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Gender and Decision Making in Agriculture: A Case Study of the Smallholder Groundnuts Sector in Zambia



By

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MUSIKA DEVELOPMENT INITIATIVES

Foreword

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Executive Summary

Over the years, there has been a rise in the number of development programs in Zambia that incorporate initiatives aimed at addressing the gender gap in the agricultural sector. Despite scoring a lot of successes, these programs have been criticized for their failure to adequately address gender inequality and women's economic empowerment. Evidence shows that there is still a discrepancy between men and women's contribution to agriculture and the benefits they derive from it. Women provide more labor to agricultural production than men. However, their agricultural productivity remains lower than that for men and they are largely sidelined from having decision making power on issues that affect their economic welfare.

Because of these issues, gender sensitive programming poses special challenges in agricultural interventions, and it is therefore imperative that empirical evidence from gender aware research is used to develop interventions. Understanding the factors that cause women's decision making power to change in different crop sectors, at different levels of decision making becomes critical in paving the way for gender sensitive programming and implementation.

With this in mind, this study analyzed data specific to the groundnut sector in Zambia. Groundnuts is second to maize in production volumes and area under cultivation and it is also considered a woman's crop. It is the most common crop grown among women and it plays an integral role in the food and nutrition security of rural households. Using the groundnuts sector as a case study, this research examined the effect of groundnut commercialization on women producers, the effectiveness of women's groups in enhancing women's decision making as well as the factors that affect female control over groundnut production, sales and income. A nationally representative sample of rural groundnut farmers was used from the RALS 2015 data for the analysis. The following were the key findings:

- i. In the groundnuts sector, the proportion of female groundnut producers were 38%. Furthermore, women made up 49% of the primary decision makers on whether to commercialize the crop, and 48% of the primary decision makers on how revenue from groundnuts sales should be used. Overall, this indicates that women's participation in decision making improves from production to revenue use, making the crop an important source of economic empowerment for rural women.

- ii. In terms of regional differences, female control varied by province, and interesting dynamics were observed when female control was also matched against the regional level of production. Eastern province accounted for the second largest groundnut production, however, it also accounted for the second lowest proportion of female control over groundnut production, sales and income. This has two significant implications for programming. Firstly, that targeting areas with higher groundnut production does not necessarily mean higher women's economic empowerment will result. Secondly, market interventions should be tailored to account for regional variation in female control.
- iii. Overall, groundnut commercialization reduces female control over production. However, it should be emphasized that this does not mean that women do not benefit from market oriented production. Results showed that women had an improvement in decision making at sale and revenue use, even in those cases in which they did not directly control the production process.
- iv. Socio-economic characteristics such as household assets, distance to the field, household headship as well as cultural variations had a significant influence on women's decision making. Therefore, understanding the socio-economic characteristics of targeted beneficiaries is crucial for predicting how a market intervention will impact men and women.
- v. Women's groups were also found to significantly aid in improving female control over groundnut production and income, but not over decisions regarding whether to sell or not. Therefore, interventions that seek to improve female control over sales should incorporate other mitigation strategies other than women's networks alone; to ensure women farmers are engaged.

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LIST OF ABBREVIATIONS AND ACRONYMS

CIMMYT	International Maize and Wheat Improvement Centre
CSO	Central Statistical Office
CDF	Cumulative Distribution Function
DFID	Department for International Development for the United Kingdom
FAO	Food and Agriculture Organization
IAPRI	Indaba Agricultural Policy Research Institute
MAL	Ministry of Agriculture and Livestock
MGCD	Ministry of Gender and Child Development
MT	Metric Tons
RALS	Rural Agricultural Livelihood Survey
SIDA	Swedish International Development Cooperation Agency
SDC	Swiss Agency for Development and Cooperation
SSA	Sub-Saharan African
USAID	United States Agency for International Development

1. INTRODUCTION

Over the years, there has been a rise in the number of development programs in Zambia that incorporate initiatives aimed at addressing the gender gap in the agricultural sector. Despite scoring a lot of successes, these programs have been criticized for their failure to adequately address gender inequality and women's economic empowerment (MGCD 2014;Humphrey 2014). Evidence shows that there is still a discrepancy between men and women's contribution to agriculture and the benefits they derive from it. Women provide more labor to agricultural production (CSO 2014; World Bank 2004; Sitko, et al. 2011) and spend 4 hours more on agricultural productive work than men (Blackden 1999). However, their agricultural productivity remains lower than that for men (Namonje-Kapembwa and Chapoto 2016) and they are largely sidelined from having decision making power on issues that affect their economic welfare (CIMMYT 1999; Shipekesa and Jayne 2012; Sichilima et.al 2016; IAPRI/MAL/CSO 2015).

