Field Test Report

Intra-household decision-making in agriculture: The value added of asking who makes the decisions around specific agricultural activities

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Abstract

Field tests were implemented in Uganda in partnership with Uganda Bureau of Statistics (UBOS) and Indonesia in partnership with Badan Pusat Statistik (BPS) between July and October 2016 to test an agricultural decision-making module. Specifically, it explored the value added of asking who makes the decisions around specific agricultural activities on the holding as compared to the standard approach in agricultural censuses and surveys of simply asking who is the holder, where the holder is the person assumed to make all the major decisions about the operation of the agricultural holding. Based on the results from the Uganda field test, women's involvement in the operation and managerial decisions of the holding are underestimated when only the sex distribution of the holder is presented. Based on the findings, at a minimum including a question about who manages agricultural production by plot or by crop and a question on who manages the livestock by type of livestock within agricultural surveys is important from a gender perspective. Which additional decision-making questions to include depends on the context of the country and the research questions of interest.

Acknowledgements

The report was prepared by Marya Hillesland, International Consultant and Economist in Gender, Development, and Agriculture for the Global Strategy for Improving Agricultural and Rural Statistics (GSARS) in the Statistics Division at FAO. Vanya Slavchevska, International Consultant and Economist in Gender and Development in the Social Policies and Rural Institutions Division at FAO, carried out much of the data cleaning and analysis. Field tests were carried out in Uganda in partnership with Uganda Bureau of Statistics (UBOS) and in Indonesia in partnership with Badan Pusat Statistik (BPS). At UBOS, the GSARS thanks Ben Paul Mungyereza, Executive Director, Imelda Atai Musana, Deputy Executive Director, Statistical Production and Development, Edgar Mbahamiza, Manager Administration and Human Resource, Patrick Okello, Director of Agriculture and Environment Statistics, Emmanuel Menya, Principal Statistician, Flavia Naiga Oumo, Senior Statistician, Israel Nsiko, Senior Statistician, Dickens George Ocen, Statistician, and Keith Ahumuza, Statistian for their involvement in the field test. The GSARS also acknowledges the great work of UBOS enumerators: Buyinza Shamsa (Team Leader), Mudega Robert, Wandeka Aggrey, Nakawuka Shanita, Ojangor Steven (Team Leader), Achakara Esther, Amuka William, Akol Mary Gorrety, Mugonza Joseph (Team Leader), Kayanga Josiah, Ssebagala Edward, and Magona Pius. At BPS, the Global Strategy for Improving Agricultural and Rural Statistics thanks Kecuk Suhariyanto, Chief Statistician, Adi Lumaksono, Deputy of Production Statistics, Yomin Tofri, Director of Livestock, Fishery, and Forestry Statistics, as well as Sigit Purnomo, Eko Haryono Subagya, Katiti Wulansari, Heru Margono, Marlina Kamil, Bachdi Ruswana, Ratih Tri Hutami and Enita Marcelina Makanoneng. GSARS also thanks Antonio Caravaggi, FAO Representative, Mark Smulders, FAO Representative, and Oemi Praptantyo, Assistant from FAO Indonesia. The report is an output of the GSARS program area, "Mainstreaming sex-disaggregated data and gender indicators in agricultural statistics," (SUST1) coordinated by Chiara Brunelli, Food Security and Nutrition Officer in the Statistics Division at FAO.

1

Introduction

The *Global Strategy for Improving Agricultural and Rural Statistics* (GSARS) aims at developing cost-effective methods for agricultural statistics that will serve as the basis for preparing handbooks and training material to be used by country statisticians. The goal of GSARS research line, "Mainstreaming sex-disaggregated data and gender indicators in agricultural statistics" (SUST1) is to improve the availability of comparable sex-disaggregated data and gender-relevant indicators within large-scale agricultural surveys. Under this line of research, a Gender Guideline, *Guidelines for collecting data for sex-disaggregated and gender-specific indicators in national agricultural surveys*, that identifies key gender-relevant indicators in agriculture and proposes questions and modifications to existing agricultural and farm surveys to better capture these indicators is being developed. It is expected to be finalized May 2017.

Since gender is a cross-cutting theme, the Guideline takes into consideration several aspects of women and men's roles in agriculture, such as access to (and control of) assets; access to financial resources; access to trainings, groups and associations; time-use and labour; and decision-making in agricultural activities. Many recommendations build on previous research and, therefore, do not require ground verification. However, some recommendations required testing. In particular, a decision-making module which could be incorporated into parcel, plot, and livestock rosters was tested. Two field tests were implemented between July and October 2016: one in Uganda in partnership with Uganda Bureau of Statistics (UBOS) and one in Indonesia in partnership with Badan Pusat Statistik (BPS). While both countries carried out the field test, only the results of the Uganda field test are presented here. In Indonesia, poor translation from English to Bahasa Indonesia affected how concepts and definitions were understood by the enumerators and made it difficult to correctly interpret and use the data. In addition, other factors, including timestamps, which identify the time the modules began and end, captured unrealistically short interview lengths signalling that the data may have been

falsified. The data analysis, therefore, for Indonesia was not carried out so to avoid the possibility of presenting erroneous findings.

Key lessons were learned, however, in comparing the implementation of the field tests in the two countries. In particular, there was a significant difference between the speed and ease in which the enumerators and supervisors in Uganda as compared to Indonesia understood the reasons behind the decision-making questions and survey design. In Uganda, many of the enumerators and all three of the supervisors (who were also enumerators) had experience with other gender studies with similar structures as the field test or had some gender training in the past. In Indonesia, none of the enumerators, nor supervisors, had received any gender training, nor had they worked on other gender studies. A full day of gender sensitivity training in Indonesia, as a way to better explain the significance of the study, would have likely improved the enumerators and supervisors understanding of the overall study. It would have helped ensure they understood the reasons for the approach as well as the importance of the questions. This, in turn, may have improved the quality of the data.

The report is organized as follows: The next section provides background and motivation for including decision-making questions around agricultural activities within agricultural surveys and describes the decision-making module. This is followed by a discussion of the field test design and implementation. The next sections discuss the results. It first explores the value added of incorporating decision-making questions into agricultural surveys. It then explores whether all the proposed decision-making questions are essential or whether a shorter version of the decision-making module could be implemented without value lost. Finally, it explores whether the decision-making statistics at the holding level depend on whom the questions were asked.

2

Background and Motivation behind the Decision-Making Module

The standard approach in agricultural censuses and surveys is to simply ask who is the holder, where the holder is the person assumed to make all the major decisions about the operation of the agricultural holding. This approach does not capture the possibility of there being multiple individuals responsible for the management of the holding. Only in some cases, questionnaires explore the presence (and sex) of co-holder(s), but they do not ask about the specific roles and responsibilities of the holder, co-holder, and other household members. Generally, the standard approach does not recognize the often complex decision-making dynamics in household sector holdings.

