Boasting, Shirking and Hiding: Spousal Disagreement among Ugandan Maize farmers

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Abstract

To gain a better understanding of intra-household bargaining processes, surveys increasingly collect data from co-heads individually. Answers provided by spouses on the same set of questions often differ substantially, and while this is partly due to measurement error, there is also some signal in the noise. Some studies argue that cultural context may lead to systematic bias that may be due to a different meaning attached to concepts being elicited. Others suggest that at least part of the disagreement originates from 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 patterns in spousal disagreement in reporting related to decision making, labour time and sales. We also implement two light weight interventions to test if we can reduce disagreement by increasing cooperation between spouses and reducing information asymmetries.

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1 Introduction

Increased attention for the inner workings of the household farm by both researchers and practitioners led to various innovations in data collection (Doss and Quisumbing, 2020). One example is the Women's Empowerment in Agriculture Index (WEAI), a comprehensive and standardized measure to directly measure women's empowerment and inclusion in the agricultural sector (Alkire et al., 2013). The focus on intra-household processes has also substantially increased the availability of data that is collected at the individual household member level, especially from the co-heads of the households. Studies that collect data from male and female co-heads separately find that spouses often provide different answers on even the most basic questions.

Ambler et al. (2021) demonstrate that while part of the this may be due 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 of the other. Furthermore, Ambler et al. (2021) argue that the fact that spousal disagreement in reporting is larger for assets that can be hidden more easily than for others suggests that, to some extent, spouses exploit these information asymmetries by deliberately hiding assets and decisions from each other. A number of lab-in-the-field experiments indeed confirm that household members conceal resources from one another (eg. Ashraf, 2009; Fiala and He, 2016; Castilla and Walker, 2013). However, it may also be that prevailing gender norms result in such a bias, if for example male co-heads start exaggerating when asked about issues they are assumed to be responsible for.

We contribute to this line of research by documenting spousal disagreement in reported behaviour among a large sample of semi-subsistance maize farming household in Uganda. First, on a range of decisions that are crucial to increase yields such as timely planting, seed spacing and weeding, we ask both spouses to indicate who made each decision on each plot. Spouses can indicate they took the decision alone, that their spouse took the decision alone, or that the decision was taken jointly. These answers are then combined to assess the degree of disagreement with respect to decision making. Second, we ask each spouse separately how much time he or she spent on each of five 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 combine these answers to construct a measure of shirking, where one spouse devotes less time on a particular activity than his or her spouse thinks. Finally, we ask each co-head how much maize he of she sold unilaterally (as opposed to joint sales) and also ask each co-head to provide an estimate of how much his or her spouses sold alone. We again combine this information to reflect income hiding, where one spouse reports more sales than the other spouse is aware of.

In addition to documenting patterns in spousal disagreement, the paper also tests two simple interventions aimed at reducing disagreement related to decision making, shirking and income hiding. Inspired by recent research on behavioral change communication and social marketing, a first intervention consists of a video treatment that promotes a mental model of farming as a joint venture, with both spouses having an equal role in decision making, activities, and rewards. A second intervention focuses more on reducing information asymmetry between spouses. By making sure both spouses have similar information about what decision need to be made, what labour is required and what yields can be expected, spouses are expected to be better able to monitor each other and provide better estimates of each other's efforts. We think that the second intervention will be relatively more effective if spouses engage in intentional concealment, while the first may reduce the likelihood that spouses feel they need to report behaviour that is more in line with norms and customs.

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. We find that the couple role model intervention reduces in the likelihood that co-heads overestimate own influence on decision making. We find similar effects from reducing information asymmetry between spouses. We further find that male co-heads shirk more frequently than female co-heads. There is weak evidence that both treatments reduce the incidence of male co-head shirking, but only for one activity. We also find that spouses report they sell about double of what the other spouse is aware of. The interventions did not affect the likelihood that spouses get a better idea of each other's sales.

The remainder of the paper is organized as follows: The next section gives a brief overview of the literature on spousal disagreement. We then present the experimental design and explain the rationale underlying the intervention. Next is a brief section describing the context and the characteristics of the households in our sample. We then turn to the results, first looking

at how the interventions affect disagreement about decision making. This is followed by a section on disagreement on labour and disagreement related to maize sales. A final section concludes.

2 Literature

In this section, we review related literature. We mainly focus on the empirical empowerment literature that uses observational data from surveys in which both spouses are interviewed separately and are asked the same set of questions. Such studies are often interested in learning about women's 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 a set of places, the mother's capacity to decide on children's affairs, if the wife is allowed to have a job, her role in deciding on the number of children and some household expenditure related decisions.

A common finding in studies that ask the same set of questions to different individuals within the household is substantial disagreement between spouses, even on questions that would seem uncontroversial such as the number of children. This may indicate that part of this divergence is simply due to measurement error. Ghuman, Lee, and Smith (2006) suggests that disagreement is also partly due the fact that the response categories do not have the same cognitive or semantic meanings to men and women, leading to the somewhat pessimistic conclusion that survey questions are of limited utility for understanding differences in gender stratification across context.

