

Bragging, Shirking, and Hiding: Spousal Disagreement among Ugandan Maize Farmers

Bjorn Van Campenhout*, Els Lecoutere[†] and David J Spielman[‡]

May 7, 2021

Abstract

To gain a better understanding of intrahousehold bargaining processes, surveys increasingly collect data from co-heads individually. Answers provided by spouses on the same set of questions often differ substantially, alternately attributed to measurement error, poor framing within the cultural context that leads to systematic biases, or other common challenges associated with surveys. However, recent studies suggest that differences in responses from co-heads may also be caused by spouses strategically hiding information from each other. Using detailed data on a large sample of monogamous smallholder maize-farming households in eastern Uganda, we document response patterns from household co-heads related to decision-making, labor time, and sales of farm output. We ask each spouse questions about themselves, but also about their spouse, and compare responses. We also implement two interventions to test if such spousal disagreement in reporting can be reduced by increasing cooperation between spouses and reducing information asymmetries.

*Development Strategy and Governance Division, International Food Policy Research Institute and LICOS Center for Institutions and Economic Performance, KULeuven, Belgium - corresponding author: b.vancampenhout@cgiar.org

[†]CGIAR Gender Platform, International Livestock Research Institute, Belgium

[‡]Development Strategy and Governance Division, International Food Policy Research Institute, Kigali, Rwanda

1 Introduction

Increased attention to the internal dynamics of agricultural households by both researchers and practitioners has led to various innovations in data collection ([Doss and Quisumbing, 2020](#); [Alkire et al., 2013](#)). Examples of best practice in data collection on intrahousehold decision-making processes include separate interviewing of male and female co-heads of the household using distinct survey instruments that may nonetheless contain common topics and questions. Although the choice of respondents may miss out on other dimensions of intrahousehold gender relations – between mothers and daughters-in-laws, or between co-wives in polygynous households, for example – studies using these instruments often find that spouses provide different answers on even the most basic questions ([Ambler et al., 2021](#); [Annan et al., 2021](#); [Acosta et al., 2020](#); [Twyman, Useche, and Deere, 2015](#)).

[Ambler et al. \(2021\)](#) demonstrate that while part of these divergent responses may be attributable to measurement error, there is also a systematic component that reflects asymmetric information within households where one co-head does not have accurate knowledge about the decisions made, actions taken, or assets owned by the other. Furthermore, [Ambler et al. \(2021\)](#) find that spousal disagreement in reporting is larger for assets that can be hidden more easily than other types of assets, suggesting that, to some extent, spouses exploit these information asymmetries by deliberately hiding information, assets, and decisions from each other. A number of lab-in-the-field experiments similarly confirm that, in many cases, household members conceal some of their resources from one another (for example, [Ashraf, 2009](#); [Fiala and He, 2016](#); [Castilla and Walker, 2013](#); [Hoel, 2015](#)).

We contribute to this line of research by documenting spousal disagreement in reported behavior among a large sample of semi-subsistence monogamous maize-farming households in Uganda. First, on a range of decisions that are crucial to increasing maize yields such as timely planting, seed spacing, and weeding, we ask both spouses separately to indicate who made each of these decisions on each plot on the household’s farm. Spouses are given the option to indicate whether they took the decision alone, whether their spouse took the decision alone, or whether the decision was taken jointly. These answers are then combined to assess the extent and direction of disagreement with respect to decision-making. Second, we ask each spouse separately how much time he or she spent on five different important maize farming-related activities – land preparation, planting, weeding, spraying, and harvesting –

on each plot. We also ask each co-head to provide an estimate of how much time his or her spouse spent on these same activities. We similarly combine these answers to assess the extent and direction of disagreement with respect to labor time allocation. Finally, we ask each co-head how much maize was sold jointly with his or her spouse, how much maize he or she sold unilaterally (as opposed to selling through joint sales), and how much maize was sold by his or her spouse unilaterally, as well how much money was obtained through the sale. These answers are again combined to assess the extent and direction of disagreement with respect to maize marketing.

We make a further contribution by testing the impact of two interventions on spousal disagreement in these same households. Inspired by recent research on behavioral change communication and social marketing, the first intervention consists of a treatment that promotes a mental image of maize farming as a cooperative or joint venture in which both spouses play an equal role in decision-making, farming activities, and rewards. The second intervention aims to reduce intrahousehold information asymmetries between spouses with regard to good maize-farming practices. Both interventions aim to influence intrahousehold gender relations in a slightly different way – one by a behavioral nudge and one with an information treatment – to affect change not only in co-heads’ approach to decision-making on cultivation and management practices, timing, labor time allocations, and yield expectations, but also in how co-heads monitor each other and estimate each other’s efforts and returns.

We find substantial disagreement between spouses. For instance, we find that co-heads exaggerate their own decision-making power on almost one in four plots. However, we also find that promoting a cooperative approach to maize farming reduces the likelihood that co-heads overestimate their own influence on decision-making. We find similar effects from reducing information asymmetries between spouses.

For labor, we find that co-heads seem to overstate their own labor contribution to the farm relative to their spouse’s contribution. Conversely, we also find a substantial share of co-heads report that they work less than what the other spouse thinks. We further observe that, to some extent, a reduction in information asymmetries between spouses tends to reduce the likelihood that a co-head overstates his or her own labor contribution, indicating an increase in monitoring capacity within the household.

Finally, we find that spouses tend to overstate own sales in the marketing of maize produced on the farm. However, the cooperative image intervention

reduces the likelihood and degree of one spouse reporting lower sales than what the other spouse reported.

The remainder of the paper is organized as follows. The next section provides a brief overview of the literature on spousal disagreement. Section 3 presents the experimental design and the rationale underlying the intervention. Section 4 offers a brief description of the context and characteristics of the households in our sample. We then turn to the results in Section 5, first by examining the extent and direction of spousal disagreement about decision-making, followed by estimates of the impact of the two interventions on spousal disagreement. Section 6 explores the mechanisms that may explain patterns of spousal disagreement observed in our study, followed by concluding remarks.

2 Literature

Our review of prior work on spousal disagreement focuses mainly on the empirical literature on intrahousehold resource allocation and decision-making in agricultural households in developing countries, and draws primarily on analyses that use observational data from surveys in which both spouses are interviewed separately and are asked the same set of questions. Such studies often focus on research questions related to women’s empowerment and autonomy. For example [Jejeebhoy \(2002\)](#) asks both spouses questions on the locus of decision-making on a variety of issues, as well as specific questions concerning women’s mobility and access to resources. [Ghuman, Lee, and Smith \(2006\)](#) collect data from both spouses on a range of autonomy items, including the need of the wife to obtain the husband’s permission to go to different types of places, the wife’s capacity to decide on their children’s affairs, whether the wife is allowed to have a job, and her role in deciding on the number of children and household expenditure-related decisions.

A common finding in studies that ask the same set of questions to different individuals within the household is that substantial disagreement often arises between spouses, even on questions that would seem easily and objectively verifiable, such as the number of children, or type of material used for house construction. This divergence may simply be attributable to measurement error by the respondents. But [Ghuman, Lee, and Smith \(2006\)](#) suggest that such divergence may also partly be due the fact that the response categories do not have the same cognitive or semantic meanings to women and men,

leading to the somewhat pessimistic conclusion that survey questions are of limited use in understanding differences in gender stratification across multiple contexts. [Anderson, Reynolds, and Gugerty \(2017\)](#), in an investigation of variation in husband and wife perspectives on the division of authority over agriculture-related decisions in rural Tanzania, goes one step further by concluding that in the absence of “intrahousehold accords,” it may be problematic for interventions informed by the analysis of survey data to reduce gender inequalities or empower women in agricultural households. [Seymour and Peterman \(2018\)](#) note that spouses often give inconsistent answers when asked about who made a particular decision. They then test whether female unilateral decision-making is equally empowering if the male co-head disagrees that the woman took the decision alone, as compared to when the male co-head agrees. They conclude that disagreement may signal underlying power dynamics within the household that are likely to be relevant when assessing individual-level agency and empowerment.

[Ambler et al. \(2021\)](#) provide a particularly insightful conceptual framework that teases out the various perspectives on spousal disagreement. First, they note that if disagreement solely derives from measurement error, disagreement should be symmetric, and the female co-head’s responses should not differ systematically from the male co-head’s responses. Second, they point out that if disagreement results from asymmetric measurement error in which men and women interpret questions differently, then answers should differ systematically between spouses, but disagreement should be similar for different questions asked in a survey. Finally, they argue that finding differing rates of disagreement across survey questions, and higher rates of disagreement for assets and activities that are easier to hide in particular, points to the presence of intrahousehold information asymmetries. Using observational data collected in Bangladesh, they find evidence that such information asymmetries in the form of hidden assets and decisions are present in their sampled households.