In agricultural households, the household head is often considered to be the holder of the agricultural holding; in which case, if we disaggregate the holder by sex, the sex-distribution of holders reflects the sex-distribution of the household heads and, again, this does not capture intra-household dynamics. Since men are often regarded as the household head, this approach underestimates women's involvement in the decision-making and management of the holding. In cases where the holder or holders are identified separately from the household head, decision-makers are often still presumed to be male in many contexts, and again the holder is likely to be identified as a male regardless of whether women also make decisions around agriculture production.[1]

Acknowledging that the standard approach overlooks the complexity around gender and decision-making within the household and may underestimate

[1] Doss, C. 2014. Data needs for gender analysis in agriculture. Gender in Agriculture. Springer Netherlands, 2014. 55-68.

women's participation in major decisions on the holding, the World Census of Agriculture 2020 (WCA 2020) Guidelines propose that agricultural censuses ask questions around the 'managerial decisions' (i.e., major decisions made on the holding) on a number of agricultural activities.[2]

Building from the WCA 2020, a decision-making module that can be incorporated in agricultural censuses and surveys was developed and tested. In Uganda, six decision-making questions were asked with regard to land investment in the last two years and land use and cropping activities since the beginning of the first agricultural season of the year (from January 2016 to September 2016).[3] Questions were asked at different levels.

Two questions were asked at the parcel level.[4]

- *Have any permanent investments been made to [the parcel], such as irrigation systems, fences, or trees in the last 2 years? Who made decision about to make these permanent investments?*

- *During the last rainy season was [the parcel] cultivated, rented out, given out for free, left fallow, a forest or woodlot, a pasture, or other? Who made this decision (either to cultivate, rent out, give out for free, or leave follow)?*

Two questions were asked at the plot level.[5]

- *Who made the decisions concerning which crops to be planted, which inputs—such as purchased or home-produced fertilizers, pesticides, herbicides—to use and the timing of cropping activities on [the plot] since the beginning of the first agricultural season?*

- *Who made the decisions on how to pay for or finance, such as whether to use savings or to take out credit and where to borrow, the cropping*

[2] FAO. 2015. World Programme for the Census of Agriculture 2020. Volume 1 Programme, concepts and definitions. FAO Statistical Development Series 15, available at (http://www.fao.org/economic/ess/ess-wca/en/).

[3] Decision-makers are defined as the primary people responsible for determining the outcomes or operations of different agricultural and livestock activities on the holding.

[4] In Uganda, a parcel is defined as a contiguous piece of land with uniform tenure that is not divided by a physical characteristic such as a body of water or road. A parcel is made up of one or more plots.

[5] In Uganda, a plot is defined a contiguous piece of land within a parcel on which a specific crop or crop mixture is grown and for which the land is used predominantly for the same purpose and is managed by the same person or group of people.

activities on [the plot] since the beginning of the first agricultural season?

Two questions were asked for each crop on each plot.

- *Who made the decision about what do to with the harvest from [the crop] (whether to sell, store, give away, or consume at home)?*

- *Was any amount of the harvest or a product made from the harvest from [the crop] sold? Who decided how to use the earnings from the sales of this crop?*

In addition, eight decision-making questions were asked with regard to the management and decisions made across different types of livestock that fit the country context.[6]

- *Who manages [livestock type]?*

- *Who makes the decisions about what preventative or curative health treatments to be used on [livestock type]?*

- *Since the beginning of the last rainy season, were any products produced from [livestock type] consumed in the household or used on the holding? (Examples include using manure as fertilizer, milk from dairy cows, eggs from poultry, and wool from sheep.) Who made the decisions regarding which products from [livestock type] to consume at home or to use on the holding?*

- *Since the beginning of the last rainy season, were any products produced from [livestock type] sold for cash or bartered? Who made the decisions on which products to sell or trade produced from [livestock type]?*

- *Who decided how to use the earnings from selling the products produced from [livestock type]?*

- *Since the beginning of the last rainy season, were any [livestock type] slaughtered for home consumption? Who made the decision to slaughter [livestock type] for home consumption?*

[6] The livestock categories in Uganda were the following: indigenous/local cattle; exotic/cross cattle; indigenous/local goats; exotic/cross goats; sheep; pigs; exotic/cross chicken; local chicken; other poultry; donkeys, mules, and horses; rabbits; beehives; and other livestock.

- *Since the beginning of the last rainy season, were any [livestock type] sold? Who made the decision to sell [livestock type]?*

- *Who decided how to use the earnings from selling the [livestock type]?*

3

Field Test Design and Implementation

The field test consisted of two questionnaires: (1) a brief holding questionnaire and (2) an individual questionnaire. The holding questionnaire asked for the holder of the holding as is traditionally done in agricultural censuses and national surveys.[7] From the holding questionnaire, the enumerators selected two respondents from the agricultural household holding for the individual questionnaire.

When possible, the holder was designated as the first respondent, while the second respondent was the spouse (or partner) of holder if he or she lives in the household and is engaged in agricultural activities on the holding. When the holder had more than one spouse in the household, enumerators were instructed to select the oldest spouse if available. If a spouse was not available, enumerators were instructed to select a household member 15 years or older of the opposite sex of the holder.

Two enumerators, ideally one male and one female, interviewed the two respondents. The first part of the individual questionnaire contained questions about the characteristics of the dwelling, a household roster, and a parcel roster. It was implemented with both enumerators and respondents together in the same room. One enumerator interviewed the respondents and both enumerators recorded the information. This ensured that the household and plot rosters contained the same information for both respondents. The second part of the individual questionnaire was administered privately and in separate locations to ensure the respondents did not influence the responses of the other. Additionally, to minimize unobserved respondent biases of household

[7] The holding is defined as an economic unit of agricultural production under single management comprising of all livestock kept and all land used for agricultural production purposes, and the holder is a person who manages or has control over the holding and makes the major decisions regarding the use of the holding.

members trying to coordinate responses once households become aware of the survey from the community, the teams were instructed to implement the survey swiftly within each neighbourhood area.

The initial sample consisted of 510 agricultural households from 30 randomly selected enumeration areas (EAs) in the districts of Bukedea, Kamelia, Buikwe in the Eastern Region with 17 systematically selected households per EA. The sample is not representative at the district level as this would have been cost prohibitive and some EAs needed to be dropped from the population prior to EA selection. A complete listing of the selected EAs was done prior to the survey implementation and sampling. In 19 households, the interviews were not completed (resulting in a non-response rate of four percent). The final sample is 491 with 169 households from Bukedea, 161 from Kamelia, and 161 from Buikwe. For 318 households, there were two respondents. Of these 318 households, 99.7 percent of the first respondents and 97.8 percent of the second respondents were interviewed privately. Eighty-five percent of the second respondents were spouses of the first respondent. Thirty percent of the first respondents and 86 percent of the second respondents were female. The average age of the female and male respondents was 42.9 and 43.4 years respectively. Ninety-five percent of the female respondents and 91 percent of the male respondents engaged in activities in agriculture or livestock on the household holding for at least seven days since the last agricultural season.

4

Results

In 20 of the 491 households interviewed, the holder was not available. The analysis is restricted to the 471 holders that were interviewed, however, the results are similar to the results of the full sample. Based on the standard approach used in the Ugandan Annual Agricultural Surveys (AAS), where enumerators are asked to identify one individual per agricultural household holding as the holder, 71 percent of the holders are male and 29 percent of the holders are female. The majority (80 percent) of the female holders are from single female-headed households and another four percent of female holders are married but their partners are away for work or other reasons. This suggests that the sex of the holders is primarily based on the household structure (female-headed vs. couple households) and that the holder was likely presumed to be male unless a male is not present. The percentage of female holders in the field test sample is significantly larger than the 16.3 percent female holders reported in 1991 in the Agricultural Census presented on FAO's Land Rights database website, which is likely due to the different samples and the changes to household structures in Uganda within the last 25 years.