In Seymour and Peterman (2018), the primary focus is on testing if sole decision making correlates differently to a measure of autonomy than joint decision making. However, they note spouses often give inconsistent answers when asked about who made a particular decision, and also consider heterogeneity in the relationship between decision making and autonomy conditional on disagreement. 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. Becker, Fonseca-Becker, and Schenck-Yglesias (2006) study spousal disagreement among 500 couples in western Guatemala and correlate this to preventive health be-

haviour. They find that, relative to their husbands' report, wives tend to under-report their decision-making power. Twyman, Useche, and Deere (2015) document gender differences in perceptions about land ownership and agricultural decision-making in Ecuador, with men reporting lower levels of women's participation compared to their wives' report. Anderson, Reynolds, and Gugerty (2017) investigate variation in husband and wife perspectives on the division of authority over agriculture-related decisions within households in rural Tanzania. They conclude that lack of "intra-household accord" may be problematic for interventions seeking to use survey data to develop and inform strategies for reducing gender inequalities or empowering women in rural agricultural households.

One particularly insightful study that tries to separate signal from noise is Ambler et al. (2021). They develop a conceptual model that differentiates between three explanations for 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. Secondly, they test for asymmetric measurement error, where men and women interpret questions differently. In this case, answers may differ systematically between spouses, but disagreement should be similar for the different questions asked in the survey. Finally, they argue that finding differing rates of disagreement across survey questions, and higher disagreement for assets and activities that are easier to hide in particular, points to asymmetric information. Using observational data on decision making and asset ownership in Bangladesh, they find that asymmetric information in the form of hidden assets and decisions is present in the households. However, we feel that information asymmetry does not always have to be the result of one spouse intentionally deceiving another. There may be other systematic biases that manifest more in one asset or decision category than others and are shaped by prevailing gender norms. For example, Acosta et al. (2020) find that in a careful case study in northern Uganda, 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 tented to view these scenarios as joint decisions. As such, it is important to understand the local cultural context to differentiate between information asymmetry stemming form intentional hiding and disagreement that is more superficial.

Annan et al. (2021) is another powerful illustration of the conceptual and analytical value of intra-household contention over decision-making. The

primary contribution of this paper is that it does not simply consider disagreement as a binary variable, but argues that the direction of the disagreement may also be important for assessing agency and empowerment. More in particular, they differentiate cases in which men disagree that women are involved in decision making from cases where men disagree that women are not involved in decision making. The former is interpreted as women "taking power", while in the second case women are said to be "given power".

In surveys where women autonomy is central, spouses are often simply asked if the other spouse has a say in decisions being made with a simple yes/no questions, allowing for four categories (man says woman was included and woman agrees, woman says she was included and man agrees, man says woman was included while women disagrees, and woman says she was included and man disagrees).[1] Questions related to asset ownership also generally take a binary nature, asking for each asset if the respondent owns it but also inquiring if the spouse owns it. Some studies go further and try to put amounts on this. For example Castilla (2012) uses the husband's own reporting of his own farm income and compares this to the wife's reporting of the husband's farm income to identify income hiding by men. She finds that the women's estimate of farm income is on average 28 thousand Cedis lower than what men report, representing 14 per cent of household income. In Malawi, Fisher, Reimer, and Carr (2010) finds that in 66% of households in their sample, the husband underestimated his wife's income by an average of 47%.

All the above studies are descriptive in nature, exploring patterns in agreement and disagreement in decision making, asset ownership and income. The emerging consensus is that disagreement has real effects on important outcomes. Therefore, we agree with Annan et al. (2021) that more research is needed to understand which interventions move the needle on women's taking of power, versus the husband giving her power or couples agreeing. Therefor, in the next section, we describe two interventions designed to reduce disagreement among spouses.

[1]These days, most studies that focus on decision making acknowledge that the majority of decisions are made jointly, and a category is added: spouses are asked to indicate if a decision was made by themselves, by the other, or jointly, leading to nine possible combinations.

3 Experimental design and Interventions

The emerging literature on spousal disagreement suggests at least two underlying mechanisms. First, to some extent, spousal disagreement may reflect different cognitive understandings of the responses categories 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 pre-conceived 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. Second, the literature also establishes that spousal disagreement reflects information asymmetry between spouses (Ambler et al., 2021). A second intervention tests if this informational imbalance can be influenced by giving spouses equal ex-ante knowledge on maize farming best practices.

At the heart of both treatments is a short video that is shown twice to individuals within households using tablet computers. The aim of the video was to increase knowledge of the viewer with respect to best practices in maize farmer, such as timely planting, row planting and the use of improved inputs such hybrid seed and inorganic fertilizer. It does this though an inspirational story where a farmer (or farmers) recount how he/she/they used to be poor but managed to increase yields over time by applying a set of techniques and inputs. It also encourages farmers to view maize growing as a business that needs investment to grow over time and some simple inter-temporal cost-benefit calculations are use to illustrate this. Viewers are encouraged to follow the example of the model farmer in the video if they also want to lead the good life. The treatments itself consist of slightly adapted version of the video and variations on who within the household was exposed to the video. These variation and the rationale behind it are explained below.

3.1 Gender roles within the household

Within households, individual members often have differing spheres of influence, resulting in some degree of division of labour reflecting traditional gender roles (Lundberg and Pollak, 1993). Gendered differences in crop diversity choices may emerge from a variety of factors, including gender related differences in knowledge about the crop, access to planting material, and customs and traditions (Nordhagen, Pascual, and Drucker, 2021). While the

existence of such gendered patterns are widely acknowledged, it is not always easy to capture this in data, as gender is only one of the determinants of crop portfolio choice (Carr, 2008; Doss, 2002).

