Advancing Gender Equity Justice Through Care-Inclusive FFBS: Baseline Report

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Photograph: Kelvin J. M. (2017). A woman carrying wood sticks for cooking at home [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:A_woman_carry_wood_stick_for_cooking_at_home.jpg

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Executive Summary

This is a baseline report for a cluster Randomized Controlled Trial (cRCT) among 1,186 households participating in CARE's Scale-up Farmer Field and Business School (FFBS) Project in Iringa Tanzania. The study will evaluate the impact of incorporating additional Care Work Modules into the existing FFBS curriculum on transforming social norms affecting women and girls, reducing and redistributing unpaid care work, increasing investment in labor-saving resources, and raising income levels.

We interviewed both the male and female partners (married or cohabiting) in 946 dual-adult households, and 240 women who are the sole heads of their households, being unpartnered (single, divorced/separated or widowed).

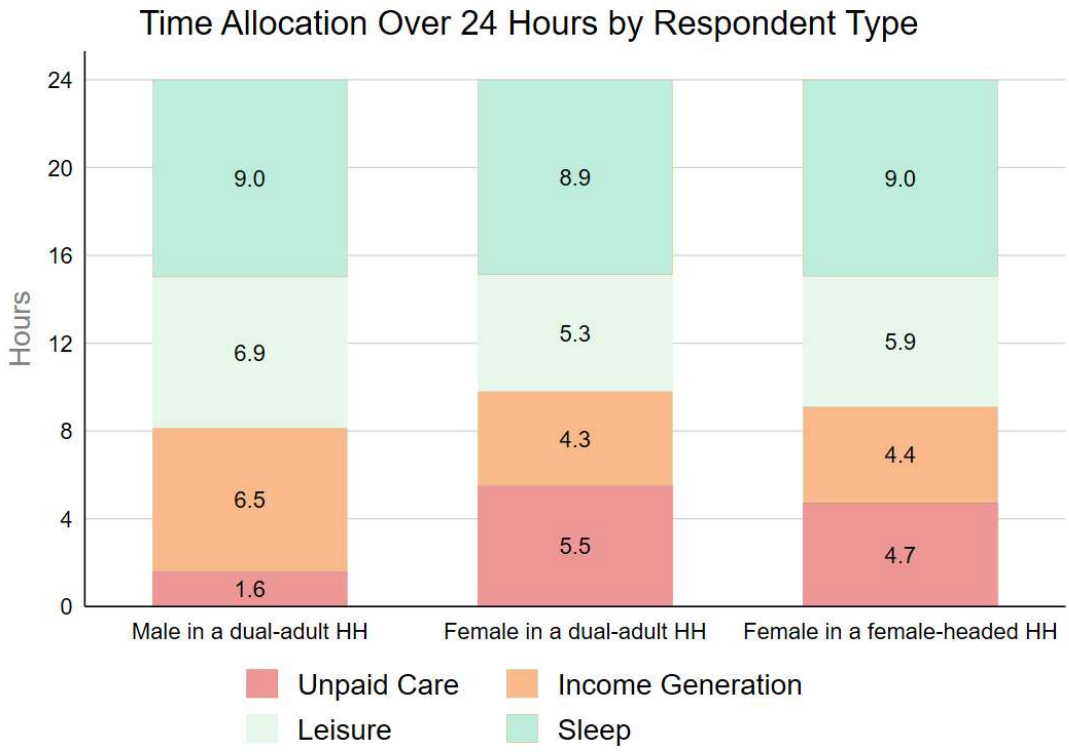
Our report focuses on establishing baseline levels of our primary outcomes and possible externalities, understanding of how key outcomes differ by household composition (dual-adult vs. female-headed) and respondent type (men in dual-adult households, their female spouses in dual-adult households, and the unpartnered women in female-headed households), and establishing whether randomization has succeeded in balancing our treatment and control groups.

Key findings include:

- We calculated each person's daily workload by summing time allocated to income generation, unpaid care work, plus half of the time spent on childcare as a secondary activity.[1] Overall, women in dual-adult households report the largest daily workload (10.7 hours), followed by women in female-headed households (9.6 hours), and men in dual-adult households (8.3 hours).
- This discrepancy in daily workload is attributable to a disproportionate responsibility of unpaid care work among women. In an average dual-adult household, men spend only 1.6 hours on unpaid care work per day, while their female spouses spend 5.5 hours of unpaid care work, corresponding to a 3.9-hour disparity between women and men. When including time spent on childcare as a secondary activity, this disparity, in unpaid care work, jumps to 4.7 hours.

[1]Our definition of daily workload was derived from the Pro-WEAI (Project-level Women's Empowerment in Agriculture Index), a validated tool to measure women's empowerment. We assessed time use with a 24-hour recall where respondents reported on their activities throughout the day in 15-minute increments. Activities were classified as either income-generating (e.g. farm work, employed work, self-employment, care work for which payment was received); unpaid care work (e.g. water and fuel collection, meal preparation, cleaning the house, errands, caring for children), leisure activities (e.g. eating, personal care, social and religious activities); or nighttime sleep. Respondents could report on childcare as both a *primary* activity and a *secondary* activity, meaning they were focused on another primary activity while also providing childcare.

Figure 1: Time allocation over the past 24 hours by respondent type

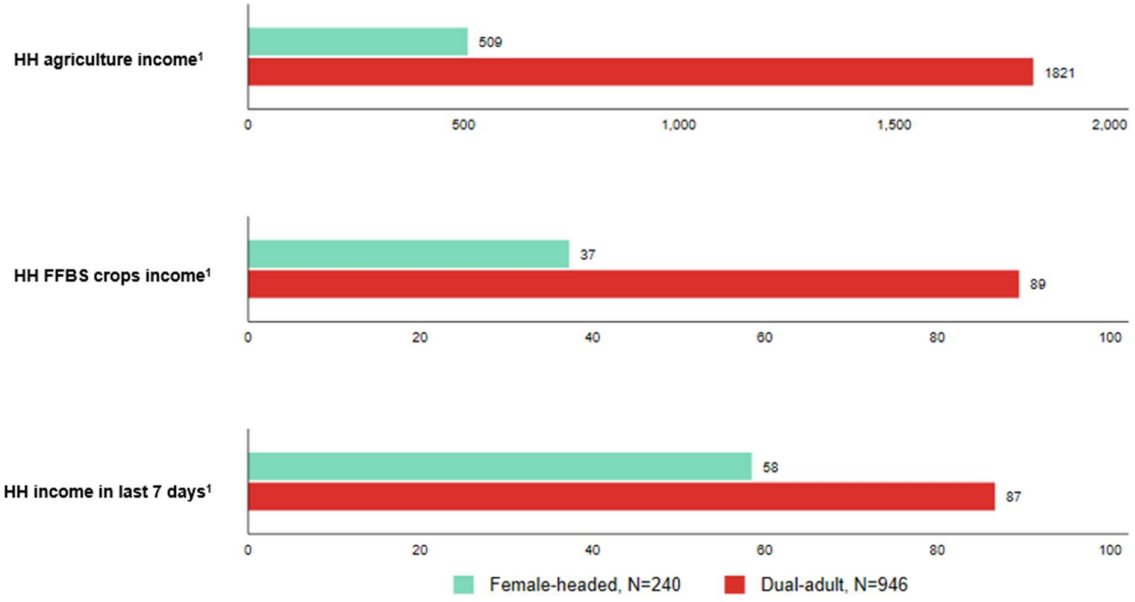


- Women in dual-adult households spend 2.3 hours in meal preparation; 0.7 hours in cleaning; 0.5 hours in washing and mending clothes; 0.4 hours in childcare *as a primary activity*; 0.4 hours in water collection, and 0.3 hours in firework or fuel collection, with women in female-headed household spending similar or slightly less time on each of these tasks. Men report contributing almost no time to these tasks.
- Compared to women in dual-adult households, men in dual-adult households are more likely to report the presence of community norms that support men's involvement in household chores and childcare. However, men also express less autonomous motivation in contributing to household chores than women. These findings may suggest that men may perceive that sharing in household chores as socially acceptable but are not personally motivated to engage in these activities.
- On average, households reported substantial investment in labor-saving devices (e.g., kitchen appliances, cleaning tools, farming equipment and other tools) for the past year (257 USD), but minimal investment in outsourcing of care work (4 USD).
- Dual-adult households earn 3.6 times more total annual agricultural income, 2.4 times more annual income attributable to FFBS (income from sunflower and soybean production activities), and 1.5 times more weekly income from all sources compared to female-headed households. Similarly, dual-adult households invest 1.9 times as much in labor-saving devices than female-headed households in the previous year.

These discrepancies suggest that structural barriers faced by female-headed households may impact their ability to reduce their care work responsibilities.

- In general, we observed good balance between our treatment and control groups across a wide range of key outcomes, indicating that the selection and randomization of study participants was successful. Having comparable treatment and control groups are comparable at baseline helps to ensure that our endline analysis can validly estimate the impact of the Unpaid Care Work Modules.

Figure 2: Household income from all agricultural activities, FFBS-related agricultural activities, and weekly income (in $PPP 2023) by household composition



[1]Income differed significantly between type of household ($p < 0.001$).

These key findings suggest that there is a substantial need to reduce the gap in unpaid care work among agricultural households participating in the FFBS. Targeted suggestions for improving the Care Work Modules include:

- **Focus on cooking and meal preparation**: We found that cooking and meal preparation is a major contributor to women's unpaid care work. FFBS should tailor its existing cooking demonstrations to emphasize men's participation as an opportunity to reduce women's unpaid care work.
- **Amplify the visibility of childcare**: Women reported spending much more time than men providing childcare as a secondary activity. This means that women are more often multitasking by providing childcare while also conducting other forms of work. Recognizing the additional responsibility associated with this multitasking may be a necessary first step in reducing this source of unpaid care work among women.
- **Build autonomous motivation among men**: Our analysis of social norms suggest that men already perceive that their community believes they should play a role in

household chores and childcare. However, they also report lower levels of autonomous motivation to engage in household chores than women. These findings suggest that it may be less important to shift norms at the community level than shifting individual men's beliefs about their roles within their own household.

- **Explore opportunities for outsourcing care work**: Investment in outsourced care work was extremely low. Understanding contextually relevant opportunities for outsourcing care work may create greater awareness of this possibility. Establishing community childcare facilities may create new opportunities to outsource some care work.

1. Introduction

1.1 Motivation for the study

In sub-Saharan Africa, women play a central role in agricultural production, contributing with nearly half of the agricultural labor force. A series of studies conducted by UN Women and UNDP-UNEP-Poverty Environment Action in East and Southern African countries have revealed that some countries in the region lose over USD 100 million in GDP per year due to the inequality faced by women in the agricultural sector (UN Women, UNDP and UN Environment, 2019). Challenges faced by women in the agricultural sector include limited access to male family labor; insufficient cash income resulting in restricted use of agricultural machinery, pesticides, or fertilizers; a reduced tendency to cultivate high-value cash crops due to women's responsibility to provide food for households; and disadvantaged access to credit and quality farmland (UN Women, UNDP and UN Environment, 2019).

These structural challenges are compounded by the expectation that women will work as unpaid family farm laborers while also providing most of the unpaid care and domestic work for their households. Globally, women spend 2.6 times more time on unpaid care and domestic work than their male counterparts: 4.2 hours compared to 1.7 (United Nations, 2020). This gap is even larger in Tanzania, where women spend 4 hours per day on unpaid care and domestic work, while men dedicate only 1 hour per day to these tasks (UN Women, 2023). This gap in unpaid care work done by women has important implications for individual, household, and national well-being (Budlender, 2010). In Tanzania, studies have linked this existing disparity between men's and women's engagement in unpaid work to poor economic empowerment and lower agricultural yields among women (Chopra, 2021 and Slavchevska, 2015).

There is a substantial need to identify effective interventions that can address the complex interactions between women's unpaid care work and agricultural production in sub-Saharan Africa. This research seeks to understand whether incorporating Care Work Modules into the Farmer Field and Business Schools (FFBS), an existing evidence-based intervention involving both men and women designed to promote agricultural productivity, women's equality, and nutrition among small-holder farmers, can reduce and redistribute the disproportionately burdensome unpaid care work carried out by women and girls in Tanzania. By generating much-needed evidence to support including care work in agriculture programs, this research can also generate recommendations for adapting, scaling, replicating, and measuring the impact of such programs globally.

1.2 The Farmer Field and Business School

The Farmer Field and Business School (FFBS), originating from CARE's Pathways to Empowerment program, strives to enhance the productivity and profitability of rural small-scale women farmers. FFBS is a practical, experiential method that is distinguished from the traditional Farmer Field School approach pioneered by the Food and Agriculture Organization

(FAO) due to its integrated, market-oriented, and nutrition-sensitive extension approach that advance the capacity of women and girls to meet their own needs and reach their full potential. In this approach, groups of farmers convene regularly during the cropping or livestock production cycle to acquire knowledge about new agricultural techniques and technologies and to experiment with these methods on group-managed demonstration plots. The FFBS is aligned with the agricultural seasonal production cycle, ensuring that learning activities are timed to address the real-time needs of farmers. For instance, sessions might focus on germination testing before the season begins or engage in dialogues about workload sharing during labor-intensive weeding periods.

Typically, FFBS participants are organized into groups comprising 25–30 farmers, representing diverse collectives such as Village Savings and Loan Associations (VSLAs), producer groups, marketing associations, and other common interest groups centered around specific agricultural enterprises. Trained facilitators lead FFBS sessions, with support from a cadre of community-based trainers. In Tanzania, these facilitators are known as “paraprofessionals”.

CARE has conducted extensive testing of the FFBS approach in 28 projects spanning 17 countries in 8 years. The results of these initiatives have directly benefited more than 2.5 million individuals, including 500,000 farmers, of which 54% are women. The positive impact of FFBS is based on evidence from six countries: Ghana, Malawi, Bangladesh, India, Mali, and Tanzania. The effectiveness of CARE's FFBS approach is evident across five key areas. First, the strength of the model is demonstrated through its integration of nutrition, income, crop yields, and women’s equality dimensions (CARE, 2020a). Second, the FFBS has shifted social norms affecting women and girls, with more participants rejecting domestic violence (CARE, 2020b). Third, it has increased household income, such as gains in Ghana ($3.41 to $9.90), Malawi ($11.60 to $17.38), and Tanzania ($17.2 to $23) (Kaspila, 2019; TANGO, 2021). Fourth, FFBS enhanced community resilience, with yields increasing by up to 56% during severe challenges such as droughts, cyclones or flooding in Tanzania (FAO, IFAD and WFP, 2020). Finally, 62% of FFBS households achieved acceptable nutrition scores (CARE, 2020a). These changes have resulted in substantial improvements in women’s empowerment (“A Win-Win for Gender”). A Social Cost Benefit Analysis of FFBS conducted by the New Economics Foundation suggests that for every dollar invested, FFBS generates USD 31 in return (NEF Consulting, 2016).