Furthermore, there is the concern that certain aspects of the development agenda could further widen the gender gap in agriculture. A crucial element in agriculture development strategy is to link farmers to formal markets in order to create a trading environment that mutually rewards them as suppliers and/or buyers. However, studies in Zambia and other Sub-Saharan African (SSA) countries have shown that commodities that are traded in formal markets are more likely to be controlled by men (Njuki, et al. 2011), and that women face more constraints as they engage in markets (Kaaria and Ashby 2001) and are substituted out of the supply chain as production becomes more commercialized (ILRI 2013; Shipekesa and Jayne 2012). Because of these issues, gender sensitive programming poses special challenges especially for market oriented programs and it is imperative that empirical evidence from gender aware research is used to develop them.

In addition, there is uncertainty about how development initiatives could address women's economic empowerment. Economic empowerment has been defined in different ways by various organizations (World Bank 2002;SIDA;DFID;SDC), but the common elements that overlap these definitions are that economic empowerment includes firstly the access to, and secondly control of resources and opportunities (Markel 2014). A number of agricultural initiatives driven by the Ministry of Gender and Child Development and other development agencies (SIDA, DFID, USAID) have provided rural women with improved access to agricultural inputs and technology

and therefore have been able to directly enhance women's access to resources and opportunities; however, the extent to which these initiatives have improved women's control or decision making power over those resources and opportunities is still unknown.

Despite this, issues of female decision making power still need to be addressed for they are a critical constituent of women's economic empowerment. At the household level, the interplay of intra-household decision-making power dynamics are such that they disadvantage women farmers from equitably benefiting from agriculture. A study conducted in Malawi and Uganda, found that women had less decision making power over income from high value commodities such as cash crops compared to food crops (Njuki, et al. 2011). Similarly, CIMMYT (1999), in its review of twenty five years of research on women farmers in Africa, found that the introduction of a maize shellers shifted control of the shelling process from men to women, while mechanized irrigation initiatives designed for women rice growers in Gambia resulted in rice becoming a communal crop under the authority of male village headship. This implies that there is an uneven balance of power, and understanding how it can be influenced is cardinal for designing initiatives that are able to yield gender inclusive outcomes.

However, there lacks sufficient country and sector specific empirical knowledge on factors that influence these gender differences in Zambia's agricultural sector. Particularly, research and development agenda needs to account for the issues that affect women's decision making power. In view of this, a four-part gender study was conducted by Musika Development Initiatives. The research examined issues of gender and decision making in four subsectors: maize, groundnuts, livestock and vegetables. This paper examines data specific to the groundnut sector in Zambia and contributes to the body of knowledge on gender issues among groundnut producers.

Groundnut production supports the livelihoods of the majority of rural households. It is produced by an estimated 1.4 million rural smallholder farmers, and is second to maize in production volumes and area under cultivation (Mofya-Mukuka and Shipekesa 2013). Groundnuts is also particularly important for it is considered a woman's crop (Namonje-Kapembwa and Chapoto 2016). It is the most common crop grown among women and it plays an integral role in the food and nutrition security of rural households. Therefore, using the groundnuts sector as a case study, the study had the following objective:

1.2 Objective

Determine the factors that affect female control over production, selling and use of revenue from groundnuts.

1.3 Research Questions

In achieving the above objective, this study addresses the following questions:

- Does groundnut commercialization substitute women out of production?
- Do women's groups enhance female control over groundnut production, commercialization and income use?

