

# Impact Assessments of Gender Transformative Interventions in Tanzania

## Pre-analysis plan

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**Abstract:** Transforming gender norms improves women’s wellbeing and may help close the agricultural productivity gap, yet evidence on pairing them with agriculture interventions is limited. We will test an innovative approach to developing and delivering gender transformative interventions with cassava producers in Tanzania. Using a cluster-randomized controlled trial, we examine the impact of these gender transformative interventions paired with standard agricultural service, compared to agricultural services alone, on the primary (gender norms, decision making, and women’s leadership) and secondary (agricultural productivity, women’s savings, and women’s access to land) outcomes. Qualitative methods will examine changes in intra-couple dynamics (communication, decision making, and division of labor).

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## 1. Introduction

Restrictive gender norms are a core cause of gender inequality in agrifood systems; reducing these restrictive norms may not only improve women's well-being but may also have wider benefits for agrifood systems and society as a whole (FAO et al., 2023). Increasing attention has been placed on the importance of gender transformative interventions for addressing structural constraints created by discriminatory social norms and gender-blind policies and laws in agrifood systems. Gender transformative interventions "include specific measures to change discriminatory social structures, sociocultural norms and gender relations to achieve more shared and equal power dynamics, decision-making and control of resources, as well as support for women's empowerment" (FAO et al., 2023, p. 40). While commonly deployed and tested in the public health sector (e.g., Sharma et al., 2020), gender transformative interventions are less often implemented in the agricultural sector.

According to Lecoutere et al. (2023), gender transformative interventions implemented in the agricultural sector are integrated within technical improvement programs for crops, livestock, and fisheries. They apply participatory action learning methods to enable critical reflection and action on the root causes of gender inequalities within agrifood systems, more equal attitudes toward women's involvement in decision-making and access to resources, and men's engagement in unpaid care work. Gender transformative interventions also aim to increase women's greater sense of self-worth and improved capacity to negotiate relationships. In Zambia, WorldFish and partners designed and piloted a gender transformative communication tool that consisted of drama skits that helped fishermen to reflect and act on norms and power relations in the value chain that create gender inequalities in post-harvest fish losses and waste and other fisheries-related outcomes (Cole et al., 2020). Njiru et al. (2024) piloted community dialogues and social media campaigns in an intervention that aimed to increase the uptake of livestock vaccines by women. However, to date, there is limited rigorous evidence on the impact of these interventions that is necessary to justify larger-scale investments in gender transformative interventions to increase gender equality, women's empowerment, and agricultural development outcomes (e.g., productivity and food security).

In collaboration with local partners, we aim to examine whether a gender transformative intervention in cassava production in Tanzania, improves gender attitudes, gender norms, women's decisionmaking, and adoption of agriculture practices and technologies. Specifically, we aim to address the following research questions:

- 1) What is the impact of gender transformative interventions **on gender norms and attitudes in agrifood systems, women's decision making in cassava production and value chains, and women's leadership in farmer organizations** when implemented in addition to a standard agriculture-focused intervention targeted to cassava farmer organizations?
- 2) What is the impact of gender transformative interventions **on the secondary outcomes of agricultural productivity, women's savings, and women's access to land** when implemented in addition to a standard agriculture-focused intervention targeted to cassava farmer organizations?
- 3) How do **dynamics between husbands and wives**, in particular discussions and decision making about cassava production and value chain participation, as well as a more equal division of labor, **change due to exposure to gender transformative interventions**?

## 2. Intervention

Using theory of change methodologies, the Gender Equality Initiative co-designed gender transformative (GT) interventions with partners who are implementing cassava-based agricultural development activities in Tanzania. The intervention was developed in two different regions: in Kigoma Region with Nyakitonto Youth for Development Tanzania (NYDT) and in Kagera Region with the Kolping Society of Tanzania (KST). The work started with measuring gender norms in the cassava agrifood systems in Tanzania (Seymour et al., 2023, 2024), which together with qualitative studies, enabled partners to identify where and how to intervene in the cassava agrifood systems to increase women's economic resilience (Mwakanyamale, Msita, Cole, et al., 2024). Based on these findings, tools such as training manuals, facilitator guides, and radio programs were developed to be used by development partners to engage with women and men cassava producers and other agrifood systems actors to critically reflect on and identify solutions to address the unequal gender norms and power relations that prohibit women from building economic resilience in the cassava agrifood systems. The GT intervention will be layered onto technical training on cassava technologies and good agronomic practices. Technical training on cassava technologies and good agronomic practices will be offered to all farm group members, both women and men, in both treatment and control groups.

In Kigoma Region the intervention aims to help transform gender norms that limit women's abilities to lead agricultural groups, interact with male extension agents, attend extension training, and make decisions about major expenditures (Mwakanyamale, Msita, & Mnyoroka, 2024). The intervention includes:

- 1) **Leadership and business skills trainings coupled with community dialogue sessions:** These capacity development trainings are conducted with women group members to increase their leadership and business skills. Business skills training and leadership development enhance women's confidence, technical competence, and visibility in cassava-related enterprises. In addition, community dialogue sessions on the importance of women in leadership positions in the cassava sector and in the broader agricultural sector explicitly challenge prevailing beliefs about "appropriate" roles for women. These sessions engage men, women, spouses, community leaders, and religious leaders in reflection and discussion. The dialogue sessions will also showcase case studies of women in group leadership positions within the cassava sector and the wider agricultural sector if needed, providing practical examples of successful women leadership. Through these discussions, community members will identify and propose solutions to increasing women's leadership opportunities in the cassava/agriculture sector. As women increasingly participate in trainings, demonstrate technical knowledge, and assume leadership roles within cooperatives, community perceptions begin to shift. These processes are expected to strengthen perceptions of women as capable leaders and economic actors in the cassava agrifood system, leading to an increase in women's leadership within cooperative groups and expanded participation in cassava business activities.
- 2) **Gender transformative dialogue sessions for inclusion in cassava-based training:** These sessions specifically address gender norms that limit women's decision-making power and restrict their ability to interact freely with male extension agents within the cassava agrifood system. Such norms constrain women's access to agricultural knowledge, improved technologies, and advisory services, resulting in lower levels of skills, knowledge, and extension support for women compared to men, and contributing to productivity gaps. Gender

transformative dialogue sessions enable households and communities to reflect on how restricting women's interaction with extension agents and limiting their involvement in decision making constrains their ability to access, purchase, or use cassava technologies, thereby undermining productivity. Over time, these engagements are expected to lead to increased adoption of improved cassava technologies and higher productivity among women.

