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DECEMBER 2023

# *How do couples in rural Tanzania make decisions? Findings from a novel mixed-methods approach for understanding intrahousehold decision-making*

By Steven Cole, Nathaniel Ferguson, Jessica Heckert, Devis Mwakanyamale, Greg Seymour, Shiferaw Feleke, Gundula Fischer, Innocensia John, Zawadi Lija, Mussa Nyaa, Happy Zacharia



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**COVER PHOTO CREDIT:** A certified cassava seed producer with her husband in her cassava field in the Tabora Region, Tanzania. Credit: Gloriana Ndibalema, IITA.

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# 1. Introduction

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Despite wide acceptance of women's empowerment as an important [development goal](#), there is less consensus on how best to measure women's empowerment. Empowerment is often defined as women having the ability to make strategic life choices where previously these were denied (Kabeer 1999). Women's input into household decision-making is considered an important indicator of women's empowerment (Doss 2013; Laszlo et al. 2020).

There are several approaches that researchers use to ask study participants about intrahousehold decision-making. Demographic and health surveys are used to ask married women and men about who usually makes decisions (e.g., about major household purchases) and inquire whether these decisions are made mainly alone, jointly with a spouse, or by someone else (Kishor and Subaiya 2008). The project-level Women's Empowerment in Agriculture Index (pro-WEAI) asks women and men to indicate which agricultural activities they participate in, who normally makes the decisions on a given matter, how much input they contributed to the decision, and to what extent they could participate (Malapit et al. 2019). Nonetheless, there is still uncertainty within the literature on how to best ask decision-making questions and interpret responses (Acosta et al. 2020; Bernard et al. 2020; Seymour and Peterman 2018). These concerns are especially salient for quantitative approaches that measure women's empowerment.

Standard approaches to measuring decision-making have been criticized for different reasons. One important criticism is that, in many study instruments, these questions focus too much on ascertaining the identity of the decision-maker (or *who* makes decisions) and less on understanding *why* and *how* decisions are made within the household (Bernard et al. 2020; Seymour and Peterman 2018; Acosta et al. 2020). Bernard et al. (2020) argue that determining who makes a particular decision is insufficient when making claims about women's empowerment. For example, neither the demographic and health surveys nor pro-WEAI questions explore how decision-making processes unfold, or why household members make certain decisions alone or jointly with other members. Asking questions beyond who makes decisions (and to what extent) is important given that in many rural, low-income country contexts (especially in Africa) spouses may not pool resources generated from their labor or have the same preferences for how resources are allocated (Duflo 2003; Duflo and Udry 2004; Haddad et al. 1997). As such, knowing how and why decisions are made can help to better explain the process and rationale used when making joint decisions.

Another criticism is about the heterogeneity in the respondents' interpretation of joint decision-making (Seymour and Peterman 2018) and conflicting reports of decision-making between spouses (Ambler et al. 2021). Anderson et al. (2017) found discrepancies in reports among spouses about who made various farm and household decisions in rural Tanzania. Acosta et al. (2020) explored differences in reports of intrahousehold decision-making in Uganda and found that women reported joint decision-making more often than men about the adoption of agricultural practices and consumption expenses. Notably, it has been shown that respondents understood joint decision-making as *respondents having the final say*, while most policy and academic literature assumes joint decisions are those in which both spouses have an equal say or negotiate the decision. These findings suggest that studies should interview both spouses in a marital dyad to better understand intrahousehold decision-making.

Furthermore, most studies on intrahousehold decision-making, or women's empowerment more broadly, use etic rather than emic perspectives when formulating questions to include in their research tools (Elias et al. 2021). Haapanen and Manninen (2021) explain that research that uses an etic perspective takes into account the *researcher-analyst's* (or outsider) viewpoints, while an emic perspective considers the *practitioner-informant's*

(or insider) viewpoints. They argue that by combining etic and emic perspectives, a more holistic understanding of “complex yet routinized real-life behaviour” is possible (Haapanen and Manninen 2021, 1). A transdisciplinary approach entails involving stakeholders from diverse educational, work and other backgrounds in the design, implementation and dissemination phases of the research, which can strengthen the consideration of both emic and etic perspectives. However, the use of transdisciplinary approaches is not common when studying intrahousehold decision-making. This means there are missed opportunities to strengthen the overall research process and/or increase the understanding of women’s involvement in decision-making within the household by different research and development actors.

## 1.1 Study objectives

This paper responds to current concerns about quantitative methods for studying decision-making by describing the development of and results from an innovative transdisciplinary and mixed-methods tool for researching intrahousehold decision-making. The tool focuses specifically on decision-making about agricultural- and expenditure-related matters by spouses in marital or cohabiting relationships, although it could easily be adapted to alternative household compositions (e.g., mother–daughter dyads). The tool explores how decisions are made and why they are made alone or jointly.

We used an iterative approach when designing the tool: each step in the process informing the next. We first consulted a diverse group of local research and development people when setting up the research. We then conducted in-depth qualitative research with decision-making dyads to inform the development of vignettes that described local decision-making patterns. Once we validated questions both within and outside the places where the qualitative research was conducted, they were included in a multitopic household survey. We piloted the new tool in rural regions of northwestern Tanzania and contextualized it for use with local cassava value chain actors.

While the ultimate objective of the study was to improve the measurement and understanding of intrahousehold decision-making on agricultural- and expenditure-related matters, we were also able to investigate how decision-making processes are associated with key development outcomes, such as crop productivity and sales, food security, and minimum dietary diversity for women. Across the study components, we addressed the primary research questions presented in Table 1.

**Table 1. Primary research questions addressed in this study**

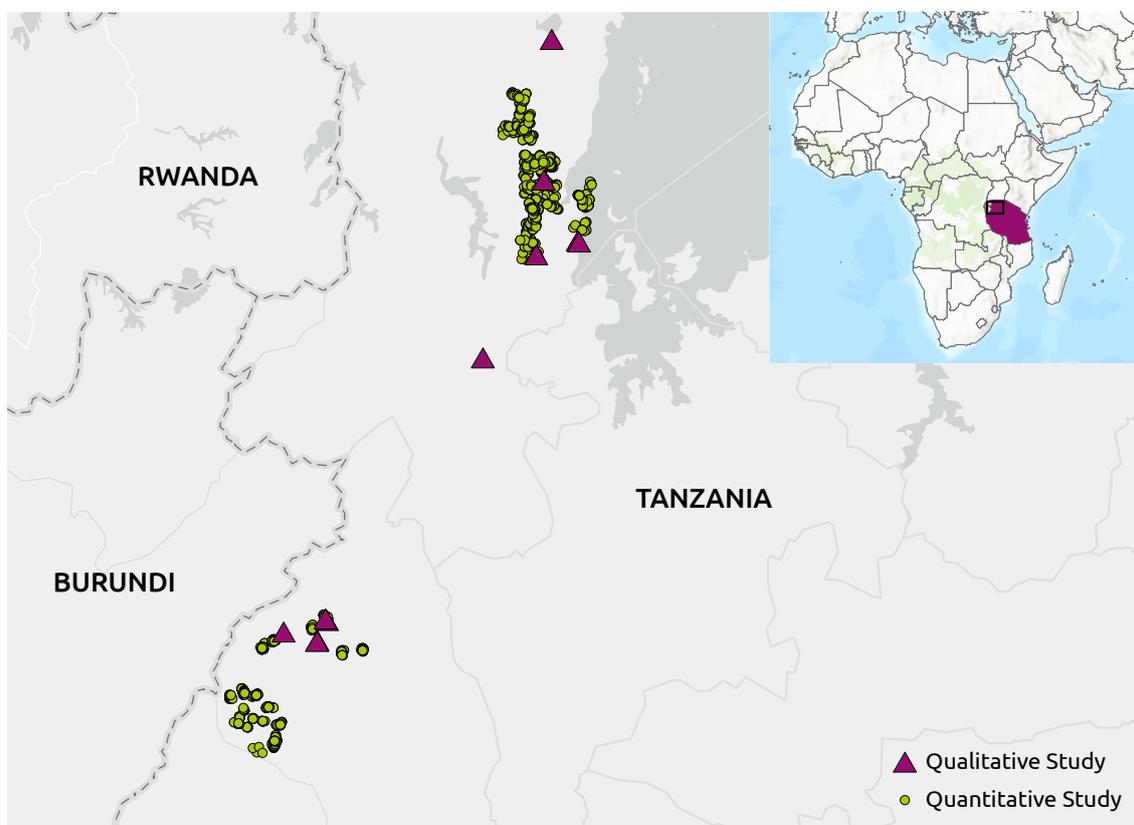
1	Who makes cassava production, processing and trading decisions, and those on expenditure-related matters, within the household?
2	Why does one spouse or the other (or another household member) make certain decisions?
3	What process(es) do couples or other dyads use to make these agricultural- and expenditure-related decisions?
4	How are decision-making processes (who decides, how and why) associated with women’s dietary diversity, food security and agricultural productivity outcomes at the household level?

The study components of the tool we developed do not match the research questions “one to one”. Instead, most of these questions are addressed *across* the research components. For that reason, we organize the content in this paper as follows. We begin with an overview of the context and our methodological approach. We then have a section describing the qualitative methods and results, as well as how the results informed the development of the vignettes. We then describe the methods and results for the quantitative household survey. In the discussion, we return to the research questions and describe how our work informed and responded to each question, and consider the overall utility of the tool for understanding intrahousehold decision-making.

## 2. Study context and overview of methods

### 2.1 Study location

While cassava (*Manihot esculenta Crantz*) is grown in almost all eight geographical zones of Tanzania, it is most widely grown in four zones—Lake, Western, Southern and Eastern. We focused this study on the Kigoma and Kagera regions of the Lake and Western zones (Figure 1).



**Figure 1. Study locations (qualitative and quantitative studies)**

These two regions contributed over one-fifth (22 percent) of the total cassava production in the country in the 2018/19 season (Table 2). Kigoma was the top cassava-producing region in the country, with over one million [metric] tons produced during the 2018/19 season. Kagera was the fifth largest cassava producer, at 0.72 million tons.

**Table 2. Cassava production in Tanzania by region**

Region	Cassava production (2018/2019)		
	Dry (ton)	Fresh (ton)	Fresh (% of total for Tanzania)
Kigoma	364,649	1,093,947	13.31
Kagera	240,600	721,800	8.78
<b>Total for Tanzania</b>	<b>2,739,319</b>	<b>8,217,957</b>	<b>100.00</b>

Note: tons are metric tons

Source: Ministry of Agriculture (2020)

## 2.2 Cassava production in Tanzania

A large share of the population in Tanzania lives in rural areas (66 percent) (Global Nutrition Report 2022). Rural livelihoods rely heavily on agricultural production, which draws on the labor of both women and men for production, processing and marketing activities. Undernutrition is a pressing concern. As a staple food, the cassava tuber is an important source of staple food, including as processed forms—despite it being considered an energy-dense and nutrient-poor food (Montagnac et al. 2009). Additionally, cassava leaves help contribute to dietary diversity.