Unlike many studies on gender, this study uses household members and not households as the main unit of analysis. By analyzing decision making at household member level, it provides information on female control over important economic decisions. In addition, the study adds to the body of knowledge on the issues of how commercialization affects women producers: Sichilima et.al (2016) and Shipekesa and Jayne (2012) analyzed the effect of commercialization on female control over the production of cereals such as maize and rice production, however this study examines the effect of commercialization on female control over groundnut production. Lastly, the study improves on methods used to assess factors affecting female control, by using an econometric model to derive the factors that influence female control over groundnut production, commercialization and income use.

The rest of this paper is organized into four Sections. Section 2 explains the data sources and methods used for the analysis. Section 3 gives a detailed discussion of the descriptive findings, econometric results and conclusion. Section 4 contains the references used to strengthen understanding on the subject matter.

2. DATA

This study utilizes data from the Rural Agricultural Livelihoods Survey 2015 (RALS15). RALS15 is a nationally representative survey that interviewed Zambian rural agricultural households in 2015. The survey interviewed 7,934 households and covered the 2013/2014 agricultural season. The RALS data contains information on farming households that cultivated less than 20 ha of land for crop or livestock production, and provides statistically valid estimates at national and provincial level. The survey was conducted by the Indaba Agricultural Policy Research Institute (IAPRI), Central Statistical Office (CSO) and the Ministry of Agriculture and Livestock (MAL).

The analysis was conducted based on a sample of members cultivating the largest groundnut field, resulting in a household member level sample of 4013 farmers. See annex A1 for the distribution of the sample of farmers by province and household headship.

In terms of the methods used for analysis, both descriptive and econometric methods in form of a probit regression were used to derive the various estimates produced in this study. Three (3) phases of decision making or control were developed: the production decision, the decision whether to sell or not and the decision on revenue use from groundnut sales. A probit regression was run for each of these phases in order to determine the factors that influence female control at each phase. Stata and Excel were the main statistical tools utilized to analyze and display the data.

3. RESULTS AND DISCUSSION

4.1 Descriptive Statistics

4.1.1 General Characteristics of Groundnut farmers and Households

As shown in Table 1, the majority (36.2%) of groundnut households were cultivating between 2 to 4.99 ha of land. An average household had about 2.7ha of own land cultivated with about 0.37ha allocated to groundnut production. Regarding household groundnut production and sales, the average household produced about 4.2 by 50kg of groundnuts (210.9kg) and sold about 2.9 by 50kg bags of maize (146.6kg), earning mean revenues of about ZMW586. In terms of gender by household headship, 78.5% of the households were male headed while 21.5% were female headed. At the farmer level, the results indicated that an average groundnut farmer was 48years old, with average years spent in formal education equal to 6 years.

Table 1: Summary Statistics of Groundnut producing farmers and Households

Farmer Level Summary Statistics	Estimate	Number of
		Observations
Average age (years)	48	4013
Largest field under groundnuts (ha)	0.36	4013
Average years spent in formal education (years)	6	4013
Household level Summary Statistics		
Households cultivating crops between 0-1.99 ha	35.8	4016
Households cultivating crops between 2-4.99 ha	36.2	4016
Households cultivating crops between 5-19.99 ha	27.1	4016
Average land under Groundnut cultivation (ha)	0.37	4016
Average groundnut production per household (kg)	210.9	4016
Average groundnut sales among households that sold the crop (kg)	146.6	2360
Proportion of households affiliated to women's group (%)	26.8	4016
Proportion of Male Headed Households (%)	78.50	4016
Proportion of Female Headed Households (%)	21.50	4016

Table 1: Summary Statistics of Groundnut producing farmers and Households...Cont'd