In the Kagera Region, the intervention aims to help transform gender norms that limit women's access to and ownership of land for cassava production and other agrifood systems activities (Mwakanyamale, Msita, Shumbusho, et al., 2024a) and to take out financial loans and make decisions about major expenditures (Mwakanyamale, Msita, Shumbusho, et al., 2024b). The intervention includes:

1. **Radio programs and community dialogues** that discuss the challenges and opportunities that women face in accessing and owning agricultural land and coming up with solutions, via critical reflection and discussion, and action plans to increase women's ownership of land. Dialogue sessions will be conducted with men and women farmer group members, with married members encouraged to attend alongside their spouses. Community leaders and other influential figures, including religious leaders, will also be engaged to support broader norm change.
2. **Training on savings and lending, integrated with gender transformation dialogue sessions** on intra-household dynamics that limit women's abilities to make decisions on and use cassava technologies and practices and save money and access credit or loans. Savings and lending training strengthens women's financial literacy, while embedding discussions on gender norms within these activities builds women's confidence and capacity to engage with financial services. The dialogue sessions further challenge negative perceptions of women borrowing or operating cassava enterprises. Sessions focused on intra-household dynamics will enable married women and men group members to engage with their spouses in critical reflection and to develop action plans to increase women's decision-making powers and abilities to take out loans for purchase or use of cassava technologies and good agronomic practices. These sessions will involve men and women farmer group members together with their spouses.

In both regions, the dialogue sessions are expected to take place at least twice per month and will run for approximately one year, to accommodate the number of sessions and the delivery modality. The trainings and dialogue sessions will be facilitated by trained Village-based Agricultural Advisors and Farmer Field Facilitators, in collaboration with trained partner staff from NYDT and KST.

### 3. Evaluation design

#### 3.1. Randomization

The study design is a cluster-randomized controlled trial including a control and treatment group. The control group consists of village clusters that will receive a cassava-based intervention, while the treatment group will receive both a cassava-based intervention and the GT interventions. This design allows for a comparative analysis to determine the effectiveness and additional benefits of implementing GT interventions alongside agricultural interventions.

Village clusters were randomized into the two arms following the baseline survey. The randomization was done separately for the two regions and stratified by district in both. In Kigoma, there were 5 districts and 10 villages. Since every district had only two villages, in practice the randomization procedure meant randomly allocating one village to treatment and one to control in each district. In Kagera, there were similarly 5 districts, but the total number of villages was 44. Spatially, some villages were very close to one another, which led us to combine seven village pairs where villages were less than 2 kilometers apart. This resulted in a total number of 37 village clusters that then got randomized into treatment and control (with 3 to 16 clusters per district). In total, across the two regions, 47 village or village clusters were randomized into treatment and control groups. Randomization was conducted at the village cluster instead of farmer organization level to reduce spillovers from community level activities that are central to gender transformative interventions.

To achieve the best balance in baseline characteristics, we applied a re-randomization procedure: we constructed 100 different potential random allocations of the treatment arms, and then tested balance between the resulting treatment arms across nine household characteristics of interest: household head is female, respondent has a primary education or more, Food Insecurity Experience Scale score, injunctive norms around ownership of productive assets, number of cassava plots cultivated, first cassava plot being female-owned, past season's cassava yield from the first plot, decisions regarding purchasing technology are made by female(s), decisions regarding taking loans are made by female(s). For each allocation, we calculated the maximum t-statistic across the coefficients on the treatment variable from the nine regressions. We then chose the treatment allocation (of the 100) with the lowest maximum t-statistic.

### 3.2. Study sample

The study will be conducted in the Kagera and Kigoma regions, which are among the largest cassava-producing regions of Tanzania. The sample villages included in the study are all those that have farmer organizations that focus on cassava and work with the implementing partners. All farmers who belong to the farmers organizations are then included in the study.

### 3.3. Timeline

A baseline survey was conducted from November to December 2024. In a handful of villages, many farmers were not available in the first attempt, leading to a second attempt in September 2025. Implementation of activities began in July 2025 with a training of trainers. The endline survey is scheduled to be conducted in the summer 2026, approximately 9 months after intervention activities have begun.

### 3.4. Outcomes of interest

Table 1 summarizes the primary outcomes of interest for the trial. They include indicators for measuring gender attitudes, gender norms (both descriptive and injunctive), decisionmaking, and women's adoption of cassava agricultural practices and technologies. The measures of gender norms were developed, piloted, and validated in an earlier phase of the project (Seymour et al., 2023, 2024).

**Table 1: Primary outcomes of interest**

Domain	Indicator
<b>Gender attitudes<sup>1</sup></b>	8 indicators on attitudes that follow same structure as gender norms
<b>Gender norms descriptive<sup>2</sup></b>	8 indicators on descriptive norms: norms 1) Women borrowing alone; 2) Ownership of productive assets; 3) Group membership; 4) Decision roles in groups; 5) Leadership roles in groups; 6) Full engagement in extension services; 7) Control over earnings; 8) Technology adoption norm
<b>Gender norms injunctive<sup>3</sup></b>	8 indicators on injunctive norms: 1) Women borrowing alone; 2) Ownership of productive assets; 3) Group membership; 4) Decision roles in groups; 5) Leadership roles in groups; 6) Full engagement in extension services; 7) Control over earnings; 8) Technology adoption norm
<b>Decisionmaking</b>	Decisions regarding purchasing technology are made by female(s)
	Decisions regarding purchasing technology are made jointly by male(s) & female(s)
	Decisions regarding taking loans are made by female(s)
	Decisions regarding taking loans are made by jointly by male(s) and female(s)
<b>Adoption of cassava technology and practices</b>	Women’s adoption of cassava technologies defined as a total score across 14 different technologies

<sup>1</sup> Not assessed at baseline. Questions will be formulated as “Do you personally think is is appropriate for women in your community to ...?”

<sup>2</sup> Descriptive norms as assessed by asking, “Of the women who you know in your community, how many do you think...”

<sup>3</sup> Injunctive norms are assessed by asking, “How many people in your community do you think would agree with the following statement? It is inappropriate for women to...”

While we are also interested in outcomes related to women’s self-efficacy, savings and loans, women’s access to land, agricultural productivity, and food security, male adoption of technologies, we expect these may take more time to materialize but have included their measurement in the baseline/endline surveys as secondary outcomes. In addition, we plan to analyze take-up of trainings using both self-reports and monitoring data.

### 3.5. Power calculations

Power calculations were conducted primarily drawing on data from the baseline survey conducted for this trial and focusing on the primary outcomes enumerated in Table 1: gender norms, decisionmaking, and technology adoption. We estimate the minimum detectable effect (MDE) using the total number of village clusters in the trial and the average cluster size, accounting for intracluster correlation (ICC) and variation across cluster size. Power calculations were conducted in STATA using the “power” command, setting the desired statistical power as 80% and the significance level at 0.05.

In Table 2 we report the MDEs for the total sample. The MDEs for gender norms range from 0.179 standard deviations (SD) to 0.375 SD. With the exception of group membership (descriptive norm), these MDEs are generally considered to be small detectable effects. The MDE for women’s technology adoption is 0.336 and the MDEs on decisionmaking are around 7 percentage points (pp). For women deciding alone, the MDE of 7 pp corresponds to an increase of about 10% when compared to the control mean, while for joint decisions the MDE of 7 pp corresponds to an increase of about 37% compared to

the control mean. The larger ICC on group membership norms (descriptive) and women’s technology adoption drives the larger MDE.