Decades of research have gone into developing new and improved varieties of cassava for the east Africa region and associated technologies, and the Government of Tanzania has recently moved to prioritize cassava as a cash crop (Ministry of Agriculture 2020). There have been and will continue to be large research and development projects on developing and upgrading the cassava value chain.

A well-documented phenomenon in the gender and women's empowerment literature is men's appropriation of certain value chain activities as they move from low-skill/low-paid status (primarily carried out by women) to higher skill/higher paid status when value chain development initiatives take root (Quisumbing et al. 2021; Fischer and Qaim 2012). Understanding the who, why and how of decision-making within households is an important aspect of informing a gender-responsive and transformative approach to value chain development in the future. Overall, the importance of cassava in the region, along with the national push to increase cassava productivity and strengthen value chains, makes our research on intrahousehold decision-making dynamics with smallholder cassava farmers highly relevant for the study area.

### 2.2.1 Gendered aspects of cassava value chains

Studies in Tanzania illustrate gendered participation in nodes of, or carrying out certain activities in, the cassava value chain. Women and men play different roles in the production of cassava. Men dominate input supply (e.g., fertilizer) in the cassava supply chain given their ability to travel long distances (Masamha et al. 2019). Men tend to clear and till the land for cassava production, while women are more involved in preparing cassava cuttings, planting, weeding, and disease management (Masamha et al. 2019). Mtunguja et al. (2014) found that women and men both play a role in the selection of cassava varieties (*landraces*) they grow in Tanzania. Men own most of the land devoted to agricultural production in the region.

Women and children are highly involved in processing cassava and in cassava food preparation (Masamha et al. 2018). Drying cassava leaves is primarily carried out by women (Andersson et al. 2016).

Men are more involved in packaging, transporting and marketing cassava using bicycles, motorcycles, and sometimes hired vehicles (Masamha et al. 2018). Women's mobility is often restricted by social norms so they are unable to travel like men do (Heckert et al. 2020). When women sell locally, they receive lower prices (Masamha et al. 2018).

## 2.3 An iterative mixed-methods approach

We used an eight-step process to develop this research tool to study intrahousehold decision-making (Figure 2). We began with a literature review (step 1), the results of which are integrated into the background section of this paper. We then conducted stakeholder consultations (step 2). The subsequent sections then describe the methods and results for the qualitative dyadic interviews (steps 3–6) and the quantitative household survey (steps 7 and 8) in greater detail.



**Figure 2. Process to develop the iterative mixed-methods research tool for studying household decision-making**

## 2.4 Stakeholder consultations

In the early stages of developing this tool, we consulted with a diverse set of people, including from local research and development organizations. This formed part of the transdisciplinary approach. To better understand and measure intrahousehold decision-making for their research or development programs, we aimed to:

- learn from people’s experiences with the research topic
- include important lessons in the design of the tool
- gauge their interests in using the proposed tool (once developed)

A brief guide was developed to facilitate the discussions, which was deployed with researchers from national programs who are involved in social and gender research, and practitioners from development organizations. This step not only increased the relevance of the tool for the study context, but also its future usefulness for other people. We recommend that all projects intending to use this approach also consult their projects’ relevant stakeholders.

## 2.5 Ethics approval

The study was approved by the Internal Review Board at the International Institute of Tropical Agriculture (reference IRB/008/2021) before the start of the research process. We obtained informed consent from all research participants before conducting the qualitative and quantitative interviews.

## 3. Qualitative dyadic interviews

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### 3.1 Study design

We conducted in-depth interviews in three districts (Muleba, Biharamulo and Kibondo) across the two study regions with 40 married/cohabiting couples and other dyads. Married/cohabiting couples were the predominant household composition in the study regions. Potential dyads were identified and purposively selected, with the help of local extension officers who used their extensive knowledge of the communities they work in and their expertise in agricultural matters.

The protocol for conducting interviews with couples and other dyads entailed an introduction by the research team (comprising one woman and one man) and obtaining the informed consent of both study participants. All the interviews were audio recorded. The criteria for target couples and dyads for the study were those who (a) lived together and who (b) participated in cassava value chain activities and, therefore, (c) together or separately within their households made cassava production, processing and/or trading decisions along with key expenditure-related decisions. The 40 couples and other dyads who comprised the qualitative study sample included:

- married/cohabiting couples (37 total, including monogamous and polygynous couples)—often, men were heads of households, but not always
- women as heads of households (three total)—not married, but living with their adult female or male child(ren)/dependents (>18 years or older)

In polygynous households (four of the 37 married/cohabiting couples), the research team did not ask to speak with multiple wives and their husband. Rather, they were asked to organize themselves according to who they thought should participate. In all cases, the husband decided who among his wives would participate in the interview.

Concerning women heads of household, very few (three) who met this profile were identified for interviews during the study. In many cases, a woman who was not married and considered herself the sole head of her household was living with children under the age of 18. These young members were not eligible to be interviewed according to our study protocol and, importantly, were likely not responsible for significant decisions in the household.

### 3.2 Qualitative interview tool

The first main section of the interview tool explores who does which cassava value chain tasks/activities in the household; and the second part explores in depth who makes important decisions within the household, how spouses make these decisions jointly or on their own, and why.

Spouses were asked to jointly identify an important decision they made recently (within the past agricultural season) on matters related to cassava production, processing and/or marketing and on expenditure-related matters. In addition, the interview tool began with a section inquiring about basic demographic information, the household's involvement in cassava value chain activities, and their subjective and relative livelihood status.

The semi-structured interviews were designed in a format that allowed the same issues to be discussed with multiple types of decision-making dyads. The open-ended questions allowed participants to respond in their own words, and the interviewer could frame follow-up questions as necessary based on responses.

To improve study participants' comprehension and response quality, the interviews were conducted with the use of two optional aids. Participants were encouraged to demonstrate their answers with beans for questions that required estimates of proportions or percentages. Additionally, we developed cards with illustrations that depicted specific tasks within cassava production, processing and trading/marketing associated with decision-making questions and included them in the qualitative dyadic interviews.

### 3.3 Analysis

Once the qualitative dyadic interviews were completed, the recordings of the interviews were transcribed and translated into English, then added into the ATLAS.ti software for analysis. Before the analysis, we developed a coding structure (Figure 3), which included inductive and deductive codes, by conducting a preliminary analysis of select transcripts.

The coding structure represents a relatively full set of possible steps and substeps (or further actions dyads might take when making decisions) based on the preliminary analysis. This does not infer that the decision-making patterns we identified would necessarily follow all steps or contain such details—the coding structure was merely a tool to use to help us highlight any and all aspects of each decision of each dyad. The coding structure was based on a process framework for decision-making and potential inputs into that process.<sup>1</sup> It is also important to note that we did not analyze all the qualitative data collected, but only those that could help us identify the decision-making patterns presented in the next section. Results from analyzing the other qualitative data will be presented in future scientific outputs.

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<sup>1</sup> Modified from a step-by-step decision-making process developed by University of Massachusetts, Dartmouth (see [https://www.umassd.edu/media/umassdartmouth/fycm/decision\\_making\\_process.pdf](https://www.umassd.edu/media/umassdartmouth/fycm/decision_making_process.pdf), PDF 89 KB)

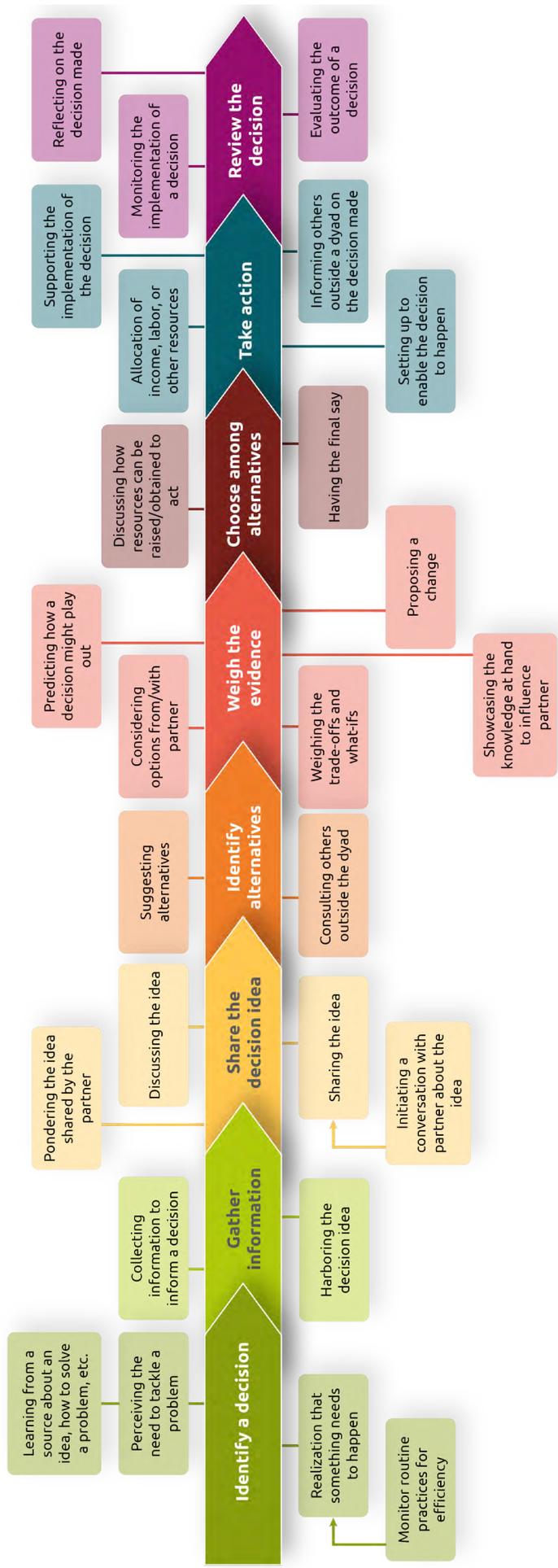


Figure 3. Coding structure for analyzing the qualitative data

### 3.4 Results

The analysis resulted in 80 individual decision-making patterns: two each from the 40 sets of interviewed couples and other dyads. That is, for each interview, we developed two different patterns in terms of visualizations (see Figure 4 for examples) to represent one agriculture- and one expenditure-related decision.



Figure 4. Illustration of (a) a longer, more complex decision-making pattern and (b) a shorter, less complex decision-making pattern

Thereafter, research team members (two women, two men) came together in a workshop to analyze the different patterns/visualizations. During the workshop, the visualizations were printed and similar decision-making patterns were grouped together. Certain patterns (or visualizations) were rather long and complex—depicting more steps (and substeps) used by dyads when making decisions—while others were short and relatively simple—depicting very few steps that led to making a decision. There were within-group differences, of course, but most patterns included in a particular group contained similar elements.

This grouping process resulted in identifying seven common decision-making patterns that informed the development of seven vignettes, or short stories, on how married/cohabiting couples make agriculture- and expenditure-related decisions—each stemming from one of the common decision-making patterns. The vignettes for each of the decision-making patterns were developed using the content contained in the visualizations of the individual patterns within the seven decision-making pattern groupings. Thereafter, the patterns were ready for validation in the study regions.

