- Cham: Springer International Publishing, pp. 187–219. Available at: https://doi.org/10.1007/978-3-030-86065-3_8.
- Fabregas, R., Kremer, M., Lowes, M., On, R. and Zane, G. (2019) ‘SMS-extension and farmer behavior: lessons from six RCTs in East Africa’, *Online at: https://www.atai-research.org/wp-content/uploads/2020/05/textfarmers1.pdf* [Preprint]. Available at: <https://www.academia.edu/download/89534253/textfarmers1.pdf> (Accessed: 27 May 2025).
- Fabregas, R., Kremer, M., Lowes, M., On, R. and Zane, G. (2025) ‘Digital Information Provision and Behavior Change: Lessons from Six Experiments in East Africa’, *American Economic Journal: Applied Economics*, 17(1), pp. 527–566. Available at: <https://doi.org/10.1257/app.20220072>.
- FAO (2018a) *Country factsheet on small family farms: UGANDA* | FAO. Available at: <https://www.fao.org/family-farming/detail/en/c/1115197/> (Accessed: 15 November 2024).
- FAO (2018b) *FAO’s value chain support for Uganda*. Rome, Italy. Available at: <https://openknowledge.fao.org/items/453634f6-0a00-4fbf-a24f-c96874d58bb8> (Accessed: 15 November 2024).
- FAO (2020) *FAO Policy on Gender Equality 2020–2030* | FAO. Available at: <https://www.fao.org/family-farming/detail/en/c/1375135/> (Accessed: 19 October 2024).
- FAO (2023) *The status of women in agrifood systems*. FAO. Available at: <https://doi.org/10.4060/cc5343en>.
- FAO (2024) *Theory of Change*. Available at: <https://www.fao.org/joint-programme-gender-transformative-approaches/resources/theory-of-change/en> (Accessed: 18 February 2025).
- FAO (2025) *Gender Inequalities in Resources in Agrifood Systems*. Available at: <https://doi.org/10.4060/cc5343en>.
- Farnworth, C.R., Badstue, L., Williams, G.J., Tegbaru, A. and Gaya, H.I.M. (2020) ‘Unequal partners: associations between power, agency and benefits among women and men maize farmers in Nigeria’, *Gender, Technology and Development*, 24(3), pp. 271–296. Available at: <https://doi.org/10.1080/09718524.2020.1794607>.
- Farnworth, C.R., Galiè, A., Gumucio, T., Jumba, H., Kramer, B. and Ragasa, C. (2024) ‘Women’s seed entrepreneurship in aquaculture, maize, and poultry value chains in Ghana, Kenya, and Tanzania’, *Frontiers in Sustainable Food Systems*, 8. Available at: <https://doi.org/10.3389/fsufs.2024.1198130>.
- Firpo, S.P., Fortin, N.M. and Lemieux, T. (2018) ‘Decomposing Wage Distributions Using Recentered Influence Function Regressions’, *Econometrics*, 6(2), p. 28. Available at: <https://doi.org/10.3390/econometrics6020028>.
- Fisher, M., Holden, S.T. and Katengeza, S.P. (2017) *Adoption of CA technologies among Followers of Lead Farmers: How Strong is the Influence from Lead Farmers?* Working Paper 7/17. Centre for Land Tenure Studies Working Paper. Available at: <https://www.econstor.eu/handle/10419/242754> (Accessed: 15 April 2025).

- Fisher, M., Holden, S.T., Thierfelder, C. and Katengeza, S.P. (2018) 'Awareness and adoption of conservation agriculture in Malawi: what difference can farmer-to-farmer extension make?', *International Journal of Agricultural Sustainability*, 16(3), pp. 310–325. Available at: <https://doi.org/10.1080/14735903.2018.1472411>.
- Fracchia, M., Molina-Millán, T. and Vicente, P.C. (2023) 'Motivating volunteer health workers in an African capital city', *Journal of Development Economics*, 163, p. 103096. Available at: <https://doi.org/10.1016/j.jdeveco.2023.103096>.
- Galiè, A., Kramer, B., Spielman, D.J., Kwarazuka, N., Rietveld, A.M. and Aju, S. (2025) 'Inclusive and gender-transformative seed systems: Concepts and applications', *Agricultural Systems*, 226, p. 104320. Available at: <https://doi.org/10.1016/j.agsy.2025.104320>.
- Gebre, G.G., Isoda, H., Rahut, D.B., Amekawa, Y. and Nomura, H. (2019) 'Gender differences in the adoption of agricultural technology: The case of improved maize varieties in southern Ethiopia', *Women's Studies International Forum*, 76, p. 102264. Available at: <https://doi.org/10.1016/j.wsif.2019.102264>.
- Ghosh, S. and Vinod, D. (2017) 'What Constrains Financial Inclusion for Women? Evidence from Indian Micro data', *World Development*, 92, pp. 60–81. Available at: <https://doi.org/10.1016/j.worlddev.2016.11.011>.
- Glover, D., Sumberg, J., Ton, G., Andersson, J. and Badstue, L. (2019) 'Rethinking technological change in smallholder agriculture', *Outlook on Agriculture*, 48(3), pp. 169–180. Available at: <https://doi.org/10.1177/0030727019864978>.
- Hancock, A.-M. (2007) 'When Multiplication Doesn't Equal Quick Addition: Examining Intersectionality as a Research Paradigm', *Perspectives on Politics*, 5(1), pp. 63–79. Available at: <https://doi.org/10.1017/S1537592707070065>.