This should not be interpreted to mean that information asymmetries always reflect the act of one spouse intentionally deceiving another. There may be other systematic biases that manifest more in one asset or decision category than others, and that may be shaped by prevailing gender roles and norms. For example, in a case study in northern Uganda, [Acosta et al. \(2020\)](#) find that men often report unilateral decision-making in areas where they are assumed to bear final responsibility, even if women had some degree of involvement. Women tend to view these scenarios as joint decisions. As

such, it is important to understand the local cultural context to differentiate spousal disagreement as a function of information asymmetries stemming from intentional hiding versus other gender-related systematic biases.

[Annan et al. \(2021\)](#) offer another illustration of the conceptual and analytical value of intrahousehold contention over decision-making. They argue that assessing agency and empowerment requires that disagreement be considered not by its presence or absence, but also in terms of its direction. Specifically, they differentiate cases in which male co-heads disagree with their spouse claiming to be involved in decision-making from cases where male co-heads disagree with their spouse claiming not to be involved in decision-making. The former is interpreted as women “taking power”, while the latter is interpreted as women “being given power”.

While most studies focus on disagreement with respect to decision-making, divergent responses on income streams and asset ownership are also commonly observed in household data (for example, [Twyman, Useche, and Deere, 2015](#)). As such, instead of simply recording whether an asset is owned by a spouse using a yes/no question, some studies go further and try to place values on incomes and assets. For example, [Castilla \(2012\)](#) uses the male co-head’s own reporting of his own farm income and compares this to the female co-head’s reporting of her husband’s farm income to identify income hiding by men, and finds that female co-heads’ estimate of farm income is on average 14 percent lower than what male co-heads report. Similarly, [Fisher, Reimer, and Carr \(2010\)](#) find that in 66 percent of the Malawian households they studied, the male co-head understated his wife’s income by an average of 47 percent of what the female co-head reported.

While most of the studies noted above explore patterns in spousal disagreement, other studies extend the line of inquiry to examine correlations with welfare outcomes of households, women, and children ([Annan et al., 2021](#); [Ambler et al., 2021](#); [Seymour and Peterman, 2018](#)). The emerging consensus is that spousal disagreement is closely correlated with – and likely causally linked to – a wide range of welfare outcomes. Following from [Annan et al. \(2021\)](#), we attempt to fill a gap in the literature that attempts to better understand these causal pathways and to explore interventions that might change intrahousehold dynamics via a reduction in spousal disagreement.

3 Experimental design and interventions

The emerging literature on spousal disagreement in survey response suggests at least two underlying mechanisms. First, spousal disagreement may reflect different cognitive understanding of the responses categories in a survey questionnaire and what the appropriate response should be (Ghuman, Lee, and Smith, 2006). This problem is compounded by the cultural context in which these questions are asked and answered (Acosta et al., 2020). A first treatment therefore attempts to challenge preconceived ideas of what decision-making of a spouse involves and who is expected to make decisions in a farm household by promoting a cooperative approach to maize farming, in which maize cultivation and management activities are seen as a joint responsibility of spouses. Second, the literature also suggests that spousal disagreement reflects information asymmetries between spouses (Ambler et al., 2021). A second intervention tests if these asymmetries can be influenced by providing spouses equal access to information about best practices in maize farming prior to the point in time when decisions are made on cultivation and management.

At the heart of both interventions is a short video that is shown twice to individuals within households using tablet computers. The aim of the video is to increase viewers' knowledge of recommended practices in maize farming, such as timely planting, row planting, and the use of improved inputs such hybrid seed and inorganic fertilizer. It does this through an aspirational story in which a farmer (or farmers) recounts how he/she/they used to be poor but managed to increase yields over time by applying a set of techniques and inputs.¹ It also suggests that farmers view maize farming as a business that needs continuous investment over time and includes some simple intertemporal cost-benefit calculations to illustrate this, followed by encouragements to follow the example of the model farmer(s) featured in the video.

The first intervention involves varying the actors featured in the video and randomizing which version of the video is viewed by farmers. The second intervention randomly varies the member(s) of the household who view the video. These variations and the rationale behind them are explained below.

¹The techniques and inputs that are demonstrated in the videos are the ones recommended by the National Agricultural Research Organization (NARO) and are also used by the public agricultural advisory system. More details can be found in Van Campenhout, Spielman, and Lecoutere (2021).

We begin with a conceptual explanation that ties to our first intervention: projecting a cooperative way of farming as a household. Consider that within households, individual members often have differing spheres of influence reflecting prevailing gender roles (Lundberg and Pollak, 1993). In many agricultural households, though certainly not all, women tend to have a stronger voice in the cultivation of crops that are predominately cultivated for home consumption, while men have a stronger voice in the cultivation of crops that are marketed. Gendered differences in crop choices may emerge from a variety of factors, including gender-related differences in knowledge about the crop, access to planting material, access to inputs and extension services, and customs and traditions (Nordhagen, Pascual, and Drucker, 2021; Iradukunda et al., 2019). While the existence of such gendered patterns are widely acknowledged, they are not always easily captured in household survey data, as gender is only one of the determinants of crop portfolio choice (Carr, 2008; Doss, 2002).

In Uganda, maize, which is in a part a cash crop, is considered to be mostly in the influence sphere of men. Generally, men make all important decisions such as what plots to plant maize on, how to prepare the land, when to start planting, and what seeds to use. Men also generally decide on how much labor is needed, while women assist men, often with weeding. While these are broad and stylized characterizations of Uganda’s maize production system, their widespread acceptance as conventional wisdom makes maize farming a topic ripe for this study.

Specifically, we expect that such a separation in spheres of influence between male and female co-heads may contribute to spousal disagreement in survey response. Therefore, our first intervention randomly varies which version of our video is screened to our study participants. One version features a male-female couple who present themselves as role models to promote a worldview where both spouses participate equally in maize farming, while another version features only a male actor.² This approach capitalizes on recent evidence on the influence that role models can have on aspirations, investment choices, and other future-oriented behaviors Bernard et al. (2015) and on increasing women’s participation in otherwise male-dominated sectors (Porter and Serra, 2020; Beaman et al., 2012); and the influence of engaging media content to expose large numbers of people to role models (La Ferrara,

²A third version of the video features only a female actor, but is not used in this intervention.

[Chong, and Duryea, 2012](#); [Riley et al., 2017](#)).

To test the hypothesis that spouses disagree less if they view farming as a joint spousal activity, we randomly assign 261 households from our sample to be shown the cooperative image version of the video, such that both the male and female co-heads watch the video together. This group functions as the treatment group. We also randomly assign 240 households from our sample to be shown the version of the video featuring only a male actor, again with both the male and female co-heads watching together. Because the only difference between the two videos is the composition of the actors featured (a male-female couple versus a male actor), any difference in outcomes between the two groups should be attributed to the role model effect of the cooperative image intervention.

Next, we turn to our second hypothesis that relates to asymmetric information within the household. Consider the farm household as a collection of individuals, each with their own preferences, skills, assets, and access to resources. In many contexts, the household's existence and the welfare of its members depend on their collective capacity to invest in common goods by drawing on each individual's skills, assets, and resources. As such, households can be considered as informal institutions, and many of the problems encountered in common pool resource management and collective action, such as free-riding and overextraction of resources, apply to the household ([Doss and Meinzen-Dick, 2015](#)).

One way in which collective action problems can be attenuated is through increased mutual monitoring. For instance, if one co-head can assess the actual time that the other co-head spends on land preparation, then the latter is less likely to engage in labor shirking. Similarly, if a co-head can determine how much the other co-head earns from the sale of farm produce, then the latter is less likely to engage in income hiding. However, for mutual monitoring to work, co-heads require information against which to compare information gained through monitoring, since merely observing an outcome may be insufficient to determine if a co-head is shirking, hiding, or otherwise mismanaging his or her collective obligations to the household. Thus, information on exactly what operations land preparation entails or on the prevailing market price for farm produce is necessary for effective monitoring. For instance, it may be difficult for the female co-head to check if her spouse overreports time spent preparing the field if she does not have a good understanding of what land preparation entails. If both spouses have a good understanding of what agricultural management entails, they are also in a

	promoting cooperative household farming	reducing information asymmetry
number of treatment households	261	261
number of control households	240	540

Table 1: Sample size

better position to monitor each other.