We note that although we interviewed several dyads who were not married or cohabiting (e.g., mother–son and mother–daughter dyads), our study did not uncover any additional unique patterns based on those interviews.

### *3.5 Validating the vignettes*

Once the vignettes were developed, we validated them in the two study regions using dramatic skits and focus group discussions (FGDs). Doing so allowed us to consult people within selected communities about whether the vignettes represented real-life scenarios of couples making agriculture- and expenditure-related decisions. First, using the vignettes, scripts for the skits were developed by a local writer and reviewed by the research team. Then, a drama group was identified and the scripts were provided to the group for rehearsing.

The skits were performed in the three study districts where qualitative data collection was conducted. The skits were followed by FGDs. This took place in two study areas (where qualitative data were collected) and one in a nonstudy area that was purposively selected on the basis of its proximity to the study areas. In total, nine FGDs were conducted, each comprising six participants. In each of the three districts, there was one mixed-sex FGD, and two separate-sex FGDs (one with women, one with men). The participants of the FGDs comprised married/cohabiting women and men, including those in monogamous and polygynous relationships. Participants of FGDs were selected based on purposive sampling that allowed us to deliberately choose people who could provide rich insights and meaningful contributions to our FGDs, increasing the relevance of the discussions for our objective.

In each validation, the drama group acted out all of the different skits while FGD participants watched. Then during the FGDs, the research team used a guide to facilitate the discussion and took notes using a prepared data-collection sheet.

The validation process indicated that all the seven vignettes represented the decision-making scenarios in the study area, although certain patterns were found to be more/less dominant across the study communities. After the validation process, the seven vignettes were ready to be embedded into the household survey.

## 4. Quantitative household survey

### 4.1 Sampling

We selected a single district from Kagera Region and a single district from Kigoma Region based on cassava-production level and population diversity. Muleba was selected from Kagera Region, and Kibondo was selected from Kigoma Region. The districts capture a diverse population with different ethnic groups, with a population of 540,310 and 261,331, respectively (URT Census 2012).

Both Muleba and Kibondo have significant cassava production, processing and trading activities in their respective districts. We purposively selected 14 wards (eight from Muleba's 43 wards and six from Kibondo's 19 wards) for this study (Table 3). Once the 14 wards were purposively selected based on cassava production and accessibility, we defined the study's target population based on the selection criteria (being married or in informal unions). The target population included households with married couples or informal unions, who were engaged in cassava production and processing (but not necessarily trading as some households only cultivate cassava as a food crop) in 35 villages of the eight wards in Muleba and 19 villages of the six wards in Kibondo.

**Table 3. Population, number of wards and villages in the study districts**

Description	Muleba	Kibondo
District population	540,310	261,331
Total number of wards	43	19
Total number of villages	166	50
Number of wards with significant cassava production	8	6
Number of selected villages with significant cassava production	35	19
Sample size (households)	816	536

The sample size was determined using Cochran's formula (1991), given  $N = p(1 - p)(z/e)^2$  as where  $N$  is the total sample size,  $e$  is the margin of error,  $z$  is the z-score,  $p$  is the proportion of joint decision-making. This sample size formula for a single proportion was applied because measuring empowerment in joint spousal decision-making has traditionally followed a dichotomous approach in which decisions are either joint or sole, with the former assumed to reflect more empowerment than the latter (Acosta et al. 2020). Since we had no information on the proportion of joint spousal decision-making, we estimated  $p$  at 0.5. Considering a z-score of 2.575 (99 percent confidence level) and  $e$  of 3.5 percent, we settled on a combined sample size for the two districts of 1,352. Strata (district) sample sizes were determined using  $N_i = w_i N$  where  $N_i$  is the sample size of strata or district  $i$ ,  $w_i$  and is the proportion of total cassava production in strata or district  $i$  (60.3 percent for Muleba and 39.7 percent for Kibondo).

Once we determined the sample size of each district, we created a sampling frame of villages arranged in alphabetical order, assigned the respective population size to each village, and determined the number of sample households to be drawn from each village based on probability proportional to population size. Village leaders and local extension agents provided lists of households in the selected villages to the research team. Households with formally or informally married couples in monogamous or polygynous relationships were sampled.

Finally, we randomly selected individual households from each village based on the sampling frame. We opted to oversample in each village to ensure the availability of replacement households in case couples from selected households were away during the survey period or had left the area. In total, 1,352 households were selected from 54 villages (i.e., 816 from 35 villages in Muleba and 536 from 19 villages in Kibondo).

## 4.2 Data collection

### 4.2.1 Interview format

We used one of two interview formats:

1. joint (husband–wife pair) interviews that covered the 12 modules in the questionnaire—except the final module (*l*), which collected data on minimum dietary diversity for women (MDD-W) that only the wife responded to
2. joint interviews that covered the first nine modules (*a* to *i*), individual interviews for the remaining three modules (*j* and *k*) of the questionnaire, and only women responded to the last module (*l*)

The two different interview formats will, in future work, allow us to compare responses across interview formats. The respondents were randomly assigned to their interview format.

In total, 2,028 respondents completed the survey: (i) 676 couples participated in interview format one; and (ii) 676 couples participated in interview format two, doubling the number of respondents from this interview format to 1,352.

All households grew and processed cassava, but not all households traded cassava. As a result, the functional sample for questions related to cassava trading is smaller—451 couples from jointly conducted interviews and 498 couples individually interviewed—a total of 1,447 respondents.

### 4.2.2 Survey questionnaire

The data were collected by trained enumerators using tablets equipped with SurveyCTO software. The household survey questionnaire included modules on (*a*) household identification; (*b*) household membership; (*c*) dwelling characteristics; (*d*) productive assets; (*e*) group membership; (*f*) credit and finance; (*g*) food security; (*h*) cassava production, processing and sales; (*i*) extension; (*j*) intrahousehold decision-making; (*k*) participation in activities linked to the decision-making topics; and (*l*) MDD-W.

For the decision-making module, respondents were questioned about the process used in their household to make decisions about several topics. In total, we asked about eight topics across four domains: three about cassava production, one about cassava processing, two about cassava trading, and two about expenditure. These eight were identified as important topics discussed by couples in the qualitative interviews.

For each topic, respondents were asked three questions about the decision-making process in their household. The first question asked who in the household generally makes the final decision about the topic. Based on their response, respondents were read up to three vignettes describing different decision-making processes involving a husband and wife, and asked which vignette is most like how they and their spouse make decisions about the topic. The final question asked respondents about the most important reason for why final decisions in their household are made by a specific individual or jointly.

Questions similar to our first question about the final decision-maker have often been used by large-scale, international household survey programs to measure respondents' participation in decision-making within a particular domain (The DHS Program 2020). This single-question approach contrasts with the multiquestion approach we used to measure intrahousehold decision-making. By comparing responses to the final decision-maker question with responses to the vignettes (on how decisions are made) and the *why* question, we were able to highlight the additional information these questions provide about intrahousehold decision-making processes that is missed by single-question approaches.

Annex table 1 presents the seven vignettes used to collect data on intrahousehold decision-making variables in the four domains: (i) cassava production, (ii) cassava processing, (iii) cassava trading and (iv) expenditure.

The vignettes in Annex table 1 were read to respondents during the interview as they were shown corresponding cards with illustrations of the vignettes. The illustration cards were designed to be self-explanatory and without the need for literacy, so that respondents could understand the different components of each vignette (e.g., who comes up with the idea to do X, who shares the idea, whether there is any discussion and/or suggestions for an alternative option, and who makes the final decision).

The number of cards presented to the respondents during the interview differed depending on the answer to the first question in the module, "Who in the household generally makes the final decisions about a given issue?" The question was first posed to the respondents before reading aloud the vignettes and presenting the graphic cards. If, for example, respondents answered, "husband only" to this question, then they were read vignettes A, B, and G in Annex table 1, presented with the accompanying illustration cards, then asked to choose the one vignette that most represented the decision-making pattern they use. The same process was used if respondents answered, "wife only" (using vignettes E and F) or, "jointly" (using vignettes C and D).

## 5. Results

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### *5.1 Descriptive results of decision-making questions*

This section presents descriptive statistics for the intrahousehold decision-making questions and vignettes. Throughout this section, we pool data from the two types of interviews (i.e., one-on-one and joint) conducted using the survey questionnaire. Hence, the proportions shown in Annex tables 2–17 represent the share of the interviews conducted during the survey (combined: joint, individual women, and individual men).

Wives' and husbands' responses to decision-making questions were not always in concord, nor should they be expected to be (Ambler et al. 2021; Seymour and Peterman 2018). For this reason, we believe considering wives' and husbands' responses separately, as we do below, provides a more accurate characterization of the data than simply relying on the responses for a single spouse per household.

#### *5.1.1 Decision 1: Which variety to use*

The first decision concerns the variety of cassava to be planted in the main plot. Overwhelmingly, the final say for this decision is had by the husband (39.6 percent) and the

husband and wife jointly (49.3 percent); see Annex table 2. In 11.1 percent of cases (225) the wife has the final say for this decision. Among the 800 respondents who reported that the husband is the final decision-maker, 79.3 percent (635) reported that the decision originates with him, and he brings it to his wife for a discussion before making the decision himself (vignette A). The husband's final say may alternatively be preceded by the wife sharing an idea (vignette B) or by no discussion at all (vignette G), but these scenarios were less common. Among the 635 households where the husband is the final decision-maker, these two scenarios were only reported by 10.2 percent (82) and 10.4 percent (83) of respondents, respectively. Among the 225 respondents who reported that the wife is the final decision-maker, 83.6 percent (188) reported that she shared the idea in the first place (vignette E). Among the 995 households where the decision was made jointly, decisions usually resulted from the husband initiating the idea (vignette C)—78.2 percent (778) couples selected this scenario—compared to 21.8 percent (217) who identified with the scenario where the wife initially shares the idea (vignette D). Only 1.8 percent (37) reported that the wife had the final say after the husband shared the idea (vignette F).

As shown in Annex table 3, after disaggregating the data by final say, 26 percent of the jointly deciding dyads said the most important reason for the joint decision about selecting a variety is because both spouses agreed/supported the decision. The next most common reason (21.5 percent; 435) was that the husband made the decision because he is the head of the household, followed by the couple making the decision jointly because they make all decisions together (15.9 percent; 321).

### *5.1.2 Decision 2: Which area of land to plant*

The second decision concerns which area of land to be devoted to the main cassava production. This decision was also primarily made by the husband or jointly, with only 7.8 percent (158) out of 2,025 total respondents reporting that the wife has the final say (Annex table 4). For decisions made solely by either the wife or husband, the final decision-maker was almost always reported to be the one who initiated the idea. Among the 884 households where the decision is made jointly, 74.9 percent (662) reported that the husband initiated the idea (vignette C) compared to 25.1 percent (222) for the wife (vignette D).

The most common reason for the decision (on which land to use) where the husband had the final say is because he is the head of the household (32.6 percent; 661) (Annex table 5). Next, 21 percent (426) reported that the decision is made jointly because the couple agreed/both supported the decision. Just over one-eighth (14.3 percent; 290) reported that the couple makes the decision jointly because they make all decisions about this matter together.

