

Working paper

**An Analysis of Intra-household Spousal Decision-Making Intensities on
Agricultural Income Use in Kenya: A Multinomial Logit Approach**

Jessica Osanya¹, Rahma I. Adam¹, David J. Otieno², Moti Jaleta³, and Rose Nyikal²

¹International Maize and Wheat Improvement Center (CIMMYT), c/o The World Agroforestry Center, ICRAF House, United Nations Avenue, Gigiri, P.O. Box 1041, Nairobi 0062, Kenya
Email addresses: jessicaosanya@gmail.com and R.Adam@cgiar.org

²University of Nairobi, Department of Agricultural Economics, P.O. Box 29053-00625, Nairobi, Kenya. Email addresses: jakinda1@yahoo.com and nyikalra@gmail.com

³International Maize and Wheat Improvement Center (CIMMYT), P.O. Box, 5689, Addis Ababa, Ethiopia. Email address: m.jaleta@cgiar.org

Abstract

This paper analyzes the socio-economic characteristics of households that affect husbands' and wives' decision-making intensity on the use of income derived from crop and livestock sale. Using a random sample of 276 small scale farming households from five counties, the paper applies a multinomial logit model to assess the determinants of decision-making intensity. Results show that husbands dominate most of the agricultural decision-making, while wives mostly decide on daily household expenditures. Husbands' education level and region had a positive effect on joint decision-making on income use from crop sale, while land size was found to skew decision-making towards the husband. Wives' education level and husband's age were found to skew decision-making towards the wife. Organizing and implementing agricultural training and educative forums for men and women can help better their education levels which in turn improves the likelihood of joint as well as more input from women in household decision-making.

Key words: *Gender, intra-household, spouses, decision-making, income, Kenya*

1. Introduction

Gender inequality continues to exist in many parts of Sub-Saharan Africa, with men and women facing unequal access to productive resources and opportunities to enable them to improve their agricultural productivity (Doss, 2011a). Despite their immense contributions to agriculture, women continue to face challenges in accessing resources such as land, credit and extension services, which are key for agricultural production causing them to have lower productivity compared to men (Seebens, 2011; Fischer and Qaim, 2012). Women are constrained mainly because of the existence of predominantly male-led African societies, hence social and cultural norms that discriminate against them, as well as other factors such as lower education levels (Colfer *et al.*, 2015; Twyman *et al.*, 2015).

A number of studies have found evidence of gender disparities with regards to access to agricultural resources in Africa. In most cases, compared to female headed households, male headed households have larger land holdings, better access to equipment such as oxen, donkey carts and water pumps (Gebreselassie, *et al.*, 2013), and have better formal education which enables them to have better access to innovative production techniques (Ajewole *et al.*, 2015). Moreover, while joint ownership of assets between a husband and a wife was common in many of the households in several countries, men have stronger rights to the assets, and could, for instance in eastern Africa, sell a piece of land without consulting their spouses (Johnson *et al.*, 2016). The existence of men's individual ownership and control over household assets gives the privilege to them to have a greater decision-making power over the use of income derived from those assets (Kikulwe *et al.*, 2018).

Services such as credit, extension, membership in agricultural development groups, access to agricultural training forums and off-farm income are critical for agricultural production. Some studies have assessed men and women's access to these services, with varying results. For instance, findings by Muriithi, (2015) showed that women were discriminated against with regards to joining farmer groups and accessing horticultural training and extension services in Central Kenya. According to Ragasa, (2012), women are less likely to participate in agricultural training and extension activities due to their greater time burdens as well as cultural factors. As a result, they miss out on accessing information and skills which could be used to improve their agricultural productivity. Van Eerdewijk and Danielsen (2015) observed in Ethiopia that membership in agricultural development groups was mainly reserved for the household members who sold produce or purchased farm inputs, which was usually the men. The same study in Kenya, however, found that, the situation was different with majority of women reporting to be members of groups. Group membership enables members to access services such as subsidized credit, inputs and collective marketing, hence it is beneficial to the farmers. Women are

generally constrained when it comes to accessing credit for agricultural use because they do not own most of the household assets and engage in limited economic activities (Fletschner and Kenney, 2011). Some studies have found the reverse to be true such as Anang, *et al.*, (2015), which found that women were more likely to receive credit in Ghana because they were observed to be more trust-worthy and had higher repayment rates than men.