- Hancock, A.-M. (2019) 'Empirical Intersectionality: A Tale of Two Approaches', in O. Hankivsky and J.S. Jordan-Zachery (eds) *The Palgrave Handbook of Intersectionality in Public Policy*. Cham: Springer International Publishing, pp. 95–132. Available at: https://doi.org/10.1007/978-3-319-98473-5_5.
- Hazell, P. (2019) 'Urbanization, Agriculture, and Smallholder Farming: Global Trends, Challenges and Opportunities', pp. 137–160. Available at: https://doi.org/10.1142/9789813278356_0004.
- Heilman, M.E. and Eagly, A.H. (2008) 'Gender Stereotypes Are Alive, Well, and Busy Producing Workplace Discrimination', *Industrial and Organizational Psychology*, 1(4), pp. 393–398. Available at: <https://doi.org/10.1111/j.1754-9434.2008.00072.x>.
- Holden, S.T., Fisher, M., Katengeza, S.P. and Thierfelder, C. (2018) 'Can lead farmers reveal the adoption potential of conservation agriculture? The case of Malawi', *Land Use Policy*, 76, pp. 113–123. Available at: <https://doi.org/10.1016/j.landusepol.2018.04.048>.
- Holden, S.T. and Quiggin, J. (2017) 'Climate risk and state-contingent technology adoption: shocks, drought tolerance and preferences', *European Review of Agricultural Economics*, 44(2), pp. 285–308. Available at: <https://doi.org/10.1093/erae/jbw016>.
- Holmström, B. (1979) 'Moral hazard and observability', *The Bell journal of economics*, pp. 74–91.

- Hörner, D., Bouguen, A., Frölich, M. and Wollni, M. (2019) 'The Effects of Decentralized and Video-based Extension on the Adoption of Integrated Soil Fertility Management – Experimental Evidence from Ethiopia'. National Bureau of Economic Research (Working Paper Series). Available at: <https://doi.org/10.3386/w26052>.
- Huete-Alcocer, N. (2017) 'A Literature Review of Word of Mouth and Electronic Word of Mouth: Implications for Consumer Behavior', *Frontiers in Psychology*, 8. Available at: <https://doi.org/10.3389/fpsyg.2017.01256>.
- Huffman, W.E. (2020) 'Human Capital and Adoption of Innovations: Policy Implications', *Applied Economic Perspectives and Policy*, 42(1), pp. 92–99. Available at: <https://doi.org/10.1002/aepp.13010>.
- Hummel, D. and Maedche, A. (2019) 'How effective is nudging? A quantitative review on the effect sizes and limits of empirical nudging studies', *Journal of Behavioral and Experimental Economics*, 80, pp. 47–58. Available at: <https://doi.org/10.1016/j.socec.2019.03.005>.
- Huyer, S., Loboguerrero, A.M., Chanana, N. and Spellman, O. (2024) 'From gender gaps to gender-transformative climate-smart agriculture', *Current Opinion in Environmental Sustainability*, 67, p. 101415. Available at: <https://doi.org/10.1016/j.cosust.2024.101415>.
- Jensen, M.C. and Meckling, W.H. (1979) 'Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure', in K. Brunner (ed.) *Economics Social Institutions: Insights from the Conferences on Analysis & Ideology*. Dordrecht: Springer Netherlands, pp. 163–231. Available at: https://doi.org/10.1007/978-94-009-9257-3_8.
- Kabeer, N. (1999) 'Resources, Agency, Achievements: Reflections on the Measurement of Women's Empowerment', *Development and Change*, 30(3), pp. 435–464. Available at: <https://doi.org/10.1111/1467-7660.00125>.
- Kabeer, N. (2010) Women's Empowerment, Development Interventions and the Management of Information Flows. IDS Bulletin. 41 (6), 105–113. doi:10.1111/j.1759-5436.2010.00188.x.
- Kabirigi, M., Adewopo, J.B., Sun, Z. and Hermans, F. (2024) 'Opinion leaders' influence on knowledge transmission about crop diseases management: Exploring the attributes that matter to followers', *Outlook on Agriculture*, 53(3), pp. 264–276. Available at: <https://doi.org/10.1177/00307270241267764>.
- Kahneman, D. (2011) 'Fast and slow thinking', *Allen Lane and Penguin Books, New York* [Preprint]. Available at: https://durmonski.com/wp-content/uploads/2021/09/Think_Workbook_005.pdf (Accessed: 9 September 2025).
- Karlan, D., Savonitto, B., Thuysbaert, B. and Udry, C. (2017) 'Impact of savings groups on the lives of the poor', *Proceedings of the National Academy of Sciences*, 114(12), pp. 3079–3084. Available at: <https://doi.org/10.1073/pnas.1611520114>.
- Kenny, D.A., Kashy, D.A. and Cook, W.L. (2020) *Dyadic Data Analysis*. Guilford Publications.
- Khaila, S., Tchuwa, F., Franzel, S. and Simpson, B. (2015) *The farmer-to-farmer extension approach in Malawi: a survey of lead farmers*. World Agroforestry Centre (ICRAF). Available at: <https://doi.org/10.5716/WP14200.PDF>.

- Kilic, T., Palacios-López, A. and Goldstein, M. (2015) 'Caught in a Productivity Trap: A Distributional Perspective on Gender Differences in Malawian Agriculture', *World Development*, 70, pp. 416–463. Available at: <https://doi.org/10.1016/j.worlddev.2014.06.017>.