In a second treatment, we therefore make sure both co-heads start off with symmetric information with respect to recommended agronomic practices for maize farming, as this facilitates mutual monitoring. To do so, we show the video that showcases recommended practices in maize farming to both spouses in a random sample of 261 households.³ This group acts as the treatment group. In another random sample of 540 households, the control group, the same video is shown, but only to one of the two co-heads.⁴ As the only difference between the two groups is related to whom the video is shown to, any difference in outcomes between the two groups should be attributed to reducing information asymmetry between spouses. For both treatments, the number of observations in each treatment group is also summarized in Table 1.

4 Study context

The interventions described above were conducted among monogamous maize-farming households in five districts in eastern Uganda, an area known for its maize production. Our survey of households that participated in the study was deployed with a two-stage cluster sampling approach to obtain a representative sample of this population. Specifically, we first selected 50 parishes randomly and in proportion to the number of villages within each parish. In the selected parishes, all villages were included in the study. Within each village, we then listed all households, and in each village we sampled 10 households to be included in the study. This resulted in a total sample size

³We show the version of the video that features a couple (male and female actor-farmers), that is, the video used in the treatment group of the previous intervention.

⁴We made sure that in about half of the cases the video was shown to the male co-head alone and in the other half of cases to the female co-head alone.

of 3,280 households. However, in about 23 percent of the households we were unable to interview both spouses separately, resulting in an effective sample of 2,548 households. The interventions described in Section 3 were implemented in random subsets of this sample.

We focus on the second maize-growing season of 2017, which runs from about August 2017, when fields are prepared, to January 2018, when maize is harvested. Treatments were administered twice, once in August 2017 when farmers were preparing fields, and one month later during planting time. Concurrent with the first treatment administration in 2017, we also collected information on household characteristics and on the previous harvest, which was the first harvesting season of 2017.

Farmers in our study area cultivated on average about 1.5 plots of maize. Yields during the first season of 2017 were extremely low (about 270 kilograms per acre) as a result of a Fall Armyworm outbreak that significantly affected the maize crop. Baseline data indicate that the average household in our sample consisted of 8 individuals. Female co-head in these households are on average 35 years old and only 30 percent have finished primary education. Male co-heads are on average 43 years old and 42 percent have finished primary education. Only 11 percent of households report that they had access to agricultural extension in the year prior to the survey. Only 17 percent of households used fertilizer on at least one plot, and 38 percent reported using improved seed bought from a shop or agro-input dealer during the last cropping season (April-July 2017). About three quarters of households reported owning a mobile phone.

5 Results

We now turn to an in-depth analysis of the data collected at endline. The focus is on spousal disagreement in survey response using own and cross-reporting (that is, what one spouse thinks the other spouse would report). We start by looking at patterns in decision making about a series of important maize cultivation practices. We then turn to time use, again disaggregated over a set of important tasks in maize cultivation. Finally, we look at decisions related to maize marketing. Under each heading, we provide a detailed descriptive analysis of disagreement based on the entire sample of 2,548 households, and then report on the findings from the two treatments in the respective subsamples.

5.1 Decision making

We start by exploring patterns of intrahousehold decision-making related to maize farming. In our survey, we asked the head of household to list all maize plots that the household was cultivating during the season preceding the survey (that is, the second agricultural season of 2017). We then cycled through the different plots and asked a series of questions for each plot, and repeated the same questions separately with the other co-head. For a range of key decisions that need to be made and that are known to significantly affect maize yields, we asked who made the decision on that particular plot. Respondents could answer that decisions were made by (1) the respondent him- or herself alone, (2) the respondent’s spouse alone, (3) the respondent jointly with his or her spouse, (4) someone else inside or outside the respondent’s household, (5) the respondent together with someone else inside or outside the household, or (6) the respondent’s spouse together with someone else inside or outside the household. Respondents could also indicate that they did not know who made the decision.

Responses given by the male co-heads are shown in Figure 1. The first decision we consider is simply who decided that maize should be planted on the particular plot. A second decision is related to timing of planting, recognizing that planting date is a strong agronomic determinant of yields.⁵ The third decision relates to the spacing of seed and the seeding rate, which reflects the fact that row planting at a rate of one seed per mound is also a strong determinant of yield.⁶ Finally, we consider decisions related to weed control. For weeding, we differentiate between decision-making related to strategies used to combat striga infestation (a parasitic weed that feeds off the roots of the maize plant) and weeding more generally.

Figure 1 shows that, at least according to the male co-head, joint decision

⁵NARO recommends that maize planting start immediately after the first rains of the season. This often results in significant time pressure on household members’ labor time, especially when large areas need to be planted.

⁶There is a wide range of seed methods used by farmers in Uganda. While some simply broadcast seeds, NARO recommends row planting because it results in significantly higher yields since it reduces competition between plants for sunlight and soil nutrients. Farmers also often plant more than one seed per hill because they fear some seeds may not germinate. However, planting more than one seed per hill also tends to increase competition for light and nutrients, leading to stunted plant growth. It is therefore recommended to use only one seed per hill and engage in gap filling when seeds do not germinate after one week.

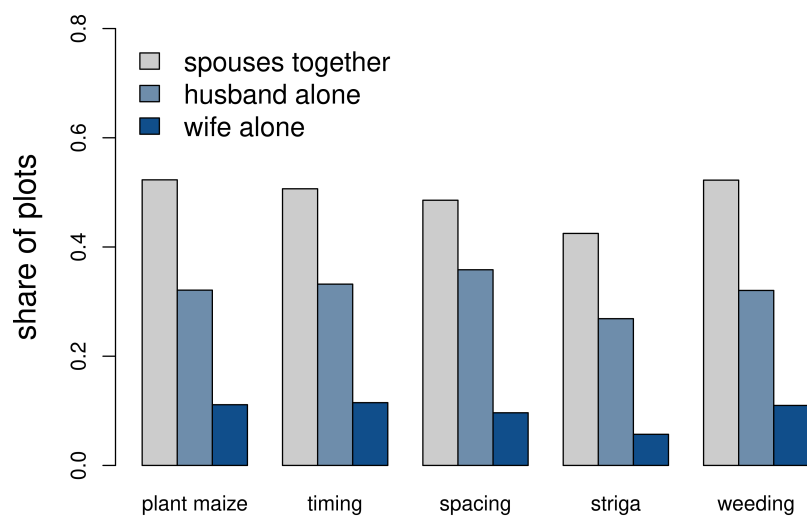


Figure 1: Decision-making on different practices and inputs as reported by the male co-head

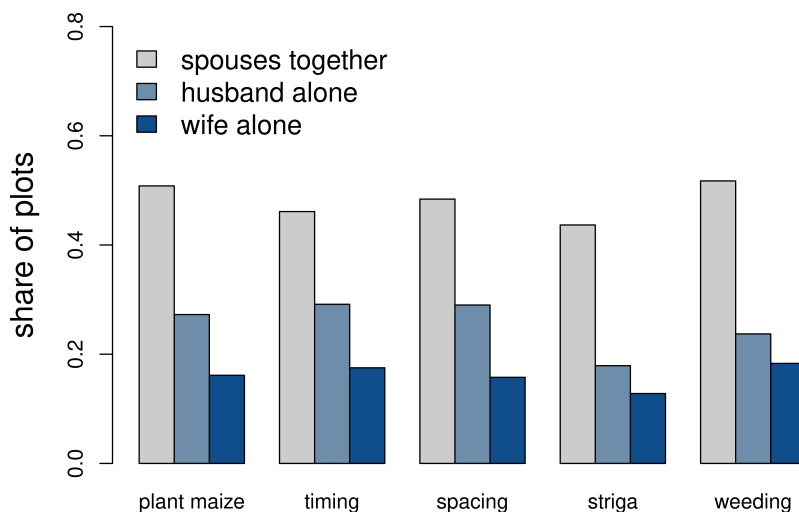


Figure 2: Decision making on different practices and inputs as reported by the female co-head

making by spouses is the norm. For example, on the 3,723 maize plots on which data were collected, men indicate that on 1,947 plots the decision to start planting maize was taken together with their wife. This corresponds to about 52 percent of plots. The pattern seems to be consistent across the different farming decisions: for the decision on how to combat striga, the percentage of joint decision-making stands at only 42 percent, but this is because on some plots in the sample, striga was not a problem and thus no decision making was required. The figure also shows that on about 33 percent of plots, the male co-head reported that decisions are made by him alone, without consulting his wife, on most of the decision points described above. On just 11 percent of plots do women decide to plant maize and undertake other decisions without consulting their husbands, at least according to the responses from male co-heads.