In addition to experiencing challenges in accessing productive resources and services, women also face constraints with regards to decision-making within their households (Sikod, 2007). Decision-making within households depends on the individuals' bargaining power. Early studies on intra-household dynamics conceptualized the household as a single unit, hence applying a unitary approach in analyses of its activities (Udry, 1996; Doss, 2011b). Under this approach, the household was viewed as possessing a single set of preferences and thus members pooled resources for a common maximum household utility, and there was a single person who made decisions for the benefit of the entire household (Quisumbing and Smith, 2007). This approach was later critiqued as household members have been found to have heterogeneous preferences regarding resource allocation and use. These individual preferences are then aggregated through a bargaining process, and the person with the greater bargaining power usually has more say in household decisions (Quisumbing, 2003; Van Aelst, 2014; Lecoutere and Jassogne, 2016).

Apart from cultural factors such as social norms and institutions, the bargaining power of individuals in the household is also influenced by ownership and control of assets (resource endowment), education levels as well as earned income or employment status (Doss, 2011b; Colfer *et al.*, 2015). This in turn influences their roles in decision-making on resources and agricultural production. Findings from Anderson *et al.*, (2017), indicated that women's age and education level was associated with greater authority over farm decisions and cash in Tanzania. As women have limited access to and control over productive assets such as land and farming

equipment as well as services such as credit and extension, their roles in household decision-making over the same are limited (Seebens, 2011).

The importance of strengthening women's decision-making power is increasingly becoming recognized by international organizations and governments. This is because with greater decision-making power on resource use, women have been found to spend more on food and health and as a result, such households experience better food security, nutritional and education levels (Ambler, *et al.*, 2017; Anderson *et al.* 2017). This has been evidenced, for instance by a study by Sneyers and Vandeplas (2013), which found a positive relationship between women's involvement in farm decision-making and dairy productivity in India.

Some studies have analyzed decision-making patterns in agriculture in Sub-Saharan Africa, such as Meijer *et al.*, (2015), which found that joint decision-making between husbands and wives was common for activities such as crops to grow, inputs to use and livestock rearing, in Malawi. However, decisions on tree planting and management were mostly undertaken by the men. Ajewole *et al.*, (2015), found that more than 80 percent of men reported undertaking decisions on rice production and farm income alone, without consultation of their spouses in Nigeria. In Kenya, studies include Van Eerdewijk and Danielsen, (2015), which found that women were involved in maize production decisions on crops to grow, input use and output utilization, through being consulted or informed. Men, however, had greater decision-making power over major resources such as land. Ngigi *et al.*, (2016), found that men were the sole decision-makers on land use in most of the households sampled in eastern and western regions of Kenya. These findings collectively indicate that there is a gender gap with regards to intra-household decision-making with men having greater decision-making power overall, and even in cases where there is joint decision-making, it is not equal as the wives often have little input.

Studies on intra-household gender decision-making in Kenya still remain limited. Moreover, the assessment of the determinants of the contribution to decision-making intensity with regards to

income generated has not received a significant amount of attention in empirical work. This study intends to fill this gap in literature, as it will provide a greater understanding of the potential contribution of men and women to agricultural production as well as inform policy on gendered approaches in agricultural development.