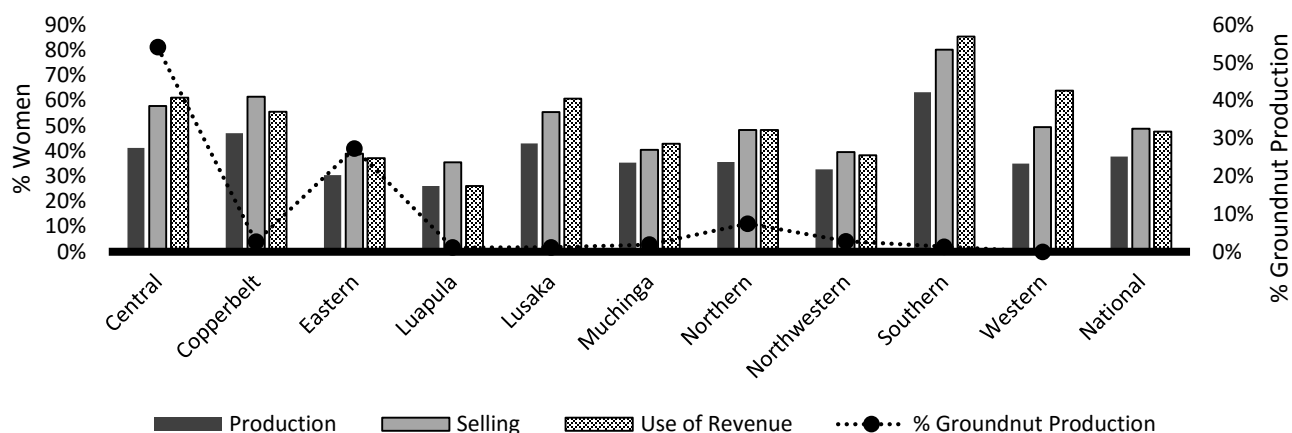
Household Level Summary Statistics	Estimate	Number of Observations
Average size of own land cultivated under crops (ha)	2.70	4016
Mean Gross annual household income (ZMW)	21429.92	4016
Mean Net annual household income (ZMW)	16572.61	4016
Mean Value of groundnut sales among households that sold (valued at actual prices) in ZMW	586.3	2211
Mean distance to the nearest agricultural service (km)	16.48947	4016
Age of the Household Head (years)	49.41484	4016
Value of Productive assets (All animal / equipment assets) in ZMW per household	23198.8	4016

Source: CSO/MAL/IAPRI (RALS) 2015.

4.1.2 Gender Differences in Decision Making by Region

Figure 1 shows the proportion of women controlling production, selling decisions and income from groundnut sales, as well as the proportion of groundnut production by province. The results indicated that there were more men than women producers within the groundnut sector. Of the total farmers controlling groundnut production, only 38% were women. This means that even if groundnuts is considered a woman's crop for being the most popular crop grown among women (Namonje-Kapembwa and Chapoto 2016), its production is male dominated. On the other hand, there was an almost equal distribution of male and female control over groundnut commercialization and income. 49% of women and 51% of men controlled selling decisions, while 48% of women and 52% of men controlled groundnut income. Overall this shows that women's control improves from production to revenue use, making the crop an important source of economic empowerment for women. This is contrary to maize, in which women's control declines from production to revenue use (Sichilima, Ngoma-Kasanda and Ikabongo 2016). Therefore, gender interventions that are market oriented should consider targeting the groundnuts sector.

Figure 1: Proportion of Women Making Economic Decisions in Households Producing Groundnuts



Source: CSO/MAL/IAPRI (RALS) 2015 and RALS Report 2015

In terms of regional differences, female control varied by province. Interesting dynamics were observed when female control was also matched against the regional level of production. For instance, even though Eastern province accounted for the second largest groundnut production at 13,712 MT (IAPRI/MAL/CSO 2015), it accounted for the second lowest proportion of female control over groundnut production (30%), sales (39%) and income (37%). In contrast, Southern province accounted for the second lowest groundnut production at 686.1MT (IAPRI/MAL/CSO 2015), but it had the highest proportion of women controlling groundnut production (63%), sales (80%) and income (85%) than in any other province. Southern province had more female control at each node. This has two significant implications for intervention design, firstly, that targeting areas with higher groundnut production does not necessarily mean higher women's economic empowerment will be achieved. Secondly, market interventions in the groundnut sector should be tailored to account for regional variation in female control.

4.1.3 Commercialization and Gender Differences in Decision Making

In Table 2, we examine whether women are substituted out of production as groundnut production becomes more market oriented. Similar to Shipekesa and Jayne (2012), we use the crop Commercialization Index (CI) to examine the change in proportion of female control over production as a crop becomes more commercialized. CI measures the quantity of groundnuts sold relative to the quantity produced, and we compute CI for the largest groundnut field controlled by

a household member. Overall, the results indicated that groundnut commercialization reduces female control over production. The proportion of women producers steadily declined as the quantity of groundnuts sold increased. In addition, even if the proportion of women generally declined as CI increased in both male and female headed households, the overall percentage of female producers remains high in female headed households. The average CI was also found to be lower among female producers than male producers, as well as in female headed households than male headed households respectively. Compared to other crops such as maize, we found that the gender gap in the control of market oriented production widens at a much lower rate in the groundnut sector than in the maize sector (Sichilima, Ngoma-Kasanda and Ikabongo 2016; Shipekesa and Jayne 2012).