In in patrilineal societies such as Uganda, maize is considered to be mostly in the influence sphere of men. Generally, men will make all important decisions such as on what plots to plant, how to prepare the land, when to start planting and what seeds to use. Men also generally decide on how much labour is needed, and women assist men, often with weeding. Women generally have a larger voice in the cultivation of food security crops such as cassava or sweet potato.

We expect that such a separation in spheres of influence between male and female co-head contributes to spousal disagreement. Therefor, we devised a treatment consisting of an adaptation of the video featuring role models to promote a worldview where both spouses participate equally in maize farming. Recent research has shown that role models may be important to increase women participation in otherwise male dominated sectors (Porter and Serra, 2020; Beaman et al., 2012). One way in which large groups of people can be exposed to role models is through engaging media content (La Ferrara, Chong, and Duryea, 2012; Riley et al., 2017). In the context of smallholder agriculture, Bernard et al. (2015) find that exposure to video that show life stories of successful farmers affected both viewers' investment in their children's education and other future-oriented behaviors.

To test the hypothesis that spouses disagree less if they view farming as a collective activity, we randomly selected 261 households from our sample and showed them (male and female co-heads together) a version of the video where a couple is depicted. In another random sample of 240 households, we showed exactly the same video, except for the fact that it only featured a single male actor. As the only difference between the two videos was the fact that in one video a single male actor appeared and in the other a couple was shown, any difference in outcomes between the two groups should be attributed to a couple role model effect.

3.2 Information asymmetry

Smallholder agricultural households consist of different individuals, each with their own preferences, skills and access to assets. At the same time, individuals also need to invest in common goods for the survival of both the household as a unit and its members. In households, there are also various shared

assets and resources from which individual household members draw. 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 over-extraction of resources also apply within 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 better asses the actual time that the other co-head worked on preparing the field, the latter will be less likely to engage in shirking. Or, if it becomes easier to check how much each co-head obtained from the sale of maize, instances of income hiding will decrease. However, in order for monitoring to work, co-heads need to have a good idea of what to compare against, as merely observing an outcome may be insufficient to determine if a co-head cheated. For instance, it may be difficult for the female co-head to check if a the male co-head over-reports 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 better position to monitor each other.

In a second treatment, we therefore make sure both co-heads start off with the same information with respect to best agronomic practices, as this facilitates mutual monitoring. To do so, we show the video that showcases best practices in maize farming to both spouses in a random sample of 261 households.[2] In another random sample of 540 households, the same video was shown, but only to one of the two co-heads.[3] As the only difference between the two groups is related to whom the video was shown to, any difference in outcomes between the two groups should be attributed to reducing information asymmetry between spouses.

4 Study context

The study involved a random sample of maize farmers in eastern Uganda, an area that is know for its maize production. Two-stage cluster sampling was used to obtain a representative sample of this population. In particular,

[2]We show the version of the video that features a couple (male and female co-head), that is, the video used in the treatment group of the previous treatment.

[3]We 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.

from five districts (Bugiri, Mayuge, Iganga, Namayingo, and Namutumba), 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 the households, and in each village we sampled 10 households to be included in the study. This resulted in a total sample size of 3,280 households. However, in an 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 harvesting is done in higher altitude areas. The video intervention happened twice, once in August 2017 when farmers were preparing and one month later during planting time. Concurrent with the first treatment administration in 2017, we also collected some 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 the Fall Armyworm invasion. The baseline data also shows that the average household head is 40 years old and about 60 percent did not finish primary education. The average household consists of almost 8 individuals. Only 11 percent of households report that that had access to agricultural extension in the year prior to the survey. Only 17 percent used fertilizer on at least one plot, and 34 percent reported to be using hybrid maize seed or an open pollinated variety. About three quarters reported that the household had owned a mobile phone.

5 Results

We now turn to an in depth analysis of the data that was collected at endline. The focus is on spousal disagreement using own and cross reporting. 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 market participation. Under each heading, we provide a detailed descriptive analysis of disagreement based on the entire sample, and then report on the findings from the two treatment in the respective sub-samples.

5.1 Decision making

We start by exploring patterns of decision making related to maize growing within the household. We asked the head of the household to list all maize plots that the household was cultivating during the season preceding the survey, which was the second agricultural seasons of 2017. We then cycle through the different plots and repeat a series of questions for each plot. The same questions were asked separately to each co-head. We asked, for a range of key decisions that need to be made and that are known to significantly affect maize yields, who made the decision on that particular plot. Respondents could answer that decisions were made by the person that was interviewed alone; by the spouse of the person interviewed alone; by the person interviewed and his or her spouse jointly; by someone else inside or outside the household; by the person interviewed together with someone else inside or outside the household; or by the spouse of the person interview jointly with someone else inside or outside the household. Respondents could also indicate that they did not know who made the decision.