Figure 2 is similar to Figure 1, but now shows responses provided to the same questions by the female co-head. Also here, we see that women reported that decisions are generally made jointly: on 51 percent of plots,

the woman co-head indicated that the decision to start planting maize was taken by the male and female co-head together. Similar results are obtained for most other farming decisions.

Women also reported that it is more common for men to take decisions alone than for women to take decisions alone. For instance, female co-heads reported that on 27 percent of plots, men took the decision to start planting alone. However, we observe less consistency in this pattern across other farming decisions: according to female co-heads, men are relatively less likely to unilaterally decide on weeding-related activities. Finally, female co-heads reported that they make decisions unilaterally on about 15 percent of the plots.

A comparison between Figure 1 and Figure 2 suggests some degree of spousal discord. For instance, while male co-heads indicated that they alone took the decision to plant maize on about 32 percent of plots, female co-heads say that men unilaterally took the decision to plant maize on only 27 percent of plots. At the same time, female co-heads indicated they alone decided to plant maize on 16 percent of plots, while male co-heads indicated that women unilaterally decided to plant maize on only 11 percent of plots.

To investigate this disagreement further, we construct measures based on answers of both spouses. Given the large number of potential response combinations, it is useful to collapse responses into a few meaningful categories to reduce noise and facilitate analysis.⁷ We follow [Annan et al. \(2021\)](#) by differentiating disagreement by the relative locus of decision-making, and defining disagreement on plots for which co-heads over- or understate their own role in decision-making. Cases where co-heads place greater weight on the self as the locus of decision-making, and so tend to overstate their own roles, are indicated in the dark-shaded area to the right of the agreement diagonal in Figure 3. These are instances where one co-head claims that decisions are made by him or her alone, but the spouse disagrees and claims that she or he took the decision alone or was at least involved in the decision. Following this definition, Figure 3 shows that for the decision to plant maize on the plot, co-heads overstated their own role on 23.3 percent of plots. This figure breaks down as follows. On 5.3 percent of plots the male or female co-head said he or she made the decision to plant maize alone but the other

⁷For example, [Ambler et al. \(2021\)](#) define a variable for cases where the wife says that she is involved (alone or jointly as part of the couple), but the husband says she is not, and a variable for cases where the husband says the wife is involved but she reports that she is not.

co-head disagreed and claimed it is she or he who decided unilaterally. On 5.9 percent of plots the male co-head said he was involved in the decision jointly with his wife but the female co-head said she took the decision alone. And on 12.1 percent of plots the female co-head said she was involved in the decision jointly with her husband but the male co-head said he took the decision alone. Overstating thus means that at least one spouse said he or she took the decision alone.

We further define instances where co-heads understate their own role in decision-making and the locus of decision-making is placed with the other spouse. These are cases in the light-shaded area to the left of the diagonal in Figure 3. Here, one co-head said his or her spouse decided unilaterally, but the spouse disagreed and said the co-head took the decision alone, or was at least involved in the decision. Figure 3 shows that for the decision to plant maize on the plot, following this definition, co-heads understate their own decision power on 17.6 percent of the plots in our sample. Specifically, on 2.7 percent of plots, the male or female co-head said the other co-head made the decision to plant maize alone but the other co-head disagreed; on 4.0 percent of plots the male co-head said his wife took the decision alone but the female co-head said he was involved in the decision; and in 10.9 percent of the cases the female co-head said her husband took the decision to plant maize alone, but the male co-head disagreed and claimed his wife was involved in the decision. Understating thus means that at least one spouse said that the other spouse took the decision alone.⁸

Figure 4 shows the frequency of overstating and understating one’s decision power for our five farming decisions. The first two bars refer to the decision to plant maize, and correspond to the information also provided in the agreement matrix of Figure 3. On 23.3 percent of the plots spouses overstate and on 17.6 percent of the plots spouses understate their contribution to the decision to plant maize. The figure further shows that spouses are

⁸[Annan et al. \(2021\)](#) refer to the first measure as instances where the female co-head “takes power” and the second measure is interpreted as the male co-head “giving power” to the female co-head. These terms are somewhat one-sided, as such an interpretation rests on additional assumptions. For instance, in cases where both spouses indicate that they themselves took a particular decision unilaterally, the interpretation that the female co-head “takes power” is only valid if we assume all power rests with the male co-head to begin with, and we believe that the female co-head is correct while the male co-head is not (assuming that they can not both have taken the decision unilaterally). Also, if in Figure 3 in 5.9 percent of cases women “take power”, it seems that in the absence of additional assumptions, by symmetry in 12.1 percent of cases men are “taking power”.

Who made the decision to plant maize on this plot?		Wife' response:		
		Husband	Joint	Wife
Husband's response:	Wife	2.7	4.0	3.8
	Joint	10.9	33.1	5.9
	Husband	12.4	12.1	5.3

Figure 3: Agreement matrix

more likely to exaggerate their role in decision-making than to understate their contribution. Especially for weeding (and related, striga weeding) the locus of decision-making inclines to the self.

Next, we explore whether the two interventions described in Section 4 affect the likelihood that spouses overstate or understate their own decision-making power related to maize farming (Table 2). The first column in Table 2 shows that among households that viewed the video featuring the male actor (the control group), co-heads overstated their own contribution to decision making on planting maize on about 23.4 percent of the plots.⁹ The second column shows the average treatment effect, indicating that there is no effect of the video projecting a cooperative household farming approach by featuring both male and female actors on the likelihood that spouses overstate their own role in the decision to plant maize on the plot. The comparison between those who saw the video featuring the couple and those who saw the video featuring the male actor is repeated for all five decisions. We find significant reductions in the likelihood that co-heads overstate their own role in decision making as a result of the cooperative household farming intervention for decisions on planting and weeding.¹⁰

⁹This is essentially the same information as depicted in Figure 4, but now in the smaller sample of (control group) households included in our experiment.

¹⁰For the timing on planting, we see that among households where the video featuring only a male farmer was shown, co-heads overstate their involvement in this decision on 22.5 percent of plots. In households that were exposed to the couple role model video, the share of plots where co-heads overstate their involvement in this decision is only 16.9 percent. For the decision related to weeding, we see that in the control group, overstatement of own influence affects 25.6 percent of the plots, but this happens on only 19.3 percent of the plots in the group that was exposed to the couple role model video treatment. Average treatment effect estimates for all other decision categories are also negative, but not significantly different from zero.

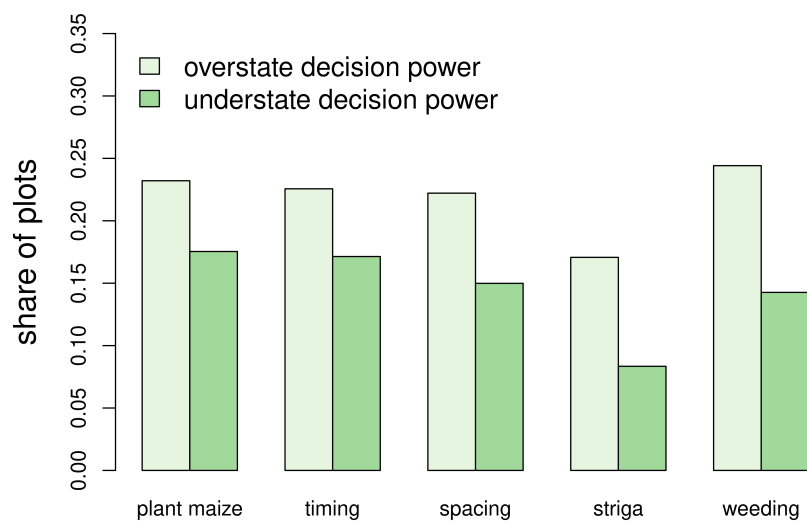


Figure 4: Disagreement in decision making

Table 2: Impact on disagreement in decision making

	<i>promoting cooperative household farming</i>				<i>reducing information asymmetry</i>			
	<i>overstate decision-</i>		<i>understate decision-</i>		<i>overstate decision-</i>		<i>understate decision-</i>	
	<i>making power</i>	ATE	<i>making power</i>	ATE	<i>making power</i>	ATE	<i>making power</i>	ATE
	ctrl mean		ctrl mean		ctrl mean		ctrl mean	
plant maize	0.234 (0.424)	-0.048 (0.033)	0.137 (0.440)	0.032 (0.028)	0.235 (0.425)	-0.050 ⁺ (0.027)	0.172 (0.440)	-0.003 (0.025)
timing	0.225 (0.418)	-0.056 ⁺ (0.032)	0.151 (0.457)	0.007 (0.027)	0.219 (0.414)	-0.050* (0.025)	0.184 (0.462)	-0.026 (0.024)
spacing	0.236 (0.426)	-0.054 (0.033)	0.131 (0.452)	0.000 (0.026)	0.223 (0.416)	-0.040 (0.027)	0.164 (0.465)	-0.034 (0.023)
striga	0.197 (0.398)	-0.012 (0.033)	0.087 (0.384)	-0.014 (0.021)	0.162 (0.369)	0.023 (0.028)	0.088 (0.391)	-0.015 (0.018)
weeding	0.256 (0.437)	-0.063 ⁺ (0.033)	0.151 (0.439)	-0.017 (0.027)	0.248 (0.432)	-0.055* (0.028)	0.147 (0.434)	-0.014 (0.023)