2. Data and Methodology

2.1. Data

The study used data which was collected in 2013 by the International Maize and Wheat Improvement Center (CIMMYT), in collaboration with the Kenya Agricultural and Livestock Research Organization (KALRO). The survey covered five counties: Bungoma and Siaya in Western Kenya and Embu, Meru and Tharaka Nithi in Eastern Kenya. These counties were selected due to the diversity of their agro-ecological conditions and diversities in their farming systems. The data were collected through face to face in-depth interviews with the respondents and was done in two stages. The first stage involved interviewing the household head on general household characteristics, for instance, housing composition and crop yields. The second stage of interviews targeted both the household head and spouse (where available), who were interviewed separately but concurrently. This sought to collect gender-disaggregated data on the socio-economic characteristics of the individuals such as group membership, access to credit, extension services, household savings, social networks and roles in decision making in the household. Since this study was characterizing intra-household decision-making of husbands and wives, the households where the head was single, widowed, divorced or separated, were excluded. The resultant sample size was 276 households. About 50 percent of the households were from each region (Western and Eastern).

2.2. Empirical model

Within households, husbands and wives make decisions on income use either jointly or separately depending on the negotiation power they have in the family. Joint decision-making does not necessarily equate to equality as there can be one party who has more input than the other (Bjornlund, 2019).

This study assessed decision-making on income derived from the sale of food crops, cash crops and livestock. The husband and wife in each household were asked separately to answer the question ‘Did you participate in decision on income use from food crop sale, cash crop sale or livestock sale?’ They were further asked about the intensity of decision-making from the question: ‘How much input did you have in making the decision?’ This was recorded on a Likert Scale, where 1 represented no input and 5 represented input in all decisions. The decision-making intensities were then categorized into three – joint decision-making, decision-making skewed to the wife (where the wife had greater input) and decision-making skewed to the husband (where the husband had greater input). A multinomial logit model was used to analyze how the socio-economic characteristics of the households affect the decision-making intensity.

The multinomial logit model is an extension of the binary logit model, which is used when the dependent variable has several categories, which are unordered (Gujarati and Porter, 2009). If the dependent variable has M categories, $M-1$ equations are estimated, with one category being used as the baseline or reference category, to which the other outcomes are compared (Williams, 2018).

The intensity of women’s decision-making (y) in a given household (i) on a specific income source (k) could take three possible outcomes (egalitarian, which is joint decision making ($y = j$), skewed to the wife ($y = w$), i.e. the wife has more inputs in decision making than the husband, and skewed to the husband ($y = h$), i.e., the husband has more inputs in making the

specific decision than the wife. The observed outcome of women's decision-making intensity in household i on income source k is given as:

$$U_{ik} = X_{ik}\beta + \varepsilon_{ik} \quad (1)$$

Where X is a vector of household specific characteristics and other socioeconomic factors affecting the bargaining power of a husband and a wife in a given household while deciding to use income from different sources of agricultural activities (in this case, $k = \text{income from food crop sale, cash crop sale, and livestock sale}$). Thus, in a given household i , the decision-making intensity on income source k could take any of the three possible intensity outcomes ($y = j, w, h$). Thus, the observed outcome, say a joint decision between a husband and a wife ($y_{ik} = j$), happens when the likelihood of j 's occurrence is greater than h , and w . That is;

$$\begin{aligned} Prob(y_{ik} = j) &= Prob\{U_{ik} = \max(U_{ijk}, U_{iwk}, U_{ihk})\} \\ &= Prob(X_{ijk}\beta + \varepsilon_{ijk} > \max(U_{iwk}, U_{ihk})) \end{aligned} \quad (2)$$

Putting the assumption that ε_{ik} are mutually independent, $0 \leq Prob(y_{ik} = j) \leq 1$, and $\sum_y Prob(y) = 1$; then, the probability that a specific decision-making intensity outcome (say, j) is observed in a given household is given as:

$$Prob(y_{ik} = j) = \frac{\exp(X_{ik}\beta_j)}{\exp(X_{ik}\beta_j) + \exp(X_{ik}\beta_w) + \exp(X_{ik}\beta_h)} \quad (3)$$