### *5.1.3 Decision 3: When to harvest cassava from main plot*

The third decision refers to when to harvest cassava from the main plot. This decision was mostly made jointly (51.3 percent; 1,038). Wives were reported to have the final say by 23.3 percent (472) of respondents, compared to 25.3 percent (512) who reported that the husband made the final decision (Annex table 6). Notably, among the 1,038 respondents who reported that the final decision is made jointly, there is a much smaller difference in the number of respondents who reported that the husband or the wife initiated than for the other decisions in the production domain—61.5 percent (638) respondents reported the husband to have initiated the idea (vignette C), compared to 38.5 percent (400) reporting that the wife initiated the idea (vignette D).

The most common reason for making the decision of when to harvest is that the couple agreed/supported the decision, leading them to jointly have the final say (23 percent; 466) (Annex table 7). Next, 16.1 percent (325) reported that the decision is made jointly because the couple makes all decisions about this matter together, and 14.2 percent (288) reported that the husband makes the decision due to him being the head of the household.

#### *5.1.4 Decision 4: How to process the cassava from main plot*

The fourth decision concerns how to process the cassava from the main plot. This decision is the only one for which more respondents reported the wife having the sole final say than the husband. Overall, 46.2 percent (930) reported the final say on the decision was made jointly, 34 percent (684) reported the wife as having the final say, and 19.7 percent (396) reported the husband had the final say (Annex table 8). Among the 684 who reported that the wife has the final say, 89.6 percent (613) reported that she also initially shared the idea (vignette F). In the 930 cases of a joint decision, the wife shared the initial idea less frequently (42.6 percent; 396) (vignette D) compared to the husband.

The most commonly reported reason for processing decisions with the wife having the final say was because she is the most knowledgeable about the matter (21.9 percent; 440) (Annex table 9). Next, 20 percent (401) reported that the decision was made jointly because the couple agreed/supported the decision. Only 14 percent (281) reported that the couple makes the decision jointly because they make all decisions about this matter together.

#### *5.1.5 Decision 5: Where to sell cassava from your main plot*

The fifth decision is about where to sell cassava from the main plot. Fifty-one percent of (734) respondents reported that the husband had the final say, while 43.4 percent (625) reported the decision was made jointly and 5.6 percent (81) reported the wife had the final say (Annex table 10). Trends among individual decision-makers are similar to those presented in the first four decision-making scenarios—the final decision-maker was usually the person who introduced the idea.

The most common reason for the decision on where to sell cassava where the husband had the final say was because he is the head of the household (27.5 percent; 396) (Annex table 11). Next, 21 percent (302) reported that the decision was made jointly because the couple agreed/supported the decision. Just over 17 percent (251) reported that the couple makes the decision jointly because they make all decisions about this matter together.

#### *5.1.6 Decision 6: How much cassava to sell from your main plot*

The sixth decision concerns the amount of cassava from the main plot to sell. For this decision, 50.7 percent (730) respondents reported that the decision is made jointly, 35.4 percent (510) reported that the husband had the final say, and 13.9 percent (200) reported that the wife had the final say (Annex table 12). Among the 730 respondents who reported that the final decision is made jointly, 65.2 percent (476) reported that the idea originated with the husband (vignette C). Among the 510 respondents who reported that the husband had the final say, 90.2 percent (460) reported that the husband initially brought up the idea (vignettes A and G)—12.4 percent (57) reported that the husband has the final say without a discussion with their wife (vignette G). Among the 200 respondents who reported the wife as having the final say, 88.5 percent (177) reported that she was also the one to initially share the idea (vignette E).

The most common reason for making decisions on how much cassava to sell from the main plot was the husband having the final say because he is the head of the household (26 percent; 375) (Annex table 13). Next, 22.8 percent (329) reported that the decision is made jointly because the couple agreed/both supported the decision. Just over 20 percent (20.6 percent; 296) reported that the couple makes the decision jointly because they make all decisions about this matter together.

### *5.1.7 Decision 7: Building/refurbishing a house*

The seventh decision refers to building/refurbishing a house. For this decision, 64.7 percent (1,183) reported that the decision is made solely by the husband, which is the highest proportion for decisions made solely by the husband across all eight decisions (Annex table 14). Just over one-third (612) reported that the decision is made jointly, and 1.9 percent (34) reported that the wife had the final say. Among the 612 who reported that the decision is made jointly, 87.7 percent (537) reported that the idea originated with the husband (vignette C). Among the 1,183 who reported that the husband has the final say, 92.5 percent (1,094) reported that the husband initially brought up the idea (vignettes A and G); 12.5 percent of those respondents (137) reported that the husband makes the decision without a discussion with his wife (vignette G). Among the 34 respondents who reported the wife as having the final say, 82.4 percent (28) reported that she was also the one to initially share the idea (vignette E).

The most common reason for the husband having the final say on building/refurbishing a house is because he is the head of the household (38.8 percent; 709) (Annex table 15). Next, 15.5 percent (283) reported that the decision is made jointly because the couple agreed/both supported the decision. About one-seventh (14.1 percent; 258) reported that the husband had the final say because he contributed the most resources, income or labor.

### *5.1.8 Decision 8: Paying school fees*

The eighth decision refers to paying school fees. For this decision, 51.1 percent (823) reported that the decision is made jointly, 44 percent (710) reported that the husband had the final say, and 4.9 percent (79) reported that the wife had the final say (Annex table 16). Among the 823 who reported that the decision is made jointly, 448 (54.4 percent) reported that the idea originated with the husband (vignette C). Among the 710 respondents who reported that the husband has the final say, 74.2 percent (527) reported that the husband initially brought up the idea (vignettes A and G); 13.5 percent (71) reported that the husband makes the decision without a discussion with his wife (vignette G). Among the 79 who reported the wife having the final say, 83.5 percent (66) reported that she initially shared the idea (vignette E).

The most common reason that school fee decisions are finally made by the husband is because he is the head of the household, which was cited by 38.8 percent (446) (Annex table 17). Next, 19.4 percent (312) respondents reported that the decision is made jointly because the couple agreed/both supported the decision. Nearly one-fifth (18.3 percent; 295) reported that the couple makes the decision jointly because they make all decisions about this matter together.

## *5.2 Regression analysis*

In this section, we investigate whether information on how and why couples make decisions can help to explain differences in economic, food security and dietary outcomes across households beyond simply who in the household makes the final decision. We consider the following outcomes:

- Cassava productivity (kg/acres) of the main plot: defined as the total cassava in kg produced from the main cassava plot, divided by the size of that plot measured in acres. The main plot was the plot determined by respondents to be the most important for their household's cassava production.
- Processed cassava sales productivity (sales/acre) of the main plot: constructed as the total sales of processed cassava from the main plot in units of 1,000 Tanzanian Shillings (TZS), divided by the size of the plot in acres.

- Dietary diversity of women (measured using MDD-W food groups) (FAO 2021): a numeric variable which measures the number of food groups that the respondent (the wife) consumed the previous day. Respondents were asked whether they had eaten 14 different food groups at any point during the previous day, and these responses were aggregated into the 10 food groups defined in the MDD-W.<sup>2</sup>
- Food insecurity (measured using the Food Insecurity Experiences Scale) (Cafiero et al. 2016): a continuous variable that represents the total number of affirmative responses given by a respondent to eight questions about food security in their household over the past 30 days.<sup>3</sup>

Table 4 presents descriptive statistics for each of four outcomes considered in our analysis.

**Table 4. Descriptive statistics for main outcome variables**

	Observations	Mean	Standard Deviation
Cassava productivity (kg/acre)	1,352	889.83	1,208.18
Processed cassava sales productivity (TZS1,000/acre)	912*	372.75	500.33
Minimum diet diversity for women	1,352	3.07	1.17
Food Insecurity Experience Scale	1,349	3.15	2.36

\* Per our selection criteria, all households who participated in the study grew and processed cassava; but it was not required that all households traded cassava (given that some regard cassava as only a food crop not a cash crop). Therefore, the number of observations is smaller for processed-cassava sales productivity.

Using Ordinary Least Squares (OLS) regression, we assess how respondents' participation in different stages of the decision-making process correlates with the outcome of interest, using data on each of the eight decisions included in the survey.

As a benchmark, we start by analyzing the correlation between who makes the final decision and the outcome variables, as is usually reported in empirical analyses of decision-making, based on the following specification:

$$Y_{ih}^d = \alpha + F_{ih}^d \beta + X_{ih}^d \gamma + \varepsilon_{ih}. \quad (1)$$

$Y_{ih}^d$  is outcome  $d$  for individual  $i$  from household  $h$ .  $F_{ih}^d$  is a vector of dummy variables indicating whether the wife made the final decision without her husband, the husband made the final decision without his wife, or the wife and husband made the final decision together for decision  $d$ . The omitted category is the husband making the final decision without his wife, such that the  $\beta$  coefficients measure the difference in means of each category compared to the husband making the final decision alone.

$X_{ih}^d$  is a vector of control variables that includes age, highest level of education attained, and primary occupation for the wife and husband, respectively; household size; youth-dependency ratio; dummy variables indicating whether the wife or husband owns the main plot; household-wealth quintile; dummy variables indicating whether an improved variety of cassava was grown and whether agrochemical inputs were used on the main plot; dummy variables indicating whether the dyad is in a formal union, monogamous nonformal union or polygynous nonformal union; dummy variables indicating, respectively, whether anyone in the household received cassava-related extension advice or training during the past 12 months, borrowed money from someone outside the household or from an institution during the past 12 months, and is an active member of a formal or informal group of any type;

<sup>2</sup> This variable is sometimes expressed by a binary variable in which consumption of food from five food groups is considered to be an adequately diverse diet, but we left the variable as the food group sum to express the full range of dietary diversity in the sample (FAO 2021).

<sup>3</sup> While this score is normally expressed as a population statistic, on the individual level it is appropriate to use the raw score, with a higher score indicating a higher probability that the household is food insecure (Cafiero et al. 2016).

and dummy variables indicating whether the wife and husband, respectively, performed work related to the four domains (cassava production, processing or trading; expenditure) during the 2020/21 agricultural season.

We then add variables from other questions following each vignette that the respondent identified with, about whether the wife or husband shared her/his idea with the other member of the dyad (*origin*) and whether discussion on the topic occurred before the final decision (*discussion occurred*), holding constant whether the wife or husband makes the final decision, as reflected in the following specification:

$$Y_{ih}^d = \alpha + F_{ih}^d \beta + S_{ih}^d \delta + O_{ih}^d \theta + X_{ih}^d \gamma + \varepsilon_{ih}. \quad (2)$$

$S_{ih}^d$  is a dummy variable indicating whether the wife initially recognized a need for a decision on the topic and shared her idea with the other member of the dyad.  $O_{ih}^d$  is a dummy variable indicating that discussion on the topic occurred before the final decision.