In light of this existing body of evidence, the Scale-Up FFBS Globally program, funded by the Sall Family Foundation, seeks to influence more than twenty global programs spanning over 30 countries, with the ambitious goal of reaching 25 million producers by 2027. As part of this scale up, the FFBS approach is being extended to 18 new countries, including Tanzania. In Tanzania, this three-year program operates in Iringa District Council, Southern Tanzania in collaboration will involve the Ministry of Agriculture, the Ministry of Community Development, Gender, Women, and Special Groups, the Ministry of Health and Social Welfare, and local government. In the Iringa District, the FFBS program focuses on sunflower and soybean production.

1.3 Scaling Innovations in Unpaid Care Work in Sub-Saharan Africa

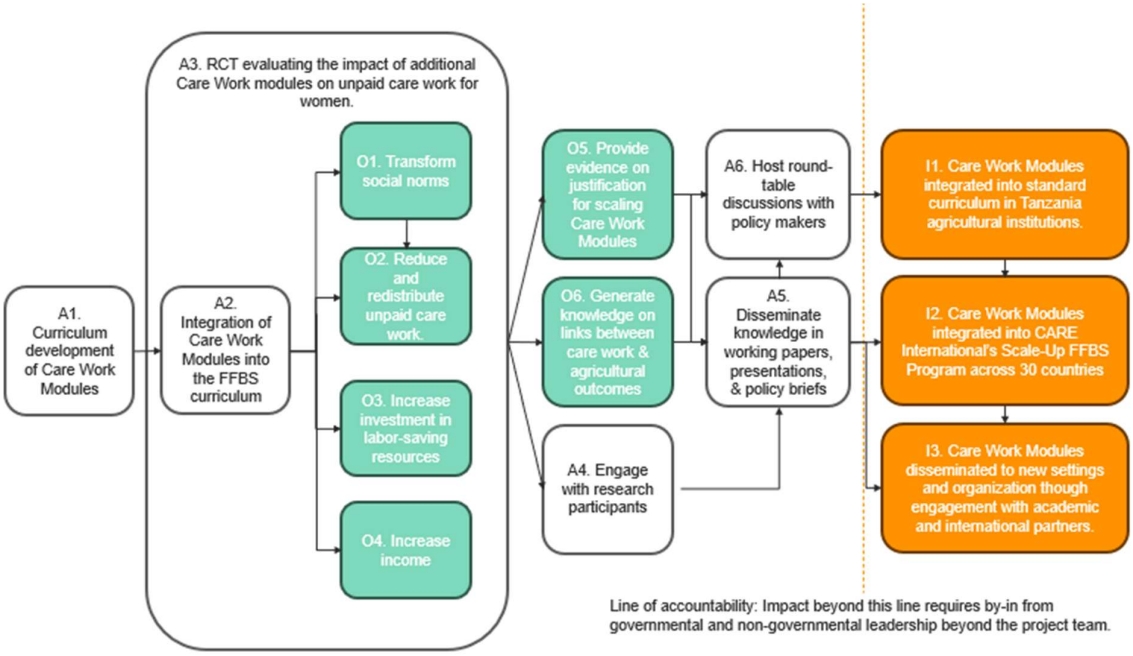
Although the FFBS approach has demonstrated success in reducing domestic violence, shifting social norms affecting women and girls, improving resilience, increasing income, and improving nutrition, it has not been explicitly designed to address the burden of unpaid care work for women.

To that end, as part of the International Development Research Center's Scaling Innovations in Unpaid Care Work in Sub-Saharan Africa initiative, CARE seeks to develop additional Care Work Modules that can be integrated into the Farmer Field and Business School (FFBS) curriculum. These modules will have a specific focus on care work within the agricultural sector and will cater to the needs of the farmer-facing FFBS approach. These newly developed curricula will serve as valuable educational tools, potentially benefiting a wide array of users including agricultural extension workers or other agricultural extension programs. While these materials will initially be developed for Tanzania, we envision that lessons learned from curriculum development will be disseminated internationally.

Our Theory of Change (see Figure 3) outlines the process through which integrating Care Work Modules into agricultural programs can advance Women's Equality at national and international levels. The approach starts with developing (A1) and integrating (A2) these Care Work Modules into existing FFBS curriculums. An impact evaluation (A3) will assess the effectiveness of these modules on six key outcomes: transforming social norms affecting women (O1), reducing and redistributing unpaid care work (O2), increasing investment in labor-saving resources (O3), raising income levels (O4), providing evidence for scaling the modules (O5), and generating insights on the link between care work and agricultural outcomes (O6). To promote policy change, the project includes direct engagement with research participants (A4), dissemination of findings (A5), and round-table discussions with policymakers (A6).

Achieving impact beyond the project team requires buy-in from both governmental and non-governmental leaders, ensuring sustainable integration of practices in agriculture that are sensitive to women's specific needs. Ultimately, the goal is to achieve widespread adoption of the Care Work Modules, with integration into Tanzania's agricultural institutions (I1), CARE International's global Scale-Up FFBS Program (I2), and expansion into new settings through partnerships (I3).

Figure 3: Theory of Change for Advancing Women's Equality Through Care-Inclusive Farmer Field and Business Schools



1.4 Impact evaluation and research questions

Embedded in our Theory of Change is an impact evaluation designed to provide evidence for scaling the modules and generate insights on the link between care work and agricultural outcomes. This report provides findings from the baseline survey of this impact evaluation.

Our main research questions for the evaluation are:

1. Compared to dual-adult households participating in the standard FFBS program, do dual-adult households who receive additional Care Work Modules report:
    a. Greater shifts in perceived norms regarding women's and men's roles and decision-making power surrounding unpaid care work?
    b. More equal allocation of time dedicated to unpaid care work among men and women in the same households?
    c. Reductions in total unpaid care work among women?
    d. Greater household investment in labor-saving devices or outsourced care work?
    e. Greater gains in household income from FFBS-related agricultural activities?
    f. No increases in intra-household conflict?

2. To what extent does receiving additional Care Work Modules generate similar impacts among women in dual-adult households compared to among women in female-headed households in terms of:
    a. Allocation of time to unpaid care work
    b. Investment in labor-saving devices
    c. Changes in household income
3. How does a reduction in unpaid care work among women change:
    a. Women's allocation of time to paid work, unpaid work, and leisure activities?
    b. The amount of income over which women have sole or joint control?
4. How does a more equal distribution of care work among men and women in the same household impact:
    a. The household's overall allocation of time to paid work, unpaid work, or leisure activities?
    b. The household's overall income?

For the purposes of this report on baseline data collection, we have focused on providing a foundation for addressing the above-stated research questions by:

1. Establishing baseline levels of our primary outcomes of social norms affecting women, allocation of time among men and women, investment in labor-saving devices and outsourced care work, and household income
2. Establishing baseline levels of key externalities, including intra-household conflict; women's control of income; and allocation of time among other household members.
3. Developing a greater contextual understanding of these primary outcomes and externalities by comparing results by household composition (dual-adult vs. female-headed) or respondent type (men in dual-adult households, women in dual-adult households, and female-headed households)
4. Establishing whether randomization has succeeded by evaluating whether our treatment and control groups are balanced in key characteristics and baseline outcomes.

2. Methodology

2.1 Geographic coverage

The Scale Up FFBS program is implemented in Iringa District Council in the Iringa region of Dar es Salaam. The study region includes 14 wards and 58 villages (see Figure 4).

Figure 4: Map of Tanzania highlighting the 14 wards where the FFBS program is being implemented in Iringa Region

2.2 Research design

This evaluation is a cluster Randomized Controlled Trial (cRCT) that evaluates the impact of incorporating additional Care Work Modules into the existing FFBS curriculum. We randomized paraprofessionals who had previously been trained to lead FFBS groups using the standard curriculum (N=62) to either the intervention arm, which will receive additional training and materials to implement the Care Work Modules in their FFBS groups, or to the control arm, which will receive no additional training or materials regarding Care Work. Randomization occurred at the paraprofessional level, rather than group, because one paraprofessional can be assigned to facilitate discussions with more than one FFBS group and we were concerned that asking a single paraprofessional to facilitate both intervention and control groups would lead to contamination of the treatment arms and a bias in the results of this study.

After randomization, we randomly selected individual FFBS groups led by each paraprofessional to participate in the study. At the time of sampling, we sampled 60 first-choice treatment and 60 first-choice control groups as well as 20 backup groups for each arm. These back-up groups were sampled in the expectation that the lists of groups we were provided with could be outdated. To increase study power and promote greater comparability between our treatment and control groups, we conducted 1,000 iterations of randomization at the paraprofessional level and FFBS group selection and used the iteration that resulted in the fewest average number of groups per paraprofessional and greatest balance in ward across the two treatment groups.

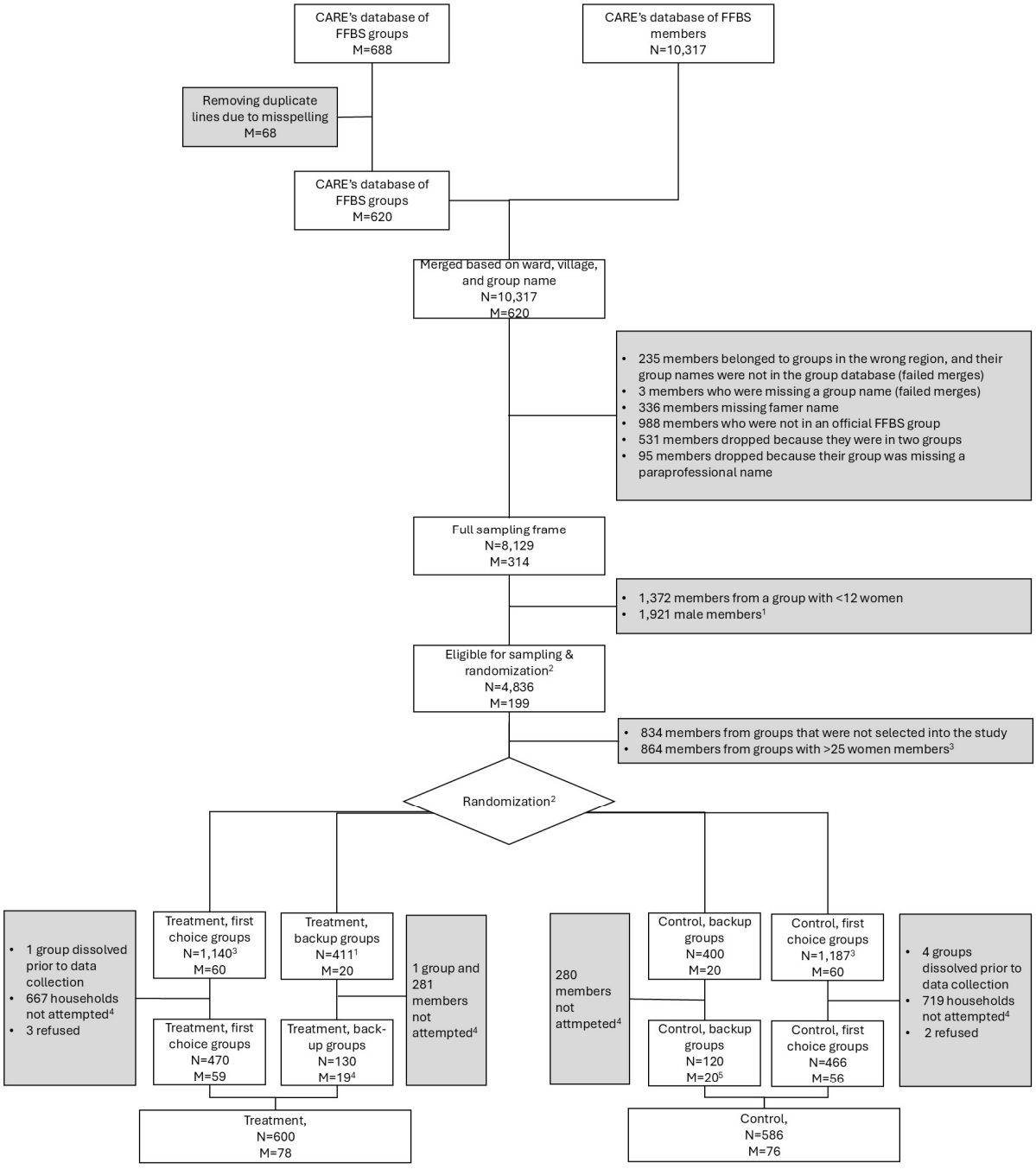
Our initial sample size calculations assumed that we would be able to identify 10 households, 8 dual-adult and 2 female-headed households in each of the 120 first-choice FFBS groups. We expect that this sample should provide 80% power to detect a reduction of between 38 minutes and 58 minutes in the gap between unpaid care work performed by men and women in the same household, assuming an average gap size of 3 hours, a standard deviation of 3 hours, and an alpha level of 0.05 for a wide range of potential intracluster correlations (0.05-0.30).

2.3 Respondent selection

All study participants were selected from villages in Iringa district council, where CARE is implementing a Scale-up FFBS Project. CARE Tanzania provided Laterite with the names of farmers, their FFBS groups, and the names of paraprofessionals to implement the sampling strategy. Figure 5 highlights the participant flow chart indicating the final sampling frame of 10,317 farmers and randomization conducted among 4,836 farmers. As outlined in Figure 5, challenges in the field required us to leverage information from our list of back-up groups and members.

First, due to outdated information in the sampling frame, some of the selected groups had dissolved or combined with another group by the time of the baseline, and we replaced these groups as needed from our list of back-up groups. Second, upon visiting the selected households, we encountered a larger-than-expect proportion of female-headed households, which made it difficult to attain our target sample size of dual-adult households. To address this challenge, we started by identifying additional dual-adult households from among the replacement households of first-choice groups. Then, we enriched our sample by visiting additional groups from our back-up lists. Our resulting sampling included 600 treatment households and 586 control households, reaching 99% of our intended sample size target. These households were clustered in 154 FFBS groups rather than our initial target of 120 FFBS groups. We achieved our full target for female-headed households (240), but only reached 946 out of a targeted 960 dual-adult households. These changes are not expected to introduce bias into the study and are anticipated to have a minimal effect on the study's power, as the small reduction in overall sample size may be balanced by the increased number of clusters.

Figure 5: Respondent selection flowchart (M=number of FFBS groups; N=number of FFBS members)



1. Because sampling occurred at the household level, we restricted our sample to women to avoid sampling a husband-wife pair from the same household
2. Randomization occurred at the paraprofessional level and sampling occurred at the group level. We conducted 1000 iterations of randomization and picked the iteration with the best balance of wards and smallest average number of groups per paraprofessional.
3. Within selected groups, we randomly sampled up to 25 households to be included in our list of eligible respondents to account for anticipated issues in the field.
4. Reasons for not being attempted includes a) inability to be located; b) having already reached a target of households from the same group; c) not having a desired household composition such that we could recruit our target sample of 980 dual adult and 120 female-headed households

2.4 Data collection

Data collection occurred between 1 August and 24 August 2024 and reached 2,132 respondents in 1,186 households.