Note: First column reports means for overstatement in the control group for the couple role model treatment (and standard deviations below); Column 2 reports differences in overstatement between treatment and the control group for the couple role model treatment (and standard errors below); column 3 reports means for understatement in the control group for the couple role model treatment (and standard deviations below); column 4 reports differences in understatement between treatment and the control group for the couple role model treatment (and standard errors below); column 5 shows means for overstatement in the control group for the information asymmetry treatment (and standard deviations below); Column 6 reports differences in overstatement between treatment and the control group for the information asymmetry treatment (and standard errors below); column 7 reports means for understatement in the control group for the information asymmetry treatment (and standard deviations below); column 8 reports differences in understatement between treatment and the control group for the information asymmetry treatment (and standard errors below); **, * and + denote that the difference is significant at the 1, 5 and 10 percent level, respectively.

The third column reports control group means for the share of plots on which spouses understate their own decision-making power. We see that in the control group, the decision to plant maize is affected by this type of disagreement on 13.7 percent of the plots. The fourth column shows the difference in this type of disagreement between households that received the cooperative imaging treatment and those who did not: we do not find that the treatment reduced the likelihood that spouses understate their own role in decision-making.

We next turn to the second treatment, which reduces information asymmetry between spouses and compare disagreement on decision-making between co-heads in households where only one co-head was shown the video and households where the video was shown to both co-heads together. We find that the information treatment leads to a significant reduction in the likelihood that one spouse assigns him- or herself more decision-making power than the other spouse claims/reports. Column 5 of Table 2 shows that in households where only one of the co-heads was exposed to the video, spouses overstated their own influence on the decision to plant maize on 23.5 percent of the plots. Column 6 indicates that this percentage was 5.0 percentage points lower among households where both spouses were shown the video, and this reduction is statistically significant ($p < 0.05$). We also find that on decisions related to the timing of planting and weeding, ensuring spouses start off with the same information leads to a reduction in the likelihood that one spouse assigns him- or herself more decision-making power than the other spouse claims.

In the last two columns, we look at the impact of providing both spouses with the same information on the likelihood that one spouse understates his or her role in decision-making. Control group means, shown in column 7, are again close to what we find in the entire sample depicted in Figure 4. The last column shows that the likelihood that spouses understate their own contribution to decision-making reduces as a result of providing both spouses with the same information, but the effect is never significant.

Overall, we conclude that both the treatment projecting cooperative household farming and the treatment reducing information asymmetry lead to a significant reduction in the likelihood that one spouse assigns him- or herself more decision-making power than the other spouse claims. Both treatments are therefore effective in reducing the likelihood that spouses overstate their own role in decision-making about maize farming.

5.2 Labor time

We also collected detailed information on labor time. On each maize plot, we asked each co-head how much time, expressed in labor days over the entire agricultural season, he or she worked on a particular activity. We also asked each co-head to give an estimate of how much time his or her spouse worked on the plot on that particular task. The activities we inquired about are land preparation, planting, weeding, spraying, and harvesting.

Results indicate that while male co-heads report high levels of own labor-time allocation to farming, they report that their spouses allocate slightly less time, especially for several specific activities. The average male co-head in our sample reports to work about 28 days on the average plot over the entire agricultural season, and reports that his wife works about 26 days. Figure 5 shows labor days spent on different activities as reported by the male co-head. We see that the male co-head reports spending about 8 days preparing the plot, 2 days planting, almost 15 days weeding, 1 day spraying, and another 2 days harvesting. The figure also shows that the male co-head reports that his wife spends one day less in preparing the land and also one-half day less in weeding. Male co-heads think their wife almost never engages in spraying of agrochemicals.

Figure 6 shows a graph similar to Figure 5, but as reported by the female co-head. Interestingly, while male co-heads report spending more time on all activities, female co-heads also report that *they* work harder than their spouse on all activities (with the exception of spraying agrochemicals). According to female co-heads, they work almost 30 days on average, while male co-heads are reported to work about 25 days over the entire season. Female co-heads report that, on average, they work about 7 to 8 days on field preparation, while they report that their male co-head only works 6 days on field preparation. Female co-heads also indicate that they spend 16.5 days on weeding, while they report that their spouse spends only 13.5 days on that activity. According to female co-heads, male and female co-heads spend about the same time on planting and harvesting. Only with respect to agrochemical spraying do co-heads agree that the male co-heads undertake most of the work.

Comparing Figures 5 and 6 again suggests substantial disagreement between spouses on time worked. For instance, we see that male co-heads report that they work on average about 8 days to prepare the land, yet women indicate that men only work 6 days to prepare the land. Women, on the other



Figure 5: Time spent on different activities as reported by the male co-head

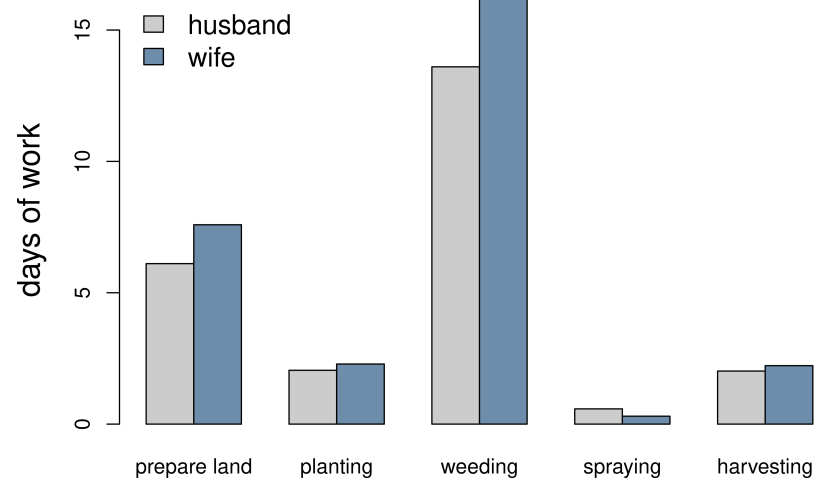


Figure 6: Time spent on different activities as reported by the female co-head

hand, report that they work on average 16 days on the field to weed, while men think that women only work 14 days on the field for weeding. And while, on average, spouses seem to relatively overstate their own labor and understate their spouses' labor, a substantial share of the sample also report that a co-head works less than what the other thinks.

To analyze spousal over- and understatement of labor time, we generate an indicator similar to the one used for decision-making about farming in Section 5.1, comparing own-reported time of the co-head to the time estimated by the other co-head. For each activity, we sum the time that the male co-head reported he spent on that activity and the time that the female co-head reported she spent on the activity, and compare this to the time the male co-head estimated his wife spent on this activity plus the time the female co-head estimated her husband spent on the activity.¹¹ We then define two categories (and associated indicator variables for the categories): (1) plots on which co-heads overestimated own labor contributions, and (2) plots on which co-heads underestimated own labor contributions.

Results show that on more than one-half of the plots, co-heads overstate the labor that was allocated to land preparation (Figure 7). At the same time, we find that on 30 percent of these plots, co-heads indicate that they actually spent less time on land preparation than their spouse reported. This means that only on about 15 percent of plots, do co-heads agree on the time spent on the activity. Further, we find that while co-heads more frequently overstate – rather than understate – labor contributions, substantial differences arise depending on the activity. For instance, with respect to agrochemical spraying, there seems to be agreement on almost 60 percent of the plots. Higher levels of agreement on planting, spraying, and harvesting are partly explained by the fact that fewer hours are reported (see Figures 5 and 6) so less scope exists for differences in cross-reporting. For spraying in particular, many households report not to spray and so both co-heads report zero hours and know their spouse also spent zero hours. However, this is only part of the explanation, as disagreement on land preparation is similar to disagreement on weeding despite the fact that about twice the amount of labor was allocated to weeding than to land preparation. The gap between over and understatement of labor is also larger for land preparation.