We estimate equations 1 and 2 for each of our specified outcomes: cassava productivity, processed cassava sales productivity, MDD-W score (continuous), and Food Insecurity Experiences Scale (continuous). In each case, we limit our investigation to only those decision-making topics which are related to each outcome. The results of these regressions are shown in Annex tables 18–20.

We begin, in Annex table 18, by assessing the relationship between cassava productivity and decision-making on production-related topics. In Annex table 19, we focus on the relationship between processed-cassava sales productivity and decision-making on processing- and sales-related topics.

The overall trend, broadly apparent in both regressions, suggests **a negative relationship between productivity and wives' involvement in decision-making on these topics**. In Annex table 18, for instance, the coefficient associated with the wife having the final say in the decision is negative in all cases and statistically significant in all cases except one specification (involving the variable based on the vignette).

In Annex table 19, for decisions involving how to process the cassava from the main plot and where to sell cassava from the main plot, the coefficients associated with the wife either solely or jointly having the final say in the decisions are negative and statistically significant in all but two specifications.

Across both Annex tables 18 and 19, **the coefficients associated with the wife initiating the decision-making process and discussion between the couple are negative, although they are statistically insignificant for three decisions**. Overall, there are no systematic differences between the specifications involving variables based on the traditional final-say survey questions and those based on the vignettes.

In Annex table 20, we assess the relationships between MDD-W (Panel A) and food security (Panel B) and decision-making on production-, processing- and sales-related topics. **The coefficients associated with the wife solely or jointly having the final say are frequently positive and statistically significant**. Because higher values of the respective variables are associated with more diverse diets, and less food-secure households, **greater involvement by wives in decision-making is therefore associated with improved MDD-W, but with decreased food security for households**. While there are instances in which these coefficients are negative and instances in which they are statistically insignificant, it is revealing that **there are no specifications in which the wife either solely or jointly having the final say is statistically significant and negatively related to MDD-W or food security**. As above, there is generally little difference in the results between the specifications involving variables based on the traditional final-say survey questions and those based on the vignettes.

# 6. Discussion

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## 6.1 *Interpreting our findings*

In this section, we return to the four key research questions motivating this work:

1. Who makes cassava production, processing and trading decisions, and those on expenditure-related matters, within the household?
2. Why does one spouse or the other (or another household member) make certain decisions?
3. What process(es) do couples or other dyads use to make these agricultural- and expenditure-related decisions?
4. How are decision-making processes (who decides, how and why) associated with women's dietary diversity, food security and agricultural productivity outcomes at the household level?

We reflect on how this new tool enables us to answer these questions to a depth that would not have been possible using traditional (i.e., single-question) approaches to measuring intrahousehold decision-making, and how our findings converge or diverge from the broader literature on intrahousehold decision-making.

In general, our findings reveal variability and complexity in couples' decision-making processes, beyond simply who in the household makes the final decision on a given topic. Decision-making processes are complex, yet this complexity is missed in research using traditional approaches to capture or measure decision-making. The variations in how married/cohabiting couples make decisions are too great to be captured by a single question, such as who generally makes decisions (or the final decision) on a given topic. In particular, the tool provides a more nuanced portrait of women's multiple and varied roles in decision-making processes and why they make sole or joint decisions with their spouses or are left out of those processes.

Turning first to our research questions about who makes decisions and what processes are used, we see across the eight topics considered that final decisions are most often either made jointly or made solely by the husband. With the exception of cassava-processing decisions—a topic often thought to be women's domain and where they are perceived to be most knowledgeable—wives are less likely than husbands to be reported as the sole final decision-maker. Broadly, these findings align with other research on women's empowerment from sub-Saharan Africa. Patriarchal gender norms remain strong throughout the region: women typically have less decision-making powers than men (Van Aelst 2014; Anderson et al. 2017). This evidence, however, relies mostly on studies using single-question approaches to measure decision-making. Our findings inform the relatively less-studied area of women's participation in specific aspects of decision-making processes.

Going deeper, our results show that wives have some level of involvement in nearly all decisions, including those in which husbands are reported as the final decision-maker. Thus, even in these decisions, wives are not necessarily excluded from the decision-making process, as could be concluded if based only on a single question about the final decision-maker. Overall, only a small share of decisions (4.4 percent across all topics) are reported as being made solely by the husband and not involving any discussions with his wife.

Most decisions are either made jointly by the husband and wife (46.1 percent across all topics) or are at least discussed between partners (95.6 percent across all topics). Whether the

decision is made jointly with equal weight by both spouses or the decision is only discussed briefly (see discussion on this by Acosta et al. 2020) cannot be determined based on our data, which warrants further investigation. Nonetheless, our results show that wives are still part of most decision-making processes.

Given that proxy measures for empowerment are often based on the outcome of the decision-making process, the nuance introduced by incorporating process-oriented questions about decision-making into these proxy measures are likely important for use in designing or evaluating programs, especially when the program being evaluated aims to increase communication between spouses as they make important decisions. One possible use of our approach is, thus, to generate richer, more complete metrics of intrahousehold decision-making and empowerment than traditional measurement approaches.

While this information is valuable for better understanding gendered power relations and intrahousehold decision-making dynamics, we recognize that this incentive alone may not be enough to justify the added costs of implementing this new approach. Hence, our final research question focuses on how decision-making processes—in particular, the process-level information gleaned by this in-depth approach—relate to specific outcomes about food and nutrition security and agricultural productivity.

For this discussion, we turn to the regression results from the previous section. Two general trends are apparent in these results. Greater involvement by wives in decision-making is associated with:

- lower productivity and household food security
- higher MDD-W

We consider potential explanations for why these outcomes are differentially associated with wives' decision-making input. Evidence from sub-Saharan African countries on gender gaps in smallholder agricultural productivity find that women farmers achieve lower levels of productivity than men because of varying combinations of unequal access to inputs, differences in individual personal characteristics, and lower returns for their inputs and characteristics (Aguilar et al. 2015; Slavchevska 2015; Oseni et al. 2015). Women farmers, for instance, may employ different techniques than men do for cultivating the same crop, use lower quality inputs (including land) compared to men, or face different estimated (*shadow*) prices for inputs and credit than men—all of which might lead women to appear to be less productive than men (Peterman et al. 2011). Moreover, women's increased input into decisions may necessarily free them from these constraints and increase their productivity or profits.

Although we control for whether the wife and husband solely or jointly own the main plot, the negative association we observe between wives' involvement in decision-making and cassava productivity and sales (i.e., households where women have more involvement in decision-making have lower cassava production and sales) may be driven by these same factors of unequal access to inputs, individual characteristics, and lower returns to inputs that commonly explain gender productivity gaps. Cassava production and sales in households in which wives are more involved in decision-making may be more exposed to underlying gender inequities inherent in carrying out these tasks, compared to households in which women are less involved in cassava-related decision-making. Thus, production and sales in these households might be lower relative to production and sales in households in which wives are less involved in decision-making. Wives who are more involved in decision-making may also be more involved in the actual day-to-day management and/or labor associated with cassava production and sales activities, although importantly this does not necessarily have to be the case. Our data, for instance, show a wide variety of reasons—other than resources, income and labor contributions—for why specific household members make production- and sales-related decisions. Specifically, the choice of decision-maker is often motivated by who is the most knowledgeable or by default reasons (e.g., that is the person who always makes the decision, or they are the head of household).

The negative association between wives' participation in decision-making and household food security, alongside a positive association with MDD-W may initially appear counterintuitive, given that these are both nutrition-related outcomes. However, they measure very different aspects of nutrition. MDD-W measures dietary *diversity* in terms of the number of different food groups that a woman consumed the previous day. Nearly all individuals are consuming staples, such as cassava. However, to have higher dietary diversity scores, individuals need to consume a range of food groups; for example, iron- or vitamin A-rich foods. Intense cassava farming may compete for the space and energy needed to produce or acquire these products. The household food security measure, on the other hand, taps into food *quantity* and the extent to which household members were able to consume enough food to avoid being hungry in the past month. Staple foods, such as cassava, often have an important role in meeting basic food security needs. Given the importance of quantity in ensuring household food security, it is not surprising that food security and productivity follow similar associations with women's decision-making.

To explain the positive association between women's increased input into decision-making and MDD-W, we see similar examples in an emerging body of literature, based mostly on evidence from the WEAI and pro-WEAI, that establishes a consistent positive relationship between women's empowerment and their health and nutrition outcomes (Amugsi et al. 2016; Malapit and Quisumbing 2015; Malapit et al. 2015; Sinharoy et al. 2018). Given the central role of decision-making power in the WEAI and pro-WEAI, it is unsurprising that we find a similar result for the influence of women's involvement in decision-making on improved MDD-W.

## 6.2 Applying this approach to future studies

The step-by-step process we took to develop the mixed-methods research tool was initially rather generic in nature, so we feel that research or development projects focusing on other agricultural value chains and geographies could easily modify their focus within each step to fit their needs and context.

Different qualitative data analyses could be carried out in addition to the ones we did to inform the development of additional vignettes. For example, we could have followed Bernard et al. (2020) to focus our analysis and the vignettes on why decisions are made between spouses in a marital dyad. We instead chose to focus on how decisions are made because we believe that decision-making processes used by spouses are an important and understudied theme that can help us better understand decision-making.

Moreover, understanding *how* decisions are made is more conducive to short vignettes in quantitative survey instruments than describing *why* a decision is made. We included questions on why spouses make decisions alone or jointly in follow-up questions.

Also, the main decision-making module we included in the household survey could instead be integrated into an existing survey instrument for studies that have an interest in (but not a central focus on) measuring intrahousehold decision-making and the topics we concentrated on in the other modules.

## 6.3 Conclusion

Intrahousehold decision-making is an important aspect of women's empowerment, yet questions remain on how to ask about decision-making and how to interpret the responses. We designed a multistep, mixed-methods, transdisciplinary approach to understand intrahousehold decision-making and applied it to households active in the cassava value chain in rural northwestern Tanzania.

This approach drew on past literature and stakeholder consultations to design and conduct qualitative dyadic interviews on how marital dyads make decisions. The results of these interviews informed the development and validation of vignettes that were later incorporated into a household survey to better understand who makes important decisions, as well as how and why these decisions are made.

The qualitative part of the study revealed seven different decision-making patterns in which one of the spouses shares the idea, the two discuss, and the final decision is made either by the wife, husband, or jointly. In our quantitative results, we find somewhat superficially—yet consistent with the literature—that women have less input than men into the types of decisions that we asked about. However, women do have some input in most decisions—either because the decision is discussed by the dyad or because the decision is made jointly.

How then does input into decisions matter for important outcomes? We find that greater involvement of wives in decision-making is linked to lower agricultural productivity and lower food security, but higher dietary diversity of women. These findings may be attributable to the fact that these are associational analyses of cross-sectional data and could be driven, for example, by the fact that women may only have control over lower quality cropping land. It is also worth considering that dietary diversity is related to the quality of diets (variety of foods consumed), not the amount of food. Meanwhile, individuals may respond to food-security questions with a primary focus on the amount of food available. Women's activities and decision-making input, however, are often dedicated to activities that enhance the diversity of available foods (such as managing kitchen gardens), not necessarily the staple crops that drive the quantity of food available.