Considering the intensity of decision-making outcome skewed towards men as a reference, the probability that the intensity of decision-making outcome on the income from the k^{th} source is a joint decision of the husband and the wife (j) is given as:

$$Prob(y_{ik} = j) = \frac{\exp(X_{ik}\beta_j)}{1 + \exp(X_{ik}\beta_j) + \exp(X_{ik}\beta_w)} \quad (4a)$$

Similarly, considering the intensity of decision-making skewed towards men as a reference, the probability that the intensity of decision-making on income from the k^{th} source is skewed to the woman (wife) is given as:

$$Prob(y_{ik} = w) = \frac{\exp(X_{ik}\beta_w)}{1 + \exp(X_{ik}\beta_j) + \exp(X_{ik}\beta_w)} \quad (4b)$$

In this analysis, the explanatory variables considered were region, savings amount the household had, age of the husband, age of the wife, education level of the husband, education level of the wife, group membership of the husband and wife and land size.

3. Results and Discussion

3.1 Socio-economic characteristics of the respondents

Mean equality test of selected socio-economic characteristics of the 276 sample households with husband and wife living together are presented in Table 1. Accordingly, there is a significant difference in the education levels of husbands and wives. Most of them have attained primary education as their highest education level, with more husbands than wives having studied beyond primary level. Moreover, the proportion of wives who have no formal education is higher than the proportion of husbands. This reiterates what is already found in most of the literature on gender (see for example FAO, 2011; Muriithi, 2015), which is that women generally have lower education levels than men due to various social and cultural factors that differ across societies. This in turn limits their access to resources such as extension services, credit and even the adoption of new technologies for use in production.

More wives than husbands were found to belong to various social and agricultural development groups such as farmer groups, cooperatives, savings associations, women's groups and youth groups. This is similar to results by Van Eerdewijk and Danielsen, (2015) and Ngigi, *et al.*, (2016), who found that a majority of women interviewed compared to men belonged to various self-help groups and community-based organizations in Western and Central Kenya,

respectively. This could be due to their need to support each other in running their household matters as well as contribute to development of their communities. According to the World Bank, (2009), group membership helps to build social capital, which in turn improves sharing of information and resources and can sometimes provide sources of subsidized credit for the members. It can also help improve the bargaining capacity of members, which can lead to them to have greater voice in decision-making.

More husbands compared to their wives were found to have earned off-farm income for the household. This is plausible given that in addition to providing agricultural labour, women have many domestic responsibilities which leave them with little or no time to partake in off-farm income- generating activities (Seebens, 2011).

About 70 percent of wives in the sample households received agricultural credit compared to 64 percent of husbands. This could be perhaps due to women's higher membership in farmer groups and merry- go - rounds which makes it easier for them to access loans for use in agricultural activities.

< Table 1 here >

3.2 Amount of input contributed to various household decisions

Table 2 shows the percentage of husbands and wives in the households who contribute to most of the decisions on various farming aspects. It shows that it is mainly the husbands who have more input than the wives for most of the farm production decisions such as crops to grow, inputs to use, crop and livestock sale, livestock rearing and major household expenditures. For instance, about 61 percent of husbands reported having input in most decisions on cash crops to grow as compared to 35 percent of wives. Ajewole (2015) also found that men were the main decision makers on productive resources, plot management and household income among rice farming households in Nigeria. This result reaffirms what is already found in most of the literature, that

due to the patriarchal nature of most of the African societies, men dominate most of decision-making. This calls for the need for greater women empowerment in order to bridge the gender inequality gap.

The Pearson Chi- square values are below 0.05 indicating that there is a significant association between gender and amount of input contributed in decision-making. This is true except for non-farm business activities and own wages.

< Table 2 here >

For minor household expenditures, women contribute more input compared to men. This is to be expected considering that in African societies women are the primary custodians of home care and carry great responsibility on most domestic chores; some including planning and managing household expenditures. This is comparable to results by Colfer *et al.*, (2015), which found women to dominate decisions about household food consumption in Indonesia.