**Table 2: Minimum Detectable Effects**

**Data from the baseline survey**

	Control mean	Control SD	ICC	MDD (SD or PP)	N
<b>Gender norms</b>					
Women borrowing alone: descriptive	2.916	0.843	0.051	0.252	1,904
Women borrowing alone: injunctive	1.933	1.046	0.032	0.224	1,904
Ownership of productive assets: descriptive	2.750	0.724	0.059	0.263	1,904
Ownership of productive assets: injunctive	1.399	0.897	0.049	0.249	1,904
Group membership: descriptive	1.686	0.735	0.168	0.375	1,904
Group membership: injunctive	1.127	0.827	0.012	0.186	1,904
Decision roles in groups: descriptive	2.256	0.786	0.009	0.179	1,904
Decision roles in groups: injunctive	1.327	0.834	0.013	0.189	1,904
Leadership roles in groups: descriptive	2.092	0.746	0.044	0.243	1,904
Leadership roles in groups: injunctive	1.171	0.846	0.018	0.199	1,904
Full engagement in extension services: descriptive	2.980	0.748	0.047	0.246	1,904
Full engagement in extension services: injunctive	1.557	1.013	0.024	0.209	1,904
Control over earnings: descriptive norm	2.578	0.852	0.018	0.200	1,904
Control over earnings: injunctive norm	1.508	1.022	0.015	0.193	1,904
Technology adoption norm: descriptive	1.848	1.013	0.020	0.203	1,904
Technology adoption norm: injunctive	1.217	0.972	0.032	0.224	1,904
<b>Technology adoption</b>					
Women's technology adoption practices	5.475	2.854	0.125	0.336	1,808
<b>Decisionmaking (binary)</b>					
Technology decisions: women decide	0.678		0.000	0.070	1,904
Technology decisions: joint decision	0.203		0.004	0.071	1,904
Loan decisions: women decide	0.686		0.000	0.069	1,904
Loan decisions: joint decision	0.188		0.003	0.068	1,904

Note: Minimal detectable effects are reported in standard deviations for continuous outcomes and percentage points for binary outcomes.

Appendix Table 1, reports the MDEs by region. The MDEs are higher when disaggregated by region, especially for Kigoma where there are fewer village clusters. The MDEs for gender norms for Kigoma range from 0.20 SD to 0.458 SD while they range from 0.189 SD to 0.315 SD for Kagera. Similarly, the MDE for women’s technology adoption for Kigoma is 0.535 while it’s 0.365 for Kagera. The MDEs for decisionmaking range around 9-11 pp for Kigoma while it ranges from 7 -8 pp for Kagera. Overall power calculations suggest that we will be power to detect small to medium size effects for most outcomes across both regions. The main exceptions are in Kigoma for women’s technology adoption practices, women borrowing alone (descriptive), and joint decisionmaking.

#### 4. Baseline data collection

The data collection team for the baseline survey consisted of IITA, KST and NYDT staff. Prior to the commencement of any data collection, a training of enumerators was conducted in-person from October 28–31, 2024, in Kigoma, with 18 enumerators (9 women and 9 men), and from November 14–18, 2024, in Kagera, with 20 enumerators (10 women and 10 men). The training covered research ethics,

survey techniques, and orientation to the specific procedures and tools for the study. The training included practice with the data collection tool and interview pretests.

A quantitative questionnaire was used to collect the baseline data. In addition to demographic information, the quantitative questionnaire covered modules on cassava production, processing, and trading; descriptive and injunctive norms; training on and use of cassava technologies and good agronomic practices and training on leadership skills. Other modules in the questionnaire included household assets, income, access to credit and finance, decision making, food insecurity experience scale, and self-efficacy. The quantitative tool was developed in English and then translated and administered in Kiswahili.

SurveyCTO was used by trained enumerators to collect the baseline data via tablets or smart phones. IITA IRB approval was obtained prior to conducting the baseline studies. The baseline study was approved on October 25, 2024, under the overall research ethics approval granted in 2022 (Approval No. IRB/004/2022). Informed consent was obtained prior to administering all baseline study questionnaires. Members of each FO congregated in a central meeting place and were interviewed individually in a private place nearby.

The baseline survey attempted to survey all farmers who were part of the cassava farmers organizations in the study villages. The sample sizes for the baseline survey were 781 households in Kigoma and 1123 households in Kagera for a total sample of 1904 households. At endline we will attempt to resurvey all baseline households.

## 5. Empirical analysis

### 5.1. Empirical specification

We will analyze the primary outcomes summarized above using an analysis of covariance (ANCOVA) estimation strategy (McKenzie, 2012). We will use the following specifications to assess the effect of the GT intervention:

$$Y_{ikd,t=1} = \beta T_{kd} + \gamma Y_{ikd,t=0} + X'_{ikd,t=0} \vartheta + \chi_d + \varepsilon_{ikd},$$

$Y_{ikd,t=1}$  captures the outcome of interest in household  $i$  residing in village  $k$  and district  $d$  at endline  $t$ , and  $Y_{ikd,t=0}$  corresponds to the same outcome measured at baseline.  $T_{kd}$  is a binary variable equal to one if the village is randomly assigned to treatment. The specification includes strata fixed effects (at the district level, captured in term  $\chi_d$ ) and standard errors clustered at the village cluster level. For any outcomes for which baseline data is not available, the same specification will be estimated to capture the simple difference. We plan to estimate equation 1 with and without baseline control variable  $X'_{ikd,t=0}$ . Baseline control variables include farmers' sex, age, education, household wealth (as measure by constructing an asset index) and income, and timing of the baseline survey. There will be no imputation for missing data due to item non-response at endline. Missing data on baseline variables will be set to zero and dummied out in the ANCOVA specifications.

We will address multiple hypothesis testing using two strategies. First, we will conduct indices within a family of outcomes (or domain) following Kling (2007). Second, we will report p-values corrected for

