Info Note

Designing New Tools for Evaluating Gender Impacts of Climate Services for Agriculture

Introduction to a Series of Field Experiments in Rwanda

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Key messages

- The multidimensional nature of empowerment does not lend itself easily to analyzing trade-offs in women's empowerment, posing challenges for evaluating gender impacts of climate services.
- To help overcome this challenge, we use lab-in-the-field experiments in Rwanda that elicit men's and women's valuation of changes in workload and control over income—two domains of empowerment—and quantify how they manage trade-offs between them.
- We test and validate the tool in partnership with four cooperatives and 1,000 study participants. On average, whereas men are not willing to pay for control over income, women are willing to pay a significantly higher amount to be paid directly.
- Demand for labor is high in the study context, but we do not find evidence of significant gender gaps in the valuation of changes in workload, as men and women are willing to pay on average the same amount for labor.

Impact evaluations and cost-benefit analyses often guide investments in agricultural development but determining whether an investment is cost effective in empowering women is a major challenge. The multidimensional, dynamic nature of women's empowerment does not lend itself easily to quantitative measurement and poses challenges for aggregation across different dimensions, and for analyzing trade-offs in development.

For instance, donors and policymakers may face questions such as:

- Introducing a new bean variety increases net household income but replaces a variety for which women previously controlled the proceeds, reducing their personal income. To what extent will rolling out this new variety benefit or harm women?
- One climate information service helps both women and men save time. Another climate service program reduces women's workload more but does not help men save time. In which program should one invest to maximize total welfare, considering that women and men may value time savings differently?

This brief introduces a tool to help agricultural development programs answer such questions—and particularly climate services for agriculture, with additional complexities of impacts, resilience, and adaptive capacity. This note describes the tool, our study context, and initial findings.

Introduction to the tool

The tool builds on experimental "lab-in-the-field" methods, used by economists to observe real-life behavior and valuations under controlled conditions. The experiment elicits respondents' valuation of two domains of women's empowerment: changes in workload and control over the use of income. It also quantifies how respondents manage trade-offs between these two domains of empowerment.

The tool can help answer questions such as whether, for instance, an increase in women's control over income is large enough to justify the increase in their workload to generate that income; whether findings differ depending on a woman's age, socioeconomic class or other dimension of intersectionality; to what extent program costs are offset by positive impacts on enhanced incomes and control over resources; and whether labor-saving technologies generate greater benefits for particular groups of women than for men.

By providing a tool to understand workload-related trade-offs, the project contributes to the study of gendered labor dynamics and time use. Traditional gender norms typically assign greater responsibility for domestic chores and care work to women. These tasks are often unpaid and undervalued, and yet they may result in heavy work burdens for women and limit whether and how women can engage in other productive activities (Seymour et al. 2020). Moreover, new tasks that require additional human labor tend to be assigned to women. The resulting time poverty is considered disempowering and is thus reflected in the time-use based "workload" indicator in the project-level Women's Empowerment in Agriculture Index (pro-WEAI, Malapit et al. 2019). However, traditional time-use instruments capture the duration of activities and do not capture the quality of time, including work effort or control over time., The tool aims to fill this gap by eliciting respondents' valuation of changes in workload.

Figure 1. Woman in the Nyanza District, Rwanda sorting her beans after harvest. Photo: Francesco Fiondella (IRI)

Development of this tool also relates to the literature on gender and climate, which has documented gender inequality in the reach, use, and benefits of climate information (Gumucio et al., 2019). Most research uses qualitative approaches to elicit perceived benefits of climate information (Tall et al., 2018), and does not quantify gender gaps in costs and benefits to guide future investments and program design. Mutenje et al. (2019) provide a gender-disaggregated cost-benefit analysis for climate-smart agriculture (CSA) and find that women may choose to increase their workload when adopting labor-intensive CSA for cost reasons. However, their quantitative analysis focuses on profitability of CSA investments at the household level and does not quantify the trade-offs with individual-level effects of CSA on workloads, bargaining power, and control over income. The tool provides a framework to help researchers quantify such costs and benefits.

Implementation of the tool

The tool is implemented as follows. First, the tool identifies respondents' willingness to pay for control by offering them the choice to be paid a larger amount through their spouse, instead of being paid directly. The minimum amount by which a payment needs to increase for a respondent to choose an indirect payment, via his or her spouse, provides a measure of control over income (Almås et al., 2018). As an important sensitivity analysis, the tool varies whether valuations are elicited when participants are paid in cash versus in kind (in the form of soap), given that respondents might have more control over the use of in-kind goods, or might not be accustomed to cash transactions (Agness et al., 2021).

Second, the tool elicits women's and men's valuation of changes in workload. We do this by offering respondents agricultural labor around the time that they need to work on their fields, but at varying costs, to identify the maximum amount that a respondent is willing to pay for a day of labor (reducing their personal workload). Valuations are elicited for different tasks (e.g., weeding, fertilizer applications, spraying pesticides, and harvesting), so that findings are not driven by attributes of a particular job. This is important because women and men will have different preferences and opinions about what constitutes a good job (for instance due to security, flexibility, income, or norms), as well as different job experiences, influencing willingness to engage in any one task.

To unpack the trade-off between an increase in workload vis-à-vis an increase in control over income, the tool elicits respondents' valuations of changes in workload under two different types of scenarios: a scenario in which not hiring labor increases a respondent's personal income, versus a scenario in which this only affects income earned by the spouse. A comparison of a respondent's willingness to pay for labor under these two scenarios provides insights on how the trade-off between not hiring labor but earning more depends on whether a respondent directly receives and controls this income, versus having access to this additional income only indirectly, via one's spouse.