- Kilwinger, F., Mugambi, S., Manners, R., Schut, M., Tumwegamire, S., Nduwumuremyi, A., Bambara, S., Paauwe, M. and Almekinders, C. (2021) 'Characterizing cassava farmer typologies and their seed sourcing practices to explore opportunities for economically sustainable seed business models in Rwanda', *Outlook on Agriculture*, 50(4), pp. 441–454. Available at: <https://doi.org/10.1177/00307270211045408>.
- Kondylis, F., Mueller, V., Sheriff, G. and Zhu, S. (2016) 'Do Female Instructors Reduce Gender Bias in Diffusion of Sustainable Land Management Techniques? Experimental Evidence From Mozambique', *World Development*, 78, pp. 436–449. Available at: <https://doi.org/10.1016/j.worlddev.2015.10.036>.
- Kondylis, F., Mueller, V. and Zhu, J. (2017) 'Seeing is believing? Evidence from an extension network experiment', *Journal of Development Economics*, 125, pp. 1–20. Available at: <https://doi.org/10.1016/j.jdeveco.2016.10.004>.
- Kramer, B. and Trachtman, C. (2024) 'Gender dynamics in seed systems: an integrative review of seed promotion interventions in Africa', *Food Security*, 16(1), pp. 19–45. Available at: <https://doi.org/10.1007/s12571-023-01403-2>.
- Labarta, R.A. (2009) 'Are small Sub-Sahara African farmers willing to pay for vegetative propagated orange fleshed sweetpotato planting material? Evidence from Central Mozambique'. Available at: <https://ageconsearch.umn.edu/record/49447/?v=pdf> (Accessed: 24 October 2024).
- Lamontagne-Godwin, J., Cardey, S., Williams, F.E., Dorward, P.T., Aslam, N. and Almas, M. (2019) 'Identifying gender-responsive approaches in rural advisory services that contribute to the institutionalisation of gender in Pakistan', *The Journal of Agricultural Education and Extension*, 25(3), pp. 267–288. Available at: <https://doi.org/10.1080/1389224X.2019.1604392>.
- Lazarsfeld, P.F. and Merton, R.K. (1954) 'Friendship as a social process: A substantive and methodological analysis', *Freedom and control in modern society*, 18(1), pp. 18–66.
- Lecoutere, E., Spielman, D.J. and Van Campenhout, B. (2019) *Women's empowerment, agricultural extension, and digitalization: Disentangling information and role model effects in rural Uganda*. 0 edn. Washington, DC: International Food Policy Research Institute. Available at: <https://doi.org/10.2499/p15738coll2.133523>.
- Lecoutere, E., Spielman, D.J. and Van Campenhout, B. (2020) *Women's empowerment, agricultural extension, and digitalization: Disentangling information and role-model effects in rural Uganda*. Intl Food Policy Res Inst. Available at: <https://books.google.co.uk/books?hl=en&lr=&id=ow7UDwAAQBAJ&oi=fnd&pg=PA1&dq=Women%E2%80%99s+empowerment,+agricultural+extension,+and+digitalization+...+By+Lecoutere,+Els,+Spielman,+David+J.,+Van+Campenhout,+Bjorn&ots=m8j2aXrzsJ&sig=t8Mk1AlkuKsMLUlnjNgz9gDvTRw> (Accessed: 25 April 2025).
- Lecoutere, E., Spielman, D.J. and Van Campenhout, B. (2023) 'Empowering women through targeting information or role models: Evidence from an experiment in agricultural extension

- in Uganda', *World Development*, 167, p. 106240. Available at: <https://doi.org/10.1016/j.worlddev.2023.106240>.
- Low, J., Ball, A., Magezi, S., Njoku, J., Mwanga, R., Andrade, M., Tomlins, K., Dove, R. and Van Mourik, T. (2017) 'Sweet potato development and delivery in sub-Saharan Africa', *African Journal of Food, Agriculture, Nutrition and Development*, 17(2), pp. 11955–11972.
- Magnan, N., Love, A.M., Mishili, F.J. and Sheremenko, G. (2020) 'Husbands' and wives' risk preferences and improved maize adoption in Tanzania', *Agricultural Economics*, 51(5), pp. 743–758.
- Makate, C. and Mutenje, M. (2021) 'Discriminatory effects of gender disparities in improved seed and fertilizer use at the plot-level in Malawi and Tanzania', *World Development Perspectives*, 23, p. 100344. Available at: <https://doi.org/10.1016/j.wdp.2021.100344>.
- Mandal, B. (2023) *Better production: Innovative sweet potato breeding and conservation in Papua New Guinea*, Food and Agriculture Organization of the United Nations. Available at: <http://www.fao.org/news/countries-good-practices/article/en/c/1649852/> (Accessed: 11 June 2024).
- Maredia, M.K., Reyes, B., Ba, M.N., Dabire, C.L., Pittendrigh, B. and Bello-Bravo, J. (2018) 'Can mobile phone-based animated videos induce learning and technology adoption among low-literate farmers? A field experiment in Burkina Faso', *Information Technology for Development*, 24(3), pp. 429–460. Available at: <https://doi.org/10.1080/02681102.2017.1312245>.
- Marenja, P.P., Wanyama, R., Alemu, S. and Woyengo, V. (2021) 'Trait preference trade-offs among maize farmers in western Kenya', *Heliyon*, 7(3). Available at: <https://doi.org/10.1016/j.heliyon.2021.e06389>.
- Martini, E., Roshetko, J.M. and Paramita, E. (2017) 'Can farmer-to-farmer communication boost the dissemination of agroforestry innovations? A case study from Sulawesi, Indonesia', *Agroforestry Systems*, 91(5), pp. 811–824. Available at: <https://doi.org/10.1007/s10457-016-0011-3>.