¹¹While we could also look at over- and understatement of labor time for the male co-head and the female co-head separately, we decided to aggregate these measures. This is because we are mainly interested in (reducing) disagreement as opposed to e.g. (increasing) women's empowerment.

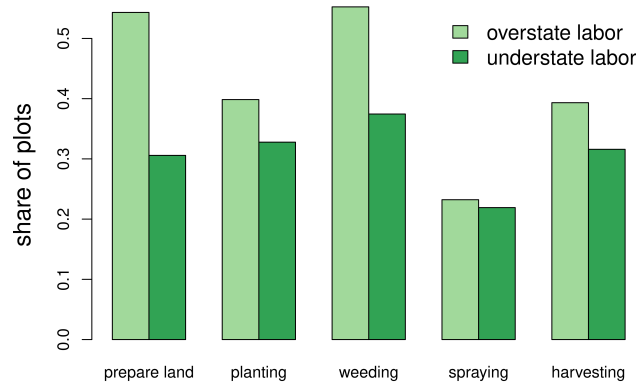


Figure 7: Disagreement about labor time

Next, we report on the impact of the treatment that promotes a household cooperative approach to farming (Table 3, left panel) and the treatment that aims to reduce information asymmetry (right panel) on the likelihood that co-heads over- or understate their own labor contributions, disaggregated by activity. As in Table 2, the first and third columns report control group means for over- and understatement of labor contributions for the first treatment. Average treatment effects of the first intervention on overstatement of own effort (reported in the second column) and on understatement of own effort (fourth column) are never significantly different from zero.

We find more significant results for the treatment aimed at reducing information asymmetry. In the fifth column of Table 3, we show again control group average rates of overstatement of spousal labor contributions. In the control group for the information treatment, spouses overstate own labor contributions on 59.2 percent of the plots. However, as shown in column 6, this percentage is 8.6 percentage points lower among couples where, as the treatment, both spouses got to see the video, and this difference is significant at the 5 percent level. We also find that reducing information asymmetry reduces the likelihood that co-heads overstate own labor contributed to harvesting. Columns, 7 and 8 respectively report control group means and average treatment effects on the likelihood of understating own labor contributions as a result of the information treatment. Here, the effects are mixed,

Table 3: Impact on disagreement related to labour contribution

	<i>promoting cooperative household farming</i>				<i>reducing information asymmetry</i>			
	<i>overstate labour contribution</i>		<i>understate labour contribution</i>		<i>overstate labour contribution</i>		<i>understate labour contribution</i>	
	ctrl mean	ATE	ctrl mean	ATE	ctrl mean	ATE	ctrl mean	ATE
prepare land	0.521 (6.672)	-0.015 (0.043)	0.302 (6.672)	0.042 (0.041)	0.592 (7.358)	-0.086* (0.038)	0.272 (7.358)	0.072* (0.035)
plant maize	0.397 (1.331)	0.004 (0.042)	0.337 (1.331)	-0.023 (0.040)	0.386 (1.430)	0.015 (0.037)	0.332 (1.430)	-0.018 (0.034)
weeding	0.480 (12.834)	0.000 (0.044)	0.419 (12.834)	0.018 (0.043)	0.528 (10.634)	-0.048 (0.038)	0.370 (10.634)	0.067+ (0.037)
spraying	0.202 (1.118)	0.025 (0.038)	0.234 (1.118)	-0.058 (0.036)	0.218 (1.044)	0.010 (0.033)	0.244 (1.044)	-0.068* (0.029)
harvesting	0.372 (1.605)	-0.016 (0.041)	0.350 (1.605)	-0.022 (0.039)	0.415 (1.903)	-0.059+ (0.035)	0.308 (1.903)	0.020 (0.032)

Note: First column reports means for overstatement in the control group for the couple role model treatment (and standard deviations below); Column 2 reports differences in overstatement between treatment and the control group for the couple role model treatment (and standard errors below); column 3 reports means for understatement in the control group for the couple role model treatment (and standard deviations below); column 4 reports differences in understatement between treatment and the control group for the couple role model treatment (and standard errors below); column 5 shows means for overstatement in the control group for the information asymmetry treatment (and standard deviations below); Column 6 reports differences in overstatement between treatment and the control group for the information asymmetry treatment (and standard errors below); column 7 reports means for understatement in the control group for the information asymmetry treatment (and standard deviations below); column 8 reports differences in understatement between treatment and the control group for the information asymmetry treatment (and standard errors below); ** , * and + denote that the difference is significant at the 1, 5 and 10 percent level, respectively.

with significant increases in the likelihood that co-heads overstate labor allocated to land preparation and weeding, but a significant reduction in the likelihood that co-heads understate own labor allocated to spraying.

5.3 Income hiding

Finally, we look at decisions regarding maize marketing. We asked each co-head separately how much maize was sold from the season under consideration. In particular, we asked each co-head separately to estimate how much was sold by (1) him or her alone, (2) by his or her spouse alone, and (3) jointly¹². We also asked both co-heads to indicate the revenue derived from these sales.

Overall, just as in the case of decision-making related to maize cultivation, most maize marketing occurs jointly, according to our respondents. Figure 8 (left panel) shows that male co-heads report that on average 1.4 bags of maize were sold jointly¹³. Female co-heads report that just under 1 bag was sold jointly. Averaged over the entire sample, joint sales amounted to about US\$23, at least as reported by the male co-heads, while female co-heads estimated this amount to be much lower at US\$13 (Figure 8, right panel).

Further analysis suggests significant differences in co-heads' estimates of the quantities sold unilaterally by their spouses'. Figure 8 (left panel) shows that male co-heads reported they sold 0.50 bags of maize by themselves, while their spouses reported that their husbands only sold 0.25 bags of maize. Female co-heads, on the other hand, reported that they sold about 12 kilograms of maize by themselves, while their spouses reported that their wives unilaterally sold about 6 kilograms.

The left panel of Figure 8 also shows that male co-heads indicate that, on average, they received about US\$7.60 from their unilateral sales of maize.¹⁴ Female co-heads estimate this revenue to be only about US\$2.00. Finally, female co-heads report that they received US\$1.50 from unilateral maize sales. Male co-heads estimate that their spouses received on average US\$0.60 from what they sold alone. Note that the difference between co-heads' own and cross-reports increases when moving from quantities to revenues, indicating

¹²We specify that sales by an individuals means all decisions regarding quantity, price and to whom to sell were taken by that individual without involving anyone else.

¹³A typical bag contains about 120 kilograms of maize.

¹⁴We use an exchange rate of US \$ 1 = UGX 3,600.



Figure 8: Maize sales

not only disagreement with respect to quantities sold but also to prices obtained. For male co-heads' unilateral sales in particular, men seem to assume significantly higher sales prices than women do.

As in previous sections, we look at the impact of the two interventions on disagreement related to maize sales. While spouses tend to overstate own sales, there are instances where spouses report having sold less than what the other co-head reports. We thus construct indicators of spousal over- and understatement of sales. As done above, we do not differentiate between female co-head and male co-head over- or underreporting of sales, but rather create an aggregate measure that evaluates the difference between male and female co-heads own-reported sales and what the other co-head thinks he or she sold. We hypothesize that encouraging a cooperative household farming approach through the treatment featuring a couple of farmer-actors and reducing information asymmetries between spouses through the information treatment leads to a reduction in spousal discord related to sales reporting.

We find an interesting set of mixed results from the treatment that attempts to promote a cooperative approach to farming on over- and under-

statement of maize sales. The three rows in Table 4 correspond to three different outcomes that reflect disagreement in market participation. The first is a simple binary indicator that takes the value of one if spouses indicate they sell more (less) than what the other spouse thinks. The second considers actual quantity overstated (understated) by spouses. The third row considers disagreement in value reported derived from these sales, as Figure 8 shows that there may be disagreement about prices received for maize sold in addition to quantity sold.

In the first column of the first row, we see that in the control group for the cooperative approach treatment, in 15.0 percent of households co-heads report that they sold more than what the other spouse thinks. The likelihood that co-heads overstate is similar in the treatment group. We also find that, as reported in the second row, the average quantity overstated is about one-half of bag. The second column finds no evidence of significant effect of the first treatment as judged by the coefficient of the treatment indicator estimated with a Tobit model. We also find no impact of the treatment on overstating of revenue (third row column 2).