Table 1. Baseline households and respondents reached.

	Dual-adult households	Female-headed households	Respondents
Treatment	480	120	960 spouses (man and woman) and 120 women
Control	466	120	932 spouses (man and woman) and 120 women
Total	**946**	**240**	**2,132**

The survey took approximately 90 minutes to complete for each household whereby a male enumerator interviewed the male respondent (husband or cohabiting male partner in a dual-adult household) and a female enumerator interviewed a female respondent (wife or cohabiting female partner in a dual-adult household, or the female head in the female-headed household). The survey collected data on social norms affecting women, decision-making processes, time use, household income, control over income, investment in labor-saving devices, outsourcing of care work, and intra-household conflict.

2.5 Variable definition

Our variables were derived from the literature and designed to capture key characteristics related to our study population as well as to reflect our key outcomes of transforming social norms affecting women, reducing and redistributing unpaid care work, increasing investment in labor-saving resources, and raising income levels.

Social Independence Index

The Social Independence Index was adapted from the SWPER index for women's empowerment in Africa (Ewerling et al., 2017). It measures respondents' social independence by incorporating five key variables that reflect various dimensions of empowerment. The index is calculated as the sum of the following components:

- Years of education beyond primary school: years of education minus 7.
- Years of adulthood before marriage: age at marriage minus 18; if the woman is unmarried, the current age is used.
- Years of adulthood before parenthood: age at first birth minus 18; if the woman has no children, the current age is used.
- Age difference between spouses at marriage: age of female respondent minus age of spouse; a value of 0 is assigned if the respondent is single.

- Difference in years of education between spouses at marriage: years of education for the respondent minus year of education for spouse; a value of 0 is assigned if the respondent is single.

These variables capture distinct aspects of a respondent's autonomy, including access to education, age-related milestones, and relational dynamics within marriage. Summing up, these variables create a composite measure of social independence. A positive index value reflects greater independence, characterized by delayed marriage and parenthood, greater education, and equitable relational dynamics (e.g., small spousal age or education gaps). Conversely, a negative value indicates limited social independence, characterized by early marriage or parenthood, lower education, or significant disparities in relational dynamics.

Household roles in chores and childcare

We assess social norms affecting women related to household roles around chores and childcare using two scales validated in a study in DRC (Costenbader et al., 2019). Each scale includes four item questions assessing injunctive and subjective norms related to roles in household chores and childcare using a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree).

For each item, a number closer to 1 indicates the least perceived support for shared responsibilities while a number closer to 4 reflects the greatest perceived support for shared responsibilities. We calculated a score by averaging responses to all four items.

Relative Autonomy Index (RAI)

We used an adapted relative autonomy index (RAI) (Vaz et al., 2016) to capture individual motivations for certain decisions or actions and understand the extent to which individuals are constrained by social norms. For each decision or task, the respondent is presented with a list of hypothetical motivations that include external, introjected and autonomous motivations and asked whether that motivation applies to them. The standard weighting structure for an RAI incorporating three types of motivation is -2 for responses indicating external motivation, -1 for responses indicating introjected motivation, and +3 for responses indicating autonomous motivation. As such, the RAI varies between -9 and 9. Positive scores are interpreted as indicating that the individual's motivation for their behavior tends to be relatively autonomous while negative scores indicate greater constraints by social norms.

All respondents, both men and women, responded to the RAI in our survey. Our adapted RAI focused on motivation around participation in household chores among all respondents, participation employment for those who were employed, abstaining from employment for those who were not employed, making decisions around major household purchases for those who participated in purchases, and abstaining from decisions around major household purchases for those who did not participate in such purchases. Our scale included nine hypothetical motivations for each activity or decision: three autonomous, three external, and three introjected.

Time allocation and daily workload

To assess allocation of time among respondents, we conducted a 24-hour recall and asked respondents to report on their activities from wake-up to sleep time in 15-minute increments using a module was based on the Pro-WEAI (Seymour et al., 2023) supplemented with additional unpaid work activities from the Tanzania Household Survey Women's Household Care Module. Respondents' individual activities were aggregated into four categories that add up to add to 24 hours for each individual:

- Income-generating activities, including farm work, employed work, self-employment, and any care work for which payment was received.
- Unpaid care work, including water and fuel collection, meal preparation, washing, ironing, and mending clothes, cleaning the house, caring for children, elderly, ill or disabled persons, community support, mobile work (commuting, shopping, seeking health services, errands), and household management (planning expenses, making appointments).
- Leisure activities, including schooling, eating, personal care, social and religious activities, leisure travel, and sleeping or resting outside of the night sleep time.
- Sleep, which was calculated as the difference between bedtime and wake-up time.

For each primary activity, we also asked respondents whether and for how long they were providing childcare as a secondary activity. This allowed us to capture time allocated to childcare as a *primary* activity, where the respondent's primary focus was on childcare, as well as time allocated to childcare as a *secondary* activity, where the respondent reported another task as their primary activity but also reported taking care of a child at the same time (e.g. collecting water while also watching a child; attending a religious service while watching a child). In alignment with standard Pro-WEAI scoring, we calculated each person's daily workload by summing time allocated to income generation as a primary activity, unpaid care work as a primary activity, plus half of the time spent on childcare as a secondary activity. We calculated a daily unpaid care workload as the sum of unpaid care work as a primary activity plus half of the time spent on childcare as a secondary activity.

Within dual-adult households, we also calculated the difference between women and men's daily workload, unpaid care work, and other time allocation categories as the difference in unpaid care hours between men and women respondents within the same household such that a positive number represents a larger allocation of time among women.

Investment in labor-saving devices and outsourced care work

We assessed investment in labor-saving devices and outsourced care work using modules adapted from the Tanzania Household Budget Survey 2017's model of household assets (MoFP- PED, NBS, & World Bank, 2020). Only one respondent per household, whichever self-identified as more knowledgeable about household expenditures, responded to this module. From this list of assets, we identified 23 different labor-saving devices (e.g., kitchen appliances, cleaning tools, farming equipment and other tools). One respondent from each household was asked if they owned a functional version of the device; how many devices of

that type were purchased in the past 12 months; and the price paid for each device purchased in the last 12 months in Tanzanian shillings.

Total annual expenditure on labor-saving devices was calculated by taking the number of each device purchased in the past 12 months, multiplying it by the average price reported for that device across all respondents, and then summing these values across all devices.

Total labor-saving assets owned measure the household's overall investment in labor-saving devices assets. It was calculated by multiplying the average price paid for each device by the total number of devices owned by the household, regardless of when they were purchased. For the total annual expenditure and investment in labor-saving devices, we specifically consider the devices used for traditionally female tasks. These devices include charcoal stove, modern firewood/coal stove, electric/gas stove (including microwave oven), cooking pot, small electric appliances, refrigerator/freezer/fridge-freezer, washing machine, sewing machine, iron (electric or charcoal), brooms/brushes/broom heads, bucket/jerry can/water drum, water heater, water pump/tap, water filter.

To assess investment in outsourced care work, one respondent per household was asked if they had outsourced any services on household chores, childcare, elderly or disabled care, and delivery services in the past month and as well as the amount spent on each service in Tanzanian shillings. For households that outsourced care work, the total monthly expenditure was calculated by summing the amount spent on all outsourced care services.

Total household investments on labor-saving devices, assets, and outsourced care work were converted and reported in 2023 USD rates using purchasing power parity (PPP) adjustments to account for price level differences.

Household income

To make an accurate assessment of household income, we considered three definitions of household income:

- Annual agricultural income, defined as household income from all agricultural and livestock production in the last 12 months. In the case of dual-adult households, the most knowledgeable spouse responded with values at the household level.
- Annual income attributable to FFBS, defined as household income from all sunflower and soybean production-related agricultural activities in the last 12 months. This definition reflects the fact that the FFBS program has a specific focus on sunflower and soybean production in this region. Note, this is a subset of the annual agricultural income in the previous point and the most knowledgeable spouse responded with values at the household level.
- Weekly income from all sources, which comprises income from agricultural activities as well as wages from formal employment, self-employment, and informal work. This measurement is included because annual income from agriculture is driven by the harvest season, which is only a few weeks each year.

Annual agricultural income and annual income attributable to FFBS were calculated using survey modules adapted from the Tanzania Household Budget Survey 2017, which captures the types of crops planted, the quantities of crops harvested and sold, the price of sold crops,

as well as income derived from livestock and related products (MoFP- PED, NBS, & World Bank, 2020). Weekly income from all sources using data from a household roster capturing income generating activities and income amounts for each household member.

Control over income

Respondents were asked about the proportion of household income over which they have (i) sole control without input from someone else, (ii) joint control with input from others, and (iii) no control at all. Answer options to each of the three questions and their corresponding numeric scores were: none (0%), almost none (10%), less than half (25%), about half (50%), more than half (75%), almost all (90%), and all (100%). To obtain the proportion of income over which the respondent has sole control, we divided the score of question (i) by the sum of the scores of questions (i), (ii), and (iii)To obtain the proportion of income over which the respondent has joint control, we divided the sum of the scores of questions (ii) by the sum of the scores of questions (i), (ii), and (iii). For example, if a women responded that she had sole control over all most no income, joint control over about half of the income, and no control over less than half of the income, we would estimate the proportion of household income over which she had sole control as:

$$\frac{10\%}{10\% + 50\% + 25\%} = 11.8\%$$

Similarly, the proportion of income over which she has joint control would be:

$$\frac{50\%}{10\% + 50\% + 25\%} = 58.8\%$$

Intra-household conflict & satisfaction with relationship

In recognition that changing social norms affecting women within the household could lead to unintended negative impacts, we sought to explore household conflict and relationship quality within dual-adult households. We measured conflict as the frequency of disputes in the past year over five areas – work, chores, finances, leisure, and childcare — on a scale from 0 (Never) to 4 (Very frequently), summing the five area scores to produce an aggregate conflict score ranging from 0 to 20 (Schumann & Lück, 2023). We also evaluated satisfaction with the spousal relationship, the division of childcare tasks and of household chores, each measured on an 11-point scale (Dush & Amato, 2005).

Time allocation to paid and educational activities at the household level

Changes in the allocation of time to unpaid care work among respondents could have spillover effects within the household. For example, a reduction in unpaid care work performed by mothers could lead to a greater responsibility being placed on children and a corresponding reduction in the allocation of time to education. To explore the possibility of these externalities, we calculated the hours spent on paid work and educational activities in the past week by household members, categorized by age and sex (adult men >=18 years of age, adult women >=18 years of age, school-aged girls 6-17, and school-aged boys 6-17).

2.6 Data analysis

We sought to establish baseline levels of our primary outcomes using descriptive statistics. We present the counts and percentages for categorical variables and means and 95% confidence intervals for continuous variables. All 95% confidence intervals were calculated to account for clustering at the paraprofessional level using Taylor-linearized variance estimation.

To develop our contextual understanding of these primary outcomes and externalities we compared respondent-level outcomes of social norms affecting women, allocation of time among men and women, and intra-household conflict by respondent type (men in dual-adult households, women in dual-adult households, and female-headed households). Similarly, we compared household-level outcomes of investment in labor-saving devices and outsourced care work, household income allocation of time among other household members and allocation of time among other household members by household composition (dual-adult vs. female-headed).

We also established whether randomization had succeeded by evaluating whether our treatment and control groups are balanced in key characteristics and baseline outcomes. For categorical dependent variables, these comparisons used a Rao-Scott test to account for clustering at the paraprofessional level. For continuous dependent variables, these comparisons used a linear regression model that included indicator variables for independent variables and accounted for clustering at the paraprofessional level using Taylor-linearized variance estimation. This analysis followed a pre-analysis plan to identify the outcomes of interest measured from the variables collected at baseline and the type of analysis used. Laterite used STATA for all data analysis.

2.7 Ethics

This study was approved by the ethics committee at Tanzania Agriculture Research Institute (TARI) and the Commission of Science and Technology (COSTECH). All participants were adults aged 18 years or older and provided informed consent before proceeding with the survey. Consent was captured in audio through SurveyCTO. In accordance with data protection laws in Tanzania and the General Data Protection Rules (GDPR), personally identifiable information was removed from the data prior to analysis.

3. Results

3.1 Characteristics of the households

At baseline, we interviewed 600 treatment households and 586 control households. The average household size was 4.7 members, including 1.1 adult men and 1.3 adult women. On average, households had 0.9 school-aged boys, 0.8 school-aged girls (ages 6-17), and 0.7 young children under 5 years old. Livestock ownership was widespread, with 79.7% of households keeping poultry, 38.4% raising pigs, and 20.3% owning cows or cattle. Crop cultivation was also common, with maize grown by 96.7% of households, followed by other beans (44.9%) and sunflower (35.5%). Household composition and agricultural practices were generally similar across treatment and control groups, though differences were observed in the cultivation of other beans (41.2% vs. 48.6%) and sunflower (39.7% vs. 31.2%). More information about respondents' livelihood activities can be found in Appendix 6.4.

Table 2: Household characteristics by treatment and control arms (N = 1,186)

Household characteristics	Overall (N=1186)	Treatment (N=600)	Control (N=586)	p-value
Household composition: Mean (95%CI)				
Total household members	4.7 (4.6,4.8)	4.7 (4.6, 4.9)	4.7 (4.5, 4.9)	0.464
Men (age 18+)	1.1 (1.1,1.2)	1.1 (1.0, 1.2)	1.1 (1.0, 1.2)	0.848
Women (age 18+)	1.3 (1.2,1.3)	1.3 (1.2, 1.3)	1.3 (1.2, 1.3)	0.669
School-aged boys (ages 6–17)	0.9 (0.8,0.9)	0.9 (0.8, 1.0)	0.8 (0.7, 1.0)	0.288
School-aged girls (ages 6–17)	0.8 (0.7,0.9)	0.8 (0.7, 0.9)	0.8 (0.7, 0.9)	0.894
Children 5 and under (age ≤ 5)	0.7 (0.6,0.7)	0.7 (0.6, 0.8)	0.7 (0.6, 0.8)	0.940
Livestock ownership status in the last year*: n (%)				
Poultry, chicken, ducks, etc.	945 (79.7)	479 (79.8)	466 (79.5)	0.926
Pig	455 (38.4)	224 (37.3)	231 (39.4)	0.618
Cows/Cattle	241 (20.3)	126 (21.0)	115 (19.6)	0.728
Goats	98 (8.3)	55 (9.2)	43 (7.3)	0.420
Rabbits	74 (6.2)	30 (5.0)	44 (7.5)	0.139
Crop cultivation status in the last year*: n (%)				
Maize	1,147 (96.7)	582 (97.0)	565 (96.4)	0.654
Other beans	532 (44.9)	247 (41.2)	285 (48.6)	0.232
Sunflower	421 (35.5)	238 (39.7)	183 (31.2)	0.230
Irish potatoes	187 (15.8)	91 (15.2)	96 (16.4)	0.804
Soybeans	100 (8.4)	50 (8.3)	50 (8.5)	0.943
Peas, field peas, cowpeas, etc.	94 (7.9)	55 (9.2)	39 (6.7)	0.352
Tomatoes	81 (6.8)	37 (6.2)	44 (7.5)	0.577

*Households could cultivate multiple crops or raise several livestock

We collected data from a total of 2,132 individual respondents, including 1,186 women and 946 men. The average respondent age was 46.8 years old, 69.5% had completed primary school, 88.7% were married or cohabitating with a partner. Among married respondents, 16.1% were in a polygamous relationship. On average, respondents show a moderate level of social independence, with an overall mean score of 5.8. This score reflects an average of years of education of 6.6, average age of first birth of 22.8, and average age of first marriage of 23.1.