For each decision-making question, the respondents were asked who in the household and outside the household were the primary decision-makers. Multiple responses were allowed. Individuals from the household and outside the household could be selected. In about eight percent of the holdings, an individual outside the household was a primary decision-maker for at least one of the fourteen activities. For land use and cropping activities, on most holdings, decisions were primarily made by one or two people.[8] In dual-

[8] In 71 percent of the households that made investments on land in the last two years, one person made decision. In 28 percent of the households, two people made the decision either jointly for the same parcels or individually for different parcels. In 57 percent of households that cultivated, rented out, gave out for free, or left follow land on their holding, one individual made the decision across all parcels. In 39 households, two people made the decision either jointly for the same parcels or individually for different parcels. In 52 percent of households that cultivated at least one plot, one person made the decisions concerning which crops to be planted, which inputs—such as purchased or home-produced fertilizers, pesticides, herbicides—to use and the timing of cropping activities. In 44 percent of households, two

headed households, across most of the cropping activities, households were more likely to have two decision-makers. Whereas in single-headed households, across most of the cropping activities, households were more likely to have a single decision-maker.

For livestock activities, on most holdings, decisions were also made primarily by one or two people across all livestock.[9] However, unlike the land and cropping activities, there were a significant number of households that had three or more managers who either managed jointly the same livestock or managed different types of livestock separately. For the other activities, in both dual and single-headed households, households were more likely to have a single decision-maker.

Taken as a whole, in 67 percent of the holdings, both men and women are primary decision-makers in agricultural activities. In 19 percent of the holdings, only women are the primary decision-makers across all the activities and in 11 percent of holdings, only men are the primary decision-makers across

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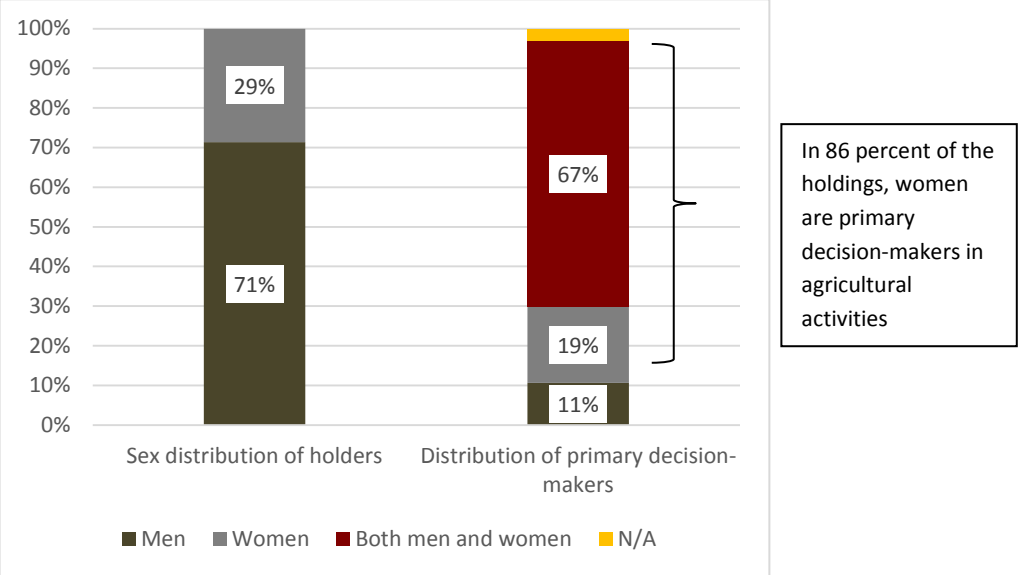
people made the decision either jointly for the same plots or individually for different plots. In 58 percent of households that cultivated at least one plot, one person made the decisions on how to pay for or finance the cropping activities. In 39 percent of households, two people made the decision either jointly for the same plots or individually for different plots. In 52 percent of households that harvested crops, one person made the decision about what do to with the harvest (whether to sell, store, give away, or consume at home) across all crops. In 42 percent of households that harvested crops, two people made the decision either jointly for the same crop or individually for different crops. In 68 percent of households that sold harvest, one person made the decision how to use the earnings from the sales from the crops. In 30 percent of households that harvested crops, two people made the decision either jointly for the same crop or individually for different crops

[9] In 57 percent of households with livestock, one person managed all the livestock on the holding. In 25 percent of households, two people managed all the livestock. Seventeen percent of households with livestock reported three or more managers. In 71 percent of households, one person made the decisions about what preventative or curative health treatments to be used for all livestock on the holding. In 27 percent of households, two people made the decisions either jointly for the same livestock or separately for different types of livestock. In 69 percent of households, one person made the decision regarding which products from the livestock to consume at home or to use on the holding. In 25 percent of households, two people made the decisions either jointly for the same livestock or separately for different types of livestock. In 80 percent of households that sold or bartered any livestock products, one person made the decision about which products to sell or trade. In 17 percent of households, two people made the decisions. In 78 percent of households that sold or bartered any livestock products, one person made the decision about how to use the earnings from selling the products. In 19 percent of households, two people made the decisions. In 67 percent of households that slaughtered any livestock for home consumption, one person made the decision to slaughter. In 29 percent, two people made the decision. In 66 percent of households that sold livestock, one person made the decision. In 32 percent of households, two people made the decision. In 64 percent of households that sold livestock, one person made the decision about how to use the earnings. In 34 percent of households, 34 percent of households, made the decision.

all the activities.[10] Overall, in 86 percent of the holdings, women are primary decision-makers in at least one agricultural activity, either exclusively or jointly with men, and in 78 percent of the holdings, men are primary decision-makers in at least one agricultural activity either exclusively or jointly with women. Figure 1 compares the sex distribution of the holders to the sex distribution of primary decisions-makers. The results suggest that in the traditional approach women's involvement in decision-making in agricultural activities on the holding are significantly underestimated.

Figure 1. Sex distribution of holders and primary decision-makers



Note: In slightly less than 3 percent of the 471 holdings, no decisions were made on cropping and livestock activities. These are primarily agricultural households that held agricultural land, such as pastures, forests, or woodlots of which they made no permanent investments. Additionally, they had no livestock and did not engage in cropping activities since the last agricultural season.

The second part of the analysis explores in more depth the decision-makers for each decision-making question. Land and cropping activities were aggregated across all parcels of the holding, while livestock was grouped in three categories: cattle (including both indigenous cattle and cross cattle); small livestock (goats, sheep, and pigs); and poultry (chickens, ducks, turkeys, guinea fowl, doves, and pigeons). All other livestock was left out of the analysis due to a limited number of observations (only eight holdings had other types of livestock).