The third column of the first row of Table 4 shows that in 12.0 percent of households, co-heads understate own sales relative to what the other spouse reports. In the fourth column, we see that the treatment that promotes a cooperative approach to farming decreases this type of disagreement by almost 6 percentage points. This treatment effect is also reflected in a reduction in the understatement of actual quantities: in households in the treatment group where the video was shown to both spouses, the quantity understated reduces by almost 1.5 bags. While the third row also shows a reduction in the value associated with the effect, the effect is not statistically different from zero.

The right panel of Table 4 shows results for the second treatment, which is aimed at reducing information asymmetry between spouses. We do not find that this treatment affected disagreement related to maize marketing.

6 Discussion

Results set forth above document substantial spousal disagreement in decision making about maize farming, labor contribution, and maize marketing. They indicate that the likelihood that co-heads in monogamous maize-farming households overstate their own role in decision-making can be re-

Table 4: Impact on disagreement related to maize marketing

	<i>promoting cooperative household farming</i>			<i>reducing information asymmetry</i>		
	<i>overstatement</i>		<i>understatement</i>	<i>overstatement</i>		<i>understatement</i>
	ctrl mean	ATE	ctrl mean	ATE	ctrl mean	ATE
sold (yes/no)	0.150 (0.357)	0.025 (0.033)	0.120 (0.325)	-0.058* (0.026)	0.122 (0.328)	0.031 (0.026)
quantity	0.401 (1.400)	0.441 (0.676)	0.253 (0.857)	-1.486* (0.665)	0.185 (1.350)	0.712 (0.610)
amount	4.591 (19.758)	12.463 (11.133)	1.937 (9.335)	-19.379 (13.150)	3.861 (19.157)	11.585 (10.269)
					0.070 (0.255)	-0.012 (0.019)
					0.070 (0.493)	-0.334 (0.427)
					0.775 (6.894)	-2.897 (6.480)

Note: First column reports means for overstatement in the control group for the couple role model treatment (and standard deviations below); Column 2 reports differences in overstatement between treatment and the control group for the couple role model treatment (and standard errors below); column 3 reports means for understatement in the control group for the couple role model treatment (and standard deviations below); column 4 reports differences in understatement between treatment and the control group for the couple role model treatment (and standard errors below); column 5 shows means for overstatement in the control group for the information asymmetry treatment (and standard deviations below); Column 6 reports differences in overstatement between treatment and the control group for the information asymmetry treatment (and standard errors below); column 7 reports means for understatement in the control group for the information asymmetry treatment (and standard deviations below); column 8 reports differences in understatement between treatment and the control group for the information asymmetry treatment (and standard errors below); ** , * and + denote that the difference is significant at the 1, 5 and 10 percent level, respectively.

duced by reducing intrahousehold information asymmetries and, to a lesser extent, by promoting intrahousehold cooperation in farming through a role model intervention. While results were less clear for the over- and understatement of labor contributions, results are more encouraging for the information treatment than the treatment projecting cooperative household farming. For marketing, promoting cooperation in farming within the household reduced the likelihood and degree of one co-head reporting lower sales than what the other spouse reported. In light of these findings, we explore possible mechanisms that might explain our observed patterns of spousal disagreement.

With respect to differences in reporting related to decision-making, in societies or cultures with strong gender norms and customs, co-heads may tend to overstate their own role in decision-making due to role congruity (Acosta et al., 2020). This may also indicate that co-heads claim a larger role within the household, in effect claiming recognition for responsibilities taken (Annan et al., 2021). The case of co-heads understating their own role in decision-making may also be consistent with a range of other possible explanations. On one hand, cultural factors may again mean that one co-head plays down his or her role and discounts own contribution. At the other extreme, one could even imagine situations where the locus of decision making is shifted to the other, effectively “blaming” poor decision-making on the other spouse, for example when, in hindsight, the decision turned out to be very bad.

The results from our intervention suggest that cultural factors play an important role in disagreement related to decision making. The intervention that promotes a cooperative household farming approach with couple role models was expected to challenge traditional views in a study region and sociocultural context in which men are assumed to take responsibility for maize farming. Although these effects were not as robust as expected, we nonetheless generate some evidence pointing in this direction. At the same time, the fact that we also find significant effects from arming both co-heads with equal information may mean that increased monitoring reduced the likelihood that spouses would take decisions behind each other’s back.

For labor contributions, cultural factors may also result in one spouse claiming to do the bulk of the work, while in reality, the work burden may be more equally shared. However, it may also indicate imbalance within the relationship, in that one spouse performs the bulk of the work without being recognized for it. This may often be the case with tedious work such as weeding or domestic work and household chores. Disagreement characterized

by one co-head underreporting own labor contributions may point to some degree of shirking. For example, it may be that the female co-head does not have a clear idea of how long it takes to spray a particular plot and the male co-head exploits this information asymmetry by making her believe that it took much longer than the time it actually took; the time difference may then be used for private activities by the male co-head that do not directly contribute to the household as a whole.

Results from our intervention show that only the treatment reducing information asymmetry had an impact on disagreement related to spouses' labor contributions. This suggests that cultural factors defining gender roles may be less important. While the effect of facilitating mutual monitoring on shirking (understating labor contributions) is not clear, we do see that arming co-heads with information reduces the likelihood that co-heads provide more labor than they get credit for.

We have seen that some studies interpret cases of overreporting related to marketing behavior and income derived from farming activities as signs that spouses are hiding income from each other ([Castilla, 2012](#)). In this case, we would have expected that especially the information treatment would be more effective in reducing disagreement. The fact that we only find an impact from the treatment that promotes a cooperative approach suggests that disagreement related to sales is more likely related to cultural factors relating to gender roles. For instance, our findings may be more consistent with a situation where a male co-head exaggerates sales to his spouse because he wants to be seen as the provider, but after seeing a video where both spouses are equally providing for the household, the male co-head reports sales that are more in line with what the female co-head thinks the male co-head sold.

7 Conclusion

Household surveys that are serious about capturing gender-related heterogeneity often try to interview both male and female co-heads separately for at least part of the survey. This is an important means of reducing biases introduced by the (typically male) household head or “most knowledgeable person” in the household, and represents an important advancement in the study of intrahousehold dynamics, especially in non-separable agricultural households where production and consumption decisions are so closely in-

tertwinced. A common finding in these surveys is that male and female co-heads often give substantially different answers to the same questions. While some discordance is inevitable due to measurement error, recent studies have been searching for patterns in this disagreement, and suggest that systematic disagreement between spouses may be key in understanding intrahousehold power dynamics.

Studies on spousal disagreement often use a simple binary variable indicating that the answer of one co-head differs (to some degree) from the answer of the other co-head. In some cases, the direction of disagreement is also considered, differentiating, for instance, between cases where male co-heads report higher levels of consumption than female co-heads, and cases where male co-heads report lower levels of consumption than female co-heads. Often, these questions relate to household-level data, such as consumption expenditure or investment in household public goods. However, studies interested in women’s autonomy and women’s empowerment go further by asking more personal questions on behaviors and personal belongings, and co-heads are typically asked to answer these questions about both themselves and their spouses. This own and cross-reporting allows for a range of interesting indicators of disagreement to be constructed, based primarily on what one co-head reports , and what his or her spouse reports about him or her.

In this study, we focused mostly on directional disagreement indicators that exploit questions about behavior of individual spouses obtained from both co-heads. In addition to documenting patterns in spousal disagreement, we tested two interventions aimed at reducing disagreement related to decision-making, labor contributions, and marketing in maize farming. Both interventions pivoted on the screening of short engaging videos to co-heads within the household that both (1) provided viewers with a mental image of a cooperative household approach to maize farming through role modeling, and (2) reduced information asymmetries between spouses with specific technical insights on recommended maize cultivation practices.

We found substantial disagreement between spouses. For instance, we found that co-heads exaggerate their own decision-making power on almost one in four plots. We found statistically significant reductions in the likelihood that co-heads overstate their own role in decision making as a result of the intervention that promotes a household cooperative approach to farming for decisions related to timing of planting and weeding. Similarly, we found that reducing information asymmetries between spouses led to a reduction in the likelihood that one co-head assigns him- or herself more decision-making

power than the other spouse claimed. The likelihood of understating one’s role in decision making was not significantly affected by either treatment.

For labor, we found that co-heads seem to relatively overstate their own labor and underestimate their spouse’s labor. However, we also found a substantial part of the sample where a co-head reported to work less than what the other spouse thinks (understating of own contributions which may point to labor-shirking behavior). We found that the likelihood that co-heads overstate own labor contributions in a number of farming activities reduced as a result of providing spouses with symmetric information that allowed them to better monitor each other.