3.3 Amount of input in decision-making on income generated

Figure 1 shows the proportion of husbands and wives who contribute to most of decisions in the household on the use of income generated from various activities. While there is no significant difference between the number of men and women who contribute to most decisions regarding off-farm business activities to engage in and own wages and salaries, a higher number of men compared to women contribute to decisions on income generated from sale of food crops, cash crops as well as livestock. These results show that, within households, men have a higher decision-making power on income matters, compared to women.

< Figure 1 >

The decision-making intensities are given in Table 3. It shows that most of the decisions on income use are undertaken either jointly or with the husband having input in most decisions. In

very few instances (less than 10 percent) did the wife have input in all decisions regarding the use of income from the sale of crops and livestock.

< Table 3 here >

3.4 Factors affecting decision-making intensity

Table 4 shows the results of a multinomial logistic regression of the decision-making intensity against the socio-economic characteristics of the households.

< Table 4 here >

The regression results show that the likelihood of decision-making on the use of income from food and cash crops sale being skewed towards the wife relative to the husband is higher in the Western region of Kenya compared to Eastern region. The likelihood of joint decision-making on income from cash crop sale is also higher in Western Kenya. This could be attributed to cultural differences between the two regions.

The age of the husband increases the probability of decision-making on income from cash crop sale being skewed towards the wife. This is perhaps because the older men are more involved in other income-generating activities other than farming leaving farming to the wives.

The education level of the husband in the household has a positive effect on joint decision-making on income from sale of food and cash crops. This shows that when men are more educated they tend to involve their wives in decision-making on income use. Including women in household decision-making is important as they have been shown to better manage household resources resulting in greater overall household welfare (Quisumbing, 2014).

Larger land sizes increase the likelihood of the husbands making decisions on the use of income from the sale of food crops, cash crops and livestock. In African societies, most of the land is usually owned by men, and hence they have a greater say in its use. Bjornlund *et al.*, (2019),

found that women who had whole or partial ownership or control over land played a greater role in decision-making on its use.

The education level of the wife was found to increase the likelihood of the wife making decisions on the use of income derived from sale of cash crops. Similar results were obtained by Hagos *et al.*, (2017), where women's education level was found to have a positive effect on household decision-making in Ethiopia. When women are educated they have more opportunities for employment and self-employment and this leads to increased income hence greater decision-making power in the household (Johnson *et al.*, 2016).

4. Conclusions and Policy Implications

The purpose of this study was to characterize intra-household gender decision making patterns in Kenya and to assess the socio-economic characteristics that affect decision-making intensity on income use. The key findings from the analyses show that there is a gender gap with regards to resource access and decision-making within households. Results show that men dominate most of the household agricultural production decisions as well as decisions on household income generated. Women generally have more say in the day to day running of the household.

Household savings, education level of the household head and region were all found to have a positive influence on the contribution to household decisions on income from sale of food crops, cash crops and livestock.

These findings complement what is already found in the literature, which is that women are disadvantaged when it comes to decision making in the household, and this is mainly because the Kenyan and African society at large is male dominated. Women also have less bargaining power and hence lower decision-making authority in the household because they have limited ownership and control over productive assets, especially land, as well as lower education levels compared to men.

This shows a need to strengthen women's decision-making power in the household. This can be done through organization and implementation of agricultural training and educative forums.

This will improve their ability to access productive resources such as land and off-farm income, as these have been found to be major determinants of bargaining power and hence decision making in the household. Studies have provided evidence that increasing women's decision-making power leads to improved children's nutrition, access to education, better health and overall improved household welfare. Women's as well as the men's education levels were found to improve their decision-making power and this highlights the importance of education as an important factor in obtaining the aforementioned benefits.

In the western region, women were found to have a greater say in decision-making on income from food and cash crop sale, compared to the eastern region. This highlights the need to educate farmers on the benefits of doing away with cultural norms that limit women's access to resources. This will help improve women's decision-making power in the household.