Overall, the novel approach we developed to studying decision-making has the potential to be applied across a wide variety of geographic contexts, as well as to different types of decisions, including those outside of agriculture. Further application of this approach has the potential to help us better understand decision-making processes, women's (dis)empowerment, and the implications for important development outcomes.

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# Annex

**Annex table 1. Vignettes applied to collect data on intrahousehold decision-making variables**

	Description	Vignette
A.	Husband shares idea, discusses with wife, and husband makes the final decision	The husband realizes something needs to happen or a decision needs to be made regarding X. The husband shares his idea with his wife and they discuss jointly about the idea. After discussing, the wife confirms she is supportive of the idea and/or suggests an alternative option that the husband considers before he makes the final decision.
B.	Wife shares idea, discusses with husband, and the husband makes the final decision	The wife realizes something needs to happen or a decision needs to be made regarding X. The wife shares her idea with her husband and they discuss jointly about the idea. After discussing, the husband confirms he is supportive of the idea and/or alternative options from either the husband or wife are considered before the husband makes the final decision.
C.	Husband shares idea, discusses with wife, and they make a joint final decision	The husband realizes something needs to happen or a decision needs to be made regarding X. The husband shares his idea with his wife and they discuss jointly about the idea. After discussing, the wife confirms she is supportive of the idea and/or suggests an alternative option that the husband considers before the husband and wife make a joint final decision.
D.	Wife shares idea, discusses with husband, and they make a joint final decision	The wife realizes something needs to happen or a decision needs to be made regarding X. The wife shares her idea with her husband and they discuss jointly about the idea. After discussing, the husband confirms he is supportive of the idea and/or suggests an alternative option that the wife considers before the wife and husband make a joint final decision.
E.	Wife shares idea, discusses with husband, and wife makes the final decision	The wife realizes something needs to happen or a decision needs to be made regarding X. The wife shares her idea with her husband and they discuss jointly about the idea. After discussing, the husband confirms he is supportive of the idea and/or the wife considers an alternative option from her husband before she makes the final decision.
F.	Husband shares idea, discusses with wife, and wife makes the final decision	The husband realizes something needs to happen or a decision needs to be made regarding X. The husband shares his idea with his wife and they discuss jointly about the idea. After discussing, the wife confirms she is supportive of the idea and/or suggests an alternative option that the husband considers before the wife makes the final decision.
G.	Husband shares idea with his wife before he makes the final decision	The husband realizes something needs to happen or a decision needs to be made regarding X. After sharing his idea with his wife, he makes the final decision.

Note: X represents eight decisions: three production decisions—(1) which cassava variety to use; (2) which plot to use for cassava production; (3) when to harvest the cassava; one processing decision—(4) how to process cassava; two trading decisions—(5) where to sell cassava; (6) how much cassava to sell; and two expenditure decisions—(7) building/refurbishing a house; (8) paying school fees.

**Annex table 2. Descriptive analysis of decisions on which cassava variety to use, according to who makes the decision and the type of couple resembled**

Among the couples that you resemble, which is the MOST similar to your couple?	Who in your household generally makes the final decision about which cassava variety to use?		
	Husband only	Wife only	Jointly
Vignette A. Husband shares idea, discusses with wife, and husband makes the final decision	<b>635</b> (229/227/179)		
Vignette B. Wife shares idea, discusses with husband, and the husband makes the final decision	<b>82</b> (23/36/23)		
Vignette C. Husband shares idea, discusses with wife, and they make a joint final decision			<b>778</b> (254/222/302)
Vignette D. Wife shares idea, discusses with husband, and they make a joint final decision			<b>217</b> (67/73/77)
Vignette E. Wife shares idea, discusses with husband, and wife makes the final decision		<b>188</b> (56/70/62)	
Vignette F. Husband shares idea, discusses with wife, and wife makes the final decision		<b>37</b> (14/16/7)	
Vignette G. Husband shares idea with his wife before he makes the final decision	<b>83</b> (29/29/25)		
Total observations	<b>800</b> (281/292/227)	<b>225</b> (70/86/69)	<b>995</b> (321/295/379)

Note: Respondent identity tally for each response is given as (# husband/# wife/# joint).

**Annex table 3. Descriptive analysis of decisions on which cassava variety to use, according to who makes the decision and why**

Most important reason why the final decisions about which variety of cassava to use are made by a sole member or jointly.	Who in your household generally makes the final decision about which cassava variety to use?		
	Husband only	Wife only	Jointly
Couple agreed/supported the decision			<b>525</b> (176/161/188)
Person X contributes the most resources, income, or labor	<b>52</b> (15/20/17)	<b>26</b> (6/10/10)	
Couple contributes resources, income, or labor			<b>149</b> (43/46/60)
Person X is head of household	<b>435</b> (126/195/114)	<b>1</b> (0/1/0)	
Person X introduced the idea	<b>81</b> (43/19/19)	<b>25</b> (2/14/9)	
Person X makes decisions about this and Person Y makes decisions about other things	<b>44</b> (17/12/15)	<b>58</b> (22/19/17)	
Couple makes all decisions about this activity together			<b>321</b> (102/88/131)
Person X is the most knowledgeable about this activity	<b>185</b> (80/46/59)	<b>113</b> (39/41/33)	
Other	<b>3</b> (0/0/3)	<b>2</b> (1/1/0)	<b>0</b> (0/0/0)
Total observations	<b>800</b> (281/292/227)	<b>225</b> (70/86/69)	<b>995</b> (321/295/379)

Note: Respondent identity tally for each response is given as (# husband/# wife/# joint).

**Annex table 4. Descriptive analysis of decisions on which land to use, according to who makes the decision and type of couple resembled**

Among the couples that you resemble, which is the MOST similar to your couple?	Who in your household generally makes the final decision about which area of land to use?		
	Husband only	Wife only	Jointly
Vignette A. Husband shares idea, discusses with wife, and husband makes the final decision	<b>795</b> (237/276/282)		
Vignette B. Wife shares idea, discusses with husband, and the husband makes the final decision	<b>98</b> (24/35/39)		
Vignette C. Husband shares idea, discusses with wife, and they make a joint final decision			<b>662</b> (263/221/178)
Vignette D. Wife shares idea, discusses with husband, and they make a joint final decision			<b>222</b> (70/67/85)
Vignette E. Wife shares idea, discusses with husband, and wife makes the final decision		<b>136</b> (53/40/43)	
Vignette F. Husband shares idea, discusses with wife, and wife makes the final decision		<b>22</b> (6/8/8)	
Vignette G. Husband shares idea with his wife before he makes the final decision	<b>90</b> (21/29/40)		
Total observations	<b>983</b> (340/361/282)	<b>158</b> (48/51/59)	<b>884</b> (288/263/333)

Note: Respondent identity tally for each response is given as (# husband/# wife/# joint).

**Annex table 5. Descriptive analysis of decisions on which land to use, according to who makes the decision and why**

Most important reason why the final decisions about which area of land to use are made by a sole member or jointly.	Who in your household generally makes the final decision about which area of land to use?		
	Husband only	Wife only	Jointly
Couple agreed/supported the decision			<b>426</b> (136/126/164)
Person X contributes the most resources, income, or labor	<b>86</b> (32/15/39)	<b>31</b> (8/10/13)	
Couple contributes resources, income, or labor			<b>165</b> (46/56/63)
Person X is head of household	<b>661</b> (207/278/176)	<b>0</b> (0/0/0)	
Person X introduced the idea	<b>57</b> (25/20/12)	<b>20</b> (4/6/10)	
Person X makes decisions about this and Person Y makes decisions about other things	<b>47</b> (20/12/15)	<b>47</b> (15/14/18)	
Couple makes all decisions about this activity together			<b>290</b> (105/80/105)
Person X is the most knowledgeable about this activity	<b>130</b> (56/35/39)	<b>59</b> (21/20/18)	
Other	<b>2</b> (0/1/1)	<b>1</b> (0/1/0)	<b>3</b> (1/1/1)
Total observations	<b>983</b> (340/361/282)	<b>158</b> (48/51/59)	<b>884</b> (288/263/333)

Note: Respondent identity tally for each response is given as (# husband/# wife/# joint).

**Annex table 6. Descriptive analysis of decisions on when to harvest cassava, according to who makes the decision and type of couple resembled**

Among the couples that you resemble, which is the MOST similar to your couple?	Who in your household generally makes the final decision about when to harvest cassava?		
	Husband only	Wife only	Jointly
Vignette A. Husband shares idea, discusses with wife, and husband makes the final decision	<b>366</b> (138/127/101)		
Vignette B. Wife shares idea, discusses with husband, and the husband makes the final decision	<b>84</b> (28/30/26)		
Vignette C. Husband shares idea, discusses with wife, and they make a joint final decision			<b>638</b> (212/192/234)
Vignette D. Wife shares idea, discusses with husband, and they make a joint final decision			<b>400</b> (122/141/137)
Vignette E. Wife shares idea, discusses with husband, and wife makes the final decision		<b>425</b> (137/143/145)	
Vignette F. Husband shares idea, discusses with wife, and wife makes the final decision		<b>47</b> (13/16/18)	
Vignette G. Husband shares idea with his wife before he makes the final decision	<b>62</b> (24/24/14)		
Total observations	<b>512</b> (190/181/141)	<b>472</b> (150/159/163)	<b>1,038</b> (334/333/371)

Note: Respondent identity tally for each response is given as (# husband/# wife/# joint).

**Annex table 7. Descriptive analysis of decisions on when to harvest cassava, according to who makes the decision and why**

Most important reason why the final decisions about when to harvest cassava are made by a sole member or jointly.	Who in your household generally makes the final decision about when to harvest cassava?		
	Husband only	Wife only	Jointly
Couple agreed/supported the decision			<b>466</b> (157/156/153)
Person X contributes the most resources, income, or labor	<b>66</b> (24/23/19)	<b>35</b> (12/11/12)	
Couple contributes resources, income, or labor			<b>247</b> (76/78/93)
Person X is head of household	<b>288</b> (94/121/73)	<b>5</b> (1/3/1)	
Person X introduced the idea	<b>33</b> (15/8/10)	<b>33</b> (15/8/10)	
Person X makes decisions about this and Person Y makes decisions about other things	<b>47</b> (19/12/16)	<b>128</b> (38/51/39)	
Couple makes all decisions about this activity together			<b>325</b> (101/99/125)
Person X is the most knowledgeable about this activity	<b>78</b> (38/17/23)	<b>270</b> (82/88/100)	
Other	<b>0</b> (0/0/0)	<b>1</b> (0/0/1)	<b>0</b> (0/0/0)
Total observations	<b>512</b> (190/181/141)	<b>472</b> (150/159/163)	<b>1,038</b> (334/333/371)

Note: Respondent identity tally for each response is given as (# husband/# wife/# joint).

