Gender and decision-making in agriculture: A case study of groundnuts farmers in Zambia

by

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ABSTRACT

Zambia's government and its development partners continue to be challenged with how to adequately address the seeming gender inequity in Zambia's agricultural sector. Women in Zambia's agricultural sector face challenges in accessing resources and opportunities that could enhance their welfare. In addition, cited inequitable distribution of power in decision-making have been assumed to hamper women's ability to enhance their own economic wellbeing. Therefore, understanding the factors that influence women's decision-making in agriculture and how these factors contribute to their wellbeing can provide insights into how to develop programs that help improve their economic wellbeing.

This thesis assessed the decision-making and production activities by women in Zambia's agriculture using the groundnuts subsector as a case study. It used data from the nationally representative Rural Agricultural Livelihood Survey 2015 (RALS15), drawing a sample of rural groundnut farmers and employed a statistical and econometric analysis to explore the relationships of specific factors on women in the groundnut subsector. The following are the key findings:

i. Women make up 38% of the producers in Zambia's groundnuts subsector but accounted for 49% of the total number of people controlling groundnut selling decisions. Women accounted for 48% of the total people controlling how income from groundnut sales are used. These distributions would challenge the prevailing perception that women have a decreasing control over decision-making as one moves from production to utilization of the income from

production, at least in the case of the groundnut subsector in Zambia's agricultural sector.

ii.   The factors influencing women's control over production include the gender of the household head, region, affiliation to women's groups, distance between the homestead and extension service access point, distance between the homestead and the field plot, the woman's education and household's production assets. For example, a percentage increase in the distance to field plot reduced the women's control by one-seventh of a percent. Similarly, the more educated the woman is, the less their control over groundnut production is.

iii.   Furthermore, groundnut commercialization did not seem to influence female control over production.

The foregoing challenges some of the conclusions from previous research regarding women's control over production decisions. It is possible that the position of groundnuts in Zambian agriculture could be an explanatory factor the results. However, it was not tested. Therefore, it is suggested that future studies explore the relationship between the crop and the empowerment women experience from its production.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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CHAPTER I: INTRODUCTION

1.1 Background and Problem Statement

Over the years, there has been a rise in the number of development programs in Zambia that are incorporating initiatives aimed at addressing the gender gap in the agricultural sector. Despite their successes, these programs have been criticized for their failure to adequately address gender disparities and women's economic empowerment (MGCD 2014; Humphrey 2014). Evidence shows that there is 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 an estimated average of four hours more on agricultural productive work than men (Blackden 1999). However, their yields remain 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 agricultural 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), 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 fully address women's economic empowerment. According to Markel (2014), economic empowerment has been defined in different ways by various organizations but the common elements that overlap these definitions are that economic empowerment includes – the access to, and control of - resources and opportunities. A number of agricultural initiatives driven by Zambia's Ministry of Gender and Child Development and its development partners (SIDA, DFID, USAID) have provided rural women with agricultural inputs and technology which, by implication, enhanced their access to production resources and opportunities. However, the extent to which these initiatives improved women's control or decision-making power over those resources and opportunities is unclear. Therefore, issues of female decision-making power need to be addressed because of their importance in enhancing women's economic empowerment.

Development policy initiatives that fail to factor in intra-household decision-making run the risk of yielding unintended outcomes. For instance, CIMMYT (1999), in its review of twenty five years of research on women farmers in Africa, found that the introduction of maize shellers to farming communities shifted control of the shelling process among households from men to women. It also found that mechanized irrigation initiatives designed for women rice growers in the Gambia resulted in rice becoming a communal crop under the authority of male village headship. This implies that male or female control over resources is influenced by a number of factors, which if well

understood and incorporated in to planning, could help program planners develop mitigation strategies for gender-related distortions.

Furthermore, in order to achieve inclusive economic growth, there is need to determine how development programs affect men and women differently. Better understanding of gender differences in the rural economy can lead to poverty reduction, not just for women but for their households as a whole (Namonje-Kapembwa and Chapoto 2016). In addition, research that mainstreams gender is critical for the development of gender sensitive initiatives.

Despite this, there lacks sufficient country and sector specific empirical knowledge on factors that influence these gender differences in Zambia's agricultural sector. In view of this, a four-part gender study was conducted with the financial support of Musika Development Initiatives. The research examined issues of gender and decision-making in two subsectors: maize and groundnuts. This paper examines data specific to the groundnut subsector in Zambia and contributes to the body of knowledge on gender issues among legume producers.

Groundnut production supports the livelihoods of the majority of rural households in Zambia. It is produced by about half of the rural smallholders, and is second to maize in production volumes and area under cultivation (Mofya-Mukuka and Shipekesa 2013). Groundnuts are 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.