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Tables

Table 1. Socio-economic profiles of the respondents (as reported by each respondent)

	Husbands (n=276)	Wives (n=276)	χ^2 Measure of difference	Significance level (<i>p-value</i>)
Average age (<i>years</i>)	52.0	43.7		
Average land size (<i>acres</i>)	3.9	3.9		
Average household size (<i>persons</i>)	6	6		
Average savings amount (<i>KES</i>)	17470.3	17470.3		
<i>Education level</i>			10.270	0.006**
No formal education (<i>I=Yes</i>)	3.3	6.5		
Primary level (<i>I=Yes</i>)	61.1	69.1		
Post-primary level (<i>I=Yes</i>)	35.7	24.4		
Group membership (<i>I=Yes</i>)	67.4	77.9	7.667	0.006**
Received extension (<i>I=Yes</i>)	66.9	63.6	0.667	0.414
Received credit (<i>I=Yes</i>)	64.1	70.4	0.169	0.681
Earned off-farm income(<i>I=Yes</i>)	63.8	53.8	4.664	0.036**
Saved money in past two years (<i>I=Yes</i>)	92.4	90.3	0.448	0.489

** Significant at 5% level.

Table 2: Percentage of husbands and wives in the households who contribute to most decisions

Decision	Input in most/all decisions		χ^2 Measure of difference	Significance level (<i>p-value</i>)
	(%)			
	Husbands (n=276)	Wives (n=276)		
Food crops to grow	58.6	40.6	17.661	0.000**
Cash crops to grow	60.7	34.7	23.752	0.000**
Seed to buy	57.9	40.1	15.863	0.000**
Fertilizer to buy	58.8	39.8	18.056	0.000**
Food crops sale	55.5	41.5	8.632	0.003**
Cash crops sale	54.8	33.8	13.748	0.000**
Livestock raising	60.4	41.5	23.463	0.000**
Livestock sale	62.3	41.6	14.657	0.000**
Off-farm business activity	44.5	47.1	0.177	0.674
Own wage/salary	59.8	50.0	1.850	0.174
Major household expenditures	60.8	45.5	4.289	0.038**
Minor household expenditures	45.3	55.8	7.676	0.006**

** Significant at 5% level. All decision variables are asked as Yes=1 and 0=No

Table 3: Frequencies for decision-making intensities on income use (%)

Joint decision-	Decision-making	Decision-making
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	making	skewed towards wife	skewed towards husband
Food crop sale	53.85	6.15	40.00
Cash crop sale	51.65	4.40	43.96
Livestock sale	53.40	2.91	43.69

Table 4 below shows the results of a multinomial regression of the decision-making intensity as the dependent variable against socio-economic characteristics of the households

Table 4: Multinomial logistic regression results of decision-making intensity against socio-economic characteristics of the households

	Income from food crop sale		Income from cash crop sale		Income from livestock sale	
	Joint decision-making	Skewed towards wife	Joint decision-making	Skewed towards wife	Joint decision-making	Skewed towards wife
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Region	-0.1820 (0.3033)	-1.9656** (0.6878)	-0.8337* (0.4311)	-3.5258** (1.2108)	-0.5511 (0.3517)	-0.2360 (0.9806)
Household savings amount (KES)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)
Age of husband	0.0202 (0.0300)	0.0693 (0.0540)	0.0161 (0.0411)	0.1883* (0.1112)	0.0329 (0.0316)	0.0771 (0.0738)
Education level of husband	0.8818** (0.3417)	0.8366 (0.7922)	1.0076** (0.4391)	-0.9843 (1.0728)	0.3749 (0.3608)	0.7798 (1.0300)
Group membership of husband	-0.1637 (0.3753)	-0.8105 (0.8369)	-0.0118 (0.4610)	0.1473 (1.5543)	-0.4639 (0.4246)	-0.0744 (1.3742)
Land size (acres)	-0.0518 (0.0400)	-1.2089** (0.4048)	-0.1034** (0.0476)	-0.9338* (0.5114)	-0.0956** (0.0435)	-0.1462 (0.2209)
Group membership of wife	0.6420	1.2989	0.4554	1.3886	0.5978	1.3192