**Annex table 8. Descriptive analysis of decisions on how to process cassava, according to who makes the decision and type of couple resembled**

Among the couples that you resemble, which is the MOST similar to your couple?	Who in your household generally makes the final decision about how to process cassava?		
	Husband only	Wife only	Jointly
Vignette A. Husband shares idea, discusses with wife, and husband makes the final decision	<b>294</b> (114/89/91)		
Vignette B. Wife shares idea, discusses with husband, and the husband makes the final decision	<b>63</b> (19/20/24)		
Vignette C. Husband shares idea, discusses with wife, and they make a joint final decision			<b>534</b> (180/173/181)
Vignette D. Wife shares idea, discusses with husband, and they make a joint final decision			<b>396</b> (130/129/137)
Vignette E. Wife shares idea, discusses with husband, and wife makes the final decision		<b>613</b> (185/221/207)	
Vignette F. Husband shares idea, discusses with wife, and wife makes the final decision		<b>71</b> (33/17/21)	
Vignette G. Husband shares idea with his wife before he makes the final decision	<b>39</b> (10/19/10)		
Total observations	<b>396</b> (143/128/125)	<b>684</b> (218/238/228)	<b>930</b> (310/302/318)

Note: Respondent identity tally for each response is given as (# husband/# wife/# joint).

**Annex table 9. Descriptive analysis of decisions on how to process cassava, according to who makes the decision and why**

Most important reason why the final decisions about how to process cassava are made by a sole member or jointly.	Who in your household generally makes the final decision about how to process cassava?		
	Husband only	Wife only	Jointly
Couple agreed/supported the decision			<b>401</b> (141/130/130)
Person X contributes the most resources, income, or labor	<b>48</b> (23/10/15)	<b>48</b> (20/16/12)	
Couple contributes resources, income, or labor			<b>248</b> (70/85/93)
Person X is head of household	<b>240</b> (79/85/76)	<b>6</b> (3/1/2)	
Person X introduced the idea	<b>15</b> (9/3/3)	<b>23</b> (9/6/8)	
Person X makes decisions about this and Person Y makes decisions about other things	<b>34</b> (7/14/13)	<b>165</b> (49/57/59)	
Couple makes all decisions about this activity together			<b>281</b> (99/87/95)
Person X is the most knowledgeable about this activity	<b>59</b> (25/16/18)	<b>440</b> (137/157/146)	
Other	<b>0</b> (0/0/0)	<b>2</b> (1/0/1)	<b>0</b> (0/0/0)
Total observations	<b>396</b> (143/128/125)	<b>684</b> (218/238/228)	<b>930</b> (310/302/318)

Note: Respondent identity tally for each response is given as (# husband/# wife/# joint).

**Annex table 10. Descriptive analysis of decisions on where to sell cassava, according to who makes the decision and type of couple resembled**

Among the couples that you resemble, which is the MOST similar to your couple?	Who in your household generally makes the final decision about where to sell cassava?		
	Husband only	Wife only	Jointly
Vignette A. Husband shares idea, discusses with wife, and husband makes the final decision	<b>598</b> (197/251/150)		
Vignette B. Wife shares idea, discusses with husband, and the husband makes the final decision	<b>46</b> (19/13/14)		
Vignette C. Husband shares idea, discusses with wife, and they make a joint final decision			<b>506</b> (178/139/189)
Vignette D. Wife shares idea, discusses with husband, and they make a joint final decision			<b>119</b> (46/34/39)
Vignette E. Wife shares idea, discusses with husband, and wife makes the final decision		<b>70</b> (27/16/27)	
Vignette F. Husband shares idea, discusses with wife, and wife makes the final decision		<b>11</b> (1/3/7)	
Vignette G. Husband shares idea with his wife before he makes the final decision	<b>90</b> (27/39/24)		
Total observations	<b>734</b> (243/303/188)	<b>81</b> (28/19/34)	<b>625</b> (224/173/228)

Note: Respondent identity tally for each response is given as (# husband/# wife/# joint).

**Annex table 11. Descriptive analysis of decisions on where to sell cassava, according to who makes the decision and why**

Most important reason why the final decisions about where to sell cassava are made by a sole member or jointly.	Who in your household generally makes the final decision about where to sell cassava?		
	Husband only	Wife only	Jointly
Couple agreed/supported the decision			<b>302</b> (103/82/117)
Person X contributes the most resources, income, or labor	<b>46</b> (17/13/16)	<b>11</b> (3/2/6)	
Couple contributes resources, income, or labor			<b>72</b> (26/18/28)
Person X is head of household	<b>396</b> (119/183/94)	<b>0</b> (0/0/0)	
Person X introduced the idea	<b>64</b> (23/27/14)	<b>8</b> (1/4/3)	
Person X makes decisions about this and Person Y makes decisions about other things	<b>37</b> (13/12/12)	<b>30</b> (10/6/14)	
Couple makes all decisions about this activity together			<b>251</b> (95/73/83)
Person X is the most knowledgeable about this activity	<b>190</b> (70/68/52)	<b>32</b> (14/7/11)	
Other	<b>1</b> (0/1/0)	<b>0</b> (0/0/0)	<b>0</b> (0/0/0)
Total observations	<b>734</b> (243/303/188)	<b>81</b> (28/19/34)	<b>625</b> (224/173/228)

Note: Respondent identity tally for each response is given as (# husband/# wife/# joint).

**Annex table 12. Descriptive analysis of decisions on how much cassava to sell, according to who makes the decision and type of couple resembled**

Among the couples that you resemble, which is the MOST similar to your couple?	Who in your household generally makes the final decision about how much cassava to sell?		
	Husband only	Wife only	Jointly
Vignette A. Husband shares idea, discusses with wife, and husband makes the final decision	<b>403</b> (137/158/108)		
Vignette B. Wife shares idea, discusses with husband, and the husband makes the final decision	<b>50</b> (15/21/14)		
Vignette C. Husband shares idea, discusses with wife, and they make a joint final decision			<b>476</b> (180/148/148)
Vignette D. Wife shares idea, discusses with husband, and they make a joint final decision			<b>254</b> (75/86/93)
Vignette E. Wife shares idea, discusses with husband, and wife makes the final decision		<b>177</b> (63/46/68)	
Vignette F. Husband shares idea, discusses with wife, and wife makes the final decision		<b>23</b> (8/6/9)	
Vignette G. Husband shares idea with his wife before he makes the final decision	<b>57</b> (17/30/10)		
Total observations	<b>510</b> (169/209/132)	<b>200</b> (71/52/77)	<b>730</b> (255/234/241)

Note: Respondent identity tally for each response is given as (# husband/# wife/# joint).

**Annex table 13. Descriptive analysis of decisions on how much cassava to sell, according to who makes the decision and why**

Most important reason why the final decisions about how much to sell are made by a sole member or jointly.	Who in your household generally makes the final decision about how much cassava to sell?		
	Husband only	Wife only	Jointly
Couple agreed/supported the decision			<b>329</b> (113/111/105)
Person X contributes the most resources, income, or labor	<b>30</b> (10/11/9)	<b>11</b> (5/3/3)	
Couple contributes resources, income, or labor			<b>104</b> (40/37/27)
Person X is head of household	<b>375</b> (117/166/92)	<b>5</b> (2/1/2)	
Person X introduced the idea	<b>21</b> (7/9/5)	<b>7</b> (3/3/1)	
Person X makes decisions about this and Person Y makes decisions about other things	<b>33</b> (12/9/12)	<b>55</b> (20/12/23)	
Couple makes all decisions about this activity together			<b>296</b> (101/86/109)
Person X is the most knowledgeable about this activity	<b>50</b> (23/13/14)	<b>122</b> (41/33/48)	
Other	<b>1</b> (0/1/0)	<b>0</b> (0/0/0)	<b>1</b> (0/1/0)
Total observations	<b>510</b> (169/209/132)	<b>200</b> (71/52/77)	<b>730</b> (255/234/241)

Note: Respondent identity tally for each response is given as (# husband/# wife/# joint).

**Annex table 14. Descriptive analysis of decisions on building/refurbishing a house, according to who makes the decision and type of couple resembled**

Among the couples that you resemble, which is the MOST similar to your couple?	Who in your household generally makes the final decision about building/refurbishing a house?		
	Husband only	Wife only	Jointly
Vignette A. Husband shares idea, discusses with wife, and husband makes the final decision	<b>957</b> (318/338/301)		
Vignette B. Wife shares idea, discusses with husband, and the husband makes the final decision	<b>89</b> (28/27/34)		
Vignette C. Husband shares idea, discusses with wife, and they make a joint final decision			<b>537</b> (175/146/216)
Vignette D. Wife shares idea, discusses with husband, and they make a joint final decision			<b>75</b> (19/29/27)
Vignette E. Wife shares idea, discusses with husband, and wife makes the final decision		<b>28</b> (11/12/5)	
Vignette F. Husband shares idea, discusses with wife, and wife makes the final decision		<b>6</b> (3/2/1)	
Vignette G. Husband shares idea with his wife before he makes the final decision	<b>137</b> (48/48/41)		
Total observations	<b>1,183</b> (394/413/376)	<b>34</b> (14/14/6)	<b>612</b> (194/175/243)

Note: Respondent identity tally for each response is given as (# husband/# wife/# joint).

**Annex table 15. Descriptive analysis of decisions on building/refurbishing a house, according to who makes the decision and why**

Most important reason why the final decisions about building/refurbishing a house are made by a sole member or jointly.	Who in your household generally makes the final decision about building/refurbishing a house?		
	Husband only	Wife only	Jointly
Couple agreed/supported the decision			<b>283</b> (91/85/107)
Person X contributes the most resources, income, or labor	<b>258</b> (91/90/77)	<b>3</b> (2/0/1)	
Couple contributes resources, income, or labor			<b>150</b> (50/41/59)
Person X is head of household	<b>709</b> (220/267/222)	<b>1</b> (0/1/0)	
Person X introduced the idea	<b>36</b> (12/8/16)	<b>24</b> (10/12/2)	
Person X makes decisions about this and Person Y makes decisions about other things	<b>31</b> (13/8/10)	<b>5</b> (2/1/2)	
Couple makes all decisions about this activity together			<b>179</b> (53/49/77)
Person X is the most knowledgeable about this activity	<b>149</b> (58/40/51)	<b>1</b> (0/0/1)	
Other	<b>0</b> (0/0/0)	<b>0</b> (0/0/0)	<b>0</b> (0/0/0)
Total observations	<b>1,183</b> (394/413/376)	<b>34</b> (14/14/6)	<b>612</b> (194/175/243)

Note: Respondent identity tally for each response is given as (# husband/# wife/# joint).