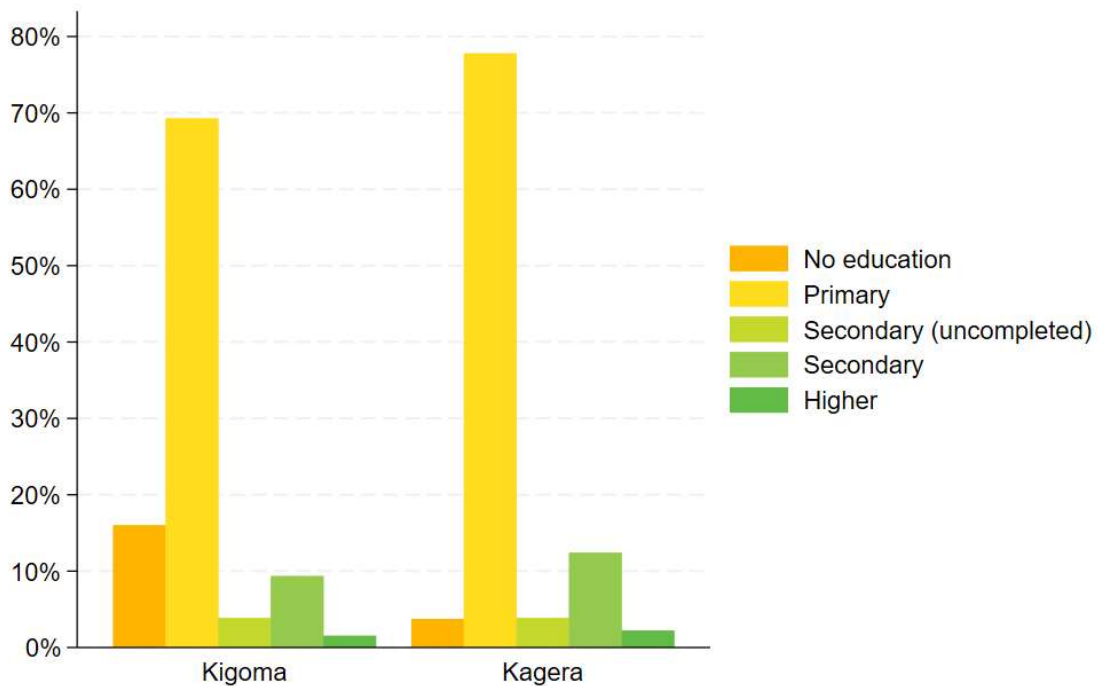
multiple hypothesis testing based on sharpened FDR (false discovery rate) q-values (Anderson, 2008). This correction will be implemented within each family of outcomes.

For the main analysis we plan to pool both regions together to maximize the power to detect impacts. However, we will also explore heterogeneity of impacts by region and by sex of farmer.

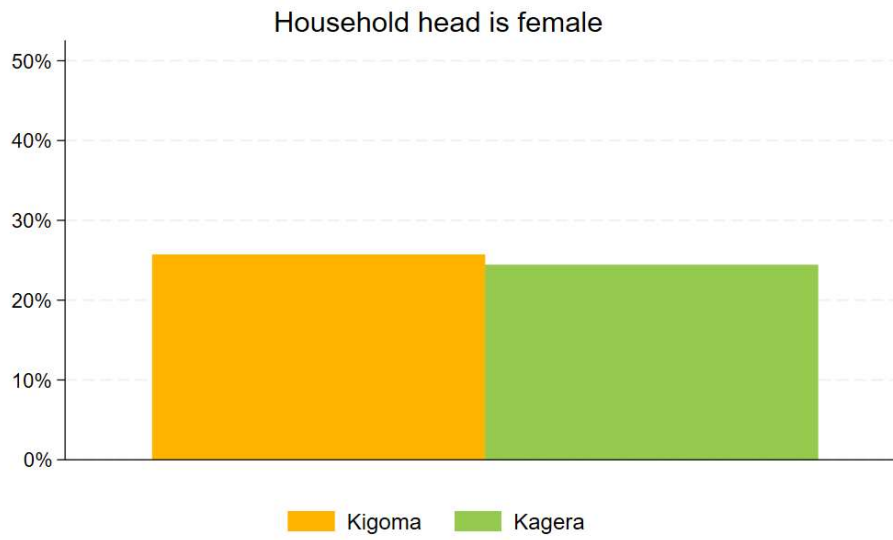
## 5.2. Baseline descriptive analysis

In the following figures, we describe the characteristics of respondents at baseline, including the differences between Kigoma and Kagera region. Nearly 70% of respondents in Kigoma and nearly 80% in Kagera attended primary school, and less than 20% in either region had attended secondary school or more (Figure 1). Approximately one-fourth of household heads are women in both regions (Figure 2). Incomes were slightly higher in Kigoma, compared to Kagera, where more households fell into the lowest income bracket and fewer into the higher two brackets (Figure 3). Experiences of food insecurity were generally low, with an average FIES score of approximately 2.5 in Kigoma and 1.5 in Kagera (Figure 4).

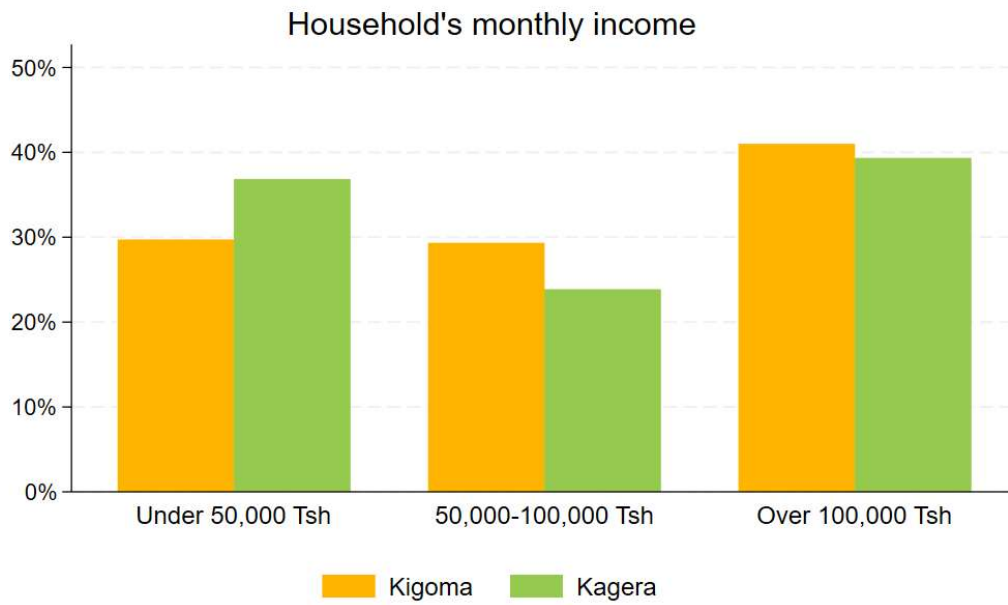
**Figure 1: Educational attainment of respondent at baseline**



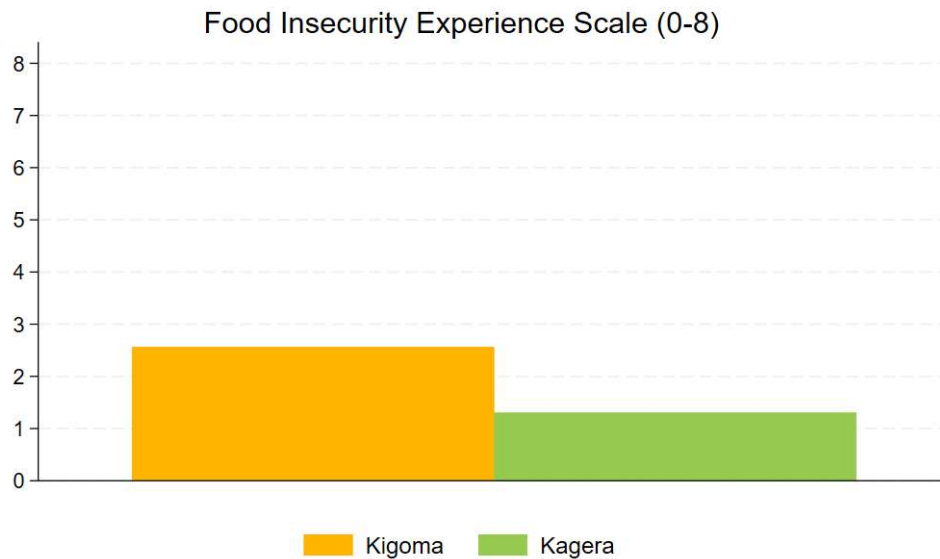
**Figure 2: Sex of household head at baseline**



