Farm and Family Balance Project: Pre-Analysis Plan

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Note: This pre-analysis plan was written after the project interventions were completed. Some analysis of baseline data, project take-up, and midline data had already occurred. Endline data collection was completed, but researchers did not have access to the data prior to developing this document. See attached letter (Appendix A). As such, the pre-analysis plan considers only analysis of endline data.

1. Introduction

As more farming households in developing countries transition to the production of high-value cash crops, increasing attention is being paid to ensuring women's integration into these lucrative value chains and to improving returns to women's production efforts. A wide range of studies have found that while cash cropping increases household income, the majority of this new income remains controlled by men. Though women provide labor for cash crops, in many cases men perform all the market-facing activities. Such a gender imbalance poses two main problems. First, when men control the income generated by the production of cash crops, women may have fewer incentives to contribute to household production. Second, men may be less likely to spend money on household food security, nutrition, and health than women (Duflo, 2003; Quisumbing, 2003; Qian, 2008). Thus, the gender imbalance in cash cropping, particularly in terms of who controls the income generated, may help explain why increases in income as a result of cash crop production do not always translate into improved household welfare (von Braun et al., 1989; von Braun, 1988; Rubin and Webb, 1988; von Braun and Immink, 1990; Kennedy and Cogill, 1987; Kennedy and Cogill, 1988; Kennedy, 1989).

Despite the importance of integrating women into value chains, however, little rigorous evidence exists regarding which interventions can actually help accomplish this goal. This project tests two approaches to increasing women's integration into and returns from cash crop value chains. We aim to determine whether these interventions affect intrahousehold allocation of resources, decision-making power, consumption and investment, productivity of the cash crop at the household level, and success of contract fulfillment for the buyer of the crop.

2. Context and Sample

The Farm and Family Balance research team partnered with Kakira Sugar Limited (KSL), the largest sugarcane processing company in Uganda, with around 2,400 smallholder farming households that sell to this processor. In this arrangement, farmers sign contracts to sell their cane to the processor and can receive advances against their final sales in the form of inputs, land preparation services, and cash. While the company has no specific policy regarding gender, the vast majority of its contracts are signed with men.

To be included in the study, households had to meet the following eligibility criteria

- Household on list of registered KSL farmers
- Household head is a married man
- Household head holds at least one sugarcane block registered to KSL or not registered to any company
- Household head has no outstanding liens against his cane

Eligible households were determined through a brief eligibility survey, enrolled in the study, and participated in a baseline survey.

3. Interventions

Following the baseline survey, households were randomly assigned in a 2X2 design to receive one, both, or neither of two interventions.

The first intervention consisted of a three-day, couples-based Family Vision Workshop focusing on communication and cooperation between spouses, gender sensitivity, and women's participation in cash cropping. The workshops may impact family behavior on their own and should also increase take-up of the second intervention.

The second intervention encouraged male heads of household to either transfer an existing sugarcane contract to their wife or to allow their wife to register a new contract in her own name. Holding a contract directly involves a woman in the market-facing activities of sugarcane farming and the management of production activities on the contracted cane plots. It additionally allows her to receive inputs on credit and directly receive cash advances and the final payment from the processor.

Randomization was stratified on polygamy, tenure of marriage, wife literacy, number of blocks, an experimental measure of household efficiency, and an experimental measure of differences in household resource allocation preferences. Approximately one-quarter of households received only the workshop intervention, one-quarter received only the contract intervention, one-quarter received both, and one-quarter comprised the control group.

4. Household level outcomes from survey data

Here we describe the outcomes to be analyzed. Outcomes are organized as primary, secondary, and tertiary, based on their hypothesized location on the impact pathway. In other words, the interventions are hypothesized to have a direct impact on primary outcomes, the secondary outcomes are impacted by the primary outcomes, and the tertiary outcomes by the secondary outcomes. Please see the attached theory of change demonstrating these channels.

For some, but not all, of these outcomes, we have comparable midline indicators available. When available, we will include analysis of the midline indicators. However, we do not prespecify these here as the midline data was available to us at the time this document was written.

Note: within each outcome level (primary, etc) there are multiple constructs. Within each construct there are multiple outcomes. We will use q-values within constructs but not across constructs.

4.1. Primary outcomes

Women's ownership of sugarcane blocks

The following indicators will measure women's cane ownership:

- Woman has active block registered
- Total active blocks registered to woman out of total registered by household

Women's management of sugarcane

The following indicators will measure women's cane management:

- Woman is primary manager of any block
- Woman participates in any management activity for sugarcane
- Number of management activities woman participates in

- Number of correct questions in cane knowledge section
- Women's decision making in production of cane and sales of cane

Women's financial inclusion

The following indicators will measure financial inclusion:

- Woman has bank account
- Woman has active bank account
- Woman has requested loan
- Woman has received loan
- Total loaned
- Woman has outstanding loan
- Total outstanding loan balance

4.2. Secondary outcomes

The outcomes detailed in this section are secondary, or midstream outcomes. We expect impacts in these areas as a result of changes in the primary outcomes listed above.