**Annex table 16. Descriptive analysis of decisions on paying school fees, according to who makes the decision and type of couple resembled**

Among the couples that you resemble, which is the MOST similar to your couple?	Who in your household generally makes the final decision about paying school fees?		
	Husband only	Wife only	Jointly
Vignette A. Husband shares idea, discusses with wife, and husband makes the final decision	<b>456</b> (164/155/137)		
Vignette B. Wife shares idea, discusses with husband, and the husband makes the final decision	<b>183</b> (60/61/62)		
Vignette C. Husband shares idea, discusses with wife, and they make a joint final decision			<b>448</b> (158/143/147)
Vignette D. Wife shares idea, discusses with husband, and they make a joint final decision			<b>375</b> (113/129/133)
Vignette E. Wife shares idea, discusses with husband, and wife makes the final decision		<b>66</b> (16/19/31)	
Vignette F. Husband shares idea, discusses with wife, and wife makes the final decision		<b>13</b> (5/5/3)	
Vignette G. Husband shares idea with his wife before he makes the final decision	<b>71</b> (21/26/24)		
Total observations	<b>710</b> (245/242/223)	<b>79</b> (21/24/34)	<b>823</b> (271/272/280)

Note: Respondent identity tally for each response is given as (# husband/# wife/# joint).

**Annex table 17. Descriptive analysis of decisions on paying school fees, according to who makes the decision and why**

Most important reason why the final decisions about paying school fees are made by a sole member or jointly.	Who in your household generally makes the final decision about paying school fees?		
	Husband only	Wife only	Jointly
Couple agreed/supported the decision			<b>312</b> (96/108/108)
Person X contributes the most resources, income, or labor	<b>221</b> (71/74/76)	<b>14</b> (4/4/6)	
Couple contributes resources, income, or labor			<b>216</b> (75/68/73)
Person X is head of household	<b>446</b> (155/155/136)	<b>2</b> (1/0/1)	
Person X introduced the idea	<b>10</b> (2/6/2)	<b>7</b> (0/0/7)	
Person X makes decisions about this and Person Y makes decisions about other things	<b>16</b> (9/2/5)	<b>33</b> (11/11/11)	
Couple makes all decisions about this activity together			<b>295</b> (96/100/99)
Person X is the most knowledgeable about this activity	<b>17</b> (5/8/4)	<b>23</b> (9/5/9)	
Other	<b>0</b> (0/0/0)	<b>0</b> (0/0/0)	<b>0</b> (0/0/0)
Total observations	<b>710</b> (245/242/223)	<b>79</b> (21/24/34)	<b>823</b> (271/272/280)

Note: Respondent identity tally for each response is given as (# husband/# wife/# joint).

**Annex table 18. Relationship between cassava productivity and decision-making on production-related topics**

Dependent variable: cassava productivity (kg/acre) in main plot						
	Which variety to plant in your main cassava plot?		What area of land should be devoted to the main cassava production?		When to harvest cassava from your main plot?	
	Model 1 (Final say)	Model 2 (Final say + origin + discussion)	Model 3 (Final say)	Model 4 (Final say + origin + discussion)	Model 5 (Final say)	Model 6 (Final say + origin + discussion)
Final say: wife	-241.372*** (80.225)	-183.312* (102.006)	-150.171* (82.779)	-38.732 (84.725)	-382.319*** (99.207)	-244.175** (116.856)
Final say: joint	38.612 (55.227)	54.779 (58.562)	-41.175 (56.683)	5.314 (58.936)	-96.408 (73.660)	-32.428 (86.719)
Origin: wife		-73.676 (79.188)		-118.025 (79.284)		-155.267** (76.361)
Discussion occurred		-82.231 (171.045)		-333.064 (208.941)		-263.848 (262.797)
Adjusted R-squared	0.132	0.132	0.131	0.135	0.140	0.144
Joint sig. test: F stat.	6.174	3.953	1.784	2.725	8.353	5.302
Joint sig. test: P value	0.004	0.007	0.178	0.039	0.001	0.001
N	2,017	2,017	2,022	2,022	2,019	2,019

Notes: Standard errors in parentheses. Significance denoted as: (\* ~  $p < 0.10$ , \*\* ~  $p < 0.05$ , \*\*\* ~  $p < 0.01$ ). Final say responses refer to answers to the question "Who in your household generally makes the decisions about X?" Origin and discussion variables are drawn from elements of the vignette that respondents selected as being most reflective of their household decision-making process—specifically, whether or not the couple discussed it together, and who had the final say. Base level: final say: husband, no discussion, decider: husband. Control variables: age of husband/wife, household size, youth dependency ratio, husband's/wife's ownership of main plot, household wealth quintile, improved variety on main plot, agrochemical inputs on main plot, marital status, educational status of husband/wife, husband's/wife's occupation, extension services, access to credit, group membership, husband's/wife's participation in activities (1–3). Hidden control variables are not included in tests for joint significance.

**Annex table 19. Relationship between processed cassava sales productivity and decision-making on processing- and sales-related topics**

Dependent variable: processed cassava sales productivity from main plot (TSZ1,000/acre)						
	How to process the cassava from your main plot?		Where to sell cassava from your main plot?		How much cassava to sell from your main plot?	
	Model 1 (Final say)	Model 2 (Final say + origin + discussion)	Model 3 (Final say)	Model 4 (Final say + origin + discussion)	Model 5 (Final say)	Model 6 (Final say + origin + discussion)
Final say: wife	-183.856*** (50.146)	-138.391*** (40.758)	-50.403 (78.307)	18.056 (74.104)	91.469 (127.125)	102.625 (122.801)
Final say: joint	-157.898*** (51.914)	-131.508*** (48.918)	-116.401** (56.126)	-97.189* (55.027)	-32.370 (19.857)	-28.111 (22.748)
Origin: wife		-41.313*** (14.221)		-76.429** (31.686)		-14.126 (19.899)
Discussion occurred		-158.884 (221.483)		-85.466 (100.578)		-7.308 (54.158)
Adjusted R-squared	0.078	0.080	0.071	0.074	0.065	0.064
Joint sig. test: F stat.	6.723	4.500	2.444	3.019	1.403	0.951
Joint sig. test: P value	0.003	0.003	0.097	0.026	0.255	0.442
N	1,383	1,383	1,382	1,382	1,382	1,382

Notes: Standard errors in parentheses. Significance denoted as: (\* ~  $p < 0.10$ , \*\* ~  $p < 0.05$ , \*\*\* ~  $p < 0.01$ ). Final say responses refer to answers to the question "Who in your household generally makes the decisions about X?" Origin and discussion variables are drawn from elements of the vignette that respondents selected as being most reflective of their household decision-making process—specifically, whether or not the couple discussed it together, and who had the final say. Base level: final say: husband, no discussion, decider: husband. Control variables: age of husband/wife, household size, youth dependency ratio, husband's/wife's ownership of main plot, household wealth quintile, improved variety on main plot, agrochemical inputs on main plot, marital status, educational status of husband/wife, husband's/wife's occupation, extension services, access to credit, group membership, husband's/wife's participation in activities (1–3). Hidden control variables are not included in tests for joint significance.

*Annex table 20. Relationship between minimum dietary diversity, food security and decision-making on production-, processing- and sales-related topics*

Panel A. Dependent variable: minimum diet diversity for women												
	Which variety to plant in your main cassava plot?		What area of land should be devoted to the main cassava production?		When to harvest cassava from your main plot?		How to process the cassava from your main plot?		Where to sell cassava from your main plot?		How much cassava to sell from your main plot?	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Final say: wife	0.018 (0.152)	-0.072 (0.168)	-0.099 (0.156)	-0.139 (0.175)	0.346** (0.148)	0.402** (0.170)	0.258* (0.131)	0.126 (0.132)	0.262 (0.283)	0.164 (0.288)	-0.071 (0.164)	-0.065 (0.185)
Final say: joint	0.018 (0.069)	-0.018 (0.072)	0.169** (0.075)	0.169** (0.075)	0.142** (0.073)	0.160** (0.074)	0.059 (0.079)	0.005 (0.082)	0.035 (0.080)	-0.000 (0.079)	0.020 (0.083)	0.022 (0.097)
Origin: wife		0.089 (0.111)		0.065 (0.108)		-0.078 (0.106)		0.173* (0.091)		0.117 (0.085)		-0.005 (0.097)
Discussion occurred		0.265 (0.210)		-0.128 (0.182)		-0.034 (0.175)		0.131 (0.164)		0.157 (0.138)		-0.013 (0.131)
Adjusted R-squared	0.113	0.114	0.117	0.116	0.121	0.120	0.119	0.121	0.115	0.115	0.114	0.112
Joint sig. test: F stat.	0.036	0.602	2.830	1.435	3.481	1.910	1.955	1.697	0.482	1.086	0.251	0.128
Joint sig. test: P value	0.965	0.663	0.068	0.235	0.038	0.122	0.152	0.164	0.620	0.373	0.779	0.972
N	1,021	1,021	1,023	1,023	1,021	1,021	1,021	1,021	1,021	1,021	1,021	1,021

Panel B. Dependent variable: Food Insecurity Experience Scale												
	Which variety to plant in your main cassava plot?		What area of land should be devoted to the main cassava production?		When to harvest cassava from your main plot?		How to process the cassava from your main plot?		Where to sell cassava from your main plot?		How much cassava to sell from your main plot?	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Final say: wife	0.000 (0.251)	0.146 (0.291)	0.243 (0.292)	0.052 (0.342)	0.118 (0.191)	0.177 (0.223)	0.009 (0.217)	-0.006 (0.199)	0.594* (0.307)	0.369 (0.361)	0.369* (0.205)	0.208 (0.220)
Final say: joint	-0.016 (0.148)	0.068 (0.147)	0.337** (0.139)	0.334** (0.137)	0.010 (0.141)	0.028 (0.147)	0.194 (0.159)	0.208 (0.166)	0.348** (0.142)	0.336** (0.140)	0.031 (0.170)	-0.016 (0.163)
Origin: wife		-0.089 (0.201)		0.310* (0.180)		-0.085 (0.150)		0.068 (0.201)		0.378** (0.183)		0.238 (0.148)
Discussion occurred		-0.778** (0.375)		-0.581 (0.403)		-0.022 (0.320)		-0.347 (0.495)		-0.353 (0.256)		-0.125 (0.279)
Adjusted R-squared	0.169	0.172	0.174	0.177	0.169	0.168	0.171	0.170	0.176	0.179	0.172	0.172
Joint sig. test: F stat	0.006	1.264	2.925	3.103	0.199	0.168	0.796	0.571	4.493	4.048	1.863	1.648
Joint sig. test: P value	0.994	0.296	0.062	0.023	0.820	0.954	0.456	0.685	0.016	0.006	0.165	0.176
N	1,020	1,020	1,022	1,022	1,020	1,020	1,020	1,020	1,020	1,020	1,020	1,020

Notes: Standard errors in parentheses. Significance denoted as: (\* ~ p<0.10, \*\* ~ p<0.05, \*\*\* ~ p<0.01). Final say responses refer to answers to the question "Who in your household generally makes the decisions about X?" Origin and discussion variables are drawn from elements of the vignette that respondents selected as being most reflective of their household decision-making process; specifically, whether or not the couple discussed it together, and who had the final say. Base level: final say: husband, no discussion, decider: husband. Control variables: age of husband/wife, household size, youth dependency ratio, husband's/wife's ownership of main plot, household wealth quintile, improved variety on main plot, marital status, agrochemical inputs on main plot, educational status of husband/wife, husband's/wife's occupation, extension services, access to credit, group membership, husband's/wife's participation in activities (1-7). Hidden control variables are not included in tests for joint significance.



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