**Figure 3: Household monthly income at baseline**



**Figure 4: Household food insecurity at baseline**



### 5.3. Baseline balance

We examine baseline balance across a wide range of outcomes. In general, we find no statistically significant differences by treatment arm, and mean differences are minimal across household characteristics (Table 3), financial services and decision making (Table 4), and characteristics of cassava cultivation (Table 5: Balance in characteristics of cassava cultivationTable 5). With regard to gender norms (Table 6), only one gender norm (descriptive norms around ownership of productive assets) shows a marginally significant difference (treatment: 2.79 vs. control: 2.72;  $p = 0.084$ ), and there is balance on the remaining gender norms.

We also examine baseline balance in each region (see Appendix Tables A2-A9). In Kagera (Tables A1–A4), we observe balance across most characteristics, but there are a few difference between treatment and control households. First, fewer treatment households fall in the 50,000–100,000 Tsh expenditure category (21% vs. 28%;  $p = 0.001$ ). There are also a few marginal differences in descriptive norms. In Kigoma (Tables A5–A8), there are several baseline differences. Treatment respondents are slightly older, and there are differences in women’s borrowing and informal savings, as well as in several descriptive and injunctive gender norms related to group membership and decision-making. Agricultural characteristics are well balanced.

**Table 3: Balance in baseline household characteristics**

	N	Mean and standard deviation			P-value
		All	Treatment	Control	
Respondent is female (1=yes, 0=no)	1,904	0.623 (0.485)	0.624 (0.485)	0.622 (0.485)	0.715
Respondent's age	1,904	48.313 (14.758)	48.817 (14.627)	47.905 (14.857)	0.475
Respondent has more than primary education	1,904	0.166 (0.373)	0.153 (0.360)	0.178 (0.382)	0.698
Household head is female	1,904	0.252 (0.434)	0.268 (0.443)	0.240 (0.427)	0.304
Household size	1,904	5.527 (2.355)	5.592 (2.500)	5.474 (2.231)	0.502
Household's monthly income is up to 50,000 Tsh	1,904	0.338 (0.473)	0.352 (0.478)	0.327 (0.469)	0.608
Household's monthly income is 50,000-100,000 Tsh	1,904	0.259 (0.438)	0.250 (0.433)	0.267 (0.443)	0.173
Household's monthly income is 100,000-200,000 Tsh	1,904	0.218 (0.413)	0.221 (0.415)	0.216 (0.412)	0.908
Household's monthly expenditure is up to 50,000 Tsh	1,904	0.432 (0.496)	0.444 (0.497)	0.423 (0.494)	0.939
Household's monthly expenditure is 50,000-100,000 Tsh	1,904	0.279 (0.449)	0.269 (0.444)	0.288 (0.453)	0.214
Household livestock assets index (PCA)	1,904	-0.000 (1.165)	-0.032 (1.176)	0.026 (1.157)	0.897
Household other assets index (PCA)	1,811	-0.000 (1.344)	-0.060 (1.364)	0.047 (1.326)	0.583
Food Insecurity Experience Scale, total score (0-8)	1,904	1.808 (2.481)	1.806 (2.453)	1.810 (2.505)	0.511
Moderate/Severe Food Insecurity	1,904	0.314 (0.464)	0.316 (0.465)	0.312 (0.463)	0.653

Notes: Summary statistics from the HER+ Social Norms baseline survey. Standard deviations are in parentheses. P-value is from the test of difference of means between the treatment arms. Standard errors are clustered at cluster level.

**Table 4: Balance in access to financial services & decision-making around it**

	N	Mean and standard deviation			P-value
		All	Treatment	Control	
Male borrowed money in past season	1,491	0.334 (0.472)	0.323 (0.468)	0.343 (0.475)	0.938
Female borrowed money in past season	1,808	0.403 (0.491)	0.397 (0.490)	0.408 (0.492)	0.569
Male saved money in formal institutions in past season	1,491	0.272 (0.445)	0.253 (0.435)	0.288 (0.453)	0.660
Female saved money in formal institutions in past season	1,808	0.211 (0.408)	0.199 (0.400)	0.221 (0.415)	0.641
Male saved money in informal institutions in past season	1,491	0.488 (0.500)	0.467 (0.499)	0.505 (0.500)	0.562
Female saved money in informal institutions in past season	1,808	0.671 (0.470)	0.667 (0.471)	0.675 (0.469)	0.965
Male has a mobile money account	1,491	0.901 (0.298)	0.894 (0.308)	0.907 (0.290)	0.684
Female has a mobile money account	1,808	0.864 (0.343)	0.854 (0.353)	0.872 (0.334)	0.714
Decisions regarding purchasing technology are made by female(s)	1,904	0.261 (0.439)	0.270 (0.444)	0.254 (0.435)	0.777
Decisions regarding purchasing technology are made jointly by male(s) & female(s)	1,904	0.343 (0.475)	0.329 (0.470)	0.356 (0.479)	0.519
Decisions regarding taking loans are made by female(s)	1,904	0.271 (0.445)	0.284 (0.451)	0.260 (0.439)	0.579
Decisions regarding taking loans are made jointly by male(s) & female(s)	1,904	0.339 (0.473)	0.326 (0.469)	0.349 (0.477)	0.559

Notes: Standard errors clustered at cluster level.

**Table 5: Balance in characteristics of cassava cultivation**

	N	Mean and standard deviation			P-value
		All	Treatment	Control	
Respondent owns agricultural land (solely or jointly)	1,904	0.868 (0.348)	0.872 (0.334)	0.865 (0.358)	0.775
How many cassava plots did the respondent cultivate during the 2022/2023 season?	1,904	1.150 (0.493)	1.144 (0.503)	1.155 (0.486)	0.901
First plot is female-owned	1,874	0.272 (0.445)	0.271 (0.445)	0.272 (0.445)	0.623
First plot is jointly owned	1,874	0.404 (0.491)	0.394 (0.489)	0.412 (0.493)	0.638
Main variety grown is a local variety	1,874	0.714 (0.452)	0.743 (0.437)	0.690 (0.463)	0.604
Yield from plot 1 (kg/ac)	1,874	2,116.967 (4,917.675)	2,204.009 (5,081.469)	2,046.103 (4,781.492)	0.842

Notes: Standard errors clustered at cluster level.