Time spent on sugarcane

The following indicators will be used to measure time and effort on sugarcane. These outcomes are available for both male and female respondents, allowing us to study whether men's labor decreased on the sugar plots.

- Self-reported assessment of sugarcane effort relative to spouse
- Self-reported assessment of sugarcane effort relative to other crops
- Self-reported assessment of whether sugarcane work affects work on other crops
- Time spent working on sugar cane
- Number of physical activities related to sugarcane

Time spent on non-sugar activities

We also consider whether shifts to sugarcane have impacted effort on other crops and labor supply in other areas. We also consider impacts on other household activities and leisure time.

- Time spent working on non-sugarcane income-generating activities: other crops, wage work, and household enterprises
- Time spent on fetching firewood and home management.
- Time spent on leisure.
- Number of physical activities related to non-cane crops

Other cane inputs

Female control of sugar cane blocks may lead to changes in the inputs allocated to blocks controlled by women compared to blocks controlled by men.

- Land preparation for new blocks: family labor, spending on hired labor, spending on machinery/animals
- Planting new blocks: spending on seed cane, family labor, spending on hired labor
- Fertilizer in past 12 months
- Pesticides or herbicides in past 12 months
- Weeding and other cultivation activities in past 12 months
- Family labor, spending on hired labor in past 12 months

- Age of cane at harvest

Women's access to resources

Female control of sugar cane blocks may increase women's access to resources.

- Income earned by women from cane blocks
- Cash advances to women from cane blocks
- Women's self-reported access to payments from own blocks
- Women's self-reported access to payments from husband's blocks
- Control over land use
- Expenditures on personal items (clothing, beauty products, tobacco and alcohol, family gifts)
- Ratio of female personal expenditures to male personal expenditures
- Ask husband's permission to use money

Women's decision-making power

We will conduct three decision making indices. For each component of each index we will create an indicator that is one if the woman reports more than the median amount of decision-making power for that variable. Then we will calculate the percentage of categories for which the woman is above median for each index. The decision-making indices are as follows:

- **Money:** How to earn money, use of money you earn, use of money your husband earns, making major household purchases, everyday household purchases, decisions about household enterprise profits, own sugarcane payments, spouse sugarcane payments
- **Household management:** Own health care, children's health care, limit the number of children you have, visits to your family or relatives, allocate household responsibilities
- **Agriculture:** By crop production decisions, by crop harvesting or sales decisions, use of agricultural land. For this index, we will first conduct indices for the by-crop production decisions and the by crop harvesting and sales decisions. We will then conduct a summary index of these two measures, plus the use of agricultural land.

4.3. Tertiary outcomes

The following are hypothesized downstream outcomes of the project.

Production activities: sugar

Changes to control of the sugar plots, labor supply, and other inputs can affect production of sugarcane.

- Land dedicated to sugarcane
- Land for sugarcane increased in last 12 months
- Sugarcane quantity sold in last 12 months: overall and by gender
- Sugarcane quantity sold since intervention: overall and by gender
- Sugarcane value sold in last 12 months: overall and by gender
- Sugarcane value sold since intervention: overall and by gender

Production activities: non-sugar

- Land for food crops
- Land for other non-food crops
- Land for food, non-food crops increased in last 12 months
- Total production of other crops
- Total amount sold of other crops

- Profits from non-ag enterprises

Household expenditures

Changes to control of household income can affect how the income is spent.

- Total health expenditure
- Total health expenditure for children
- Total health expenditure for wife
- Sought treatment for a sick child in the past 2 weeks
- School enrollment for girls and boys
- Skipping school terms for girls and boys
- Spending on education for girls and boys

Household welfare

- Food security score
- Coping strategies index[1]
- Child sick in past two weeks
- Child with diarrhea in past two weeks

Women's assets

Increased female control of income can increase women's asset ownership.

- Wife's ownership of land
- Wife's savings balance

Women's empowerment

Women's block ownership may increase her empowerment more generally. The workshop intervention can also act to change empowerment. We study the following indicators.

- Intimate partner violence index (survey section 5.4 questions 1-5
- Frequency of IPV last year (female and male reported)
- Ever regular IPV (female reported)
- Self-esteem index (survey section 4.4 question 1-10)
- Self-confidence index (survey section 4.4 question 11-16)
- Group membership
- Life satisfaction index (survey section 5.2)

Marital quality and gender norms

- Marital quality index (survey section 5.3)
- Gender norms index (survey section 5.1)

5. Additional outcomes

5.1. Household outcomes from administrative data

In addition to our main analysis using the survey data, we have administrative data from the sugar company. We can identify all men through the farmer ID codes, and all women who were registered as part of the intervention. While the number of women registered with the company outside of the intervention was very small, we will conduct a matching exercise using names and locations to match

[1] The food security score and the coping strategies index will be conducted as described in Beegle, Galasso, and Goldberg (2017).

women in the control group and other women in the treatment group with the administrative data, as some of them may have registered with the company outside of the intervention.