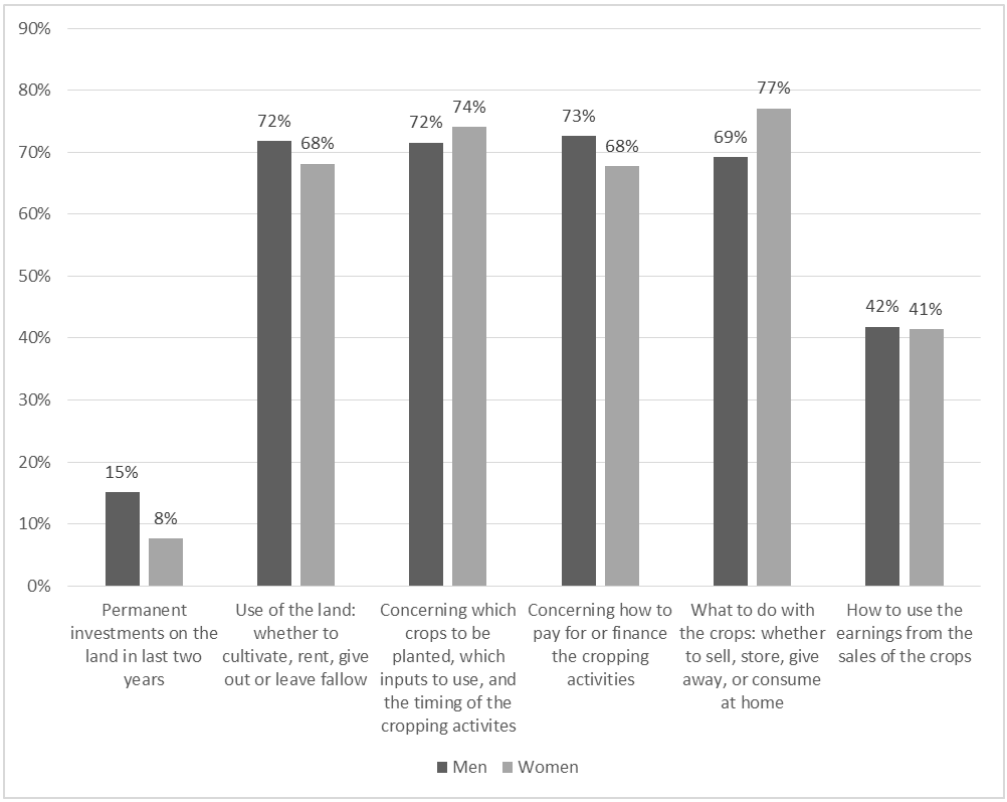
[10] These are based on the holders' responses.

Sex distribution of decision-makers across activities

Land and Cropping Activities

For land and cropping activities, with the exception of land investment, women are as likely as men to be primary decision-makers either exclusively or jointly with men across all the activities (Figure 2).[11]

Figure 2. Primary decision-makers of land and cropping activities of holdings



Tables 1 to 3 provide additional detail on the primary decision-makers across holdings. For 82 percent of the holdings, the decision to make permanent investments on the land in the last two years was not made. For the majority of the holdings that made land investments, the decision was made exclusively by men. Women were the sole decision-makers of land investments in only three percent of the holdings. Beyond investments, women are more likely than men to make the decisions exclusively around which crops to be planted, which inputs to use, and the timing of the cropping activities. Women are also more likely than men to make decisions exclusively around what to do with the crops

[11] Jointly means that both men and women are primary decision-makers in that men and women either collaborated together in making the decision or they both made the decision separately for different plots, crops, or livestock in the same holding.

(i.e. whether to sell, store, give away, or consume at home). Men, on the other hand, are more likely than women to solely decide about the use of the land (i.e. whether to cultivate, rent, give out, or leave fallow) and how to finance the cropping activities. However, for all these activities, the gender gap is relatively small. Both men and women are equally likely to make decisions exclusively on how to use the earnings from the sales of the crops (Table 1).

When results are disaggregated by the sex of the holder, we observe that women are more likely to make all the decisions exclusively on female-headed holdings, which are primarily single-headed households (Table 2). Whereas, on male-headed holdings, which are primarily dual-headed households, with the exception of land investment, decisions about land use and cropping activities are more likely to be made by both men and women rather than by men exclusively or women exclusively (Table 3).

Table 1. Primary decision-makers of land and cropping activities of all holdings

	Men exclusively	Women exclusively	Both men and women	Decision not made
Permanent investments on the land in last two years	10%	3%	5%	82%
Use of the land: whether to cultivate, rent, give out or leave fallow	28%	25%	43%	3%
Concerning which crops to be planted, which inputs to use, and the timing of the cropping activities	22%	25%	49%	4%
Concerning how to pay for or finance the cropping activities	29%	24%	44%	4%
What to do with the crops: whether to sell, store, give away, or consume at home	18%	26%	51%	4%
How to use the earnings from the sales of the crops	20%	19%	22%	39%

Table 2. Primary decision-makers of land and cropping activities of female-headed holdings

	Men exclusively	Women exclusively	Both men and women	Decision not made
Permanent investments on the land in last two years	1%	8%	1%	90%
Use of the land: whether to cultivate, rent, give out or leave fallow	3%	67%	22%	8%
Concerning which crops to be planted, which inputs to use, and the timing of the cropping activities	1%	7%	21%	8%
Concerning how to pay for or finance the cropping activities	1%	71%	20%	8%
What to do with the crops: whether to sell, store, give away, or consume at home	1%	72%	19%	9%
How to use the earnings from the sales of the crops	1%	43%	7%	50%

Table 3. Primary decision-makers of land and cropping activities of male-headed holdings

	Men exclusively	Women exclusively	Both men and women	Decision not made
Permanent investments on the land in last two years	14%	0%	7%	79%
Use of the land: whether to cultivate, rent, give out or leave fallow	39%	8%	52%	1%
Concerning which crops to be planted, which inputs to use, and the timing of the cropping activities	31%	7%	61%	2%
Concerning how to pay for or finance the cropping activities	40%	5%	54%	2%
What to do with the crops: whether to sell, store, give away, or consume at home	26%	8%	64%	3%
How to use the earnings from the sales of the crops	27%	10%	28%	35%

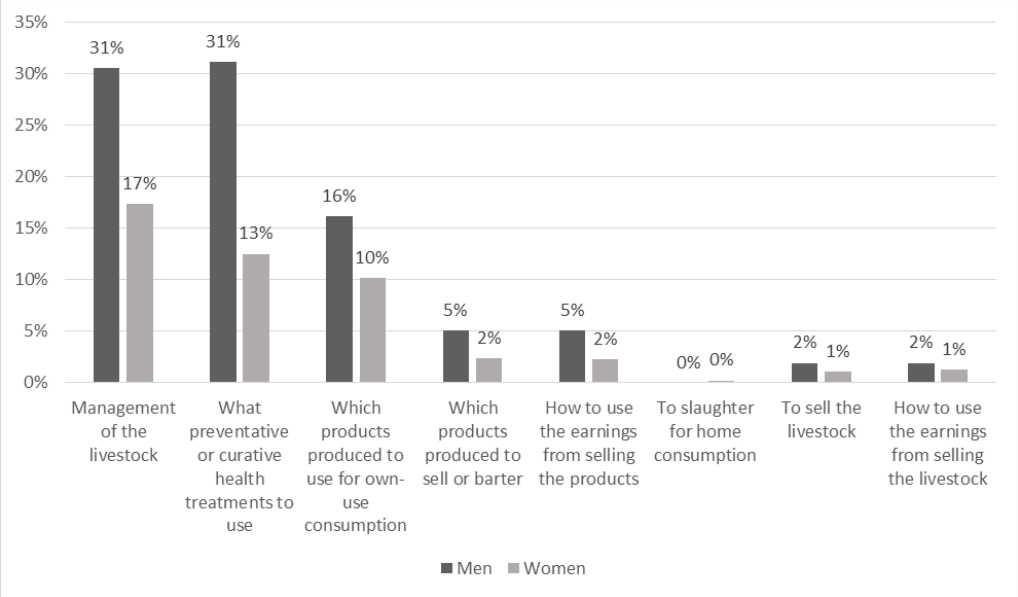
Livestock: Cattle

Men are more likely than women to be the managers and primary decision-makers with regards to cattle (Figure 3). In 31 percent of holdings, men (either exclusively or jointly with women) and 17 percent of holdings, women (either exclusively or jointly with men) managed the cattle. In 31 percent of holdings,

men (either exclusively or jointly with women) and 13 percent of holdings, women (either exclusively or jointly with men) made the decisions about what

preventative or curative health treatments to use. In only 20 percent of the holdings, decisions were made about which cattle-derived products (i.e. manure for fertilizer or fuel, milk) to use for own-use consumption, and men (either exclusively or jointly with men) were more likely than women to make the decision. For the remaining questions, a large majority of holdings did not make decisions specific to those activities during the reference period.[12]

Figure 3. Primary decision-makers of cattle



Of the 38 percent of holdings with cattle, the majority are male-headed holdings (which are primarily dual-headed households) where the management and majority of decisions with regard to cattle are made exclusively by men (Table 6). Of the few female-headed holdings with cattle, women are more likely than men to manage and make the majority of decisions with regard to cattle exclusively (Table 5).