- Matous, P. (2023) 'Male and stale? Questioning the role of “opinion leaders” in agricultural programs', *Agriculture and Human Values*, 40(3), pp. 1205–1220. Available at: <https://doi.org/10.1007/s10460-023-10415-9>.
- Mausch, K., Almekinders, C.J.M., Hambloch, C. and McEwan, M.A. (2021) 'Putting diverse farming households' preferences and needs at the centre of seed system development', *Outlook on Agriculture*, 50(4), pp. 356–365. Available at: <https://doi.org/10.1177/00307270211054111>.
- McCall, L. (2005) 'The Complexity of Intersectionality', *Signs: Journal of Women in Culture and Society*, 30(3), pp. 1771–1800. Available at: <https://doi.org/10.1086/426800>.
- McCann, R.S., van den Berg, H., Takken, W., Chetwynd, A.G., Giorgi, E., Terlouw, D.J. and Diggle, P.J. (2018) 'Reducing contamination risk in cluster-randomized infectious disease-intervention trials', *International Journal of Epidemiology*, 47(6), pp. 2015–2024. Available at: <https://doi.org/10.1093/ije/dyy213>.

- McEwan, M.A., Almekinders, C.J., Andrade-Piedra, J.J., Delaquis, E., Garrett, K.A., Kumar, L., Mayanja, S., Omondi, B.A., Rajendran, S. and Thiele, G. (2021) “Breaking through the 40% adoption ceiling: Mind the seed system gaps.” A perspective on seed systems research for development in One CGIAR’, *Outlook on Agriculture*, 50(1), pp. 5–12. Available at: <https://doi.org/10.1177/0030727021989346>.
- McEwan, M.A., Matui, M.S., Mayanja, S., Namanda, S. and Ogero, K. (2023) ‘Gender dynamics in seed systems: female makeover or male takeover of specialized sweetpotato seed production, in Lake Zone Tanzania?’, *Food Security*, 15(3), pp. 693–710. Available at: <https://doi.org/10.1007/s12571-023-01355-7>.
- McGuire, S. and Sperling, L. (2016) ‘Seed systems smallholder farmers use’, *Food Security*, 8(1), pp. 179–195. Available at: <https://doi.org/10.1007/s12571-015-0528-8>.
- Mekonnen, D.A., Gerber, N. and Matz, J.A. (2018) ‘Gendered Social Networks, Agricultural Innovations, and Farm Productivity in Ethiopia’, *World Development*, 105, pp. 321–335. Available at: <https://doi.org/10.1016/j.worlddev.2017.04.020>.
- Mertens, S., Herberz, M., Hahnel, U.J.J. and Brosch, T. (2022) ‘The effectiveness of nudging: A meta-analysis of choice architecture interventions across behavioral domains’, *Proceedings of the National Academy of Sciences*, 119(1), p. e2107346118. Available at: <https://doi.org/10.1073/pnas.2107346118>.
- Michels, M., Luo, H., Weller von Ahlefeld, P.J. and Mußhoff, O. (2023) ‘Compliance with pre-harvest interval rules in apple production—A comparative analysis of green nudges among fruit growers and agricultural students in Germany’, *Journal of Behavioral and Experimental Economics*, 102, p. 101963. Available at: <https://doi.org/10.1016/j.socec.2022.101963>.
- Mobarak, A.M. and Saldanha, N.A. (2022) ‘Remove barriers to technology adoption for people in poverty’, *Nature Human Behaviour*, 6(4), pp. 480–482. Available at: <https://doi.org/10.1038/s41562-022-01323-9>.
- Morgan, S.N., Mason, N.M. and Maredia, M.K. (2020) ‘Lead-farmer extension and smallholder valuation of new agricultural technologies in Tanzania’, *Food Policy*, 97, p. 101955. Available at: <https://doi.org/10.1016/j.foodpol.2020.101955>.
- Mudege, N.N., Chevo, T., Nyekanyeka, T., Kapalasa, E. and Demo, P. (2016) ‘Gender Norms and Access to Extension Services and Training among Potato Farmers in Dedza and Ntcheu in Malawi’, *The Journal of Agricultural Education and Extension*, 22(3), pp. 291–305. Available at: <https://doi.org/10.1080/1389224X.2015.1038282>.
- Mudege, N.N. and Heck, S. (2019) ‘Building gender equitable sweetpotato value chains: recommendations for programming’. Available at: <https://cgspace.cgiar.org/items/7f82309b-f878-40c0-bac1-8242f30b902f> (Accessed: 2 July 2024).
- Mudege, N.N., Mayanja, S. and Naziri, D. (2016) ‘Gender situational analysis of the sweetpotato value chain in Central and Eastern Uganda and strategies for gender equity in postharvest innovations.’ Available at: <https://cgspace.cgiar.org/bitstream/10568/88210/1/RTB-ENDURE-Gender-situational-analysis-sweetpotato.pdf> (Accessed: 14 June 2024).

- Mudege, N.N., Mdege, N., Abidin, P.E. and Bhatasara, S. (2017) 'The role of gender norms in access to agricultural training in Chikwawa and Phalombe, Malawi', *Gender, Place & Culture*, 24(12), pp. 1689–1710. Available at: <https://doi.org/10.1080/0966369X.2017.1383363>.
- Mudege, N.N. and Walsh, S. (2016) 'Gender and Roots Tubers and Bananas Seed Systems: a literature review.', *RTB Working Paper* [Preprint].
- Mwangi, C.W., Ateka, J., Mbeche, R., Oyugi, L. and Ateka, E. (2022) 'Comparing farmers' willingness to pay with costs of clean sweet potato seed multiplication in Kenya', *Food Security*, 14(5), pp. 1279–1293. Available at: <https://doi.org/10.1007/s12571-022-01293-w>.