	(0.3998)	(0.8953)	(0.4575)	(1.2433)	(0.4374)	(1.2082)
Age of wife	-0.0149	-0.0581	0.0126	-0.1125	-0.0223	-0.0755
	(0.0305)	(0.0542)	(0.0416)	(0.1016)	(0.0319)	(0.0770)
Education level of wife	-0.4738	0.4724	-0.8519*	2.9721**	-0.2065	-0.2825
	(0.3515)	(0.7998)	(0.4539)	(1.2734)	(0.3714)	(1.0534)
Constant	-0.0962	0.5719	0.2144	-3.5245	0.6862	-3.3789
	(0.9575)	(1.9638)	(1.1962)	(3.4226)	(0.9637)	(2.7861)

*Source: Adoption Pathways project data, 2013; Figures in parentheses are standard errors; * shows significance at 5% level while ** shows significance at 10% level*

Figures

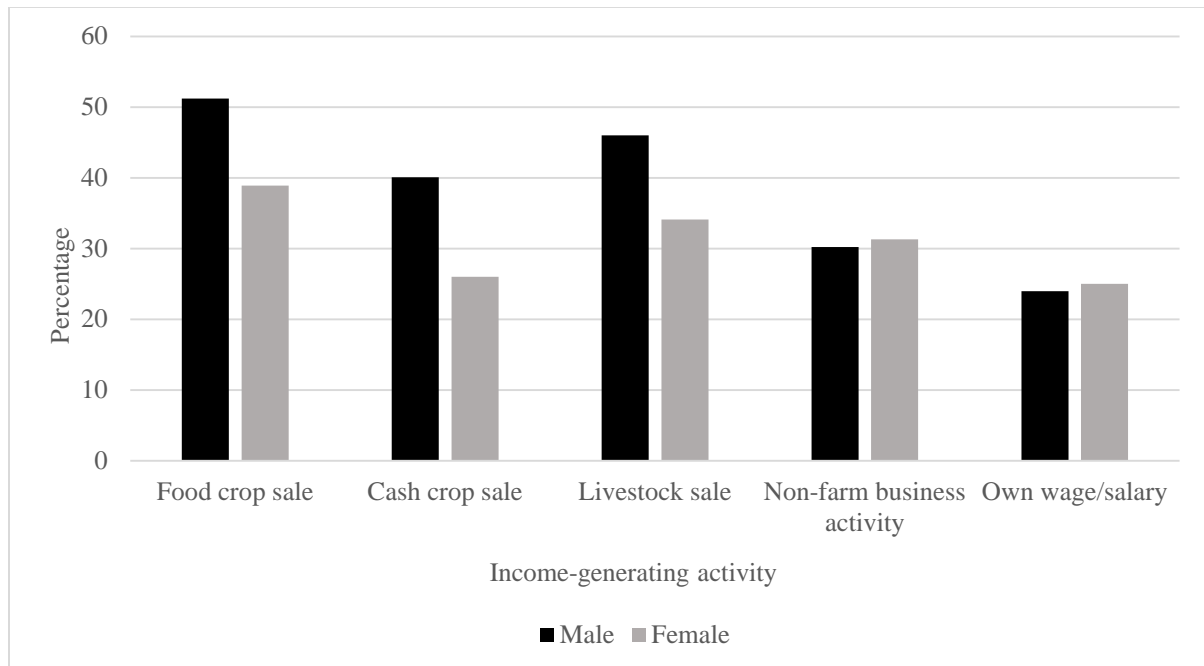


Figure 1: Percentage of men and women who contribute to most of the decisions on income generated