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 how intra-household power dynamics are affected by various socioeconomic influences, thereby providing evidence of how gender can be finely tuned to deliver beneficial outcomes. In addition, the study adds to the body of knowledge of how commercialization affects women farmers. 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 commercialzation on female control over groundnut production. Lastly, the study improves on methods used to assess factors affecting female control over prouction, by using an econometric model to derive those factors

1.2 Objectives

This research used the groundnuts subsector as a case study and its overall objective was to determine the factors that affect female control over groundnut production. The specific objectives are as follows:

- To determine the effect of women's groups on female control over groundnut production
- To examine the relationship between groundnut commercialization and female control over its production

1.4 Outline of the thesis

The rest of this thesis is organized into four chapters. Chapter 2 reviews related literature on gender issues by looking at works done by other scholars. Chapter 3 outlines the data and methods used in this study, while chapter 4 discusses the findings of the data analysis conducted. Chapter 5 outlines the conclusion.

CHAPTER II: LITERATURE REVIEW

This chapter will review gender and decision-making in agriculture literature. It begins by defining key terms used in this paper and discusses findings on gender and decision-making within households. It further reviews factors that affect female decision-making or control and concludes with a review of the theory underlying the aspect of female control over production activities within households.

2.1 Definition of terminologies

According to Zambia's Ministry of Gender and Child Development (2014), gender refers to the attributes and opportunities associated with being male and female, the socio-cultural relationships between women and men, girls and boys, as well as the relations between different groups of women and different groups of men. These attributes, opportunities and relationships are socially constructed and learned through socialization processes. In spite of this definition, gender is often misunderstood as a vehicle for the promotion of women. However, gender issues center on the relationship between men and women and their roles and responsibilities, access to and control over resources, division of inputs, interests and needs (FAO 2017).

A key aspect of gender in development is the concept of gender sensitivity. A program is considered gender sensitive if it takes into account the impact of policies and initiatives on men, women, boys and girls and tries to mitigate the negative consequences thereof (MGCD 2014).

2.2 Gender and decision-making within households

Most households assign different gender roles and responsibilities to their members to help them function. This model of organization doesn't just influence the type of social activities members undertake but economic activities as well. According to a review of

gender literature done by Guyer (1980), men and women engage in different economic activities which in many instances are not jointly controlled. Households tend to distribute decision-making responsibilities over economic activities, such as production and consumption, differently amongst their members. One of the most significant ways in which roles have been assigned is where men assume the breadwinner role while women play the role of caregivers. A study by Bianchi (2011) attributes this to the socialization process which creates and shapes how people identify themselves, in this case whether individuals will perceive themselves as breadwinners or care givers. Thus breadwinning remains core to men's identity, and the paper suggests that it's because of this that marriages occur, families are stabilized and essentially households are created.

However, (Guyer 1980) points to a critical finding, which is that the households' allocative rules may not always ensure each member's welfare is safeguarded. For instance, in the Mwea-Tebere rice settlement scheme in Kenya, payment for crop marketing was given entirely to the male head even though other members of the household provided labour (Hanger and Morris 1973). The distributive rationale for this was that the head is breadwinner who takes into account the wellbeing of other members of the household (Haddad, Hoddinott and Alderman 1994). However, evidence shows that this may not always hold true. Holmboe-Ottesen and Wandel (1991), in their study on men's contribution to the food and nutrition situation showed some men tended to favor cash in order to purchase non-food items above family food needs.

A study conducted by Alan De Brauw in 2014 in Northern Mozambique found that cropping choices were also affected by gender and decision-making dynamics. Brauw found that plots managed by women were more likely to be used for growing crops with

less complicated production methods. Similarly, Namonje-Kapembwa and Chapoto (2016), in their study of technology adoption in Zambia found that staple food production was largely under male control throughout the country. This is because maize, the staple food, is widely grown for both food and income generation purposes, therefore it enables men to play the role of provider.

CIMMYT (1999), in its review of 25 years of gender research, found that gender roles and responsibilities are dynamic and that they change with new economic conditions. When the opportunities for a particular group of people are enhanced, whether men or women, their relationships with others in the household and in society are renegotiated. For example, Abbott (1976) found that in Kenya, the relative decision-making power of the wife improves when the husband is a migrant, while in other cases, the opposite happens - women whose husbands are absent have low levels of control for they live on extended homesteads. This shows that issues of intra-household decision-making can be complex and need to be analyzed within the appropriate context.