The comparison of treatment and control groups indicate successful randomization. Among both men and women in dual-adult households, we observed balance across treatment and control groups in all variables, including education, age, and polygamous relationships. Among women in female-headed households, respondents' highest level of education differs between treatment and control groups, with the treatment group reporting somewhat higher education levels, while other characteristics remain balanced across groups.

Table 3: Respondents characteristics by respondent type (N = 2,132). Table shows n (%) for categorical variables and mean (95% CI) for continuous variables

	Overall (N=2132)	Men in a dual-adult HH (N=946)		Women in a dual-adult HH (N=946)		Women in a female-headed HH (N=240)	
		Treatment (N=480)	Control (N=466)	Treatment (N=480)	Control (N=466)	Treatment (N=120)	Control (N=120)
Sex							
Male	946 (44.4%)	480 (100 %)	466 (100 %)	---	---	---	---
Female	1,186 (55.6%)	---	---	480 (100 %)	466 (100 %)	120 (100 %)	120 (100 %)
Age (years)	46.8 (45.6,47.9)	48.2 (46.5, 50.0)	49.1 (47.5, 50.8)	43.1 (41.5, 44.8)	44.6 (43.1, 46.2)	49.5 (46.3, 52.8)	51.5 (49.1, 54.0)
Highest level of education							
Never attended school	211 (9.9%)	30 (6.3%)	31 (6.7%)	52 (10.8%)	52 (11.2%)	25 (20.8%) *	21 (17.5%) *
Less than primary	174 (8.2%)	45 (9.4%)	34 (7.3%)	38 (7.9%)	36 (7.7%)	11 (9.2%) *	10 (8.3%) *
Complete Primary	1,482 (69.5%)	341 (71 %)	340 (73 %)	327 (68.1%)	329 (70.6%)	63 (52.5%) *	82 (68.3%) *
Completed Secondary	217 (10.2%)	44 (9.2%)	50 (10.7%)	57 (11.9%)	42 (9 %)	18 (15 %) *	6 (5 %) *
Post-secondary/vocational	48 (2.3%)	20 (4.2%)	11 (2.4%)	6 (1.3%)	7 (1.5%)	3 (2.5%) *	1 (0.8%) *
Current marital status							
Single	42 (2%)	---	---	---	---	21 (17.5%)	21 (17.5%)
Currently married, cohabiting	1,892 (88.7%)	480 (100 %)	466 (100 %)	480 (100 %)	466 (100 %)		
Widowed, Divorced, Separated	198 (9.3%)					99 (82.5%)	99 (82.5%)
Polygamous relationship[1]	304 (16.1%)	77 (16 %)	75 (16.1%)	77 (16 %)	75 (16.1%)	---	---
Parent to child aged <12	602 (28.2%)	296 (61.7%)	281 (60.3%)	296 (61.7%)	281 (60.3%)	45 (37.5%)	40 (33.33%)
Adapted women's Social Independence Index[2]	5.8 (5.0,6.7)	9.6 (8.1, 11.0) *	11.8 (10.4, 13.2) *	0.4 (-1.3, 2.0)	0.7 (-0.9, 2.2)	7.7 (5.2, 10.1)	8.1 (5.7, 10.5)
Years of education	6.6 (6.4, 6.9)	6.9 (6.6, 7.3)	6.9 (6.6, 7.3)	6.6 (6.1, 7.0)	6.4 (6.0, 6.8)	6.0 (5.3, 6.8)	5.8 (5.2, 6.3)
Education gap[1]	0.0 (0.0, 0.0)	0.4 (0.1, 0.6)	0.5 (0.2, 0.9)	-0.4 (-0.6, -0.1)	-0.5 (-0.9, -0.2)	---	---
Age gap at marriage[1]	0.0 (0.0, 0.0)	5.1 (4.6, 5.6)	4.5 (4.0, 5.0)	-5.1 (-5.6, -4.6)	-4.5 (-5.0, -4.0)	---	---
Age at first marriage[3]	23.1 (22.8,23.5)	25.3 (24.7, 26.0)	25.5 (25.0, 26.1)	21.3 (20.7, 21.8)	21.4 (20.8, 22.0)	21.0 (19.9, 22.1)	20.6 (19.8, 21.4)
Age at first child[4]	22.8 (22.6,23.0)	24.9 (24.4, 25.3) *	26.1 (25.6, 26.6)*	20.8 (20.4, 21.2)	20.8 (20.4, 21.1)	21.0 (20.2, 21.7)	20.9 (20.2, 21.7)

[1]Among currently married/cohabitating respondents, [2]Adapted from the SWPER index for women's empowerment in Africa (Ewerling et al., 2017). [3]Among ever-married respondents, [4]Among respondents with ≥1 child. **HH** = Household; ***p<=0.05; **95%CI** = 95% Confidence Interval.

3.2 Social norms affecting women

Respondents in the sample report that others in their community tend to believe that men should share in both household chores (average score of 2.8 out of 4) and childcare (3 out of 4) using a four-point Likert scale, where 1 indicates least perceived support for shared responsibilities and 4 reflects the greatest perceived support for shared responsibilities. However, compared to women in dual-adult households, men in dual-adult households are more likely to report that others in their community believe that men should share in household chores and childcare. In terms of overall relative autonomy, our sample reports a negative RAI score of -2.1, indicating motivations that are relatively more constrained by social norms. We did not observe statistically significant differences by respondent type in terms of the overall RAI, RAI related to employment or non-employment, and RAI related to making decisions about major household purchases. However, men in dual-adult households report significantly less autonomous motivation to participating in household chores compared to women in dual-adult and female-headed households.

Table 4: Social norms affecting women and relative autonomy by respondent type. Mean (95% CI).

	Total (N=2,132)	Men in a dual-adult HH (N=946)	Women in a dual-adult HH (N=946)	Women in a female-headed HH (N=240)	p-value
Household social norms[1]					
Role in chores	2.8 (2.8, 2.9)	3.0 (3.0, 3.1)	2.7 (2.7, 2.8)	2.6 (2.5, 2.7)	<0.001
Role in childcare	3.0 (3.0, 3.1)	3.2 (3.2, 3.3)	2.9 (2.9, 3.0)	2.7 (2.6, 2.8)	<0.001
Relative autonomy index[2]					
Overall	-2.1 (-2.2, -2.0)	-2.2 (-2.3, -2.1)	-2.0 (-2.1, -1.9)	-2.1 (-2.3, -1.9)	0.337
HH Chores	-2.2 (-2.4, -2.1)	-2.5 (-2.7, -2.4)	-2.0 (-2.1, -1.9)	-2.2 (-2.5, -2.0)	0.002
Employment (N=1,988)	-2.0 (-2.2, -1.8)	-2.0 (-2.2, -1.9)	-2.0 (-2.1, -1.9)	-1.9 (-2.1, -1.7)	0.753
Not employed (N=144)	-0.6 (-0.9, -0.3)	-0.3 (-0.6, -0.0)	-0.8 (-1.1, -0.4)	-0.9 (-1.4, -0.4)	0.180
HH Purchases (N=2,104)	-2.2 (-2.3, -2.0)	-2.1 (-2.3, -2.0)	-2.1 (-2.3, -2.0)	-2.2 (-2.5, -2.0)	0.656
No HH Purchases (N=28)	-0.9 (-1.5, -0.3)	-0.4 (-1.0, 0.1)	-1.1 (-2.1, -0.2)	-0.7 (-1.6, 0.3)	0.403

[1]A number closer to 1 indicates least perceived support for shared responsibilities and 4 reflects the greatest perceived support for shared responsibilities. [2]A positive number indicates greater autonomy while negative scores indicate a relatively controlled motivation

Our investigation into the perceived differences in social norms reported by women and men in dual-adult households aligns with our findings for the overall sample. Women perceive less community support for sharing responsibilities for household chores and childcare compared than men. As for relative autonomy, we do not observe a significant within-household

difference in men and women's RAI for any domain expect household chores where, on average women indicate more autonomy.

We did not observe any significant differences in social norms affecting women's, relative autonomy, or within-household differences in social norms reported by women and men between the treatment and control groups. See the detailed table in Appendix 6.1 for the differences between treatment and control groups by respondent type.

Table 5: Within-household differences in social norms and relative autonomy among dual-adult households. Differences are calculated at the household level by subtracting the woman's responses from the man's. Mean (95% CI). (N = 946).

	Dual-adult households
Within-household difference in household social norms [1]	
Role in chores	-0.3 (-0.4, -0.2)
Role in childcare	-0.3 (-0.4, -0.2)
Within-household difference in relative autonomy index[2]	
Relative Autonomy Index – Overall	0.2 (-0.1, 0.5)
Relative Autonomy Index - HH Chores	0.5 (0.2, 0.8)
Relative Autonomy Index - Employment (n=830)	0.1 (-0.3, 0.4)
Relative Autonomy Index - Not employed (n=5)	-0.5 (-3.8, 2.9)
Relative Autonomy Index - HH Purchases (n=921)	0.003 (-0.3, 0.3)
Relative Autonomy Index - No HH Purchases (n=1)	-0.7

[1]A positive number indicates greater perceived community support for shared responsibility among women while a negative number reflects greater perceived community support for shared responsibility among men. [2]A positive number indicates greater autonomy among women while a negative number reflects more autonomy among men.

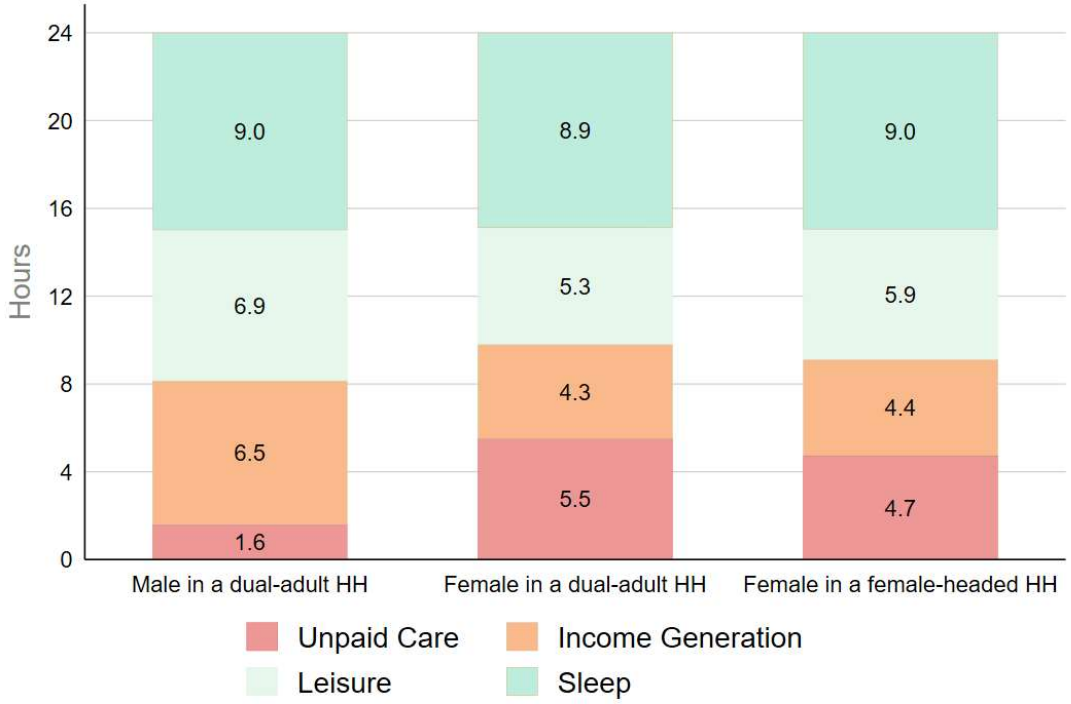
3.3 Unpaid care work

3.3.1 Allocation of time among men and women in dual-adult and female-headed households

Overall, women in dual-adult households report the largest daily workload (10.7 hours), followed by women in female-headed households (9.6 hours), and men in dual-adult households (8.3 hours). Men in dual-adult households spend the more time on income generation (6.5 hours) than women in both dual-adult households and female-headed households (4.3 and 4.4 hours, respectively). However, men's additional hours allocated to paid labor is dwarfed by the women's additional hours allocated to unpaid labor. Men in dual-adult households spend only 1.6 hours on unpaid care work, while women in dual-adult households carry out 5.5 hours of unpaid care work. Men in dual-adult households have more

leisure time (6.9 hours) than women in dual-adult households (5.3 hours), possibly due to less time spent on unpaid care responsibilities. Please see Figure 9 in Appendix 6.2 for a detailed breakdown of time spent on activities including those marked as 'Leisure'.

Figure 6: Time allocation over the past 24 hours by respondent type



Interestingly, women in female-headed households appear to have a significantly lower responsibility of care work (4.7 vs. 5.5 hours) and a lower daily workload (9.6 vs. 10.7 hours) than women in dual-adult households. Women in female-headed households spend less time on childcare as a secondary activity than women in dual-adult households (1.0 vs. 1.9 hours) possibly owing to smaller household size and fewer children. They also have slightly, but significantly, more leisure time than partnered women (5.9 hours vs 5.3 hours).

Table 6: Overall time allocation in the past 24 hours by respondent type (N = 2,132). Mean (95% CI).

	Overall (N=2,132)	Men in a dual-adult HH (N=946)	Women in a dual-adult HH (N=946)	Women in a female-headed HH (N=240)	p-value
Primary activities (hours)					<0.001
Unpaid care work	3.7 (3.5, 3.9)	1.6 (1.4, 1.8)	5.5 (5.3, 5.7)	4.7 (4.3, 5.2)	<0.001
Income generation	5.3 (5.0, 5.6)	6.5 (6.2, 6.9)	4.3 (4.0, 4.6)	4.4 (3.7, 5.0)	<0.001
Leisure	6.1 (5.8, 6.3)	6.9 (6.6, 7.2)	5.3 (5.1, 5.6)	5.9 (5.5, 6.4)	0.081

Sleep	8.9 (8.9, 9.0)	9.0 (8.9, 9.1)	8.9 (8.8, 9.0)	9.0 (8.8, 9.1)	<0.001
Childcare as secondary activity (hours)	1.1 (0.8, 1.3)	0.3 (0.2, 0.3)	1.9 (1.4, 2.3)	1.0 (0.6, 1.3)	<0.001
Daily Workload[1]	9.5 (9.2, 9.8)	8.3 (8.0, 8.6)	10.7 (10.4, 11.1)	9.6 (9.0, 10.2)	<0.001
Daily Unpaid Care Workload[2]	4.2 (4.0, 4.4)	1.7 (1.5, 2.0)	6.5 (6.1, 6.8)	5.2 (4.7, 5.7)	<0.001
Daily Primary Activities Workload[3]	9 (8.7, 9.3)	8.1 (7.8, 8.5)	9.8 (9.5, 10.1)	9.1 (8.6, 9.6)	<0.001

[1]Time in unpaid care work or income generation + 1/2 time in childcare as secondary activity; [2]Time in unpaid care work activity + 1/2 time in childcare as secondary activity; [3]Time in primary work-related activities: unpaid care and income generation.