**Table 6: Balance in gender norms**

	N	Mean and standard deviation			P-value
		All	Treatment	Control	
Women borrowing alone: descriptive	1,904	2.916 (0.843)	2.924 (0.856)	2.909 (0.834)	0.992
Ownership of productive assets: descriptive	1,904	2.750 (0.724)	2.787 (0.698)	2.720 (0.744)	0.084*
Group membership: descriptive	1,904	1.686 (0.735)	1.664 (0.710)	1.704 (0.754)	0.463
Full engagement in extension services: descriptive	1,904	2.980 (0.748)	2.965 (0.747)	2.992 (0.750)	0.611
Decision roles in groups: descriptive	1,904	2.256 (0.786)	2.252 (0.782)	2.259 (0.789)	0.993
Leadership roles in groups: descriptive	1,904	2.092 (0.746)	2.075 (0.734)	2.106 (0.756)	0.720
Control over earnings: descriptive norm (single item)	1,904	2.578 (0.852)	2.570 (0.844)	2.585 (0.859)	0.902
Technology adoption norm: descriptive (single item)	1,904	1.848 (1.013)	1.819 (1.002)	1.871 (1.022)	0.193
Women borrowing alone: injunctive	1,904	1.933 (1.046)	1.955 (1.060)	1.916 (1.036)	0.233
Ownership of productive assets:	1,904	1.399	1.401	1.397	0.565

injunctive		(0.897)	(0.900)	(0.895)	
Group membership: injunctive	1,904	1.127	1.159	1.100	0.112
		(0.827)	(0.837)	(0.818)	
Full engagement in extension services: injunctive	1,904	1.557	1.560	1.555	0.993
		(1.013)	(1.032)	(0.998)	
Decision roles in groups: injunctive	1,904	1.327	1.362	1.299	0.100
		(0.834)	(0.832)	(0.836)	
Leadership roles in groups: injunctive	1,904	1.171	1.185	1.159	0.554
		(0.846)	(0.846)	(0.845)	
Control over earnings: injunctive norm (single item)	1,904	1.508	1.500	1.515	0.881
		(1.022)	(1.040)	(1.007)	
Technology adoption norm: descriptive (single item)	1,904	1.848	1.819	1.871	0.193
		(1.013)	(1.002)	(1.022)	

Notes: Standard errors clustered at cluster level.

#### 5.4. Qualitative investigation

The third research question on how spousal dynamics change as a result of exposure to the intervention will be addressed with complementary qualitative methods that are intended to be flexible and responsive to learning throughout the implementation period. We will systematically collect field notes during trainings, group meetings, and panel and dialogue sessions, to assess farmer attendance and participation, proposed solutions/actions, and lessons learned. In addition, couple profiles will be developed to understand how the interventions affect dynamics between husbands and wives, specifically discussions and decision making about cassava production and value chain participation and the division of labor. Thirty couples, across a range of couple types, according to the extent to which the follow restrictive norms will be identified and interviewed to develop the profiles before the gender transformative interventions begin. These couples will be interviewed intermittently across the intervention period to better understand if and how transformative change unfolds from their involvement in the interventions and in what ways. Notes and interview transcripts will be coded using inductive and deductive codes and analyzed to identify common trends and themes. The qualitative findings will be used to interpret quantitative results and to generate hypothesis for further analysis of the qualitative data.

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**Table A1: Minimum Detectable Effect, Tanzania by region**

	Kigoma					Kagera				
	Control mean	Control SD	ICC	MDD	N	Control mean	Control SD	ICC	MDD	N
<b>Gender norms</b>										
Women borrowing alone: descriptive	3.006	0.829	0.053	0.458	781	2.853	0.848	0.039	0.268	1,123
Women borrowing alone: injunctive	2.029	1.011	0.001	0.215	781	1.867	1.066	0.042	0.272	1,123
Ownership of productive assets: descriptive	2.620	0.789	0.022	0.333	781	2.840	0.661	0.059	0.298	1,123
Ownership of productive assets: injunctive	1.414	0.874	0.015	0.300	781	1.389	0.912	0.071	0.315	1,123
Group membership: descriptive	1.358	0.598	0.009	0.267	781	1.915	0.735	0.038	0.265	1,123
Group membership: injunctive	1.116	0.844	0.006	0.250	781	1.134	0.815	0.018	0.229	1,123
Decision roles in groups: descriptive	2.177	0.776	0.000	0.203	781	2.310	0.788	0.005	0.198	1,123
Decision roles in groups: injunctive	1.375	0.821	0.008	0.257	781	1.294	0.843	0.014	0.220	1,123
Leadership roles in groups: descriptive	1.965	0.750	0.008	0.263	781	2.181	0.731	0.038	0.265	1,123
Leadership roles in groups: injunctive	1.167	0.848	0.007	0.257	781	1.173	0.844	0.028	0.248	1,123
Full engagement in extension services: descriptive	3.058	0.744	0.004	0.234	781	2.926	0.747	0.065	0.306	1,123
Full engagement in extension services: injunctive	1.693	1.043	0.000	0.203	781	1.463	0.982	0.022	0.237	1,123
Control over earnings: descriptive norm (single item)	2.603	0.869	0.033	0.383	781	2.561	0.840	0.010	0.211	1,123
Control over earnings: injunctive norm (single item)	1.551	1.014	0.011	0.276	781	1.479	1.027	0.018	0.228	1,123
Technology adoption norm: descriptive (single item)	1.700	0.997	0.013	0.289	781	1.950	1.012	0.001	0.189	1,123
Technology adoption norm: injunctive (single item)	1.113	0.931	0.004	0.234	781	1.289	0.994	0.036	0.263	1,123
<b>Technology adoption</b>										
Women's adoption practices	4.922	2.430	0.078	0.535	756	5.873	3.063	0.111	0.364	1,052
<b>Decisionmaking (binary)</b>										
Technology decisions: women decide	0.695		0.000	0.089	781	0.665		0.000	0.084	1,123
Technology decisions: joint decision	0.215		0.007	0.113	781	0.195		0.003	0.082	1,123
Loan decisions: women decide	0.667		0.000	0.092	781	0.699		0.000	0.081	1,123
Loan decisions: joint decision	0.227		0.001	0.095	781	0.161		0.000	0.073	1,123