We start by looking at the responses given by the male co-heads within the household (Figure 1). The first decision we consider was simply who decided that maize should be planted on the particular plot. A second decision is related to timing of planting. Timely planting of maize is very important for subsequent maize yields. Maize planting should start immediately after the first rains of the season, resulting in significant time pressure when large areas need to be planted. A third important decision that maize farmers have to make is related to the spacing of seed and seed rate. There is a wide range of seed methods used by farmers. Some simply broadcast the seeds. However, row planting leads to significantly higher yields as plants have optimal space to obtain sufficient sun and nutrients. Farmers also often plant more than one seed per hill, because they fear some seeds may not geminate. However, planting more than one seed per hill may also increase competition for light and nutrients, leading to stunted 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. We also asked who made 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 general.

Figure 1 shows that, at least according to the male co-head, joint decision making is the norm. For example, on the 3,723 maize plots on which data was

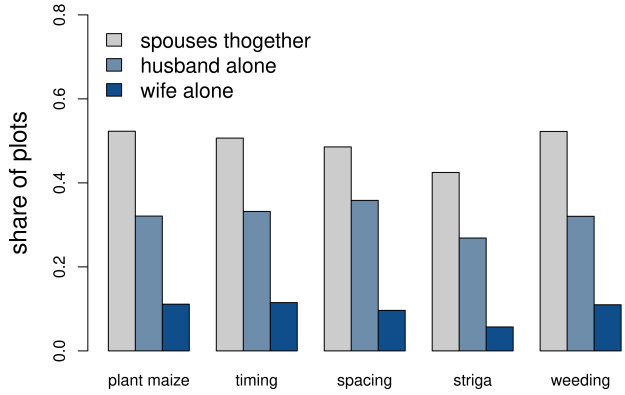

Figure 1: Decision making on different practices and inputs as reported by the male co-head

collected, men indicate that on 1,947 plots the decision to start planting maize was taken together with the wife. This corresponds to about 52 percent of plots. The pattern seems to be rather consistent across the different decision spheres. For the decision on how to fight striga, the percentage drops to 42 percent, but this is due to the fact that on some plots striga was not a problem and so no decision needed to be made.

The figure also shows that on one out of three plots, the male co-head states that decisions are made by him alone, without consulting his wife. Also here, the percentages remain stable across the decision makings spheres, with a slightly higher incidence of male co-head unilateral decision making on spacing and slightly less unilateral male decision making on weeding. Finally, the figure also shows that, according to men, women decide to plant maize without consulting their husband on 414 out of the total 3,723 plots, corresponding to about 11 percent. This share is also stable over the five decision spheres considered in the figure, with slightly more decisions taken by women on weeding and slight less on seed spacing.

Figure 2 is similar to Figure 1, but now shows responses as provided by the female co-head. Also here, we see that women report that decisions are generally made jointly: on the 3,723 maize plots in the sample, the woman co-head indicates that on 1,892 plots the decision to start planting maize was

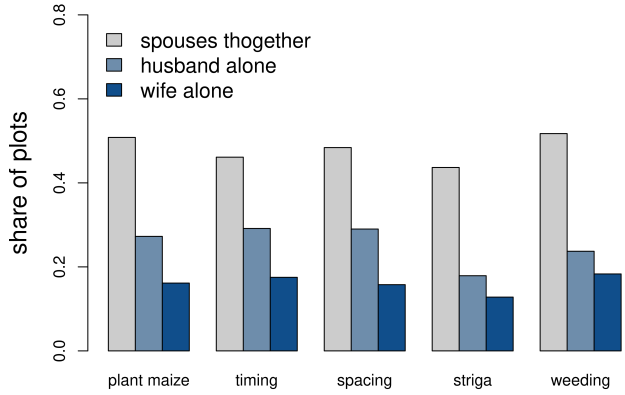

Figure 2: Decision making on different practices and inputs as reported by the female co-head

taken by the male and female co-head together. Also for the other decisions, on about half of all plots women say the decision was made jointly.

Women also report that it is more common that men take decisions alone than that women take decisions alone. For instance, women report that on 1,015 out of the 3,723 maize plots, man took the decision to start planting without consulting anyone else. However, there is less consistency over the different decision spheres. Men are relatively less likely to unilaterally decide on weeding related activities. Finally, women report that they make decisions unilaterally on about 15 percent of the plots.

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

To investigate this disagreement further, we construct measures based on answers of both spouses. As there are a large number of potential response combinations, it is customary to collapse responses into a few meaningful categories to reduce noise and facilitate analysis. For 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.

In this study, we follow Annan et al. (2021) and define plots on which co-heads over or underestimate their own role in decision making. Cases where co-heads over estimate their decision making power are indicated in the dark shaded area at 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 says disagrees and claims that she or he took the decision alone or was at least involved in it. Figure 3 shows that for the decision to plant maize on the plot, following this definition, co-heads overestimate their own decision power on 23.3 percent of the plots in our sample: on 5.3 percent of plots the male or female co-head says he or she made the decision to plant maize but the other disagrees and claims it is her or him who decided unilaterally; on 5.9 percent of plots the male co-head says he was involved in the decision but the female co-head says she took the decision alone; and on 12.1 percent of plots the female co-head says she was involved in the decision but the male co-head says he took the decision alone.