Within dual-adult households, these differences correspond to a substantial responsibility of unpaid care work faced by women within dual-adult households, with women allocating an additional 3.9 hours of time to ($p<0.001$) unpaid care work as a primary activity daily. When including additional time spent on childcare as a secondary activity, women in dual-adult households allocate 6.5 hours to unpaid care work compared to men's 1.7 hours, yielding an even larger difference of 4.7 hours ($p<0.001$).

Table 7: Within-household difference in allocation of time allocated to care work comparing men and women in dual-headed households. Mean (95% CI). (N = 946)

	Value of the difference woman minus man in dual-headed households	p-value
Daily Workload[1]	2.5 (2.1, 2.9)	<0.001
Unpaid care as primary activity (hours)	3.9 (3.6, 4.2)	<0.001
Daily Unpaid Care Workload[2]	4.7 (4.3, 5.1)	<0.001
Daily Primary Activities Workload[3]	1.7 (1.4, 2.0)	<0.001

[1]Time in unpaid care work or income generation + 1/2 time in childcare as secondary activity; [2]Time in unpaid care work activity + 1/2 time in childcare as secondary activity; [3]Time in primary work-related activities: unpaid care and income generation.

Meal preparation is the largest contributor to unpaid care work overall (1.3 hours per day); followed by mobile work (0.8 hours); cleaning the house or compound (0.4 hours); washing, ironing, mending clothes (0.3 hours); and caring for children (0.3 hours); water collection (0.2 hours); and fuel collection (0.2 hours). However, these averages obscure women's and men's specific contributions. Women in dual-adult households spend 2.3 hours in meal preparation; 0.7 hours in cleaning; 0.5 hours in washing and mending clothes; 0.4 hours in childcare; 0.4 hours in water collection, and 0.3 hours in firework or fuel collection with women in female-headed household spending similar or slightly less time on each of these tasks. Men, however, report contributing almost no time to these tasks. On the other hand, men spend slightly more time on mobile work than women (1 hour compared to 0.7-0.8 hours). Both men and women

report similarly low levels of involvement in activities like caring for the elderly, ill, disabled or community members, household management and home repairs.

Table 8: Time spent on specific unpaid care activities by respondent type. Mean (95% CI).

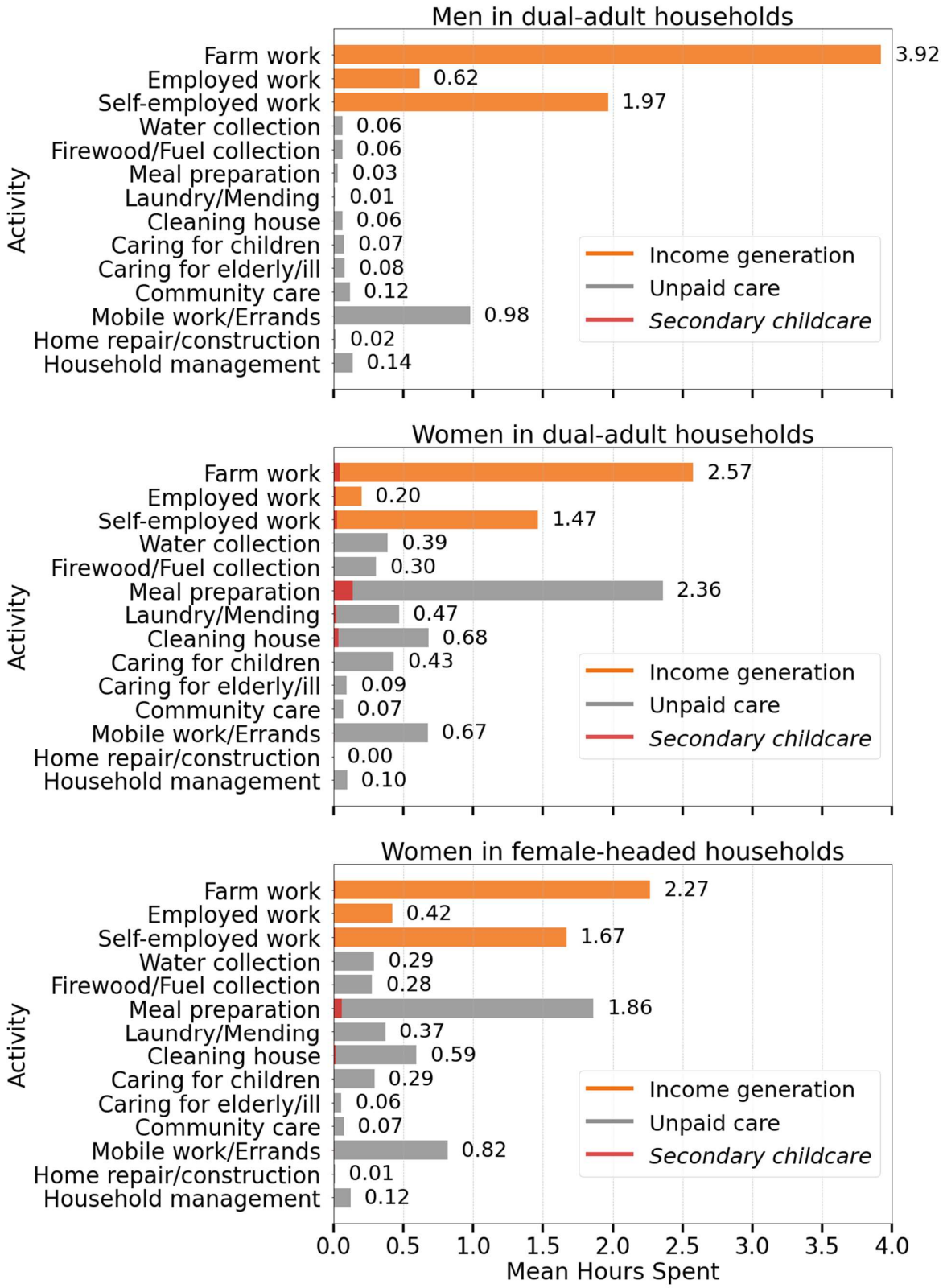
	Overall (N=2132)	Men in a dual-adult HH (N=946)	Women in a dual-adult HH (N=946)	Women in a female-headed HH (N=240)	p-value
Meal preparation	1.3 (1.2, 1.3)	0.0 (0.0, 0.0)	2.3 (2.2, 2.5)	1.8 (1.7, 2.0)	<0.001
Mobile work (commuting, shopping, etc.)	0.8 (0.7, 0.9)	1.0 (0.8, 1.1)	0.7 (0.5, 0.8)	0.8 (0.6, 1.0)	0.035
Cleaning the house or compound	0.4 (0.4, 0.4)	0.1 (0.0, 0.1)	0.7 (0.6, 0.7)	0.6 (0.5, 0.7)	<0.001
Washing, ironing, mending clothes	0.3 (0.2, 0.3)	0.0 (0.0, 0.0)	0.5 (0.4, 0.5)	0.4 (0.3, 0.5)	<0.001
Caring for children	0.3 (0.2, 0.3)	0.1 (0.0, 0.1)	0.4 (0.4, 0.5)	0.3 (0.2, 0.4)	<0.001
Water collection	0.2 (0.2, 0.3)	0.1 (0.0, 0.1)	0.4 (0.3, 0.4)	0.3 (0.2, 0.4)	<0.001
Firewood/Fuel collection	0.2 (0.2, 0.2)	0.1 (0.0, 0.1)	0.3 (0.2, 0.4)	0.3 (0.2, 0.4)	<0.001
Caring for elderly, ill, or disabled	0.1 (0.1, 0.1)	0.1 (0.0, 0.1)	0.1 (0.1, 0.1)	0.1 (0.0, 0.1)	0.482
Caring for other community members	0.1 (0.1, 0.1)	0.1 (0.1, 0.2)	0.1 (0.0, 0.1)	0.1 (-0.0, 0.1)	0.315
Household management	0.1 (0.1, 0.1)	0.1 (0.1, 0.2)	0.1 (0.1, 0.1)	0.1 (0.1, 0.2)	0.440
Home repair and construction	<0.01[1]	<0.01[1]	<0.01[1]	<0.01[1]	0.242

[1]Point estimates and upper and lower bound of 95% CIs were less than 0.01 hours.

Looking more closely at specific time-use activities that comprise paid and unpaid work provides additional insights (Figure 7). Men in dual-adult households dedicate significantly more time to agricultural work compared to women. Women in female-headed households, on the other hand, spend more time on self-employment and are less active in agriculture than women in dual-adult households, suggesting variations in livelihood activities across household types.

Secondary childcare activities also show marked differences. Women in female-headed households primarily care for children while engaging in home-based activities like cooking and cleaning. In contrast, women in dual-adult households not only manage home-based childcare but also often take their children along for farm and mobile work activities. Moreover, women also perform childcare as a secondary activity during times marked as leisure (Figure 9, Appendix 6.2), especially during eating and pure leisure and social time. Men's contributions to secondary childcare are so minimal that they are not visible on the graph.

Figure 7: Primary activity and secondary childcare time by respondent type.



Time use patterns also reveal stark contrasts in the number of distinct activities in a day. Only 18% of women in dual-adult households report fewer than 10 distinct activities in a day, compared to 34% of women in female-headed households. For men in dual-adult households, 56% report fewer than 10 daily activities, often involving long, uninterrupted periods of paid work and leisure, underscoring the uneven distribution of responsibilities across women and men and importance of household structures.

Appendix 6.3 conveys more information about the allocation of time to childcare among parents specifically. As expected, female respondents who have children of their own spend a great deal more time on childcare than the average woman in the sample. The highest amounts of time spent on childcare appear among mothers who have both children under 5 and children aged 5 to 11—around 44 minutes in primary childcare and 3.6 hours in secondary childcare. In contrast, fathers contribute only about 8 minutes on primary childcare and 25 minutes on secondary childcare amongst the dual-adult households with both children under 5 and children aged 5 to 11.

3.3.2 Allocation of time and within-household differences in treatment and control households ahead of the intervention

Overall, the baseline data largely supports the comparability of the control and treatment groups, with minor exceptions that may need to be accounted for in subsequent analyses. Analyzing time allocation by respondent type and treatment group reveals that, prior to the intervention, there are minimal differences between treatment and control groups within each respondent category at baseline.

Among men in dual-adult households, those in the treatment arm spend on average 1.9 hours on unpaid care compared to the 1.3 hours for their counterparts in the control group. This leads to a corresponding statistically significant difference among men in dual-adult households in terms of daily workload in unpaid care work, including time spent on childcare as a secondary activity (2.0 vs 1.5). Although this difference is statistically significant, in both the treatment and the control groups men's contribution to unpaid care remains substantially lower than women's contribution. Also, women in female-headed households spend more time on income generation in the treatment arm than the control arm (5 vs. 3.8 hours), a statistically significant difference.

Table 9: Time allocation by respondent type and treatment. Mean (95% CI).

	Men in dual-adult household			Women in dual-adult household			Women in female-headed household		
	Treatment (N=480)	Control (N=466)	p-value	Treatment (N=480)	Control (N=466)	p-value	Treatment (N=120)	Control (N=120)	p-value
Primary activities (hours)									
Unpaid care work	1.9 (1.5, 2.2)	1.3 (1.1, 1.6)	0.016	5.5 (5.2, 5.9)	5.5 (5.2, 5.8)	0.756	4.5 (3.9, 5.1)	5.0 (4.3, 5.6)	0.299
Income generation	6.4 (5.9, 7.0)	6.6 (6.2, 7.1)	0.585	4.4 (3.9, 4.9)	4.2 (3.8, 4.6)	0.443	5.0 (4.2, 5.8)	3.8 (2.8, 4.7)	0.047
Leisure	6.7 (6.3, 7.1)	7.0 (6.7, 7.4)	0.283	5.2 (4.9, 5.5)	5.4 (5.0, 5.8)	0.377	5.7 (5.1, 6.3)	6.2 (5.5, 6.9)	0.270
Sleep	9.0 (8.8, 9.1)	9.0 (8.9, 9.1)	0.749	8.8 (8.7, 9.0)	8.9 (8.8, 9.0)	0.391	8.8 (8.6, 9.1)	9.1 (8.9, 9.3)	0.072
Childcare as secondary activity (hours)	0.3 (0.2, 0.4)	0.2 (0.2, 0.3)	0.714	1.7 (1.3, 2.1)	2.1 (1.3, 2.9)	0.351	1.2 (0.7, 1.6)	0.7 (0.2, 1.2)	0.179
Daily Workload[1]	8.4 (7.9, 8.9)	8.1 (7.7, 8.5)	0.282	10.8 (10.4, 11.2)	10.7 (10.0,11.4)	0.811	10.1 (9.4, 10.8)	9.1 (8.2, 9.9)	0.072
Daily Unpaid Care Workload[2]	2.0 (1.7, 2.4)	1.5 (1.2, 1.7)	0.014	6.4 (6.0, 6.8)	6.5 (6.0, 7.1)	0.684	5.1 (4.4, 5.8)	5.3 (4.6, 6.0)	0.625
Daily Primary Activities Workload[3]	8.3 (7.8, 8.8)	8.0 (7.6, 8.4)	0.298	10.0 (9.6, 10.3)	9.7 (9.2, 10.1)	0.254	9.5 (8.9, 10.2)	8.7 (8.0, 9.5)	0.118

[1]Time in unpaid care work or income generation + 1/2 time in childcare as secondary activity; [2]Time in unpaid care work activity + 1/2 time in childcare as secondary activity; [3]Time in primary work-related activities: unpaid care and income generation.

At baseline, within-household difference in allocation of time to unpaid care work comparing men and women in dual-headed households are similar between the treatment and control groups, suggesting that the randomization process was largely effective. Only the unpaid time spent on caring for elderly, ill, or disabled individuals indicates a statistically significant difference between the control and treatment groups (p=0.035), but this activity represents a very small contributor to the unpaid care work responsibility.

Table 10: Within-household difference in allocation of time in unpaid care by treatment arm. within dual-adult households. . Differences are calculated at the household level by subtracting the woman's responses from the man's such that positive values reflect greater responsibilities of unpaid care work among women. Mean and (95% CI).