**Table A2: Balance in baseline household characteristics  
Kagera**

	N	Mean and standard deviation			P-value
		All	Treatment	Control	
Respondent is female (1=yes, 0=no)	1,123	0.550 (0.498)	0.566 (0.496)	0.538 (0.499)	0.552
Respondent's age	1,123	52.423 (13.789)	52.566 (13.498)	52.315 (14.013)	0.860
Respondent has more than primary education	1,123	0.180 (0.384)	0.166 (0.372)	0.190 (0.393)	0.774
Household head is female	1,123	0.248 (0.432)	0.266 (0.442)	0.236 (0.425)	0.406
Household size	1,123	5.111 (2.179)	5.025 (2.197)	5.176 (2.164)	0.289
Household's monthly income is up to 50,000 Tsh	1,123	0.367 (0.482)	0.367 (0.483)	0.367 (0.482)	0.768
Household's monthly income is 50,000-100,000 Tsh	1,123	0.236 (0.425)	0.226 (0.419)	0.243 (0.429)	0.372
Household's monthly income is 100,000-200,000 Tsh	1,123	0.195 (0.396)	0.207 (0.406)	0.186 (0.389)	0.457
Household's monthly expenditure is up to 50,000 Tsh	1,123	0.403 (0.491)	0.415 (0.493)	0.395 (0.489)	0.980
Household's monthly expenditure is 50,000-100,000 Tsh	1,123	0.251 (0.434)	0.212 (0.409)	0.281 (0.450)	0.001***
Household livestock assets index (PCA)	1,123	0.000 (1.150)	-0.008 (1.166)	0.006 (1.139)	0.848
Household other assets index (PCA)	1,030	-0.000 (1.379)	-0.062 (1.393)	0.044 (1.368)	0.846
Food Insecurity Experience Scale, total score (0-8)	1,123	1.283 (2.118)	1.309 (2.108)	1.264 (2.127)	0.887
Moderate/Severe Food Insecurity	1,123	0.212 (0.409)	0.207 (0.406)	0.215 (0.411)	0.568

Notes: Summary statistics from the HER+ Social Norms baseline survey. Standard deviations are in parentheses. P-value is from the test of difference of means between the treatment arms. Standard errors are clustered at cluster level.

**Table A3: Balance in access to financial services & decision-making around it  
Kagera**

	N	Mean and standard deviation			P-value
		All	Treatment	Control	
Male borrowed money in past season	873	0.369 (0.483)	0.364 (0.482)	0.373 (0.484)	0.784
Female borrowed money in past season	1,052	0.345 (0.476)	0.364 (0.482)	0.331 (0.471)	0.400
Male saved money in formal institutions in past season	873	0.348 (0.477)	0.311 (0.464)	0.375 (0.484)	0.270
Female saved money in formal institutions in past season	1,052	0.265 (0.442)	0.248 (0.433)	0.278 (0.448)	0.696
Male saved money in informal institutions in past season	873	0.549 (0.498)	0.570 (0.496)	0.533 (0.499)	0.239
Female saved money in informal institutions in past season	1,052	0.620 (0.486)	0.636 (0.482)	0.607 (0.489)	0.242
Male has a mobile money account	873	0.904 (0.295)	0.887 (0.317)	0.916 (0.278)	0.205
Female has a mobile money account	1,052	0.889 (0.315)	0.889 (0.314)	0.889 (0.315)	0.822
Decisions regarding purchasing technology are made by female(s)	1,123	0.271 (0.445)	0.286 (0.453)	0.259 (0.438)	0.429
Decisions regarding purchasing technology are made jointly by male(s) & female(s)	1,123	0.370 (0.483)	0.351 (0.478)	0.385 (0.487)	0.354
Decisions regarding taking loans are made by female(s)	1,123	0.281 (0.450)	0.293 (0.455)	0.273 (0.446)	0.619
Decisions regarding taking loans are made jointly by male(s) & female(s)	1,123	0.361 (0.480)	0.346 (0.476)	0.371 (0.484)	0.483

Notes: Standard errors clustered at cluster level.

**Table A4: Balance in characteristics of cassava cultivation  
Kagera**

	N	Mean and standard deviation			P-value
		All	Treatment	Control	
Respondent owns agricultural land (solely or jointly)	1,123	0.854 (0.368)	0.853 (0.355)	0.855 (0.378)	0.887
How many cassava plots did the respondent cultivate during the 2022/2023 season?	1,123	1.109 (0.453)	1.095 (0.427)	1.119 (0.473)	0.926
First plot is female-owned	1,093	0.240 (0.427)	0.234 (0.424)	0.244 (0.430)	0.761
First plot is jointly owned	1,093	0.362 (0.481)	0.344 (0.476)	0.376 (0.485)	0.361
Main variety grown is a local variety	1,093	0.692 (0.462)	0.718 (0.451)	0.672 (0.470)	0.564
Yield from plot 1 (kg/ac)	1,093	605.479 (2,411.194)	610.099 (2,238.386)	601.980 (2,536.002)	0.735

Notes: Standard errors clustered at cluster level.

**Table A5: Balance in gender norms  
Kagera**

	N	Mean and standard deviation			P-value
		All	Treatment	Control	
Women borrowing alone: descriptive	1,123	2.853 (0.848)	2.817 (0.895)	2.879 (0.810)	0.390
Ownership of productive assets: descriptive	1,123	2.840 (0.661)	2.860 (0.639)	2.825 (0.678)	0.491
Group membership: descriptive	1,123	1.915 (0.735)	1.858 (0.709)	1.957 (0.751)	0.084*
Full engagement in extension services: descriptive	1,123	2.926 (0.747)	2.902 (0.757)	2.943 (0.739)	0.751
Decision roles in groups: descriptive	1,123	2.310 (0.788)	2.279 (0.806)	2.333 (0.774)	0.224
Leadership roles in groups: descriptive	1,123	2.181	2.122	2.225	0.130

Control over earnings: descriptive norm (single item)	1,123	(0.731) 2.561	(0.728) 2.539	(0.731) 2.577	0.530
Technology adoption norm: descriptive (single item)	1,123	(0.840) 1.950	(0.845) 1.900	(0.837) 1.988	0.035**
Women borrowing alone: injunctive	1,123	(1.012) 1.867	(1.025) 1.882	(1.001) 1.856	0.460
Ownership of productive assets: injunctive	1,123	(1.066) 1.389	(1.081) 1.373	(1.055) 1.401	0.924
Group membership: injunctive	1,123	(0.912) 1.134	(0.933) 1.143	(0.897) 1.127	0.869
Full engagement in extension services: injunctive	1,123	(0.815) 1.463	(0.842) 1.453	(0.795) 1.470	0.760
Decision roles in groups: injunctive	1,123	(0.982) 1.294	(1.014) 1.295	(0.958) 1.293	0.952
Leadership roles in groups: injunctive	1,123	(0.843) 1.173	(0.861) 1.161	(0.829) 1.183	0.706
Control over earnings: injunctive norm (single item)	1,123	(0.844) 1.479	(0.870) 1.477	(0.824) 1.480	0.805
Technology adoption norm: injunctive (single item)	1,123	(1.027) 1.289	(1.056) 1.266	(1.005) 1.307	0.693
		(0.994)	(1.013)	(0.980)	

Notes: Standard errors clustered at cluster level.