[12] Only seven percent of the holdings decided which products to sell and sold products produced from cattle. Only one household slaughtered cattle for home consumption in a female-headed holding. Less than two percent of holdings sold cattle in the reference period.

Table 4. Primary decision-makers of cattle across all holdings

	Men exclusively	Women exclusively	Both men and women	Decision not made
Management of the livestock	20%	7%	10%	62%
What preventative or curative health treatments to use	25%	6%	6%	62%
Which products produced to use for own-use consumption	10%	4%	6%	80%
Which products produced to sell or barter	4%	1%	1%	93%
How to use the earnings from selling the products	4%	1%	1%	93%
To slaughter for home consumption	0%	0%	0%	100%
To sell the livestock	1%	0%	1%	98%
How to use the earnings from selling the livestock	1%	0%	1%	98%

Table 5. Primary decision-makers of cattle in female-headed holdings

	Men exclusively	Women exclusively	Both men and women	Decision not made
Management of the livestock	7%	13%	6%	74%
What preventative or curative health treatments to use	6%	16%	4%	74%
Which products produced to use for own-use consumption	0%	9%	1%	90%
Which products produced to sell or barter	0%	4%	1%	94%
How to use the earnings from selling the products	0%	4%	1%	94%
To slaughter for home consumption	0%	1%	0%	99%
To sell the livestock	1%	1%	0%	99%
How to use the earnings from selling the livestock	1%	1%	0%	99%

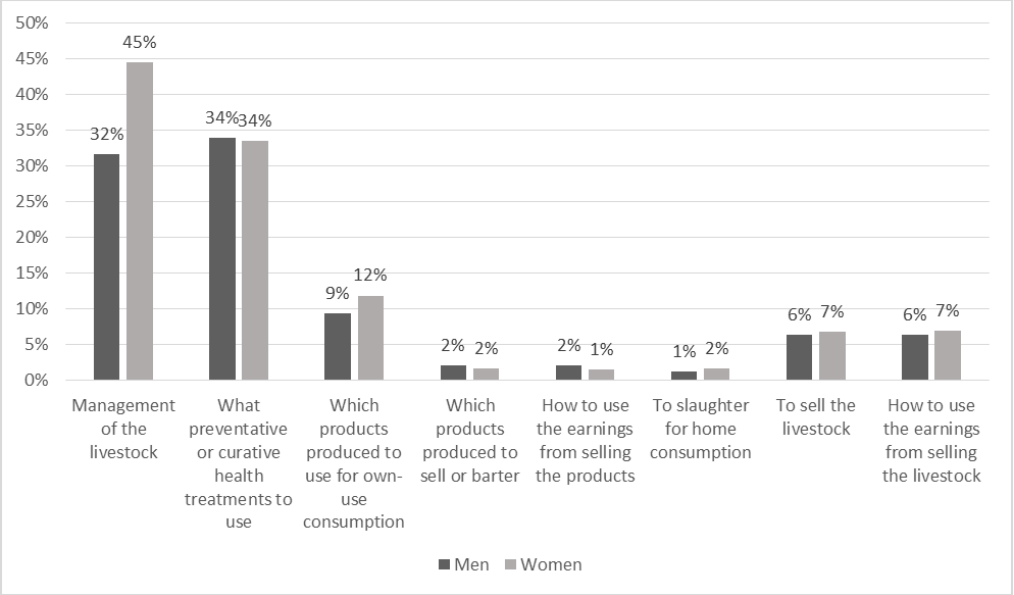
Table 6. Primary decision-makers of cattle in male-headed holdings

	Men exclusively	Women exclusively	Both men and women	Decision not made
Management of the livestock	26%	4%	12%	58%
What preventative or curative health treatments to use	33%	3%	7%	58%
Which products produced to use for own-use consumption	14%	2%	8%	76%
Which products produced to sell or barter	6%	0%	1%	93%
How to use the earnings from selling the products	6%	0%	1%	93%
To slaughter for home consumption	0%	0%	0%	100%
To sell the livestock	1%	0%	1%	97%
How to use the earnings from selling the livestock	1%	0%	1%	97%

Small livestock

On 45 percent of the holdings, women (either exclusively or jointly with men) are more likely than men (either exclusively or jointly with women) to manage small livestock. However, for the rest of the decisions, men and women are about equally likely to be primary decision-makers (either exclusively or jointly) (Figure 4).

Figure 4. Primary decision-makers of small livestock



When the results are disaggregated by the sex of the holder, on female-headed holdings (which are primarily single-headed households), women are more likely to be the managers of small livestock and to be the primary decision-makers across all activities (Table 8). Whereas on male-headed holdings (which are primarily dual-headed households), small livestock are more likely to be managed by men and women jointly (Table 9). Men exclusively, however, are more likely make the decisions about what preventative or curative health treatments to use. Men are also slightly more likely to be primary decision-makers with regards to which products produced from the livestock to use for own consumption on male-headed holdings. Less than three percent of holdings sold products produced from the livestock and decided how to use the earnings and even fewer holdings slaughtered livestock for home consumption. Ten percent of holdings sold small livestock, and men in male-headed holdings are slightly more likely than women to be primary decision-makers in whether to sell the animal and how to use the earnings from selling the livestock.

Table 7. Primary decision-makers of small livestock across all holdings

	Men exclusively	Women exclusively	Both men and women	Decision not made
Management of the livestock	11%	24%	21%	45%
What preventative or curative health treatments to use	22%	21%	12%	45%
Which products produced to use for own-use consumption	5%	7%	5%	83%
Which products produced to sell or barter	1%	1%	1%	97%
How to use the earnings from selling the products	1%	1%	1%	97%
To slaughter for home consumption	0%	1%	1%	98%
To sell the livestock	3%	4%	3%	90%
How to use the earnings from selling the livestock	3%	4%	3%	90%

Table 8. Primary decision-makers of small livestock in female-headed holdings

	Men exclusively	Women exclusively	Both men and women	Decision not made
Management of the livestock	4%	37%	11%	48%
What preventative or curative health treatments to use	4%	43%	5%	48%
Which products produced to use for own-use consumption	1%	14%	1%	84%
Which products produced to sell or barter	0%	3%	0%	97%
How to use the earnings from selling the products	0%	3%	0%	97%
To slaughter for home consumption	0%	2%	0%	98%
To sell the livestock	1%	7%	1%	90%
How to use the earnings from selling the livestock	0%	8%	1%	90%