We further define instances where co-heads underestimate their own role in decision making. These are cases in the light shaded area to the left of the diagonal in Figure 3. These are cases where one co-head says his or her spouse decided unilaterally, but the spouse disagrees and says 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 underestimate their own decision power on 17.6 percent of the plots in our sample: on 2.7 percent of plots the male or female co-head says the other co-head made the decision to plant maize but the other co-head disagrees; on 4.0 percent of plots the male co-head says his spouse took the decision alone but the wife says he was involved; and in 10.9 percent of the cases the female co-head says the husband took the decision to plant maize unilaterally, but the husband disagrees and claims his wife was involved. [4].

[4] 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 contentious, 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 women

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

Figure 4 shows the frequency of overestimation and underestimation of decision power for the five decision categories. The first two bars refer to the decision to plant maize and correspond to the information also provided in Figure 3: on 23.3 percent of the plots spouses overestimate and on 17.6 percent of the plots spouses underestimate their contribution to the decision to plant maize. The Figure further shows that spouses are more likely to exaggerate their their role in decision making than to underestimate their contribution. Especially for weeding (and related striga weeding) the locus of decision making is in the self.

We will now use these disagreement indicators as outcomes to test the effectiveness of the two intervention described in Section 4. Results are in Table 1. The first column in table 1 shows that among household where a video was shown where a male actor provided the information (the control group), on about 23.5 percent of the plots co-heads overestimate their own contribution in the decision to plant maize[5]. The second column shows the average treatment effect of the treatment and reveals that there is no effect of the treatment on this measure of disagreement. This comparison between those who saw the couple video and those who saw a video with a single actor is repeated for all five decision spheres.

We do find significant reductions in the likelihood that co-head overestimate own influence as a result of the couple role model intervention for

"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 claim power, it seems that in the absence of additional assumptions by symmetry, in 12.1 percent of cases men are claiming power.

[5]This is essentially the same information as depicted in Figure 4, but now in the smaller sample of households included in our experiment.

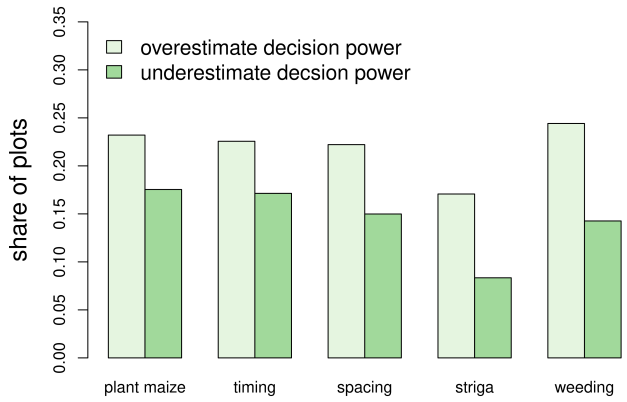

Figure 4: Disagreement in decision making

the decisions on when to start planting and on weeding. For the timing on planting, we see that among households where the video featuring only a male farmer was shown, co-heads overestimate 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 overestimate their involvement in this decision is only 16.9 percent. For the decision related to weeding, we see that in the control group, overestimation 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.

In the third column, we report control group means for the share of plots on which spouses underestimate 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 couple role model treatment and those who did not. Overall, we do not find that the treatment reduced the likelihood that spouses underestimate own decision making.

We next turn to the second treatment and compare disagreement on decision making between co-heads in households where only one co-head viewed

Table 1: Impact on disagreement in decision making

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

Note: First column reports mean rates of overestimation in decsion making power in the control group for the couple role model treatment (and standard deviations below); Column 2 reports differences in rates of overestimation in decsion making power between treatment and the control group for the couple role model treatment (and standard errors below); cloumn 3 reports mean rates of underestimation in decsion making power in the control group for the couple role model treatment (and standard deviations below); column 4 reports differences in rates of underestimation in decsion making power between treatment and the control group for the couple role model treatment(and standard errors below); column 5 shows mean rates of overestimation in decsion making power in the control group for the information asymmetry treatment (and standard deviations below); Column 6 reports differences in rates of overestimation in decsion making power between treatment and the control group for the information asymmetry treatment (and standard errors below); cloumn 7 reports mean rates of underestimation in decsion making power in the control group for the information asymmetry treatment (and standard deviations below); column 8 reports differences in rates of underestimation in decsion making power between treatment and the control group for the information asymmetry treatment (and standard errors below); **, * and + denote that the difference is signficant at the 1, 5 and 10 percent level, respectively.

the video and households where the video was shown to both co-heads. Column 5 of Table 1 show that in households where only one of the co-heads was exposed to the video, spouses overestimate their own influence on the decision to plant maize on the plot 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 different from zero at the 5 percent significance level. We also find that on decisions related to the timing of planting and weeding, making sure spouses start off with the same information leads to a reduction in the likelihood that one spouse assigns him or herself more decision 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 gives too much credit to the other spouse. Control group means, shown in column 7, are again in close to what we find in the entire sample depicted in Figure 4. The last column shows that the likelihood that spouses underestimate their own contribution reduces as a result of providing both spouses with the same information, but the effect is never significant. Overall, we conclude that both treatment are effective in reducing the likelihood that that spouses overestimate their own role in decision making.

5.2 Labour time

We also collected detailed information on labour. On each maize plot, we ask each co-head how much time, expressed in labour days, he or she worked on a particular activity. We also ask 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.