We can examine the following individual-level outcomes from the administrative data:

- Sales to company
- Blocks registered with company (at different points in time)
- Cash advances received from company
- Other inputs received from company
- Age of cane at harvest

5.2. Company outcomes

We additionally examine whether the intervention resulted in benefits to the cane company. We will examine the following outcomes.

- Land under cane registered to company (per HH)
- Cane production sold to company (per HH)
- Blocks diverted (administrative data)

6. Analysis and inference

6.1. Estimating treatment impact

All regressions in the paper will follow the same two basic specifications. When we have male and female responses for the same question, the analysis will be run separately by gender. First we examine the main impact of the contract intervention through the following regression:

$$(1) \qquad Y_i = \alpha + \beta_C Contract_i + \beta_W Workshop_i + \theta_{SC} + \varepsilon_i$$

Y_i is the outcome for individual (or household) i. $Contract_i$ and $Workshop_i$ are indicators for being assigned to the contract and workshop interventions respectively. θ_{SC} are stratification cell fixed effects and ε_i is an error term. We will test whether β_C is equal to zero. Although the main focus of this paper is the contract intervention, we will also report the test on whether β_W is equal to zero.

The interaction of the two interventions is also of interest. We will run the following specification to examine the independent impact of each intervention, and the impact of receiving both.

$$(2)\ Y_i = \alpha + \beta_C ContractOnly_i + \beta_W WorkshopOnly_i + \beta_{CW} Contract\&Workshop_i + \theta_{SC} + \varepsilon_i$$

We will test whether each of the coefficients is equal to zero. Also of potential interest is whether $\beta_C + \beta_w$ is equal to β_{CW}. However, this comparison may be confounded by the differences in take-up of the contract intervention between those who received the workshop and those who did not. If the results are suggestive of a multiplicative effect, we will explore a bounding exercise to estimate the portion of the effect due to take-up differences.

6.2. Heterogeneity analysis

We expect the project interventions to have differential impact on certain types of households. As such we will examine the heterogeneity of impact on primary outcomes by the following measures, all of which were part of the randomization stratification protocol. If heterogeneity is identified in primary impacts, we will also test for heterogeneity in secondary impacts.

- *Polygamy:* Household structure is different in polygamous and monogamous households. Shifting cane ownership to one wife may be less effective at increasing her involvement in polygamous households, compared to monogamous household.
- *Wife literacy:* More educated wives may be better equipped to manage sugar cane plots effectively.
- *Experimental measure of efficiency in intrahousehold allocation:* At baseline, husbands and wives participated in incentivized decision-making activities. In one exercise, they chose who they preferred to control money, even when allocations were unequal. Households are deemed "selfishly inefficient" when either the husband or wife is willing to give up money to control it themselves.
- *Experiment measure of differences in allocation preferences:* Husbands and wives both decide how to allocate a sum of money between the two. This variable is defined as the wife choosing to allocate at least 2,000 more to herself than the husband chose to allocate to her.

6.3. Inference

The stratified randomization was designed with the intention of estimating randomization inference p-values for all outcomes (Athey and Imbens 2016). Randomization inference will be estimated using ritest in Stata with 2,000 replications, and the randomization process exactly replicated (Heß 2017).

We will also report conventional robust standard errors.

6.4. Multiple hypothesis testing

Given the large number of outcomes under consideration in this study, we will employ corrections for multiple hypothesis testing. The procedure will be as follows: for each family of outcomes in section 4 we will construct an index. We will additionally test each measure of the construct individually and calculate sharpened q-values for the individual measures within each construct (Benjamini, Krieger, and Yekutueli 2006, Anderson 2008).

6.5. Approach to outliers

In cases where clear outliers exist we will winsorize at the top 1% (and bottom 1% for variables that are not lower-truncated).

References

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Heß, Simon. 2017. "Randomization Inference with Stata: A Guide and Software." The Stata Journal 17 (3): 630-51.

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Re: Embargo of Data for *Journal of Development Economics* Pre-Results Review

To Whom it May Concern:

Ignosi Research was contracted by the World Bank to carry out the endline data collection for the Uganda Farm and Family Balance (FFB) Study (AEA RCT Registry: AEARCTR-0001647). Fieldwork for the Farm and Family Balance endline data collection began in July 2018 and will be completed this month, with the finalization and submission of the endline data to the World Bank to follow shortly thereafter.

We hereby certify that we will not share these data with the study's principal investigators (Kate Ambler, Kelly Jones, and Michael O'Sullivan). The study's endline data will be delivered to Amy Copley, Operations Analyst at the World Bank, solely for the purposes of approving the deliverables for counter-payment. Ms. Copley has no role in the design, implementation or analysis of the FFB Study, and will be responsible for safeguarding the data until such as time that it will be released to the principal investigators. This arrangement has been requested in order to embargo the endline data through Stage 1 of peer review under the *Journal of Development Economics* Pre-Results Review Process.

We would be happy to provide any additional information that may be required.

Sincerely,

Ivan Ssenkubuge

Managing Partner
Ignosi Research