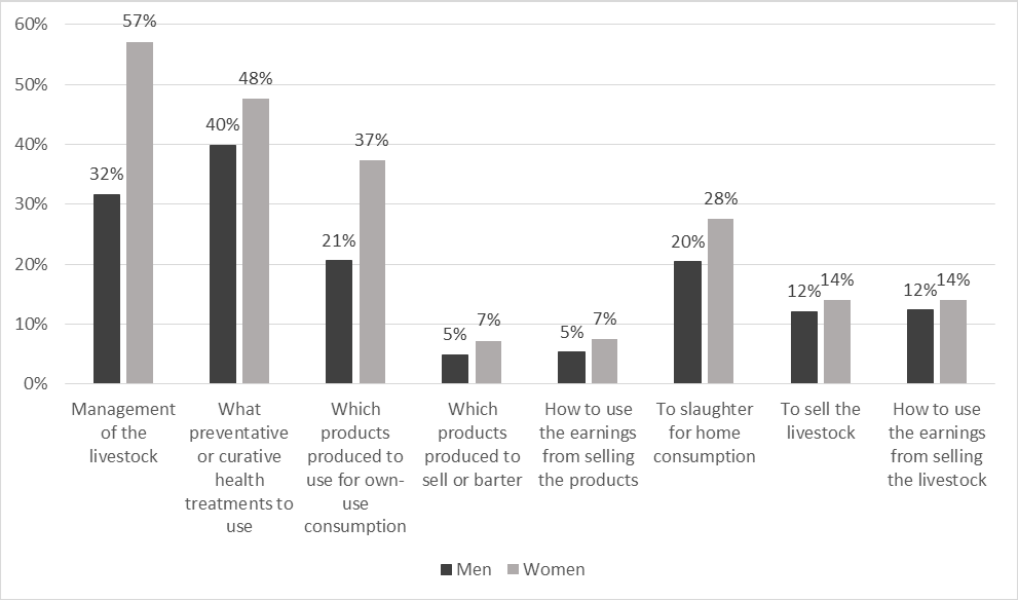
Table 9. Primary decision-makers of small livestock in male-headed holdings

	Men exclusively	Women exclusively	Both men and women	Decision not made
Management of the livestock	14%	18%	25%	43%
What preventative or curative health treatments to use	29%	13%	15%	43%
Which products produced to use for own-use consumption	6%	4%	6%	83%
Which products produced to sell or barter	2%	0%	1%	97%
How to use the earnings from selling the products	2%	0%	1%	97%
To slaughter for home consumption	1%	0%	1%	98%
To sell the livestock	4%	2%	4%	90%
How to use the earnings from selling the livestock	4%	2%	4%	99%

Poultry

Women are more likely than men to manage and be the primary decision-maker across all activities with regards to poultry (Figure 5).

Figure 5. Primary decision-makers of poultry



When the results are disaggregated by the sex of the holder, in both male and female-headed holdings, poultry is more likely to be managed by women exclusively rather than by both men and women or by men exclusively. For all the other decision-making activities, in female-headed holdings (which are primarily single-headed households), women are also more likely to be the primary decision-makers exclusively. However, in male-headed holdings (which are dual-headed households), the primary decision-makers vary by activity. In a greater number of male-headed holdings, men exclusively make the decisions about what preventative or curative health treatments to use on poultry than men or women making the decision jointly or women making the decision exclusively. Women are more likely to make the decision exclusively to consume products produced from the poultry (i.e. eggs). Few holdings sold the products produced in the reference period, of those holdings that did, men (either exclusively or jointly with women) are slightly more likely to be the primary decision-maker in the decision to sell and what do to with the earnings than women (either exclusively or jointly with men). The decision to slaughter for home consumption, sell the animal, and around what to do with the earnings from selling the animal are more likely to be joint activities in male-headed holdings.

Table 10. Primary decision-makers of poultry across all holdings

	Men exclusively	Women exclusively	Both men and women	Decision not made
Management of the livestock	13%	38%	19%	30%
What preventative or curative health treatments to use	22%	30%	18%	30%
Which products produced to use for own-use consumption	8%	25%	12%	54%
Which products produced to sell or barter	3%	5%	2%	90%
How to use the earnings from selling the products	3%	5%	3%	90%
To slaughter for home consumption	9%	16%	11%	63%
To sell the livestock	5%	7%	7%	81%
How to use the earnings from selling the livestock	5%	7%	7%	81%

Table 11. Primary decision-makers of poultry in female-headed holdings

	Men exclusively	Women exclusively	Both men and women	Decision not made
Management of the livestock	4%	54%	9%	33%
What preventative or curative health treatments to use	3%	59%	5%	33%
Which products produced to use for own-use consumption	1%	33%	5%	61%
Which products produced to sell or barter	1%	14%	1%	84%
How to use the earnings from selling the products	1%	13%	1%	84%
To slaughter for home consumption	3%	27%	4%	66%
To sell the livestock	1%	14%	1%	84%
How to use the earnings from selling the livestock	0%	14%	2%	84%

Table 12. Primary decision-makers of poultry in male-headed holdings

	Men exclusively	Women exclusively	Both men and women	Decision not made
Management of the livestock	16%	32%	23%	29%
What preventative or curative health treatments to use	30%	18%	23%	29%
Which products produced to use for own-use consumption	11%	22%	15%	51%
Which products produced to sell or barter	4%	2%	2%	92%
How to use the earnings from selling the products	4%	1%	3%	92%
To slaughter for home consumption	11%	12%	15%	63%
To sell the livestock	7%	4%	9%	79%
How to use the earnings from selling the livestock	7%	4%	9%	79%

Associations between the decision-making questions and recommendations

This next section explores the associations between the decision-making questions. In the three districts in Uganda, the data suggests who manages cropping activities and the livestock is highly associated with the primary decision-makers in most other activities (see Appendix 1 for two-way tables and associations). This is similar to the findings in Slavchevska et al. (2016) for Uganda with regard to the association between management and economic control of agricultural production.[13] Slavchevska et al. (2016) explore the relationships between land rights and decision-making using the most recent waves of the Living Standards Measurement Surveys-Integrated Surveys on Agriculture (LSMS-ISA) for six Saharan African countries. Based on the 2010-2011 Uganda National Panel Survey, in the majority of plots, the managers of the plots also controlled the output. This may be country specify, however. For other countries in the same study, this relationship does not hold. For example, in Ethiopia, Tanzania and Uganda, the association between joint management and joint economic control is high, but in Nigeria and Malawi joint management of cropping activities is less likely to lead to joint economic control over the harvest. Instead, men alone are more likely control the output (Slavchevska 2016). The LSMS-ISA surveys do not ask about other decision-making activities. It is likely, however, the relationships between who manages

[13] Slavchevska, V., De la O Campos, A.P., Brunelli, C., and Doss, C. 2016. Beyond ownership: Tracking progress on women's land rights in Sub-Saharan Africa. Working Paper No. 15. Roma: Global Strategy.

and who makes the decisions around other activities, beyond economic control, also varies by the countries within the study.

To the author's knowledge, few other studies explore the associations between different types of decision-making activities in agricultural. While not specifically exploring associations between decision-making in agricultural production, Twyman et al. (2015) find that joint decision-making tends to be the principal method for making decisions about what to cultivate, what inputs to use, how much of the output to sell, and how to use the earnings in partnered households that own land in Ecuador.[14] In a study focused on women land owners in Ghana, Ecuador, and Karnataka, India, women's engagement in agricultural decisions in terms of what to cultivate, what to sell, and how to use the income differs across activity in Karnataka, India, and less so in Ecuador and Ghana (Deere et al. 2013).[15] The studies suggest that the association between management and other decision-making activities varies by context. It is ideal, therefore, for countries to initially incorporate all fourteen decision-making questions.