Figure 5 shows time spent on different activities as reported by the male co-head. We see that the male co-head spends about 8 days preparing the plot, 2 days planting, almost 15 days weeding, one day of 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 half a day less in weeding. Men think women almost never engage in spraying of insecticides, herbicides or fungicides. The average male co-head in our sample thus reports to work about 28 days on the average plot over the entire agricultural season. He reports that his wife works about 26 days on that plot over the

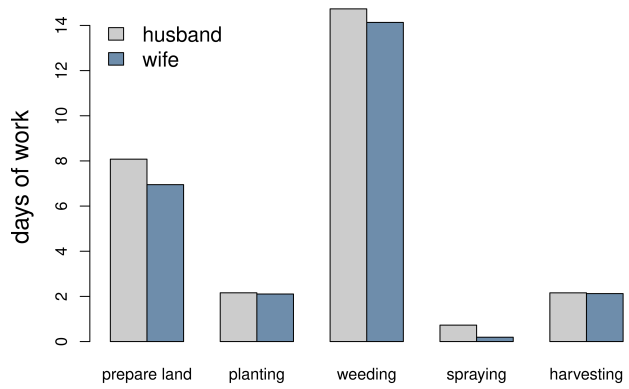

Figure 5: Time spent on different activities as reported by the male co-head

entire season.

Figure 6 shows a graph similar to Figure 5, but now as reported by the female co-head within the household. Interestingly, while male co-heads think they spent more time on all activities, female co-heads are also of the opinion that they work harder than their spouse on all activities, the only exception being spraying. Female co-heads claim they work on average about 7 to 8 days on field preparation on a plot, while they think the 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 spend only 13.5 days on that activity. According to women, male and female co-heads spend about the same time on planting and harvesting. Only for spraying, co-heads agree that the male co-head provides most of the work. According to the female co-head, she works almost 30 days, while the male co-head works about 25 days over the entire season.

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 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.

While on average, spouses tend to overestimate their own labour and

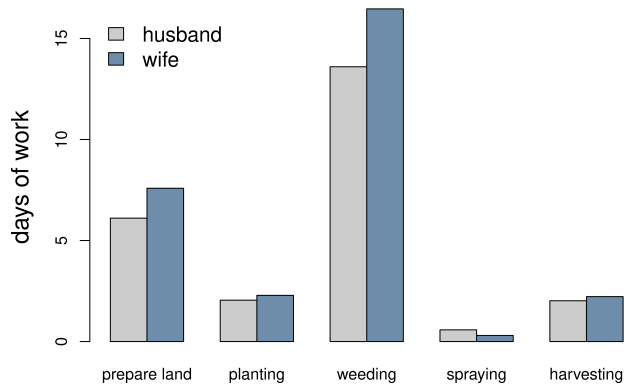

Figure 6: Time spent on different activities as reported by the female co-head

underestimate their spouses labour, there is also a substantial part of the sample where a co-head reports to work less than what the other thinks. This type of disagreement in labour reported may signal some level of shirking. For the analysis, we define shirking as a simple binary variable where a male co-head shirks on a particular activity if he reports he worked fewer hours than his wife thinks he did. A female co-head shirks if she works less than the male co-head thinks she did.

Figure 7 shows the incidence of shirking by male and female co-heads. For example, we find that on about 30 percent of the plots, the male co-head spends less time preparing the land than the female co-head thinks he does. For the task of preparing the land, women shirk slightly more. However, in general, the figure indicates male co-heads shirk more than female co-heads. Shirking is highest for men when it comes to weeding: On 40 percent of the plots, male co-heads put in less time than their female co-head thinks he does.

Table 2 reports on the impact of the role model intervention (left panel) and the intervention aimed at increasing information symmetry (right panel) on male co-head and female co-head shirking behaviour disaggregated by the different tasks. We see for instant that in the control group of households that got to see the video where a male actor is providing all the information, on about 18 percent of the plots male co-heads indicate that they spent

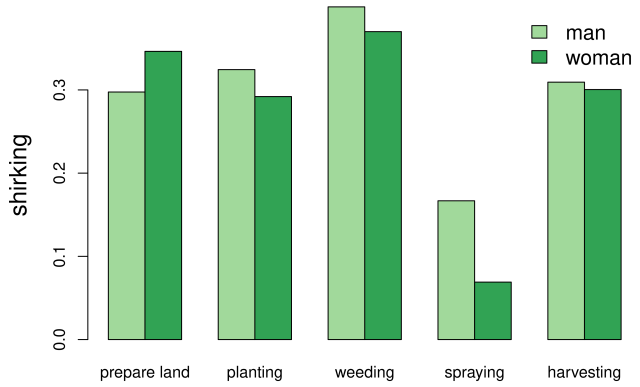

Figure 7: Shirking

less time on spraying the plot than their wife thinks he does. The second column reveals a significant treatment effect of the couple role model video on the likelihood that men shirk on this activity. In the treatment group, the incidence of male shirking on spraying reduced by 5.3 percentage points. However, we only find an effect for spraying, and no clear pattern for the impact of the first intervention on male shirking on other activities. We do not find any effect of the couple video intervention on female shirking (column 4).