Even with this, it should be emphasized that this does not mean that women do not benefit from market oriented production. Earlier results, shown in Figure 1, indicated that overall there were more women controlling groundnut income than production. This implies that more women enter into decision making at sale and revenue use level, even in those cases in which they did not directly control the production process. This varies widely with the scenario in the maize sector, in which women are substituted out of decision making at sale and revenue use. Therefore, if the main goals of a market intervention are to see an increased number of female producers involved at production, then measures need to be incorporated to mitigate the negative effects of commercialization on female participation at production level. On the other hand, a market intervention that aims to achieve higher incomes for women is likely to be successful even by working through both men and women.

Table 2: Proportion of Female and Male producers by Commercialization Index

Groundnut CI (%)at field level	Female farmers controlling production (%)	Male Farmers controlling production (%)	Proportion of females Controlling Production (%)	
			Male headed households	Female headed households
0	40.5	59.5	22.5	98.3
0-25	37.2	62.8	18.5	100.0
25-50	36.5	63.5	23.1	97.0
50-75	35.2	64.8	20.3	96.0
75-100	33.2	66.8	19.1	96.9
Average				
CI	26.9	30.5	28.3	25.8

Source: CSO/MAL/IAPRI (RALS) 2015.

4.1.4 Groundnut's Income Contribution and Effects on Women's Decision Making

When income from a particular crop accounts for a large share of the household's total income, female control over the crop's production, sales and income is likely to be low. To assess the changes in female control as income from a crop increases relative to household income, we computed the groundnut Income Contribution Index (ICI). Groundnuts ICI measures the gross income from groundnuts sales relative to the household's total gross income. In Table 3, the effect of ICI is highlighted. Overall, there was a reduction in female control over groundnut production and sales as ICI increased. As for the revenue, female control over revenue only began declining only after groundnuts accounted for 50% or more of the total household income. These findings are similar to the evidence illustrated in a study conducted by Njuki, et al. (2011), in which he showed that men tend to assume the role of financial provider and therefore engage in those activities that present opportunities for them to play the lead in that role. It is therefore important that the decline in female control over revenue is mitigated in those regions in which households are more likely to depend on groundnuts for their livelihood.

Table 3: Proportion of Female producers by Income Contribution Index

ICI	Proportion of female controlling		
	Production	Selling	Revenue Use
0	40.4	52.2	-
0-25	35.7	46.2	47.8
25-50	35.1	48.6	48.6
50-100	37.5	37.5	37.5

Source: CSO/MAL/IAPRI (RALS) 2015.

4.2 Econometric Results: Factors Affecting Female Control over Groundnut

Production, Sales and Income

4.2.1 Decision Making at Production Level

The results indicated that male headship negatively affects female decision making in households producing groundnuts. Male headship significantly reduced the probability of female control over production, see table A2 in the annex. In addition, regional and cultural differences as well were observed to have an effect on female control over production. Because rural settlement clusters common ancestry along geographical lines, provincial variables were used to account for the effect of regional and cultural variation, ancestry and tribal norms on female decision making power. We found that female farmers from Eastern, Luapula, Muchinga and North western province were less likely to control groundnut production, while those in, Southern province had higher chances of controlling groundnut production. This supports the earlier findings in the descriptive section, which showed more women decision makers in the Southern Province.

It is evidenced that women are assigned with reproductive roles and household duties that take up much of their time away from production activities (CIMMYT 1999). Therefore, their participation in production activities can be negatively affected if they have to spend long hours covering long distances from the household to the farm plot. This explains why we found that field plots that are further from the homestead are less likely to be managed by women. Further results showed that women that achieve higher levels of education tend to move away from groundnut production. As education attainment increases, the probability of women farmers engaging in groundnut production reduces. This implies that women diversify away from groundnuts as their

level of education improves, and that groundnut tends to be grown by female farmers that are less educated.