- Mwiti, F.K., Okello, J.J., Munei, K. and Low, J. (2020) 'Farmer demand for clean planting material of biofortified and non-biofortified vegetatively propagated crop varieties: The case of sweetpotato', *Scientific African*, 8, p. e00400. Available at: <https://doi.org/10.1016/j.sciaf.2020.e00400>.
- Nakanyike, S. (2014) *Farmers' willingness to pay for virus-free sweet potato vines in Central Uganda: A case of Mpigi and Wakiso Districts*. Thesis. Makerere University. Available at: <http://makir.mak.ac.ug/handle/10570/3260> (Accessed: 24 October 2024).
- Ngo, T.M.-P. and Wahhaj, Z. (2012) 'Microfinance and gender empowerment', *Journal of Development Economics*, 99(1), pp. 1–12. Available at: <https://doi.org/10.1016/j.jdeveco.2011.09.003>.
- Niu, C. and Ragasa, C. (2018) 'Selective attention and information loss in the lab-to-farm knowledge chain: The case of Malawian agricultural extension programs', *Agricultural Systems*, 165, pp. 147–163. Available at: <https://doi.org/10.1016/j.agsy.2018.06.003>.
- Njuki, J., Eissler, S., Malapit, H., Meinzen-Dick, R., Bryan, E. and Quisumbing, A. (2022) 'A review of evidence on gender equality, women's empowerment, and food systems', *Global Food Security*, 33, p. 100622. Available at: <https://doi.org/10.1016/j.gfs.2022.100622>.
- Nyantakyi-Frimpong, H. and Bezner-Kerr, R. (2015) 'The relative importance of climate change in the context of multiple stressors in semi-arid Ghana', *Global Environmental Change*, 32, pp. 40–56.
- Nyberg, Y., Mackay, H., Wilson, M., Samkunde, M. and Wetterlind, J. (2025) 'Supporting access and implementation of agricultural extension services for female smallholder farmers – a systematic review', *International Journal of Agricultural Sustainability*, 23(1), p. 2505387. Available at: <https://doi.org/10.1080/14735903.2025.2505387>.
- Nye, J.S. (1990) 'Soft Power', *Foreign Policy*, (80), pp. 153–171. Available at: <https://doi.org/10.2307/1148580>.
- Oaxaca, R. (1973) 'Male-Female Wage Differentials in Urban Labor Markets', *International Economic Review*, 14(3), pp. 693–709. Available at: <https://doi.org/10.2307/2525981>.
- Ochieng, W., Silvert, C.J. and Diaz, J. (2022) 'Exploring the Impacts of Lead Farmer Selection on Community Social Learning: The case of Farmer-to-Farmer Model: A Review of Literature', *Journal of International Agricultural and Extension Education*, 29(3), pp. 7–31. Available at: <https://doi.org/10.4148/2831-5960.1022>.

- Ojwang, S.O., Otieno, D.J., Okello, J.J., Muoki, P. and Nyikal, R.A. (2021) 'Do Nutrition Education Approaches With Preschoolers and Their Caregivers Influence Retention of Biofortified Orange-Fleshed Sweet Potato on Farms? Evidence From Homa Bay County, Kenya', *Food and Nutrition Bulletin*, 42(3), pp. 347–360. Available at: <https://doi.org/10.1177/03795721211025445>.
- Okello, J., Shikuku, K.M., Lagerkvist, C.J., Rommel, J., Jogo, W., Ojwang, S., Namanda, S. and Elungat, J. (2023) 'Social incentives as nudges for agricultural knowledge diffusion and willingness to pay for certified seeds: Experimental evidence from Uganda', *Food Policy*, 120, p. 102506. Available at: <https://doi.org/10.1016/j.foodpol.2023.102506>.
- Okello, J.J., Just, David Ryan, Verschoor, A., Ojwang, S.O., Mutiso, J.M., Mulwa, C.K., Gong, C., Namanda, S., Rajendran, S., Ssali, R.T., Okim, M. and Campos, H. (2025) 'Nudging the adoption of improved crop varieties: evidence from a large randomized controlled sweetpotato trial in Uganda', *Food Security*, 18(1), pp. 241–262. Available at: <https://doi.org/10.1007/s12571-025-01617-6>.
- Okumu, O.O., Rajendran, S., Okello, J.J., Ward, P., Gatto, M., Kilwinger, F.B.M., Maredia, M., Kiriimi, S., Nshimiyimana, J.C., Ndirigwe, J., Uzamuschaka, S., Munyabarambe, D., Shumbusha, D., Hareau, G. and Spielman, D.J. (2021) 'Farmers' demand for quality and nutritionally enhanced sweetpotato planting material: Evidence from experimental auctions in Rwanda'. Available at: <https://hdl.handle.net/10568/116849> (Accessed: 24 October 2024).
- Oseni, G., Corral, P., Goldstein, M. and Winters, P. (2015) 'Explaining gender differentials in agricultural production in Nigeria', *Agricultural Economics*, 46(3), pp. 285–310. Available at: <https://doi.org/10.1111/agec.12166>.
- Pircher, T. and Almekinders, C.J. (2021) 'Making sense of farmers' demand for seed of root, tuber and banana crops: a systematic review of methods', *Food Security*, 13(5), pp. 1285–1301.
- Poku, A.-G., Birner, R. and Gupta, S. (2018) 'Why do maize farmers in Ghana have a limited choice of improved seed varieties? An assessment of the governance challenges in seed supply', *Food Security*, 10(1), pp. 27–46. Available at: <https://doi.org/10.1007/s12571-017-0749-0>.