However, if including all 14 decision-making activities is not feasible, a question around who manages agricultural production by plot or by crop and a question on who manages the livestock by type of livestock are particularly important in include at a minimum from a gender perspective:

- "*Who made the decisions concerning which crops to be planted, which inputs—such as purchased or home-produced fertilizers, pesticides, herbicides—to use and the timing of cropping activities on [the plot] since the beginning of the first agricultural season?"*

- *"Who manages [the livestock]?"*

Which additional questions to include of the other decision-makings questions depends on what is appropriate by country and the research questions of interest. Knowing who manages agricultural production at the plot or crop level is useful for studies that explore gender differences in agricultural productivity. Autonomy over financing of the cropping activities is also an important part of

[14] Twyman, J., Useche, P. and Deere, C.D., 2015. Gendered perceptions of land ownership and agricultural decision-making in Ecuador: Who are the farm managers? *Land Economics*, *91*(3), pp.479-500.

[15] Deere, C.D., Boakye-Yiadom, L., Doss, C., Oduro, A.D., Swaminathan, H., Twyman, J. and Suchitra, J.Y., 2013. Women's land ownership and participation in agricultural decision-making: evidence from Ecuador, Ghana and Karnataka, India. *Bangalore, India: Centre for Public Policy, Indian Institute of Management*.

management.[16] Similarly, who makes decisions regarding the health of the livestock is important part of the management of the livestock.[17]

Questions that capture the autonomy over the output and economic benefits from the land and livestock are useful in understanding intra-household dynamics agricultural production particularly in terms of households' food security and nutrition outcomes. The Uganda field test data suggests that who made decisions around the use of the use is highly correlated with who made the decisions about how to use the earns if the output was sold and thus could be combine to one questions about who controls or makes decisions about the output (Appendix 1). Additional research is needed to understand whether this is the case across countries.

Finally, Chapter 2 in the GSARS *Guidelines for collecting data for sex-disaggregated and gender-specific indicators in national agricultural surveys* recommends a set of indicators to capture land tenure as well as ownership and rights over the land. Autonomy over the use of the land are included in those rights and are associated with tenure security and the mechanisms in which the land is acquired.[18] Given that these mechanisms are often gendered, land investment and land use decisions-making questions could help further tease out the gender dimensions of rights over the land. These can be included at the parcel or plot level, depending on the structure of the agricultural survey.

Do the decision-making statistics at the holding level depend on whom the questions were asked?

The last analysis tests whether the response by proxy rather than a self-reported response has an effect on the estimates from land and cropping decision-making questions. Specifically, it compares what respondents one and two self-declare in terms of their involvement in each decision-making activity with what the other respondent (a proxy respondent) reports is his or her involvement. The assumption is that self-declared responses are the most accurate. However, administering self-reported decision-making questions is

[16] While associated with management of agricultural production, the Uganda field test suggests the financing of the cropping activities is more likely to be done exclusively by men than by women or jointly, while management is most likely to be done jointly in the field test area (Appendix 1).

[17] The Uganda field test suggests decisions regarding the health of the livestock is also more likely to be made exclusively by men than by women or jointly even when management is a joint activity in the field test area (Appendix 1).

[18] Indeed, permanent investments in the Uganda field test were only made on land with at least some level of tenure security, such as land acquired through inheritance, purchased, allocated by a family member, received as a gift or received as part of the a bride price.

more burdensome and costly than asking a single individual about decision-making for all individuals in the household.

The analysis is limited to only those households with both first and second respondents for a total of 318 households and 636 individuals with one male respondent and one female respondent. The analysis is done at the holding level, which means it aggregates across crops, plots, and parcels for the entire holding in the reference period. That is, if the individual self-reported that she made the decision about what to do with the maize harvest—whether to sell, store, give away, or consume at home - the response is coded that she was a decision-maker with regards to what to do with the crops, even if she did not make this decision for other crops. This is compared to what the other individual reported about her involvement about what to do with the harvest.

Table 13 presents the findings at the holding level disaggregated by sex for each decision-making question. The difference in means is tested using a t-test. While there are differences in the estimates, none are statistically significant. The findings suggest that the response by proxy, primarily the spouse if he or she is involved in agriculture in this case, rather than self-reported respondents has no statistically significant effect on the estimates when the estimates are at the holding level for our sample. That means that for estimates on the gender incidence of decision-making made at the holding level, the person designated as the holder in Uganda provides reasonably unbiased estimates of whom in the household makes decisions on the holding.

To the author's knowledge, no other studies explore respondent selection for decision-making in agriculture on the holding. The results, however, differ from a study on labour statistics in Tanzania were the proxy was found to underreport male employment rates; although, the results were reduced when the proxy was a spouse (Bardasi et al. 2011).[19] The results also differ from the MEXA project, which finds that the standard approach of asking a single respondent (usually the household head or the 'most knowledgeable') about who owns the household's assets overestimates the extent of the gender asset gap compared to when each household member reports on his or her own ownership in Uganda (Kilic and Moylan 2016).[20] Additional analysis and further research is needed to draw conclusive conclusions, particularly for incidence of decision-making at the crop or plot level. Future analyses,

[19] Bardasi, E., Beegle, K., Dillon, A. and Serneels, P. 2011. Do labor statistics depend on how and to whom the questions are asked? Results from a survey experiment in Tanzania. *The World Bank Economic Review*, *25*(3), pp.418-447.

[20] Kilic, T. and Moylan, H. 2016. Methodological experiment on measuring asset ownership from a gender perspective (MEXA): technical report. Washington, DC: World Bank.

independent from the GSARS, will explore respondent selection further using the Uganda field test data.

Table 13. Self-reported and proxy responses by sex

		Self-reported	Proxy	Difference	Statistical significant
Primary decision-maker with regard to the permanent investments on the land in last two years (%)					
	Male n = 318	17.3	17.6	-0.3	No
	Female n = 318	7.2	8.5	-1.3	No
Primary decision-maker with regard to the use of the land: whether to cultivate, rent, give out or leave fallow (%)					
	Male n = 318	84.9	88.7	-3.8	No
	Female n = 318	75.8	71.7	4.1	No
Primary decision-maker concerning which crops to be planted, which inputs to use, and the timing of the cropping activities (%)					
	Male n = 318	86.2	88.4	-2.2	No
	Female n = 318	81.4	78.9	2.5	No
Primary decision-maker concerning how to pay for or finance the cropping activities (%)					
	Male n = 318	86.5	87.7	-1.3	No
	Female n = 318	72.6	69.2	3.5	No
Primary decision-maker with regard to what to do with the crops: whether to sell, store, give away, or consume at home (%)					
	Male n = 318	82.1	82.1	0.0	No
	Female n = 318	88.1	84.0	4.1	No
Primary decision-maker with regard to how to use the earnings from the sales of the crops (%)					
	Male n = 318	49.1	55.3	-6.3	No
	Female n = 318	48.7	45.0	3.8	No

5

Conclusions

Women's involvement in the operation and managerial decisions of the holding are underestimated when only the sex distribution of the holder is presented. Including decision-making questions around land, cropping, and livestock activities into farm surveys is important in better understanding gender dynamics in production on agricultural household holdings. Knowing who makes the agricultural decisions around cropping is useful for studies that explore the gender dimensions and potential pathways toward increased household agricultural productivity. Similarly, since livestock output can also be a large part of household agricultural productivity and income in many agricultural households, understanding who makes the decisions around livestock use and production is also useful when thinking about pathways toward increased household agricultural productivity and poverty alleviation.