Women's groups were found to be an effective avenue for improving female control over groundnut production. A household member's affiliation to a women's group increased the chances that a woman would control groundnut production by 4.3%. Women's groups are platforms within the communities normally used to share knowledge and experiences. Therefore, women's decision making capacity is improved through them. Market interventions whose goal is to increase the proportion of women engaged in groundnut production could utilize women's groups. Another observation was that households with more productive assets were likely to have more women engaged in managing groundnut production, though the size of the effect was very negligible. This is because wealthier households have the capacity to embark on multiple production activities, which women can be part of.

In addition, having more female members at decision making age (16 years and above) in a household increases the chances of female control over production. And surprisingly, having more male members at decision making age in a household also improves chances that women will control groundnut production. This is because groundnuts are rarely produced for earning cash, and since men tend to assume the role of income earner, they gravitate away from managing the more traditional crops.

4.2.2 Decision making at Selling Level

As for sales, it was found that a woman who was controlling production was more likely to control decisions on whether to sell or not. To be specific, a woman managing groundnut production has a 53% chance of having decision making power on whether or not to sell the groundnuts produced. Therefore, market interventions that improve production for women farmers are also more likely to improve their participation in marketing the crop.

Similar to findings on female control of production, the distance to the point of sale impacts female control over sales negatively. In addition, women farmers from Eastern, Luapula, Muchinga and North western province were less likely to control sales, with the exception again of Southern province farmers. As for the effect of education, attaining higher levels of education reduces the

chances that females will spearhead decisions on groundnut marketing. On the other hand, having more female members at decision making stage in the household increases the chance of female control over sales, while male headship reduces the probability of female control over sales by 56%. And lastly, it was interesting to note that women's groups were not effective in improving female control over selling decisions.

4.2.3 Decision making at Revenue Use Level

As for control over income, female control over income reduced with an increase in ICI. This is consistent with the descriptive findings outlined on the effect of ICI on female control over income. However, we also found that when a woman is involved in the production and selling decisions, chances that she will also control income are high. To be specific, there is an 18% chance that females in charge of groundnut production will also control income from groundnut sales, and a 75% chance that a woman with control over sales will also control the income earned from the sales. This implies that market interventions that encourage women's involvement from production to marketing, are more likely to ensure women have more control over income.

In addition, being part of a women's group increases the chances that women will control income from groundnuts, while male headship negatively affects women's female control of income. As for the effect of regional differences, we found that women in Luapula and Western province were less likely to have control over income from groundnuts. As for the effect of education on female control over income, higher education attainment reduces the chance that women will control incomes from groundnut sales for the same reasons highlighted, that women diversify away from groundnuts as their education level increases. It was also observed that a matrilineal descent positively affects decision making power over income.

4.3 Conclusions and Recommendations

This study had sought to identify factors that influence female control over groundnut production in Zambia. The study had also sought to determine if commercialisation of groundnuts had led to women being substituted out of production. In addition to this the effect of women's groups on female control over groundnut production, commercialisation and revenue use was examined.

All in all, there are a number of factors that can hinder or promote female control over production, sales and income. Socio-economic characteristics such as education and household assets, distance to the field, household headship as well as cultural variations have a significant influence on women's decision making. In addition, groundnut commercialization negatively affects female control over production. However, this does not mean that women do not benefit from market oriented production for more women enter into decision making at sale and revenue use. In addition, women's groups were found to significantly aid in improving female control over groundnut production and income, and not control over sales.

These findings suggest that women's groups do have a positive impact on decision control. Women groups provide a platform for women to access information and improve their agricultural knowledge. Thus developing innovative approaches to increase the proportion of households with affiliations to women's organizations will make a significant contribution to empowering women through increased control over their groundnut production and revenue use decisions. While the literature has continued to indicate that increased commercialization is beneficial to women's empowerment, our results showed that it did not influence women's production decisions. Therefore, it is prudent for policymakers and development agencies working on enhancing women's empowerment to facilitate market access in ways that encourage women to produce and to sell more.