- Puskur, R., Mudege, N.N., Njuguna-Mungai, E., Nchanji, E., Vernooij, R., Galiè, A. and Najjar, D. (2021) 'Moving Beyond Reaching Women in Seed Systems Development', *Advancing Gender Equality through Agricultural and Environmental Research: Past, Present, and Future*, pp. 113–145.
- Pyburn, R., Slavchevska, V. and Kruijssen, F. (2023) 'Gender dynamics in agrifood value chains: Advances in research and practice over the last decade', *Global Food Security*, 39, p. 100721. Available at: <https://doi.org/10.1016/j.gfs.2023.100721>.
- Quisumbing, A., Heckert, J., Faas, S., Ramani, G., Raghunathan, K., Malapit, H., Malapit, H., Heckert, J., Eissler, S., Faas, S., Martinez, E., Myers, E., Pereira, A., Quisumbing, A., Ragasa, C., Raghunathan, K., Rubin, D., Seymour, G., and The pro-WEAL for Market Inclusion Study Team (2021) 'Women's empowerment and gender equality in agricultural value chains: evidence from four countries in Asia and Africa', *Food Security*, 13(5), pp. 1101–1124. Available at: <https://doi.org/10.1007/s12571-021-01193-5>.

- Ragasa, C. (2020) 'Effectiveness of the lead farmer approach in agricultural extension service provision: Nationally representative panel data analysis in Malawi', *Land Use Policy*, 99, p. 104966. Available at: <https://doi.org/10.1016/j.landusepol.2020.104966>.
- Ragasa, C., Berhane, G., Tadesse, F. and Taffesse, A. (2013) 'Gender Differences in Access to Extension Services and Agricultural Productivity', *The Journal of Agricultural Education and Extension*, 19. Available at: <https://doi.org/10.1080/1389224X.2013.817343>.
- Ragasa, C., Mzungu, D., Kalagho, K. and Kazembe, C. (2021) 'Impact of interactive radio programming on agricultural technology adoption and crop diversification in Malawi', *Journal of Development Effectiveness*, 13(2), pp. 204–223. Available at: <https://doi.org/10.1080/19439342.2020.1853793>.
- Ragot, M., Bonierbale, M.W. & Weltzien, E. (2018) From market demand to breeding decisions: a framework. https://cgspace.cgiar.org/bitstream/10568/91275/6/Working%20Paper%202_BreedingObjectives_FINAL%20VERSION_18_02_13.pdf.
- Raza, M.S. and Qamar, U. (2019) 'Fuzzy Rough Sets', in M.S. Raza and U. Qamar (eds) *Understanding and Using Rough Set Based Feature Selection: Concepts, Techniques and Applications*. Singapore:
- Ridgeway, C.L. (2006) 'Gender as an organizing force in social relations: Implications for the future of inequality', *The declining significance of gender*, 265287. Available at: [https://books.google.com/books?hl=en&lr=&id=K-4WAAwAAQBAJ&oi=fnd&pg=PA265&dq=Ridgeway+and+Correll+\(2004\)+contend+that+gender+functions+as+a+fundamental+organising+principle&ots=Oi8wGjP3-5&sig=r-7Xgl5XYY-R_pqqARlo5eCC59w](https://books.google.com/books?hl=en&lr=&id=K-4WAAwAAQBAJ&oi=fnd&pg=PA265&dq=Ridgeway+and+Correll+(2004)+contend+that+gender+functions+as+a+fundamental+organising+principle&ots=Oi8wGjP3-5&sig=r-7Xgl5XYY-R_pqqARlo5eCC59w) (Accessed: 25 November 2024).
- Rietveld (Anne), A.M., van der Burg (Margreet), M. and Groot (Jeroen), J.C.J. (2020) 'Bridging youth and gender studies to analyse rural young women and men's livelihood pathways in Central Uganda', *Journal of Rural Studies*, 75, pp. 152–163. Available at: <https://doi.org/10.1016/j.jrurstud.2020.01.020>.
- Rios-Avila, F. (2020) 'Recentered influence functions (RIFs) in Stata: RIF regression and RIF decomposition', *The Stata Journal*, 20(1), pp. 51–94. Available at: <https://doi.org/10.1177/1536867X20909690>.
- Rockenbach, T. and Sakdapolrak, P. (2017) 'Social networks and the resilience of rural communities in the Global South: a critical review and conceptual reflections', *Ecology and Society*, 22(1). Available at: <https://www.jstor.org/stable/26270110> (Accessed: 9 September 2025).
- Rogers, E.M. (1995) 'Diffusion of Innovations: Modifications of a Model for Telecommunications', in M.-W. Stoetzer and A. Mahler (eds) *Die Diffusion von Innovationen in der Telekommunikation*. Berlin, Heidelberg: Springer, pp. 25–38. Available at: https://doi.org/10.1007/978-3-642-79868-9_2.
- Roy, P. and Patro, B. (2022) 'Financial Inclusion of Women and Gender Gap in Access to Finance: A Systematic Literature Review', *Vision*, 26(3), pp. 282–299. Available at: <https://doi.org/10.1177/09722629221104205>.

- Sarkar, M.A.R., Habib, M.A., Sarker, M.R., Rahman, M.M., Alam, S., Manik, M.N.I., Nayak, S. and Bhandari, H. (2024) 'Rice farmers' preferences for seed quality, packaging, and source: A study from northern Bangladesh', *PLOS ONE*, 19(6), p. e0306059. Available at: <https://doi.org/10.1371/journal.pone.0306059>.