A similar negative effect on male shirking related to spraying in the field emerges from the second treatment: while men in households where only one spouse saw the video report less time spent on this activity then their wives think on 19.9 percent of the plots, this happens on only 12.8 percent of the plots in households where both spouses were exposed to the video. Interestingly, we also find that reducing asymmetric information within the household increases male co-head shirking on weeding. As was the case for the first treatment, the second treatment does not seem to affect shirking by the female co-head.

Table 2: Impact on division of labour

	couple role model				*information asymmetry*			
	male shirking		*female shirking*		*male shirking*		*female shirking*	
	ctrl mean	ATE	ctrl mean	ATE	ctrl mean	ATE	ctrl mean	ATE
prepare land	0.303	0.026	0.307	0.037	0.273	0.056	0.374	-0.030
	(6.672)	(0.040)	(7.118)	(0.042)	(7.358)	(0.035)	(6.842)	(0.037)
plant maize	0.321	0.000	0.284	0.010	0.339	-0.018	0.298	-0.004
	(1.331)	(0.040)	(1.581)	(0.040)	(1.430)	(0.035)	(1.432)	(0.034)
weeding	0.456	0.009	0.307	0.041	0.399	0.066^{+}	0.325	0.022
	(12.834)	(0.043)	(12.420)	(0.042)	(10.634)	(0.037)	(11.789)	(0.036)
spraying	0.180	-0.053^{+}	0.088	-0.016	0.199	-0.071^{**}	0.074	-0.003
	(1.118)	(0.031)	(0.728)	(0.024)	(1.044)	(0.026)	(0.879)	(0.020)
harvesting	0.346	-0.031	0.280	0.016	0.310	0.005	0.313	-0.018
	(1.605)	(0.040)	(1.493)	(0.038)	(1.903)	(0.032)	(1.843)	(0.033)

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

5.3 Income hiding

Finally, we look at maize marketing. We asked each spouse separately how much maize was sold from the season under consideration. In particular, we asked each of the spouses separately to estimate how much was sold by (1) him or her alone, (2) by his or her spouse alone, and (3) jointly[6]. We also asked both co-heads to indicate the revenue that was derived from these sales. Overall, just as in the case of decision making related to maize cultivation, most maize marketing happens as a couple. Men report that households sold on average 1.4 bags of maize as a couple[7]. Women report that they sold just under one bag as a household. Averaged over the entire sample, joint sales amounted to about 23 dollars, at least as reported by the male co-head. Women estimated this amount much lower at 13 dollars. However, as we are particularly interested in spousal disagreement, we focus on unilateral sales as reported by both spouses. Figure 8 shows in the left panel that men reported they sold half a bag themselves. Women reported that they think the male co-head only sold 0.25 bags of maize. This may indicate that the average male co-head in our sample sold about one quarter of a bag behind the female co-head's back. Women, on the other hand, report that they sold only about 12 kilograms of maize alone. Men think that the female co-head unilaterally sold about 6 kilograms. As such, in percentage terms, quantities hidden is similar between male and female co-heads.

The right panel of Figure 8 looks at income derived from these sales. Male co-heads indicate that they received about 7.6 dollars on average from their unilateral sales of maize. Women estimate this revenue to be only about 2 dollar. The fact that the gap between what men report and what women report has increased dramatically may indicate that men also hide income by reporting to the female co-head lower prices than what they actually received for the maize. This seems to be less the case for women, where differences in male and female reported revenues are in line with differences in quantities sold.

As in previous sections, we look at the impact of the two interventions on disagreement related to maize sales. We conjecture that encouraging cooperation through the use of a couple as role models and reducing information asymmetries between spouses may lead to a reduction in income hiding.

[6]We 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.

[7]A typical bag contains about 120 kilograms of maize.

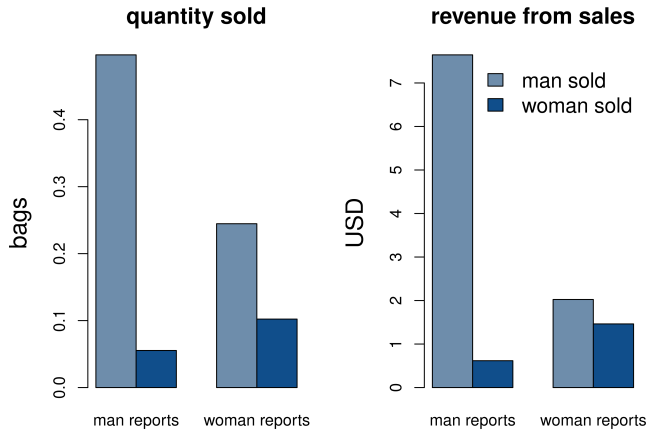

Figure 8: Maize sales

Table 3 reports results for three outcomes. A first outcome is a simple binary indicator that takes the value of one if a spouse appears to engage in concealing sales. In particular, male income hiding happens if men's own reported quantities exceed what the wife reports that the man sold unilaterally. Female income hiding happens if female co-head's own reported quantities exceed what her husband reports that she sold unilaterally.

The first row in the table shows that among households that were shown a video with only one actor, 13.6 percent of male co-heads sold more than what the female co-head thought. In this same subset, about 6.7 percent of female co-heads sold more than what the male co-head thought the female co-head sold. We do not find that these rates are significantly different among households that were given the couple role model treatment video.