In the Uganda field test, six decision-making questions were asked with regard to land investment in the last two years and land use and cropping activities since the beginning of the first agricultural season of the year (from January 2016 to September 2016) and eight additional decision-making questions were asked with regard to the management and decisions made across types of livestock. At a minimum including a question about who manages agricultural production by plot or by crop and a question on who manages the livestock by type of livestock within agricultural surveys is important from a gender perspective. Which additional decision-making questions to include of the other decision-makings questions depends on the context of the country and the research questions of interest.

In the Uganda field test, the decision-making statistics around land and cropping activities at the holding level do not depend on whom the questions were asked. This finding differs from similar studies. Future analyses will explore respondent selection further using the same data.

6

Appendix

Table 1. Associations between management and who made decisions about other cropping activities by plot

	Which crops to be planted, which inputs to use, and the timing of the cropping activities				
		Only male	Only female	Only Joint	Total
How to pay for or finance the cropping activities	Only male	347	30	136	513
	Only female	9	416	31	456
	Only joint	23	41	388	452
	Total	379	487	555	1,421
	Association (Cramér's V)		0.7356*		
What to do with the crops: whether to sell, store, give away, or consume at home	Only male	239	4	22	265
	Only female	24	396	44	464
	Only joint	69	36	428	533
	Total	332	436	494	1,262
	Association (Cramér's V)		0.7644*		
How to use the earnings from the sales of the crops	Only male	149	1	32	182
	Only female	16	147	24	187
	Only joint	17.0	11.0	137.0	165.0
	Total	182	159	193	534
	Association (Cramér's V)		0.7257*		

* Indicates statistical significance at 0.01.

Table 2. Associations between the management of cattle and who made decisions on other activities

	Management				
		Only male	Only female	Only Joint	Total
What preventative or curative health treatments to use	Only male	87	5	26	118
	Only female	1	25	4	30
	Only joint	7	3	19	29
	Total	95	33	49	177
	Association (Cramér's V)		0.6010*		
Which products produced to use for own-use consumption	Only male	43	0	4	47
	Only female	5	11	3	19
	Only joint	11	1	17	29
	Total	59	12	24	95
	Association (Cramér's V)		0.6093*		

* Indicates statistical significance at 0.01.

Table 3. Associations between the management of small livestock and who made decisions on other activities

	Management				
		Only male	Only female	Only Joint	Total
What preventative or curative health treatments to use	Only male	47	20	36	103
	Only female	4	83	14	101
	Only joint	0	9	48	57
	Total	51	112	98	261
	Association (Cramér's V)		0.5660*		

* Indicates statistical significance at 0.01.

Table 3. Associations between the management of small livestock and who made decisions on other activities (continued)

	Management			
	Only male	Only female	Only Joint	Total
Which products produced to use for own-use consumption	Only male 15	3	4	22
	Only female 1	31	2	34
	Only joint 1	1	20	22
	Total 17	35	26	78
	Association (Cramér's V)	0.7610*		
To sell the livestock	Only male 6	4	5	15
	Only female 1	12	4	17
	Only joint 0	2	13	15
	Total 7	18	22	47
	Association (Cramér's V)	0.5131*		
How to use the earnings from the sale of the livestock	Only male 6	4	4	14
	Only female 1	12	4	17
	Only joint 0	2	14	16
	Total 7	18	22	47
	Association (Cramér's V)	0.5363*		

* Indicates statistical significance at 0.01.

Table 4. Associations between the management of poultry and who made decisions on other activities

	Management				
		Only male	Only female	Only Joint	Total
What preventative or curative health treatments to use	Only male	51	32	22	105
	Only female	7	122	12	141
	Only joint	2	26	55	83
	Total	60	180	89	329
	Association (Cramér's V)		0.5376*		
Which products produced to use for own-use consumption	Only male	30	6	4	40
	Only female	4	95	20	119
	Only joint	3	16	38	57
	Total	37	117	62	216
	Association (Cramér's V)		0.6243*		
Which products to sell or trade produced from the livestock	Only male	7	3	4	14
	Only female	1	20	4	25
	Only joint	0	5	4	9
	Total	8	28	12	48
	Association (Cramér's V)		0.4652*		

* Indicates statistical significance at 0.01.

Table 4. Associations between the management of poultry and who made decisions on other activities (continued)

	Management			
	Only male	Only female	Only Joint	Total
How to use the earnings from selling the products	Only male 8	3	2	13
	Only female 0	19	4	23
	Only joint 0	6	6	12
	Total 8	28	12	48
	Association (Cramér's V)	0.5663*		
To slaughter the animals for home consumption	Only male 51	32	22	105
	Only female 7	122	12	141
	Only joint 2	26	55	83
	Total 60	180	89	329
	Association (Cramér's V)	0.5068*		
To sell the livestock	Only male 30	6	4	40
	Only female 4	95	20	119
	Only joint 3	16	38	57
	Total 37	117	62	216
	Association (Cramér's V)	0.3786*		

* Indicates statistical significance at 0.01.

Table 4. Association between the management of poultry and who made decisions on other activities (continued)

	Management			
	Only male	Only female	Only Joint	Total
How to use the earnings from the sale of the livestock	Only male 7	3	4	14
	Only female 1	20	4	25
	Only joint 0	5	4	9
	Total 8	28	12	48
	Association (Cramér's V)	0.3245*		

* Indicates statistical significance at 0.01.

Table 5. Association between control over the output and who made decisions on how to use the earnings from the sales of the crops by plot

	What to do with the crops: whether to sell, store, give away, or consume at home			
	Only male	Only female	Only Joint	Total
How to use the earnings from the sales of the crops	Only male	144	1	37	182
	Only female	0	165	22	187
	Only joint	4	6	155	165
	Total	148	172	214	534
	Association (Cramér's V)		0.8203*		

* Indicates statistical significance at 0.01.

Table 6. Association between decision to sell the animal and who made decisions on how to use the earnings from the sales for small livestock

	To sell the livestock			
	Only male	Only female	Only Joint	Total
How to use the earnings from selling the livestock	Only male	13	1	0	14
	Only female	0	16	1	17
	Only joint	2	0	14	16
	Total	15	17	15	47
	Association (Cramér's V)		0.8752*		

* Indicates statistical significance at 0.01.

Table 7. Association between control over products produced and who made decisions on how to use the earnings from the sales of products produced from poultry

	Which products produced to sell or barter			
	Only male	Only female	Only Joint	Total
How to use the earnings from selling the products	Only male	12	1	0	13
	Only female	0	23	0	23
	Only joint	2	1	9	12
	Total	14	25	9	48
	Association (Cramér's V)		0.8635*		

* Indicates statistical significance at 0.01.

Table 8. Association between decision to sell the animal and who made decisions on how to use the earnings from the sales for poultry

	To sell the livestock				
		Only male	Only female	Only Joint	Total
How to use the earnings from selling the livestock	Only male	22	0	3	25
	Only female	0	33	0	33
	Only joint	3	1	29	33
	Total	25	34	32	91
	Association (Cramér's V)		0.8844*		

* Indicates statistical significance at 0.01.