- Sasaki, H., Horie, S., Horie, T. And Tanaka, K. (eds) (2024) 'Assessing the Effects of Nudge and Boost for Methane Emission Reduction from Paddy Field- Cluster Randomized Controlled Trial in Japan'. Available at: <https://doi.org/10.22004/ag.econ.344318>.
- Sasaki, S., Saito, T. and Ohtake, F. (2022) 'Nudges for COVID-19 voluntary vaccination: How to explain peer information?', *Social Science & Medicine*, 292, p. 114561. Available at: <https://doi.org/10.1016/j.socscimed.2021.114561>.
- Shikuku, K.M. (2019) 'Information exchange links, knowledge exposure, and adoption of agricultural technologies in northern Uganda', *World Development*, 115, pp. 94–106. Available at: <https://doi.org/10.1016/j.worlddev.2018.11.012>.
- Shikuku, K.M., Pieters, J., Bulte, E. and Läderach, P. (2019) 'Incentives and the Diffusion of Agricultural Knowledge: Experimental Evidence from Northern Uganda', *American Journal of Agricultural Economics*, 101(4), pp. 1164–1180. Available at: <https://doi.org/10.1093/ajae/aaz010>.
- Shohel, T.A., Niner, S. and Gunawardana, S. (2021) 'How the persistence of patriarchy undermines the financial empowerment of women microfinance borrowers? Evidence from a southern sub-district of Bangladesh', *PLoS ONE*, 16(4), p. e0250000. Available at: <https://doi.org/10.1371/journal.pone.0250000>.
- Singbo, A., Njuguna-Mungai, E., Yila, J.O., Sissoko, K. and Tabo, R. (2021) 'Examining the Gender Productivity Gap among Farm Households in Mali', *Journal of African Economies*, 30(3), pp. 251–284. Available at: <https://doi.org/10.1093/jae/ejaa008>.
- Slavchevska, V. (2015) 'Gender differences in agricultural productivity: the case of Tanzania', *Agricultural Economics*, 46(3), pp. 335–355.
- Small, S.F. (2025) What is a Feminist Quantitative Method? Opportunities for Feminist Econometrics. *Feminist Economics*. 31 (2), 35–56. Available at: [doi:10.1080/13545701.2024.2413906](https://doi.org/10.1080/13545701.2024.2413906).
- Spielman, D.J. (2021) 'Seed systems and markets: Reflection on policy progress and political economy', *Other briefs* [Preprint]. Available at: <https://ideas.repec.org/p/fpr/othbrf/1290144014.html> (Accessed: 25 November 2024).
- Strack, F. and Deutsch, R. (2004) 'Reflective and Impulsive Determinants of Social Behavior', *Personality and Social Psychology Review*, 8(3), pp. 220–247. Available at: https://doi.org/10.1207/s15327957pspr0803_1.
- Sumberg, J., Chamberlin, J., Flynn, J., Glover, D. and Johnson, V. (2020) 'Landscapes of Rural Youth Opportunity', *SSRN Electronic Journal*, pp. 1–55. Available at: <https://doi.org/10.2139/ssrn.3521380>.
- Sunstein, C.R. (2017) 'Nudges that fail', *Behavioural Public Policy*, 1(1), pp. 4–25. Available at: <https://doi.org/10.1017/bpp.2016.3>.

- Sunstein, C.R. & Thaler, R.H. (2003) Libertarian Paternalism Is Not an Oxymoron. *The University of Chicago Law Review*, 70 (4), 1159–1202. doi:10.2307/1600573.
- Suri, T. and Udry, C. (2022) 'Agricultural Technology in Africa', *Journal of Economic Perspectives*, 36(1), pp. 33–56. Available at: <https://doi.org/10.1257/jep.36.1.33>.
- Takahashi, K., Mano, Y. and Otsuka, K. (2019) 'Learning from experts and peer farmers about rice production: Experimental evidence from Cote d'Ivoire', *World Development*, 122, pp. 157–169. Available at: <https://doi.org/10.1016/j.worlddev.2019.05.004>.
- Takahashi, K., Muraoka, R. and Otsuka, K. (2020) 'Technology adoption, impact, and extension in developing countries' agriculture: A review of the recent literature', *Agricultural Economics*, 51(1), pp. 31–45. Available at: <https://doi.org/10.1111/agec.12539>.
- Tavenner, K. and Crane, T.A. (2019) 'Beyond "women and youth": Applying intersectionality in agricultural research for development', *Outlook on Agriculture*, 48(4), pp. 316–325. Available at: <https://doi.org/10.1177/0030727019884334>.
- Tavenner, K., Crane, T.A., Bullock, R. and Galiè, A. (2022) 'Intersectionality in gender and agriculture: toward an applied research design', *Gender, Technology and Development*, 26(3), pp. 385–403. Available at: <https://doi.org/10.1080/09718524.2022.2140383>.
- Taylor, M. and Bhasme, S. (2018) 'Model farmers, extension networks and the politics of agricultural knowledge transfer', *Journal of Rural Studies*, 64, pp. 1–10.
- Teklewold, H., Adam, R.I. and Marenja, P. (2020) 'What explains the gender differences in the adoption of multiple maize varieties? Empirical evidence from Uganda and Tanzania', *World Development Perspectives*, 18, p. 100206. Available at: <https://doi.org/10.1016/j.wdp.2020.100206>.