	Overall N=946	Treatment (N=480)	Control (N=466)	p-value
Unpaid care as primary activity (total)	3.9 (3.6, 4.2)	3.7 (3.2, 4.1)	4.1 (3.8, 4.5)	0.109
Meal preparation	2.3 (2.2, 2.4)	2.4 (2.2, 2.5)	2.2 (2.1, 2.4)	0.220
Cleaning the house or compound	0.6 (0.6, 0.7)	0.6 (0.5, 0.7)	0.6 (0.5, 0.7)	0.816
Washing, ironing, mending clothes	0.5 (0.4, 0.5)	0.4 (0.3, 0.5)	0.5 (0.4, 0.6)	0.077
Caring for children	0.4 (0.3, 0.4)	0.3 (0.3, 0.4)	0.4 (0.3, 0.5)	0.449
Water collection	0.3 (0.3, 0.4)	0.4 (0.3, 0.4)	0.3 (0.2, 0.4)	0.333
Firewood/Fuel collection	0.2 (0.2, 0.3)	0.2 (0.1, 0.4)	0.2 (0.2, 0.3)	0.790
Caring for elderly, ill, or disabled	0.0 (-0.1, 0.1)	-0.0 (-0.1, 0.1)	0.1 (0.0, 0.1)	0.035
Household management	-0.0 (-0.1, 0.0)	-0.0 (-0.1, 0.1)	-0.0 (-0.1, 0.0)	0.871
Home repair and construction	-0.0 (-0.0, 0.0)	-0.0 (-0.1, 0.0)	0.0 (., .)	NA
Caring for other community members	-0.1 (-0.1, 0.0)	-0.0 (-0.1, 0.1)	-0.1 (-0.2, 0.0)	0.524
Mobile work (commuting, shopping, etc.)	-0.3 (-0.5, -0.1)	-0.5 (-0.8, -0.1)	-0.1 (-0.3, 0.2)	0.060

3.4 Investment in labor-saving devices and outsourcing of care work

Overall, we estimated that total household expenditure on labor-saving devices in the past year averaged 245 USD, total household asset ownership of labor-saving devices was valued at 1,540 USD, and expenditure on outsourced care work in the previous month was only 4USD. On average, about 27% of asset ownership in labor-saving devices is for traditionally female tasks such as cooking, cleaning, and water collection/use.

We observed different investment patterns on labor-saving devices between dual-adult and female-headed households, with dual-adult households reporting significantly higher average expenditure (271 USD vs. 143 USD) and asset ownership (1,726 USD vs. 810 USD) of labor-saving devices purchased in the 12 months before the survey.

There is no significant difference in the expenditure or asset ownership by household type for devices used traditionally for female tasks. However, in female-headed households devices used for traditionally female tasks account for a larger share of all devices (50%) compared to dual-adult households (25%).

The mean expenditure on outsourced care work in the last month before the survey is more aligned between dual-adult and female-headed households (4 USD vs. 3 USD).

Table 11: Investment in labor-saving devices and outsourced care work by household composition (N=1186). All values presented as 2023 PPP USD. Mean (95% CI).

	Overall (N=1,186)	Dual-adult household (N=946)	Female-headed household (N=240)	p-value
Annual HH expenditure on labor-saving devices	245 (204, 286)	271 (220, 321)	143 (90, 196)	0.001
Annual HH expenditure on labor-saving devices for traditionally female tasks[2]	69 (61, 77)	70 (62, 79)	63 (52, 75)	0.264
Total HH asset ownership of labor-saving devices	1540 (1419, 1662)	1726 (1583, 1869)	810 (691, 929)	<0.001
Total HH asset ownership of labor-saving devices of traditionally female tasks	423 (399, 447)	429 (402, 455)	401 (366, 436)	0.138
Last month's HH expenditure on outsourced care work	4 (3, 5)	4 (3, 6)	3 (1, 5)	0.204

When comparing the treatment and control groups, we did not observe any significant difference in household investments in labor-saving devices, overall asset ownership, or outsourced care work, in the overall study population or when we stratified by household composition.

[2] The list of the 14 labor-saving devices considered for traditionally female tasks includes: charcoal stove, modern firewood/coal stove, electric/gas stove (including microwave oven), cooking pot, small electric appliances, refrigerator/freezer/fridge-freezer, washing machine, sewing machine, iron (electric or charcoal), brooms/brushes/broom heads, bucket/jerry can/water drum, water heater, water pump/tap, water filter.

Table 12: Investment in labor-saving devices and outsourced care work among treatment and control stratified by household composition (N = 1,186). All values are in 2023 PPP USD. Mean (95% CI)

	Overall (N = 1186)			Dual-adult Household (N = 946)			Female-headed Household (N = 240)		
	Treat. (N=600)	Control (N=584)	p-value	Treat. (N=466)	Control (N=480)	p-value	Treat. (N=120)	Control (N=120)	p-value
Annual HH expenditure on labor-saving devices	243 (191, 296)	247 (182, 311)	0.940	270 (204, 336)	271 (195, 349)	0.973	137 (66, 207)	149 (69, 229)	0.825
Annual HH expenditure on labor-saving devices for traditionally female tasks	73 (62, 84)	65 (55, 75)	0.316	75 (63, 87)	66 (55, 77)	0.294	65 (48, 81)	62 (46, 78)	0.814
Total asset ownership	1507 (1320, 1694)	1575 (1424, 1725)	0.575	1677 (1462, 1893)	1775 (1591, 1960)	0.491	825 (632, 1019)	794 (655, 934)	0.797
Total HH asset ownership of labor-saving devices of traditionally female tasks	419 (380, 458)	427 (399, 456)	0.721	422 (379, 464)	436 (406, 466)	0.585	408 (355, 460)	395 (348, 441)	0.707
Last month HH expenditure on outsourced care work	4 (3, 6)	4 (2, 6)	0.854	5 (3, 6)	4 (2, 6)	0.882	3 (1, 5)	3 (-0, 6)	0.886

In the previous year, households most commonly invested in cooking pots (99.2%); buckets, jerry cans, or water drums (98.1%); brooms and brushes (82.6%); charcoal stoves (60.5%); and solar lamps (54.3%); and solar systems (49.2%). Dual-adult households have higher investment in many of the devices compared to female-headed households. These gaps are significantly more pronounced for household appliances like solar systems (53.6% vs 32.1%), bicycle (46.0% vs 12.9%), electric or charcoal iron (35.7% vs 28.3%) motorcycles/scooters (26.8% vs 5.4%), and ox plough (22.4% vs 5.8%). When we compared investment in individual devices, the only significant difference between treatment and control group was for water heaters, 4.2% treatment vs 2.0% control.

Table 13: Most invested-in labor-saving devices by household type in the last year. n (%)

	Overall (N=1,186)	Dual-adult household (N=946)	Female-headed household (N=240)	p-value
Cooking pot*	1,176 (99.2)	937 (99.0)	239 (99.6)	0.442
Bucket, jerry can or water drum*	1,163 (98.1)	929 (98.2)	234 (97.5)	0.480

Brooms, brushes, or broom heads*	980 (82.6)	775 (81.9)	205 (85.4)	0.161
Charcoal stove*	718 (60.5)	573 (60.6)	145 (60.4)	0.962
Solar lamp	644 (54.3)	527 (55.7)	117 (48.8)	0.072
Solar system	584 (49.2)	507 (53.6)	77 (32.1)	<0.001
Bicycle	466 (39.3)	435 (46.0)	31 (12.9)	<0.001
Electric or charcoal Iron*	406 (34.2)	338 (35.7)	68 (28.3)	0.019
Modern firewood or coal stove*	341 (28.8)	264 (27.9)	77 (32.1)	0.208
Motorcycle, Motorbike, Scooter or Moped	267 (22.5)	254 (26.8)	13 (5.4)	<0.001
Electric or gas stove*	239 (20.2)	180 (19.0)	59 (24.6)	0.049
Ox plough	226 (19.1)	212 (22.4)	14 (5.8)	<0.001
Water pump or water tap*	107 (9.0)	89 (9.4)	18 (7.5)	0.364
Lantern lamps	100 (8.4)	81 (8.6)	19 (7.9)	0.761
Sewing machine*	87 (7.3)	72 (7.6)	15 (6.3)	0.471

*Labor-saving devices for traditionally female tasks in the kitchen, for cleaning, for upkeep of clothes, for water collection and use.

Households predominantly outsourced delivery services, with no significant differences between female-headed and dual-adult households. Among the 125 households that reported outsourcing care work in the last month before the survey, 51.2% used delivery services, followed by household chores (cooking, cleaning) at 21.6% while other care services showed minimal outsourcing at less than 4%. The type of household does not significantly influence the reported outsourcing decisions.

Table 14: Types of outsourced care work that households invested the most in among those investing in at least some outsourced care work (N = 125). n (%)

	Overall (N=125)	**Dual-adult household (N=103)**	**Female-headed household (N=22)**	**p-value**
Delivery services	64 (51.2)	53 (51.5)	11 (50.0)	0.906
Chores (cooking, cleaning etc.)	27 (21.6)	22 (21.4)	5 (22.7)	0.883
Childcare	4 (3.2)	4 (3.9)	0 (0.0)	0.545
Care for elderly or disabled	2 (1.6)	1 (1.0)	1 (4.5)	0.230
Other work	2 (1.6)	1 (1.0)	1 (4.5)	0.252

3.5 Household income

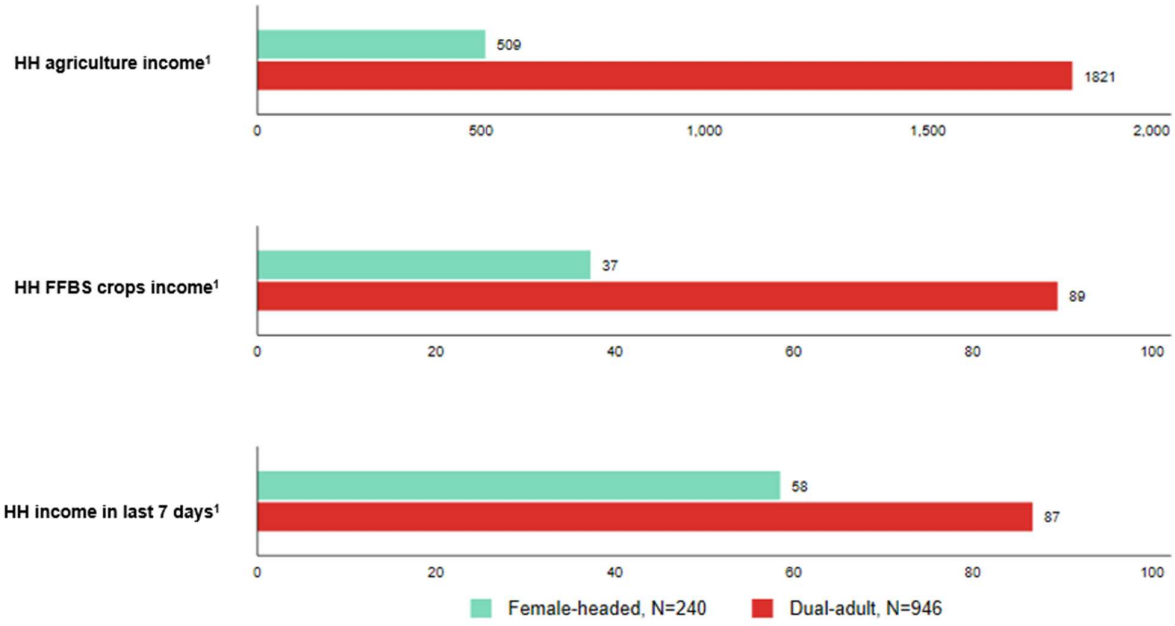
Overall, we estimate that households earn $1,555 (2023 PPP) in annual agricultural income from all sources wherein about 11% report earning no annual agricultural income. About 5% of the annual agricultural income is from FFBS- related agricultural activities (soybeans and sunflower crops reported to be grown by about 20% of the sample). In terms of weekly income from all sources, the households report earning $81 (2023 PPP).

Table 15: Household income from all agricultural activities, FFBS-related agricultural activities and weekly income by household composition. All values are given in 2023 PPP USD. Mean (95% CI). (N = 1,186).

	Overall
Annual agricultural income	1,555 (1,289, 1,822)
Annual income attributable to FFBS	79 (49, 109)
Weekly income from all sources (winsorized at 98 percentile)	81 (72, 90)

Dual-adult households earn 3.6 times more annual agricultural income, 2.4 times more annual income attributable to FFBS, and 1.5 times more weekly income from all sources compared to female-headed households. Even though the dual-headed households earn more income from FFBS-related agricultural activities (soybeans and sunflower crops), these crops form about 7% of the female-headed households compared to 5% for the dual-adult households.

Figure 8: Household income from all agricultural activities, FFBS-related agricultural activities, and weekly income (in $PPP 2023) by household composition



¹Income differed significantly between type of household (p < 0.001).

There are no significant differences in income between treatment and control groups in dual-adult and female-headed households except for income from agricultural activities. Among female-headed households, income from agricultural activities is significantly higher at the 5% level in the treatment arm ($652 PPP 2023) than in the control arm ($366 PPP 2023).

The table highlights how household structure impacts women and men's control over household income. As expected, women in female-headed households who are the household heads have the most sole control over income (70%) and decide jointly with other household members on only 25% of income. Meanwhile, dual-adult households share control over household income. Perhaps surprisingly, women reported a higher proportion of sole control compared to their husbands (26% versus 20%), and conversely men reported a higher proportion of joint control compared to their wives (72% and 63%, respectively).

Table 16: Proportion of household income over which respondents have control by respondent type. Mean (95% CI).

	Overall (N=2,132)	Men in a Dual-Adult HH (N=946)	Women in a Dual-Adult HH (N=946)	Women in a Female-Headed HH (N=240)	p-value
Sole control	29% (28%, 31%)	20% (18%, 22%)	28% (26%, 31%)	70% (66%, 75%)	<0.001
Joint control	63% (60%, 65%)	72% (68%, 75%)	63% (61%, 65%)	25% (21%, 29%)	<0.001
No control	8% (6%, 9%)	8% (6%, 10%)	9% (7%, 11%)	4% (3%, 6%)	0.003

3.6 Externalities

3.6.1 Evidence for intra-household conflict and satisfaction with relationship

Dual-adult household respondents generally report a low frequency of spousal disagreements on each of the five areas of interest, with averages ranging between 0-1 (Never to Seldom). Yet women report a significantly higher frequency of disagreements with their partners compared to men, for all topics of disagreement except leisure time.

The total conflict score shows a clear difference in perceptions of conflict among spouses within the same households, with the female spouse scoring 2.1 compared to the male spouse's 1.4 score (on a scale from 0 to 20, $p < 0.00$). Similarly, women report significantly lower satisfaction levels in their relationship (8.1 versus 9 for men), the division of household tasks (7.9 versus 8.8) and childcare responsibilities (7.9 versus 9).