The tool focuses on revealed behaviors in an experiment instead of asking respondents directly to value their time or control over income to avoid the hypothetical bias common in stated valuations (Harrison and Rutström, 2008).

Study context

The study was implemented in partnership with four cooperatives in Rwanda, spread across the country. From these cooperatives, we recruited 500 members and their spouses to participate in a first round in October 2021, resulting in a total study sample of 1,000 respondents. All respondents also participated in a second and third round in November and December, respectively (with zero attrition); and one more round will be conducted around harvesting time early 2022.

Table 1 describes participants. Most cooperative members are male (77 percent), but since all participants are required to bring their spouse, the experiment includes an equal number of men and women. Female respondents are on average four years younger than their husbands, and almost all consider farming as their main occupation. About half of all respondents completed primary school, and more than half fall into the third (middle) category of Rwanda's social stratification programme Ubudehe[1]. The average household has close to six members. Men cultivate more land than women, including cooperative land for which the experiment offers to hire laborers. Virtually all households grow maize, most do hire labor for agricultural activities, and the majority of farmers grows for both subsistence and commercialization.

	Male	Female
Is cooperative member (proportion)	0.77	0.23
Age of respondent	46.8	42.9
Farming is main occupation (prop.)	0.97	0.98
Completed primary school (prop.)	0.50	0.48
Ubudehe Cat. 3 or above (prop.)	0.58	0.56
Household size	5.77	5.85
Total land cultivated (m^2)	5,554	4,035
Total cooperative land (m^2)	1,247	1,080
Grows maize (prop.)	0.98	0.98
Normally hires labor (prop.)	0.83	0.82
Commercial & subsistence farm (prop.)	0.87	0.85
Number of observations	**500**	**500**

Table 1. Participant characteristics

Initial findings and implications for climate services in Rwanda

Testing the tool yielded the following initial findings:

- On average, men are not willing to pay for control over income. In fact, their willingness to pay for control over income is negative, whereas women are willing to pay a significantly higher amount to be paid directly (see Figure 2).
- Demand for labor is high, and respondents reveal a strong valuation for a reduced workload. The average respondent is willing to sacrifice more than RFW 650 (or 26% of total income from the experiment) for a day of labor (reducing one's workload by a day).
- We do not find evidence of significant gender gaps in the valuation of changes in workload, as men and women are willing to pay on average the same amount for labor (see Figure 3).
- Both male and female respondents do not value changes in workload differently depending on whether they themselves or their spouses control the income from this change in workload.

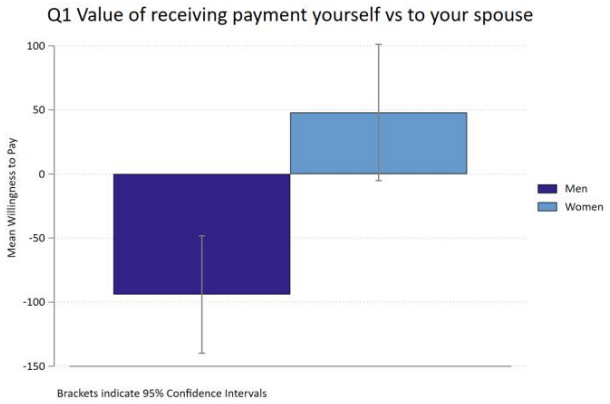

Figure 2. Willingness to pay for control over income.

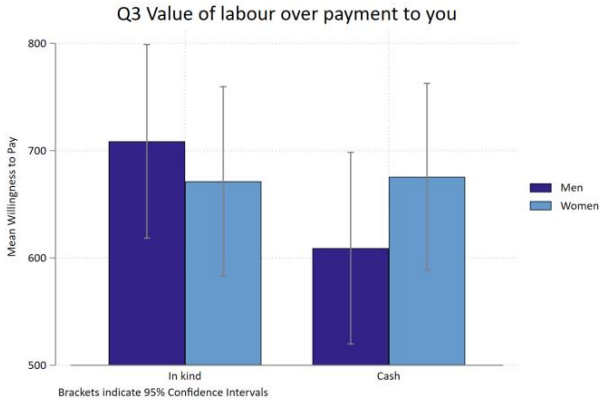

Figure 3. Valuation of a reduction in workload.

Study findings can be utilized to inform gender-responsive design of climate services, by helping practitioners, donors, and policymakers understand the different types of climate information that men and women might value, and how their valuations might differ. For example, initial findings indicate that maintaining control over income is more important for women than for men, and that both men and women reveal a strong demand for reduced workload. Thus, based on findings thus far, reducing workload should be a key priority for climate information service programs, along with interventions that could help reallocate control over income from men towards women.

Next steps

As a next step, we will identify to what extent the valuations elicited using the tool are correlated with quantitative survey-based women's empowerment indices that are more commonly used in program evaluation, including the project-level Women's Empowerment in Agriculture Index (pro-WEAI) and Gender Empowerment Index for Climate Smart Villages (GEI-CSV). These data were collected for

[1] Ubudehe is an income-based social stratification programme in Rwanda's poverty reduction strategy that classifies households into categories A, B, C, D, and E; with A consisting of households with the highest income; and E consisting of those who are the most vulnerable in the society.

the full sample of participants to analyze how choices in the experiment correlate with different types of indicators for women's empowerment.

Finally, subject to availability of funding, we will validate the tool using qualitative semi-structured interviews and work with climate information services in Rwanda to use these findings for gender-responsive program design.

- Following the approach of Jayachandran et al. (2021), we will use semi-structured interviews to explore how women and men perceive control over income, workload, and trade-offs between these two; and use these qualitative data as benchmarks to assess the validity of the experimental methods.
- We will then work with climate information services to use these findings in adapting recommendations to different groups of women and men, and test whether this increases the perceived relevance and adoption of recommended practices and technologies.

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