- Thaler, R. and Sunstein, C. (2008) 'Nudge: Improving decisions about health, wealth and happiness', *Amsterdam Law Forum; HeinOnline: Online*. HeinOnline, p. 89. Available at: https://heinonline.org/hol-cgi-bin/get_pdf.cgi?handle=hein.journals/amslawf1§ion=49 (Accessed: 12 September 2024).
- Thiele, G., Dufour, D., Vernier, P., Mwanga, R.O.M., Parker, M.L., Schulte Geldermann, E., Teeken, B., Wossen, T., Gotor, E., Kikulwe, E., Tufan, H., Sinelle, S., Kouakou, A.M., Friedmann, M., Polar, V. and Hershey, C. (2021) 'A review of varietal change in roots, tubers and bananas: consumer preferences and other drivers of adoption and implications for breeding', *International Journal of Food Science & Technology*, 56(3), pp. 1076–1092. Available at: <https://doi.org/10.1111/ijfs.14684>.
- Tibamanya, F.Y., Henningsen, A. and Milanzi, M.A. (2022) 'Drivers of and barriers to adoption of improved sunflower varieties amongst smallholder farmers in Singida, Tanzania: A double-hurdle approach', *Q Open*, 2(1), p. qoac008. Available at: <https://doi.org/10.1093/qopen/qoac008>.
- Tirole, J. (1986) 'Hierarchies and bureaucracies: On the role of collusion in organizations', *The Journal of Law, Economics, and Organization*, 2(2), pp. 181–214.

- Tjernstrom, E. (2016) *Signals, Similarity and Seeds: Social Learning in the Presence of, Ferdi*. Available at: <https://ferdi.fr/publications/signals-similarity-and-seeds-social-learning-in-the-presence-of-imperfect-information-and-heterogeneity> (Accessed: 20 April 2025).
- Tufa, A., Alene, A., Ngoma, H., Marenja, P., Manda, J., Matin, M.A., Thierfelder, C. and Chikoye, D. (2024) 'Willingness to pay for agricultural mechanization services by smallholder farmers in Malawi', *Agribusiness*, 40(1), pp. 248–276. Available at: <https://doi.org/10.1002/agr.21841>.
- UBOS (2024a) 'National Population and Housing Census 2024'.
- UBOS (2024b) *Revised Quarterly Gross Domestic Product, 4th Quarter 2023/24 Press Release*. Available at: <https://www.ubos.org/explore-publications/> (Accessed: 21 October 2024).
- Valea, A.B. and Noufé, T. (2024) 'Gender gap in agricultural productivity: evidence from Burkina Faso', *International Journal of Social Economics*, ahead-of-print(ahead-of-print). Available at: <https://doi.org/10.1108/IJSE-11-2023-0923>.
- Van Campenhout, B., Spielman, D. and Lecoutere, E. (2018) 'The Role of Gender in ICT-mediated Agricultural Information Campaigns'. Available at: <https://doi.org/10.22004/ag.econ.277438>.
- Van Campenhout, B., Spielman, D.J. and Lecoutere, E. (2021) 'Information and Communication Technologies to Provide Agricultural Advice to Smallholder Farmers: Experimental Evidence from Uganda', *American Journal of Agricultural Economics*, 103(1), pp. 317–337. Available at: <https://doi.org/10.1002/ajae.12089>.
- Vasilaky, K.N. and Leonard, K.L. (2018) 'As Good as the Networks They Keep? Improving Outcomes through Weak Ties in Rural Uganda', *Economic Development and Cultural Change*, 66(4), pp. 755–792. Available at: <https://doi.org/10.1086/697430>.
- Welsh, M.P. and Poe, G.L. (1998) 'Elicitation Effects in Contingent Valuation: Comparisons to a Multiple Bounded Discrete Choice Approach', *Journal of Environmental Economics and Management*, 36(2), pp. 170–185. Available at: <https://doi.org/10.1006/jeem.1998.1043>.
- Wiggins, S., Glover, D. and Dorgan, A. (2021) 'Agricultural innovation for smallholders in sub-Saharan Africa', *DEGRP Synthesis Report* [Preprint]. Available at: <https://media.odi.org/documents/ODI-DEGRP-AgriculturalInnovation-Synthesis-Report-Final.pdf>.
- Witinok-Huber, R., Radil, S., Sarathchandra, D. and Nyaplue-Daywhea, C. (2021) 'Gender, place, and agricultural extension: a mixed-methods approach to understand farmer needs in Liberia', *The Journal of Agricultural Education and Extension*, 27(4), pp. 553–572. Available at: <https://doi.org/10.1080/1389224X.2021.1880453>.
- World Bank (2023) *Gender Gaps in Agriculture Productivity and Public Spending in Nigeria*. Washington, DC: World Bank. Available at: <https://doi.org/10.1596/40392>.
- Yada, B., Musana, P., Chelangat, D.M., Osaru, F., Anyanga, M.O., Katungisa, A., Oloka, B.M., Ssali, R.T. and Mugisa, I. (2023) 'Breeding Cultivars for Resistance to the African Sweetpotato Weevils, *Cylas puncticollis* and *Cylas brunneus*, in Uganda: A Review of the Current Progress', *Insects*, 14(11), p. 837. Available at: <https://doi.org/10.3390/insects14110837>.

Yegbemey, R.N., Adimi, E.B.O., Dassoundo-Assogba, J. and Djebbari, H. (2021) 'Contract Farming Can Bridge Knowledge and Productivity Gender Gaps: Evidence from an Experimental Study in Benin'. Available at: <https://policycommons.net/artifacts/2195354/contract-farming-can-bridge-knowledge-and-productivity-gender-gaps/2951708/> (Accessed: 18 June 2024).