**Table A6: Balance in baseline household characteristics  
Kigoma**

	N	Mean and standard deviation			P-value
		All	Treatment	Control	
Respondent is female (1=yes, 0=no)	781	0.727 (0.446)	0.700 (0.459)	0.752 (0.432)	0.307
Respondent's age	781	42.403 (14.092)	43.932 (14.617)	41.027 (13.472)	0.063*
Respondent has more than primary education	781	0.147 (0.355)	0.135 (0.342)	0.158 (0.365)	0.808
Household head is female	781	0.257	0.270	0.246	0.569

A016	781	(0.437) 6.124 (2.470)	(0.445) 6.330 (2.675)	(0.431) 5.939 (2.256)	0.288
Household's monthly income is up to 50,000 Tsh	781	0.297 (0.457)	0.332 (0.472)	0.265 (0.442)	0.061*
Household's monthly income is 50,000-100,000 Tsh	781	0.293 (0.456)	0.281 (0.450)	0.304 (0.461)	0.330
Household's monthly income is 100,000-200,000 Tsh	781	0.251 (0.434)	0.238 (0.426)	0.263 (0.441)	0.573
Household's monthly expenditure is up to 50,000 Tsh	781	0.474 (0.500)	0.481 (0.500)	0.467 (0.500)	0.919
Household's monthly expenditure is 50,000-100,000 Tsh	781	0.320 (0.467)	0.343 (0.475)	0.299 (0.458)	0.085*
Household livestock assets index (PCA)	781	-0.000 (1.177)	-0.040 (1.038)	0.036 (1.290)	0.674
Household other assets index (PCA)	781	-0.000 (1.335)	-0.035 (1.414)	0.032 (1.259)	0.675
Food Insecurity Experience Scale, total score (0-8)	781	2.563 (2.756)	2.454 (2.709)	2.662 (2.797)	0.447
Moderate/Severe Food Insecurity	781	0.460 (0.499)	0.457 (0.499)	0.462 (0.499)	0.927

Notes: Summary statistics from the HER+ Social Norms baseline survey. Standard deviations are in parentheses. P-value is from the test of difference of means between the treatment arms. Standard errors are clustered at cluster level.

**Table A7: Balance in access to financial services & decision-making around it  
Kigoma**

	N	Mean and standard deviation			P-value
		All	Treatment	Control	
Male borrowed money in past season	618	0.285 (0.452)	0.273 (0.446)	0.296 (0.457)	0.508
Female borrowed money in past season	756	0.484 (0.500)	0.439 (0.497)	0.525 (0.500)	0.001***
Male saved money in formal institutions in past season	618	0.165 (0.372)	0.182 (0.386)	0.150 (0.357)	0.606
Female saved money in formal institutions in past season	756	0.136 (0.343)	0.137 (0.344)	0.136 (0.343)	0.811
Male saved money in informal institutions in past season	618	0.403 (0.491)	0.340 (0.475)	0.461 (0.499)	0.004***
Female saved money in informal institutions in past season	756	0.743 (0.437)	0.707 (0.456)	0.776 (0.417)	0.002***
Male has a mobile money account	618	0.898	0.902	0.894	0.509

Female has a mobile money account	756	(0.303) 0.829	(0.297) 0.810	(0.308) 0.847	0.583
Decisions regarding purchasing technology are made by female(s)	781	(0.376) 0.247	(0.393) 0.249	(0.361) 0.246	0.674
Decisions regarding purchasing technology are made jointly by male(s) & female(s)	781	(0.432) 0.305	(0.433) 0.300	(0.431) 0.309	0.783
Decisions regarding taking loans are made by female(s)	781	(0.461) 0.256	(0.459) 0.273	(0.463) 0.241	0.794
Decisions regarding taking loans are made jointly by male(s) & female(s)	781	(0.437) 0.307	(0.446) 0.300	(0.428) 0.314	0.916
		(0.462)	(0.459)	(0.465)	

Notes: Standard errors are clustered at the cluster level.

**Table A8: Balance in characteristics of cassava cultivation  
Kigoma**

	N	Mean and standard deviation			P-value
		All	Treatment	Control	
Respondent owns agricultural land (solely or jointly)	781	0.889 (0.315)	0.897 (0.304)	0.881 (0.324)	0.450
How many cassava plots did the respondent cultivate during the 2022/2023 season?	781	1.210 (0.540)	1.208 (0.582)	1.212 (0.500)	0.933
First plot is female-owned	781	0.316 (0.465)	0.319 (0.467)	0.314 (0.465)	0.717
First plot is jointly owned	781	0.462 (0.499)	0.457 (0.499)	0.467 (0.500)	0.692
Main variety grown is a local variety	781	0.745 (0.436)	0.776 (0.418)	0.718 (0.451)	0.800
Yield from plot 1 (kg/ac)	781	4,260.047 (6,874.089)	4,278.077 (7,244.818)	4,243.815 (6,531.228)	0.910

Notes: Standard errors are clustered at the cluster level.

**Table A9: Balance in gender norms  
Kigoma**

	N	Mean and standard deviation			P-value
		All	Treatment	Control	
Women borrowing alone: descriptive	781	3.006 (0.829)	3.064 (0.780)	2.955 (0.868)	0.278
Ownership of productive assets: descriptive	781	2.620 (0.789)	2.692 (0.758)	2.556 (0.812)	0.047**
Group membership: descriptive	781	1.358 (0.598)	1.412 (0.627)	1.309 (0.567)	0.003***
Full engagement in extension services: descriptive	781	3.058 (0.744)	3.046 (0.725)	3.069 (0.762)	0.597
Decision roles in groups: descriptive	781	2.177 (0.776)	2.216 (0.749)	2.142 (0.799)	0.060*
Leadership roles in groups: descriptive	781	1.965 (0.750)	2.014 (0.738)	1.921 (0.759)	0.145
Control over earnings: descriptive norm (single item)	781	2.603 (0.869)	2.611 (0.843)	2.596 (0.893)	0.593
Technology adoption norm: descriptive (single item)	781	1.700 (0.997)	1.714 (0.962)	1.689 (1.029)	0.146
Women borrowing alone: injunctive	781	2.029 (1.011)	2.050 (1.025)	2.010 (0.999)	0.191
Ownership of productive assets: injunctive	781	1.414 (0.874)	1.438 (0.855)	1.392 (0.892)	0.334
Group membership: injunctive	781	1.116 (0.844)	1.180 (0.833)	1.058 (0.851)	0.009***
Full engagement in extension services: injunctive	781	1.693 (1.043)	1.700 (1.041)	1.686 (1.045)	0.538
Decision roles in groups: injunctive	781	1.375 (0.821)	1.449 (0.787)	1.308 (0.846)	0.005***
Leadership roles in groups: injunctive	781	1.167 (0.848)	1.218 (0.814)	1.122 (0.877)	0.072*
Control over earnings: injunctive norm (single item)	781	1.551 (1.014)	1.530 (1.020)	1.569 (1.008)	0.893
Technology adoption norm: injunctive (single item)	781	1.113 (0.931)	1.132 (0.914)	1.095 (0.946)	0.497

Notes: Standard errors are clustered at the cluster level.