Similarly, the right panel in Table 3 reports result for the second treatment. It shows that there is also no impact of providing both spouses with the same information on the likelihood that spouses engage in income hiding.

Instead of simply using a binary variable indicating income hiding, we further consider quantities hidden in rows 3 and 4 of the table. We see that in the control group for the first treatment, men hid on average 0.1 bags of maize, while women hide 0.05 bags of maize. The couple role model intervention does not appear to affect these amounts. The amounts are somewhat higher in the control groups used to compare the second treatment with,

Table 3: Impact on income hiding

	couple role model				*couple information*			
	male hides		*female hides*		*male hides*		*female hides*	
	ctrl mean	ATE	ctrl mean	ATE	ctrl mean	ATE	ctrl mean	ATE
hiding	0.136	0.018	0.067	-0.009	0.122	0.031	0.070	-0.012
	(0.344)	(0.032)	(0.250)	(0.022)	(0.328)	(0.026)	(0.255)	(0.019)
quantity	0.101	0.187	0.047	-0.003	0.185	0.102	0.070	-0.027
	(1.549)	(0.136)	(0.569)	(0.042)	(1.350)	(0.106)	(0.493)	(0.034)
amount	2.541	2.404	0.631	-0.327	3.861	1.085	0.775	-0.471
	(20.996)	(2.054)	(6.625)	(0.508)	(19.157)	(1.590)	(6.894)	(0.474)

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

reflecting the high variance in the outcome variable. Also for the treatment designed to reduce information asymmetry between spouses, we do not find an impact on amounts hidden.

Finally, as we found income hiding seems more prevalent for men when revenue is considered in Figure 8, we also look at income obtained from selling these quantities in rows 5 and 6. Indeed, we see men hide income worth between USD 2.5 and 3.8 depending on what control group used. For women, these amounts range between 63 and 77 cents. We again do not find an impact of the interventions on amounts hidden. From this we conclude that our interventions did not affect disagreement related to maize sales, though it should be noted that outcome variables are extremely noisy.

6 Conclusion

Household surveys that are serious about capturing gender related heterogeneity will, at least for part of the survey, interview both male and female co-heads separately, as opposed to only the household head or most knowledgeable person. 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 intra-household power dynamics.

Earlier studies often investigate spousal disagreement through 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 husbands report higher levels of consumption then wives, and cases where husbands report lower levels of consumption than the wives. Often, these questions relate to household level data, such as consumption expenditure of investment in household public goods. However, studies interested in women autonomy and women empowerment go further and ask more personal questions on behaviour and personal belongings, and spouses are typically asked to answer these questions about themselves but also about their spouse. This allows a range of interesting indicators of disagreement to be constructed based on what one co-head claims about his or her own behaviour (or asset ownership), and what his or her spouse thinks he or she

did (or owns).

In this study, we focused mostly on directional disagreement indicators that exploit questions about individual spouses obtained from both co-heads. In addition to documenting patterns in spousal disagreement in this way, we also tested two simple interventions aimed at reducing disagreement related to decision making, shirking and income hiding. Both these interventions consisted of showing short engaging video's to co-heads within the household. More in particular, in a first treatment we tested if promoting a cooperative approach to maize farming (by showing a couple farming together) reduced disagreement. In a second treatment we vary who gets to see the video to test if reducing information asymmetry between spouses also reduced disagreement.

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 significant reductions in the likelihood that co-heads overestimate own influence as a result of the couple role model intervention for the decisions related to timing of planting and weeding. We did not find that the couple role model treatment reduced the likelihood that spouses underestimate own decision making. We found that reducing information asymmetry between spouses led to a reduction in the likelihood that one spouse assigns him or herself more decision power than the other spouse claimed. The likelihood that spouses underestimated their own contribution also reduced as a result of providing both spouses with the same information, but the effect was never significant.

For labour, we found that male co-heads shirk more frequently than female co-heads. There is weak evidence that both treatments reduced the incidence of male co-head shirking related to spraying. Shirking by the female co-head was not affected by the interventions. With respect to income hiding, we found that spouses reported they sold about double of what the other spouse was aware of. However, men also hid income by reporting to the female co-head lower prices than what they actually received for the maize. The interventions did not affect the likelihood that spouses had a better idea of each other's sales.

The fact that we find similar effects from both interventions suggest that two distinct mechanisms are likely at play. On the one hand, some of the disagreement may be because one spouse overestimates his or her own role or position to make it appear in line with expectations within communities. Reducing this disagreement will involve longer run efforts to challenge per-

ceptions 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 genuine hiding. Here, interventions aimed as reducing the information disadvantage of one spouse, may be effective.

Our findings are consistent with other studies on spousal disagreement and makes us wary about studies that use household surveys where expenditure and income of the entire household is reported by one spouse to assess poverty. In light of the fact that we find some evidence of discretionary spending, we also want to reiterate that this can result in suboptimal allocation, away from easily observable investments such as education and nutrition (Ambler et al., 2021). Finally, we confirm that spousal disagreement represents much more than statistical noise, and much more research is warranted.

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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 Evidence 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.

Becker, S., F. Fonseca-Becker, and C. Schenck-Yglesias. 2006. "Husbands' and wives' reports of women's decision-making power in Western Guatemala and their effects on preventive health behaviors." *Social Science & Medicine* 62 (9): 2313–2326.

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.

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.