For marketing, co-heads tend to overstate own sales, suggesting some degree of income hiding. At the same time, we did not find an effect of facilitating mutual monitoring. Promoting cooperation in farming within the household reduced the likelihood and degree of one co-head understating own sales, that is, reporting lower sales than what the other spouse assumed.

The fact that we found similar effects from both the intervention that projects a cooperative household farming approach and the intervention reducing information asymmetry suggests that two distinct mechanisms are likely at play. On one hand, some of the disagreement may be because one co-head overestimates his or her own role or position to make it appear in line with prevailing expectations, customs, and gender roles. Reducing this disagreement will involve longer-run efforts to challenge perceptions and gender stereotypes. Recent research has found that role models may be particularly effective for this ([Beaman et al., 2009](#); [Porter and Serra, 2020](#)). On the other hand, some disagreement may reflect deliberate appropriation of decisions, shirking, or income hiding. Here, interventions aimed at reducing the information disadvantage of one spouse, may also be effective.

Acknowledgments

This study was carried out with financial support from Digital Green and the U.S. Agency for International Development (USAID) under Feed the Future’s Developing Local Extension Capacity (DLEC) project; the CGIAR Research Program on Policies, Institutions, and Markets (PIM), led by the International Food Policy Research Institute (IFPRI) the CGIAR Research Program on Maize (MAIZE), led by the International Maize and Wheat Improvement Center (CIMMYT); and the International Development Re-

search Center, Ottawa, Canada (grant no. 109177-001), through the CGIAR Collaborative Platform for Gender Research. The CGIAR programs and platforms, in turn, are supported by [<https://www.cgiar.org/funders/>||these funders]. The views expressed in this study do not necessarily represent those of Digital Green, USAID, IDRC or its Board of Governors, or the CGIAR research programs, platforms, and centers mentioned above. The study is registered in the American Economic Association RCT Registry (AEARCTR-0002153), and received approval from IFPRI’s Institutional Review Board (IRB). We thank Anusha De, Jamie Arkin, Kristin Davis, Rikin Gandhi, Vivian Hoffman, Suprita Kudesia, and Karin Lion for their support for this research; and Fiona Nattembo, Wilberforce Walukano, and Marc Charles Wanume for excellent field support. This paper benefited from comments provided by participants of the Third Annual Workshop on Gender, Agricultural Growth, and Rural Transformation Research in the CGIAR. The analysis contained here is the sole responsibility of the authors, and does not reflect the views of any funding agency or organization mentioned here. The research was approved by IFPRI’s Institutional Review Board (IRB #00007490 FWA #00005121). Any and all errors are the sole responsibility of the authors.

References

- Acosta, M., M. van Wessel, S. van Bommel, E. L. Ampaire, J. Twyman, L. Jassogne, and P. H. Feindt. 2020. “What does it Mean to Make a ‘Joint’ Decision? Unpacking Intra-household Decision Making in Agriculture: Implications for Policy and Practice.” *The Journal of Development Studies* 56 (6): 1210–1229.
- Alkire, S., R. Meinzen-Dick, A. Peterman, A. Quisumbing, G. Seymour, and A. Vaz. 2013. “The women’s empowerment in agriculture index.” *World Development* 52: 71–91.
- Ambler, K., C. Doss, C. Kieran, and S. Passarelli. 2021. “He Says, She Says: Spousal Disagreement in Survey Measures of Bargaining Power.” *Economic Development and Cultural Change* 69 (2): 765–788.
- Anderson, C. L., T. W. Reynolds, and M. K. Gugerty. 2017. “Husband and Wife Perspectives on Farm Household Decision-making Authority and Ev-

- idence on Intra-household Accord in Rural Tanzania.” *World Development* 90: 169–183.
- Annan, J., A. Donald, M. Goldstein, P. Gonzalez Martinez, and G. Koolwal. 2021. “Taking power: Women’s empowerment and household Well-being in Sub-Saharan Africa.” *World Development* 140: 105292.
- Ashraf, N. 2009. “Spousal control and intra-household decision making: An experimental study in the Philippines.” *American Economic Review* 99 (4): 1245–77.
- Beaman, L., R. Chattopadhyay, E. Duflo, R. Pande, and P. Topalova. 2009. “Powerful women: does exposure reduce bias?” *The Quarterly journal of economics* 124 (4): 1497–1540.
- Beaman, L., E. Duflo, R. Pande, and P. Topalova. 2012. “Female leadership raises aspirations and educational attainment for girls: A policy experiment in India.” *science* 335 (6068): 582–586.
- Bernard, T., S. Dercon, K. Orkin, and A. Seyoum Taffesse. 2015. “Will video kill the radio star? Assessing the potential of targeted exposure to role models through video.” *The World Bank Economic Review* 29 (suppl_1): S226–S237.
- Carr, E. R. 2008. “Men’s Crops and Women’s Crops: The Importance of Gender to the Understanding of Agricultural and Development Outcomes in Ghana’s Central Region.” *World Development* 36 (5): 900–915.
- Castilla, C. 2012. “Ties that bind: The kin system as a mechanism of income-hiding between spouses in rural Ghana.” *UNU-WIDER Working Paper* .
- Castilla, C. and T. Walker. 2013. “Is ignorance bliss? The effect of asymmetric information between spouses on intra-household allocations.” *American Economic Review* 103 (3): 263–68.
- Doss, C. R. 2002. “Men’s Crops? Women’s Crops? The Gender Patterns of Cropping in Ghana.” *World Development* 30 (11): 1987–2000.
- Doss, C. R. and R. Meinzen-Dick. 2015. “Collective action within the household: Insights from natural resource management.” *World Development* 74: 171–183.

- Doss, C. R. and A. R. Quisumbing. 2020. "Understanding rural household behavior: Beyond Boserup and Becker." *Agricultural Economics* 51 (1): 47–58.
- Fiala, N. and X. He. 2016. "Unitary or Noncooperative Intrahousehold Model? Evidence from Couples in Uganda." *The World Bank Economic Review* 30 (Supplement_1): S77–S85.
- Fisher, M., J. J. Reimer, and E. R. Carr. 2010. "Who Should be Interviewed in Surveys of Household Income?" *World Development* 38 (7): 966–973.
- Ghuman, S. J., H. J. Lee, and H. L. Smith. 2006. "Measurement of women's autonomy according to women and their husbands: Results from five Asian countries." *Social Science Research* 35 (1): 1–28.
- Hoel, J. B. 2015. "Heterogeneous households: A within-subject test of asymmetric information between spouses in Kenya." *Journal of Economic Behavior & Organization* 118: 123–135. Economic Experiments in Developing Countries.
- Iradukunda, F., R. Bullock, A. Rietveld, and B. van Schagen. 2019. "Understanding gender roles and practices in the household and on the farm: Implications for banana disease management innovation processes in Burundi." *Outlook on Agriculture* 48 (1): 37–47.
- Jejeebhoy, S. J. 2002. "Convergence and Divergence in Spouses' Perspectives on Women's Autonomy in Rural India." *Studies in Family Planning* 33 (4): 299–308.
- La Ferrara, E., A. Chong, and S. Duryea. 2012. "Soap operas and fertility: Evidence from Brazil." *American Economic Journal: Applied Economics* 4 (4): 1–31.
- Lundberg, S. and R. A. Pollak. 1993. "Separate spheres bargaining and the marriage market." *Journal of political Economy* 101 (6): 988–1010.
- Nordhagen, S., U. Pascual, and A. G. Drucker. 2021. "Gendered differences in crop diversity choices: A case study from Papua New Guinea." *World Development* 137: 105134.

- Porter, C. and D. Serra. 2020. "Gender Differences in the Choice of Major: The Importance of Female Role Models." *American Economic Journal: Applied Economics* 12 (3): 226–54.
- Riley, E. et al. 2017. "Increasing students' aspirations: the impact of Queen of Katwe on students' educational attainment." In "CSAE Working Paper WPS/2017-13," .
- Seymour, G. and A. Peterman. 2018. "Context and measurement: An analysis of the relationship between intrahousehold decision making and autonomy." *World Development* 111: 97–112.
- Twyman, J., P. Useche, and C. D. Deere. 2015. "Gendered perceptions of land ownership and agricultural decision-making in Ecuador: Who are the farm managers?" *Land Economics* 91 (3): 479–500.
- Van Campenhout, B., D. J. Spielman, and E. Lecoutere. 2021. "Information and Communication Technologies to Provide Agricultural Advice to Smallholder Farmers: Experimental Evidence from Uganda." *American Journal of Agricultural Economics* 103 (1): 317–337.