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Appendix

Table A 1: Sample Distribution by Province and Household Headship

Province				Female farmers in		Male Farmers in	
	All	Female	Male	Female	Male	Female	Male
	Farmers	Farmers	Farmers	Headed	Headed	Headed	Headed
	Farmers	Farmers	Farmers	Households	Households	Households	Households
Number of Observations	4013	1518	2495	839	679	19	2476
% Farmers in							
Central	8.3	9.1	7.9	7.6	10.9	5.3	7.9
Copperbelt	5.5	6.9	4.7	6.4	7.4	10.5	4.6
Eastern	33.3	26.9	37.2	33.7	18.4	47.4	37.2
Luapula	8.5	5.9	10.2	6.0	5.7	10.5	10.2
Lusaka	5.0	5.7	4.6	5.4	6.2	0.0	4.6
Muchinga	9.5	9.0	9.8	11.0	6.5	10.5	9.8
Northern	10.6	10.0	11.0	10.0	10.0	5.3	11.0
North-western	4.4	3.8	4.8	4.9	2.5	5.3	4.8
Southern	12.3	20.5	7.3	12.6	30.2	5.3	7.3
Western	2.5	2.3	2.6	2.4	2.2	0.0	2.6
Total	100	100	100	100	100	100	100

Source: CSO/MAL/IAPRI (RALS) 2015.

Table A 2: Factors Influencing Gender Decision Making in Groundnuts Production, Selling and Use of Revenue from Groundnuts*

Variables	Production		Selling		Revenue Use	
Female Controlling Selling					0.754***	(0.020)
Female Controlling production			0.534***	(0.027)	0.184***	(0.046)
Age	-0.012	(0.005)	-0.017***	(0.007)	-0.011	(0.010)
Age (squared)	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)
Adult females(above 16 years)	0.051***	(0.011)	0.057***	(0.015)	0.011	(0.020)
Adult males(above 16 years)	0.024*	(0.011)	0.014	(0.014)	0.022	(0.017)
Production assets	0.000***	(0.000)	0.000	(0.000)	0.000	(0.000)
Male household head	-0.81***	(0.011)	-0.564***	(0.031)	-0.413***	(0.058)
Affiliation to women's group	0.043**	(0.023)	0.034	(0.032)	0.062*	(0.037)
Production contribution index	-0.113	(0.093)	0.001	(0.123)		
Income Contribution Index					-0.622**	(0.250)
Distance to point of sale			-0.001**	(0.000)		
Central	-0.013	(0.052)	-0.036	(0.210)	0.062	(0.086)
Copperbelt	0.038	(0.062)	-0.079	(0.219)	-0.035	(0.092)
Eastern	-0.244***	(0.043)	-0.747***	(0.204)	-0.100	(0.083)
Luapula	-0.148***	(0.051)	-0.588***	(0.221)	-0.171*	(0.096)
Muchinga	-0.147***	(0.047)	-0.686***	(0.222)	-0.009	(0.096)
Northern	-0.073	(0.049)	-0.220	(0.212)	-0.039	(0.087)
North western	-0.173***	(0.054)	-0.731***	(0.239)	-0.045	(0.105)
Southern	0.230***	(0.049)	0.622***	(0.237)	0.111	(0.097)
Western	-0.067	(0.070)	0.033	(0.272)	0.196*	(0.114)
Distance to extension services	-0.001	(0.000)				
Distance to field plot	-0.006***	(0.002)				
Lineage	-0.022	(0.024)	-0.110	(0.082)	-0.111**	(0.037)
Monogamously Married	-0.0026	(0.038)	0.017	(0.128)	0.016	(0.056)
Polygamously Married	-0.043	(0.045)	-0.186	(0.155)	-0.045	(0.072)
Primary education	-0.161***	(0.031)	-0.272**	(0.123)	-0.131***	(0.049)
Junior secondary education	-0.252***	(0.029)	-0.555***	(0.143)	-0.214***	(0.060)
Senior secondary education	-0.358***	(0.024)	-0.161***	(0.081)	-0.350***	(0.061)
Tertiary education	-0.339***	(0.031)	-0.515*	(0.287)	-0.405***	(0.067)

*For each node, marginal effects are presented followed by the standard error in Parenthesis