Table 17: Intra-household conflict and satisfaction in dual-adult households. Mean (95% CI).

	Overall (N=1892)	Men (N=946)	Women (N=946)	p-value
Frequency of disagreements with partner[1]				
Total conflict score (0-20)	1.8 (1.6, 2.0)	1.4 (1.2, 1.7)	2.1 (1.9, 2.4)	<0.001
About paid work	0.4 (0.3, 0.4)	0.3 (0.2, 0.3)	0.4 (0.4, 0.5)	<0.001
About household chores	0.3 (0.3, 0.4)	0.3 (0.2, 0.3)	0.4 (0.3, 0.4)	0.011
About money	0.5 (0.4, 0.5)	0.4 (0.3, 0.4)	0.6 (0.5, 0.7)	<0.001
About use of leisure time	0.2 (0.2, 0.3)	0.2 (0.2, 0.3)	0.2 (0.2, 0.3)	0.358
About child-raising issues	0.4 (0.4, 0.5)	0.3 (0.3, 0.4)	0.5 (0.4, 0.6)	0.001
Satisfaction[2]				
With spousal relationship	8.6 (8.5, 8.7)	9.0 (8.9, 9.2)	8.1 (7.9, 8.3)	<0.001
With division of household tasks	8.3 (8.2, 8.5)	8.8 (8.7, 9.0)	7.9 (7.6, 8.1)	<0.001
With division of childcare	8.4 (8.3, 8.6)	9.0 (8.8, 9.1)	7.9 (7.7, 8.1)	<0.001

[1]In the last 12 months (Never=0 - Very often=4). [2]On a scale of 0 (least satisfaction) to 10 (most satisfaction)

The baseline data reveals no significant differences in frequency of conflict between control and treatment groups.

Table 18: Intra-household conflict and satisfaction in dual-adult households by treatment status. Mean (95% CI).

	Men			Women		
	Treatment (N=480)	Control (N=466)	p-value	Treatment (N=480)	Control (N=466)	p-value
Frequency of disagreements with partner[1]						
Total conflict score (0-20)	1.4 (1.1, 1.7)	1.5 (1.2, 1.9)	0.444	2.1 (1.7, 2.5)	2.2 (1.8, 2.6)	0.740
About paid work	0.3 (0.2, 0.3)	0.3 (0.2, 0.4)	0.828	0.4 (0.3, 0.5)	0.4 (0.4, 0.5)	0.758
About household chores	0.2 (0.2, 0.3)	0.3 (0.2, 0.4)	0.248	0.3 (0.2, 0.4)	0.4 (0.3, 0.5)	0.229
About money	0.4 (0.3, 0.4)	0.4 (0.3, 0.5)	0.661	0.6 (0.5, 0.7)	0.6 (0.5, 0.7)	0.590
About use of leisure time	0.2 (0.1, 0.3)	0.2 (0.2, 0.3)	0.352	0.2 (0.2, 0.3)	0.2 (0.2, 0.3)	0.784
About child-raising issues	0.3 (0.2, 0.4)	0.3 (0.3, 0.4)	0.528	0.5 (0.4, 0.6)	0.5 (0.4, 0.6)	0.586
Satisfaction[2]						
With spousal relationship	9.1 (8.9, 9.2)	9.0 (8.8, 9.2)	0.542	8.0 (7.7, 8.2)	8.3 (8.0, 8.5)	0.113
With division of household tasks	8.8 (8.6, 9.0)	8.9 (8.7, 9.0)	0.690	7.8 (7.5, 8.1)	7.9 (7.6, 8.2)	0.742
With division of childcare	9.0 (8.8, 9.2)	8.9 (8.6, 9.2)	0.559	8.0 (7.7, 8.3)	7.9 (7.6, 8.2)	0.608

[1]In the last 12 months (Never=0 - Very often=4). [2]On a scale of 0 (least satisfaction) to 10 (most satisfaction)

3.6.2 Household members' time spent on paid work and education

The table presents baseline data on the average time spent on their own education (training or capacity building included) and paid work in the past week among adults (over 18) and school-aged children (6 to 17). The average adult man spends weekly slightly more time than the adult woman on paid work (25 hours compared to 23.2 hours), and both adult men and women spend negligible amounts of time on education. The average school-aged girl spends 24 hours per week studying and the average school-aged boy spends 23.1 hours, though boys are significantly more engaged in income generation than girls (1.2 hours versus 0.1 hours), possibly reflecting increased unpaid care responsibilities for girls. Across all categories, including adult women and men, as well as school-aged girls and boys, the mean values for both education and paid work are statistically not different between the control and treatment groups.

Table 19: Differences between the time allocated to paid work and to education in the past week per adult woman, adult man, girl, and boy in the household by treatment status. Mean (95% CI).

	Overall (N=2132)	Treatment (N=1080)	Control (N=1052)	p-value
Hours spent on education in the past week by:				
Adult women (≥18)	0.7 (0.4, 1.0)	0.9 (0.4, 1.3)	0.6 (0.2, 0.9)	0.327
Adult men (≥18)	0.8 (0.5, 1.1)	0.9 (0.4, 1.3)	0.8 (0.4, 1.1)	0.730
School-aged girls (6-17)	24.4 (22.4, 26.3)	24.0 (21.5, 26.4)	24.8 (21.8, 27.8)	0.667
School-aged boys (6-17)	23.0 (21.6, 24.4)	23.1 (21.1, 25.0)	22.9 (20.8, 24.9)	0.878
Hours spent on paid work in the past week by:				
Adult women (≥18)	23.2 (21.3, 25.0)	21.8 (19.6, 23.9)	24.6 (21.7, 27.6)	0.121
Adult men (≥18)	25.0 (23.1, 26.9)	23.5 (21.2, 25.8)	26.5 (23.6, 29.4)	0.116
School-aged girls (6-17)	0.1 (0.0, 0.2)	0.1 (-0.0, 0.2)	0.1 (-0.0, 0.3)	0.747
School-aged boys (6-17)	1.2 (0.7, 1.6)	1.0 (0.5, 1.6)	1.3 (0.5, 2.1)	0.607

4. Discussion

Our study confirms that there is a large gap in women and men's workload overall and care work. Our estimates are in line with previous estimates for Tanzania that showed a male-female breakdown of daily unpaid labor of 1 hour and 4 hours, respectively (World Bank 2019). Women in dual-adult households reported an average workload of 10.7 hours, which is above the threshold used by the Pro-WEAI to identify individuals who are disempowered (Seymour 2023). These findings suggest that unpaid care work is reducing the time available for women's economic activities and personal leisure and contributing to disempowerment. In our study, we found meal preparations and childcare as secondary activity are major contributions to women's unpaid care work, and these may be high-priority areas for focus. We also discovered that boys in the study households are significantly more engaged in income generation than girls, possibly reflecting increased unpaid care responsibilities for girls. While not a main focus of the project, this externality is important to keep in mind.

Our exploration of attitudes, norms and perceptions revealed several interesting differences among men and women. The findings reveal a gap between men's attitudes and motivations regarding household chores in dual-adult households. While men are more likely to report that others in their community believe that men should share in household chores and childcare—suggesting an acceptance of changing social norms—they also express lower autonomous motivation to engage in these tasks. This indicates that while men recognize the importance of shared responsibilities, their participation may be influenced more by societal pressures rather than intrinsic drive. This disconnect highlights the need for the Care Work Modules to foster autonomous motivation for men to participate in household chores. Similarly, men in dual-adult households report greater overall satisfaction with their spouse and perceive less feelings of conflict with their spouse than women. One possible explanation is that men's responsibilities often align more closely with traditional societal norms, potentially reducing their perceptions of conflict or dissatisfaction. While our evaluation will monitor intrahousehold conflict as a possible negative externality of the invention, it is likely that equalizing care work - and satisfaction - within the household could challenge men to confront some of these social norms in a way that is, at times, uncomfortable.

The findings provide valuable insights into household investments in labor-saving devices in Iringa, highlighting patterns influenced by economic disparities among household types. Households predominantly invest in items beneficial for traditionally female tasks that reduce domestic labor, such as cooking pots (99.2%), water storage containers (98.1%), and cleaning tools like brooms and brushes (82.6%). However, disparities in asset ownership are evident in areas such as mobility assets (e.g., bicycles, motorcycles/scooters) and productive technologies (e.g., solar systems, ox ploughs). Men are more likely to benefit from these assets, which enhance mobility and productivity, while women primarily benefit from domestic labor-saving devices. These patterns in asset ownership align with broader findings across developing contexts, where the number, share, and value of male-owned assets consistently exceed those of female-owned assets across all asset categories (Johnson et al., 2016). Household expenditure on outsourced care work remains low (4 USD),

suggesting a reliance on internal labor-saving solutions rather than external services. This trend may stem from economic constraints but also highlights a potential growth area for interventions promoting care work outsourcing.

Women in female-headed households face different constraints than those in dual-adult households regarding investments in labor-saving devices. Despite potentially having lower care work demands due to smaller family sizes, female-headed households demonstrate lower investment in labor-saving devices (143 USD) compared to dual-adult households (271 USD). There are no significant differences in the monetary investment in labor-saving devices traditionally used for female tasks between dual-adult households and female-headed households. However, these devices constitute a larger proportion of the total investment in labor-saving devices for female-headed households. This substantial gap reflects broader structural challenges, where female-headed households often operate under more financial constraints and lower disposable incomes. Dual-adult households, benefiting from higher incomes and resource pooling, demonstrate greater capacity to prioritize and invest in labor-saving devices. This disparity suggests that female-headed households' lower investment levels may reflect both resource constraints and different household priorities, where immediate needs might take preference over long-term labor-saving investments.

The successful randomization at the paraprofessional level for this study ensured that the treatment and control groups were largely comparable at baseline, minimizing selection bias and enhancing the internal validity of the findings. Any differences between the treatment and control groups at baseline will be considered in the analysis at endline. The rigorous selection criteria from the farmer registration list ensured that the sample was representative of the FFBS group members in Iringa district council. These methodological strengths underpin the credibility of the study's conclusions and contribute to its robustness.

This study provides valuable insights, but certain limitations must be acknowledged to contextualize the findings and their broader applicability. First, while the focus on Iringa District Council limits the generalizability to regions with different socio-economic or cultural contexts, Iringa is a well-suited choice for studying rural livelihoods and agriculture. The district's economy is predominantly agricultural, with most residents engaged in activities that are characteristic of many rural Tanzanian districts, such as cropping, horticulture, and livestock rearing. Additionally, its population density, which falls in the middle range among Tanzanian districts, reflects a mix of rural agricultural livelihoods and small-town hubs, making it a representative case for rural-focused studies, though less applicable to urban settings. Furthermore, the scope of this study can be expanded upon successful scaling in other regions of Tanzania and beyond.

Second, the study encountered challenges in identifying and securing participation from both spouses in dual-adult households due to the unavailability of spouses, no consent given or spouses not seeing the direct benefit of the FFBS program, which impacted the ability to achieve the full target sample size for these households. Despite this, the baseline reached 99% of the overall target sample, minimizing any effects on the robustness of the analysis. Nonetheless, it will be critical to monitor attrition at endline to ensure the capacity to detect smaller effect sizes and maintain the validity of the findings.

5. Conclusion and recommendations

These key findings suggest that there is a substantial need to reduce the gap in unpaid care work among agricultural households participating in the FFBS. Targeted suggestions for improving the Care Work Modules include:

- **Focus on cooking and meal preparation**: We found that cooking and meal preparation is the largest contributor to women's unpaid care work. FFBS should tailor its existing cooking demonstrations to emphasize men's participation as an opportunity to reduce women's unpaid care work.
- **Amplify the visibility of childcare**: Women reported spending much more time than men providing childcare as a secondary activity. Recognizing the additional responsibility associated with this multitasking may be a necessary first step in reducing this source of unpaid care work among women.
- **Encourage men's involvement in recurring input collection tasks**: Despite men contributing significantly to mobile work activities such as commuting and running errands, they provide minimal to no effort in other essential outdoor tasks like collecting water and firewood or fuel. Furthermore, women in dual-adult households often shoulder additional responsibilities by taking on secondary childcare responsibilities during farm and mobile activities, as well as during mealtimes. Men could play a greater role in these areas to alleviate some of the unpaid care workload for women.
- **Pay attention to household structure as a factor shaping unpaid care work**: Women in female-headed households report a lower daily workload (9.6 hours) and less time spent on unpaid care (4.7 hours) compared to their counterparts in dual-adult households (10.7 hours and 5.5 hours, respectively). These reduced responsibilities may stem from smaller household sizes, fewer dependents, or the absence of a male partner whose care needs are added to women's responsibilities in dual-adult households.
- **Build autonomous motivation among men**: Our analysis of social norms suggest that men already perceive that their community believes they should play a role in household chores and childcare. However, they also report lower levels of autonomous motivation to engage in household chores. These findings suggest that it may be less important to shift norms at the community level than shifting individual men's beliefs about their roles within their own household.
- **Explore opportunities for outsourcing care work**: Investment in outsourced care work was extremely low. Understanding contextually relevant opportunities for outsourcing care work may create greater awareness of this possibility.

At endline, our priority will be to investigate the causal impact of the additional Care Work Modules, specifically assessing the program's effect on dual-adult households, and evaluating whether these effects differ for women in dual-adult versus female-headed households. We will also address our other research questions which are more observational in nature,

focusing on key dynamics, such as how reductions in unpaid care work among women affect their time allocation to paid work, unpaid work, and leisure, as well as their control over income. We will also explore how equalizing the distribution of care work between men and women would influence overall household time use and income.

Our baseline findings suggest several additional opportunities for analysis at endline and for future research:

- Understand the heterogeneous effects of the Care Work Modules based on woman's age and motherhood status, woman's baseline empowerment, asset ownership (measured by value of labor-saving devices owned) at baseline, and men's attitude at baseline. This could help identify specific subgroups that benefit most from the Care Work Modules and provide insights to tailor future program strategies for enhanced impact
- To strengthen the evidence base and assess the broader applicability of the findings, the study could be replicated in another location where the FFBS intervention is implemented. Conducting the study in a different socio-economic and cultural context would provide insights into how local factors influence the intervention's outcomes and help identify context-specific barriers or facilitators.

6. Appendix

6.1 Difference in social norms affecting women by treatment status

The treatment and control groups are similar with respect to social norms affecting women, and relative autonomy index. We did not observe any significant differences; therefore, the groups are balanced.

Table 20: Social norms affecting women and girls, and relative autonomy index by treatment status and sex.

	Men in dual-adult household			Women in dual-adult household			Women in female-headed household		
	Treatment (N=480)	Control (N=466)	p-value	Treatment (N=480)	Control (N=466)	p-value	Treatment (N=120)	Control (N=120)	p-value
Household Social Norms[1]									
Role in chores	2.0 (1.9, 2.1)	1.9 (1.8, 2.0)	0.335	2.3 (2.2, 2.3)	2.3 (2.2, 2.3)	0.567	2.3 (2.2, 2.5)	2.4 (2.3, 2.6)	0.454
Role in childcare	1.8 (1.7, 1.9)	1.8 (1.7, 1.9)	0.949	2.1 (2.0, 2.1)	2.1 (2.0, 2.1)	0.764	2.2 (2.1, 2.3)	2.4 (2.2, 2.5)	0.197
Relative autonomy index[2]									
Overall	-2.2 (-2.5, -1.9)	-2.2 (-2.5, -1.9)	0.945	-2.0 (-2.3, -1.8)	-2.0 (-2.2, -1.7)	0.752	-2.0 (-2.4, -1.6)	-2.1 (-2.5, -1.8)	0.731
HH Chores	-2.6 (-2.9, -2.2)	-2.4 (-2.8, -2.1)	0.612	-2.0 (-2.2, -1.7)	-2.0 (-2.3, -1.8)	0.759	-2.1 (-2.7, -1.6)	-2.3 (-2.7, -1.9)	0.645
Employment (N=1,988)	-2.0 (-2.3, -1.7)	-2.1 (-2.5, -1.7)	0.775	-2.0 (-2.4, -1.7)	-1.9 (-2.2, -1.6)	0.583	-1.9 (-2.3, -1.5)	-1.9 (-2.3, -1.5)	0.943
Not employed (N=144)	-0.3 (-0.7, 0.1)	-0.4 (-0.8, 0.1)	0.887	-0.9 (-1.5, -0.2)	-0.6 (-1.1, -0.1)	0.479	-1.0 (-1.6, -0.4)	-0.7 (-1.5, 0.2)	0.486
HH Purchases (N=2,104)	-2.2 (-2.5, -1.8)	-2.1 (-2.5, -1.8)	0.873	-2.2 (-2.5, -1.9)	-2.1 (-2.3, -1.8)	0.490	-2.2 (-2.6, -1.8)	-2.3 (-2.7, -1.9)	0.839
No HH Purchases (N=28)	-0.2 (-0.5, 0.1)	-0.8 (-2.2, 0.7)	0.469	-1.0 (-1.7, -0.2)	-1.4 (-2.9, 0.1)	0.570	-0.7 (., .)	. (., .)	.

[1]A number closer to 1 indicates the least perceived support for shared responsibilities and 4 reflects the greatest perceived support for shared responsibilities.

[2]A positive number indicates greater autonomy while negative scores indicate a relatively controlled motivation

6.2 Breakdown of activities including 'Leisure'

In our survey we list as 'Leisure' all daytime activities that are not paid work or unpaid care work. The list of activities in this category comprises the following:

- Schooling activities (including training and homework)
- Eating
- Personal care activities (bathing, getting dressed, brushing teeth/hair)
- Leisure/social/religious activities including e.g., spending time online/TV/social media
- Travelling (not including commuting to work or the market; this refers to travelling for leisure, e.g., visiting parents)
- Sleeping/resting outside of nighttime sleep

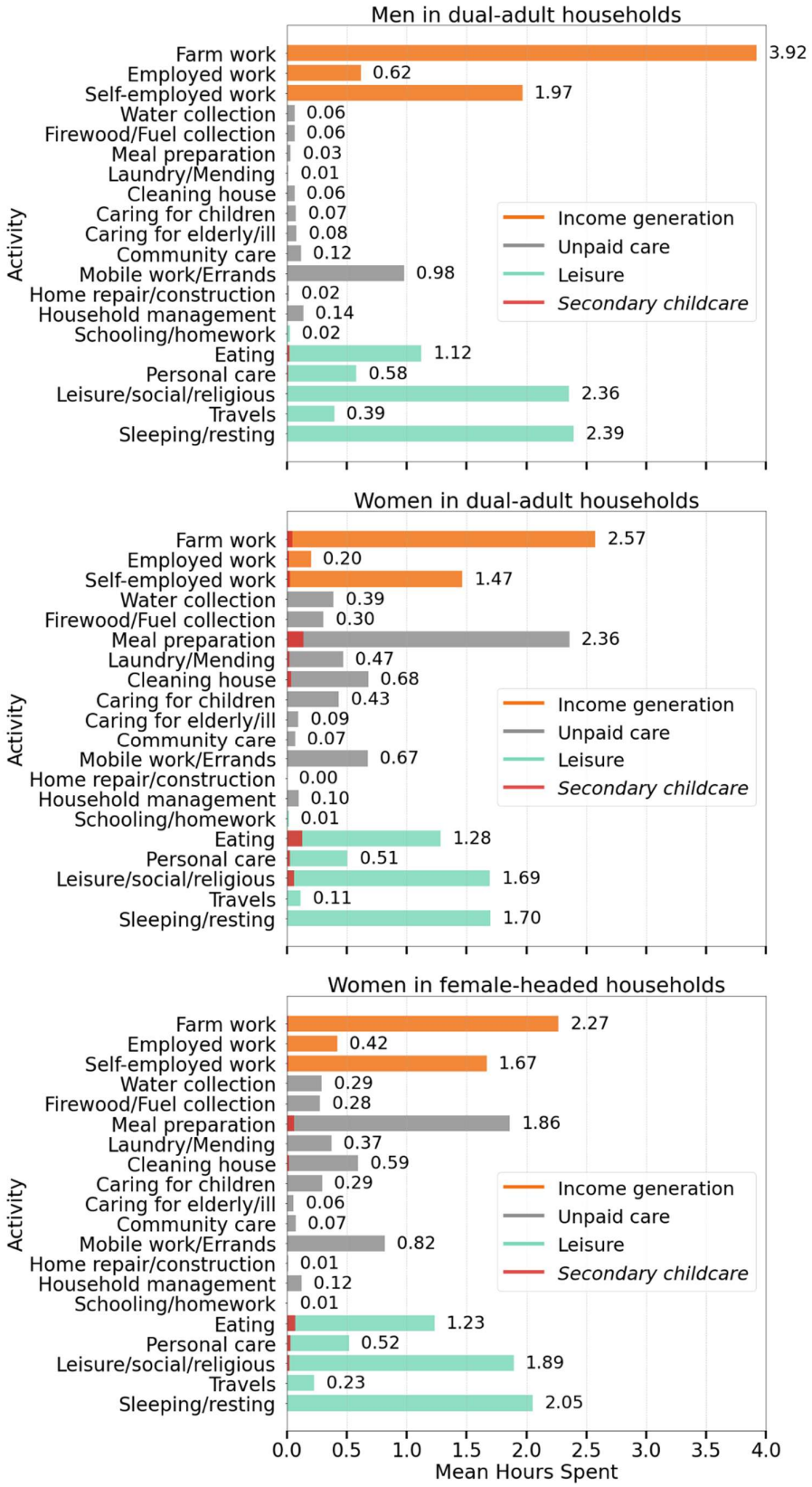
Figure 9 below shows that men in dual-adult households spend the most time daily on such activities (6.9 hours), followed by women in female-headed households (5.9 hours) and finally women in dual-adult adult households (5.3 hours). Sleeping/resting and leisure/social/religious/entertainment activities dominate overall leisure time for both men and women, and account for the largest differences in time use between men and women.

For example, men in dual-adult households spend much more time sleeping/resting (2.39 hours) than their female spouses (1.70 hours) or women in female-headed households (2.05 hours. 'Pure' leisure activities account for 2.36 hours of men's time use compared to 1.69 for their partners, and 1.89 for women in female-headed households. Men also travel for social purposes much more than women (0.39 hours): nearly 4 times more than women in the same households (0.11 hours), and nearly twice more than women who head their own households (0.23 hours). The time allocated to eating, personal care, and schooling/homework is somewhat more balanced across groups.

Across activities such as eating, personal care, and leisure, women consistently perform more secondary childcare than men. For example, women in dual-adult households spend 0.13 hours on secondary childcare while eating, compared to just 0.02 hours for their male partners. During 'pure leisure' activities, women in dual-adult households spend 0.06 hours, six times the 0.01 hours recorded for men.

Women in female-headed households typically perform less secondary childcare during activities marked as leisure compared to partnered women. For example, during eating, women in female-headed households spend 0.07 hours on childcare, nearly half the 0.13 hours recorded for women in dual-adult households. Similarly, during 'pure leisure' activities, women in female-headed households spend 0.02 hours, a third of the time spent by women in dual-adult households (0.06 hours). Men in dual-adult households have minimal secondary childcare responsibilities, enjoying largely uninterrupted time during activities marked as leisure.

Figure 9. Activities breakdown by respondent type including 'Leisure'.



6.3 Time spent on childcare by parents

The study sample comprises 1186 households, of which about 44% have no children younger than 12. In addition, 839 households – about 40% of the sample – have teenaged children, aged 12 to 17.

Table 21. Distribution of female respondents with children in the sample.

	Respondent is a mother of child aged 5 to 11		
Respondent is a mother child under 5	**Yes**	**No**	***Total***
Yes	297	286	*583*
No	79	524	*603*
Total	*376*	*810*	*1,186*

Women contribute the largest share of childcare in the household. Overall, mothers who have no children of their own under the age of 12 report comparatively low levels of childcare: about 0.18 hours per day as a primary activity and 0.71 hours as a secondary activity. It is likely this consists of spending time with their older, teenaged children, or caring for the children of relatives in the household. Once there are children under 5 in the household, however, time spent on childcare increases significantly, particularly in secondary childcare, to more than three hours a day. Mothers whose children are only aged 5 to 11 spend an intermediate amount of time on childcare (around 0.44 hours primary, 1 hour secondary). The highest levels appear among mothers who have both children under 5 and children aged 5 to 11—around 0.73 hours in primary childcare and 3.6 hours in secondary childcare. Having other adults or teens present in the household does not substantially reduce mothers' reported childcare time.

Table 22. Time spent on primary and secondary childcare by mothers.

Sub-group of mothers	N	Childcare as primary activity: Mean (95% CI)	Childcare as secondary activity: Mean (95% CI)
Female respondents with no children under 12	524	0.18 (0.14, 0.21)	0.71 (0.54, 0.88)
Female respondents with only children aged under 5	79	0.61 (0.47, 0.75)	3.52 (2.63, 4.40)
Female respondents with only children aged 5 to 11	286	0.44 (0.36, 0.51)	0.99 (0.76, 1.21)
Female respondents with both children under 5 and children aged 5 to 11	297	0.73 (0.63, 0.83)	3.61 (3.14, 4.08)

Fathers from the 946 dual-adult households interviewed contribute about half an hour daily to childcare as a secondary activity in households with children younger than 5, and about 20 mins in households with only children aged 5 to 12, and otherwise spend little time on childcare.

Table 23. Time spent on primary and secondary childcare by fathers.

Sub-group of fathers	N	Childcare as primary activity: Mean (95% CI)	Childcare as secondary activity: Mean (95% CI)
Male respondents with no children under 12	369	0.03 (0.01, 0.05)	0.08 (0.04, 0.12)
Male respondents with only children aged under 5	69	0.07 (–0.00, 0.14)	0.54 (0.18, 0.90)
Male respondents with only children aged 5 to 11	234	0.08 (0.03, 0.12)	0.29 (0.19, 0.40)
Male respondents with both children under 5 and children aged 5 to 11	274	0.13 (0.08, 0.19)	0.41 (0.28, 0.54)

6.4 Respondents' livelihood activities

We asked a short set of questions on livelihood activities about respondent who reported doing "any work of any type for pay, profit, barter, or home use during the last seven days even for one hour" (all respondents apart from 505). For working respondents, we obtained a 2-4 words description of their main job, and we recoded the responses into the following categories.

Table 24. Main work of respondents who worked in the past 7 days.

Main work of respondent	Men in dual-adult households	Women in dual-Adult households	Women in female-headed households	Total
Did not work last week	*226 (23.89%)*	*228 (24.1%)*	*51 (21.25%)*	*505 (23.69%)*
Farmer	454 (47.99%)	405 (42.81%)	101 (42.08%)	960 (45.03%)
Business, trader, local shop owner	47 (4.97%)	107 (11.31%)	26 (10.83%)	180 (8.44%)
Crafts and technicians (tailor, carpenter, electrician etc.)	72 (7.61%)	33 (3.49%)	4 (1.67%)	109 (5.11%)
Small sales (vegetables, charcoal etc).	32 (3.38%)	70 (7.4%)	25 (10.42%)	127 (5.96%)
Transportation (bodaboda, delivery etc.)	25 (2.64%)	0 (0%)	0 (0%)	25 (1.17%)
Employed (teacher, cook, guard, nurse etc.)	30 (3.17%)	19 (2.01%)	9 (3.75%)	58 (2.72%)
Casual laborer in agriculture	21 (2.22%)	25 (2.64%)	7 (2.92%)	53 (2.49%)
Cooking and selling alcohol	2 (0.21%)	36 (3.81%)	15 (6.25%)	53 (2.49%)
Other labor (domestic, cargo, road works)	27 (2.85%)	6 (0.63%)	1 (0.42%)	34 (1.59%)
Other / not specified	4 (0.42%)	12 (1.27%)	1 (0.42%)	17 (0.8%)
Livestock raising	6 (0.63%)	5 (0.53%)	0 (0%)	11 (0.52%)
Total	946 (100%)	946 (100%)	240 (100%)	2132 (100%)

Farming remains the backbone of economic activity for all groups, with 960 respondents (45%) identifying it as their main job. Men in dual-adult households are more engaged in farming (48%) than women in dual-adult households (42.8%) or women in female-headed households (42.1%).

Women, particularly in female-headed households, are more active in business, trade, and informal income-generating activities than men. Business and trade are the second most common livelihoods for women, with about 11% of women from both household types identifying this as their primary activity, compared to just 5% of men. Small sales, such as selling vegetables or charcoal, are also prominent for women, especially in female-headed households (10.4%) and dual-adult households (7.4%), compared to only 3.4% of men. Other informal activities, like cooking and selling alcohol, are more common among women in female-headed households (6.3%).

In contrast, some categories, such as transportation (e.g., bodaboda drivers or delivery work), are entirely male-dominated, with 25 men (2.6%) listing it as their primary job. Qualified self-employment activities like crafts and technicians (e.g., tailors, bakers, or carpenters), are also much more prevalent amongst men (7.6%) than amongst women (3.5% for unpartnered women and only 1.7% for partnered women). Casual agricultural labor is relatively evenly distributed across groups, but men are more likely to be engaged in other casual labor activities such as construction work.

A smaller but notable group of respondents, 58 individuals (2.7%), reported being formally employed in roles such as teachers, guards, cooks, workers in organizations, or nurses. Women in female-headed households are the most likely to report formal employment (3.8%), compared to 3.2% of men and only 2% of women in dual-adult households. This suggests that formal employment may serve as a key income source for women who are sole breadwinners and men who are likely the main breadwinners in their households.

However, overall participation in formal employment remains low across all respondent types, reflecting the predominantly informal and agrarian nature of the local economy.

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