2.3 Factors affecting female control over production

The literature presents numerous factors found to influence female control or decision-making power over production activities. For example, a study of the determinants of female control among livestock producers conducted by Shafaq et.al (2010) in India found that age, household male dominance, traditional belief systems, cultural norms and education influenced women's control over livestock production. Particularly, the study found that, apart from education, all the factors had an adverse effect on the involvement of rural women in the decision-making process.

Maluccio and Quisimbing (2000), in their study on intra-household allocations and gender relations in Ethiopia, Indonesia, South Africa and Bangladesh, found that lineage

affected women's decision-making power. Women from a matrilineal society were more likely to control field plots than those who were not. Similarly, they found that the availability of production assets increased the likelihood of female control over field plots.

There are certain crops, such as groundnuts, that are considered to be women's crops in certain communities. These crops are, thus, more likely to be managed and controlled by women. Yet this classification is not static because as the commercial status of the crop increases, its likelihood to be managed and controlled by males also increases (Njuki, et al. 2011). This may be because women are more likely to shun an occupation that involve spending long periods of time away from the home because of their ranking of their household responsibilities in relation to their pecuniary economic activities. This is especially true when the household is a dual income household and the woman's male partner can assume the commercial pecuniary duties. Petersen and Hyde (2014), explain this through the lens of different sociological theories such as the expectancy-value theory, stereotype threat and sociocultural theory. They show that the gender differences in occupational interests may be due to parental or cultural expectations, changes in developmental trends, stereotypes and discrimination, or gendered-expectations to achieve work-family balance.

2.4 Conceptual Framework

There are two models that have been used to model household decision-making: unitary and collective models. According to Maluccio and Quisumbing (2000), the unitary model of the household has fallen short in various country settings in both developed and developing countries. The model assumes that members of a household share the same preferences and welfare function and pool their resources. However, there is evidence to support the idea that household decision-making follows collective models in which

8

households do not function as single units. In these models individual household members are shown to have different preferences, and do not necessarily pool their resources unless there is an economic rationale (Njuki, et al. 2011). Individuals also bargain over how to allocate the resources to ensure their individual objective functions are attained (Maluccio and Quisumbing, 2000; CIMMYT, 1999).

This study adopts the collective model as its underlying conceptual framework for the analysis. With this, the result of decisions made within the household is a consequence of the bargaining power distribution and structure of its individual members.

CHAPTER III: DATA AND METHODS

This chapter discusses the data and methods used to conduct the analyses. It is organized into two sections: the first section discusses the sources of data and tools used and the second section specifies the model used to conduct the econometric analysis.

3.1 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 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 groundnuts, resulting in a household member level sample size of 4013 farmers. The distribution of the sample of farmers by province and household headship is presented in Appendix A.

3.2 Model specification and data analysis

This study employed the probit model, and the dependent variable, Y, was defined as a female controlling a groundnut field ($Y_i = 1$) or a male controlling a groundnut field ($Y_i = 0$). The underlying model takes the following functional form defined in Equation (3.1):

$$Y_i = \alpha + \beta X_i + e_i \qquad (3.1)$$

where Xi is a vector of factors that influence whether a female controls the groundnut field in a household. The Greek letters, α and β, represent the estimated parameters. The error term, e, is a normally distributed error term that has a zero mean and constant variance.

The probit model bounds the probability of an outcome to between 0 and 1 while forcing the error term to be homoscedastic. According to Boughton (2007), the probit generates a cumulative distribution function (CDF) which displays a sigmoid relationship rather than linear one. The marginal effects of the variables depend on the value of the probability density function, $f(Y)$, and on the values of each of the independent variables within the model. To derive the marginal effects of the independent variables, the Y for the average values of the independent variables are first calculated, then $f(Y)$ and finally $f(Y)\beta_i$.

The full model specification process was guided by literature and it took the following form:

$$Y_i = \alpha - \beta_1 agef^2 + \beta_2 agef + \beta_3 prodasst + \beta_4 HHsex1 + \beta_5 wom\_gp + \beta_6 pci + \beta_7 prov +$$

$$\beta_8 dist\_ext + \beta_9 dist\_plot + \beta_{10} lineage + \beta_{11} mstatusf + \beta_{12} edu\_levelf + \beta_{13} ci \qquad (3.2)$$

The variables are defined as follows:

- *age and age²:* is age of the decision-maker over the groundnut field. The age of the decision-maker and female control over production were anticipated to have a quadratic relationship. According to CIMMYT (1999), older women are able to influence agriculture decisions much more than younger ones; therefore age was anticipated to affect female control over production positively. However, this positive relationship was anticipated only up to a certain age after which a further increase in age would negatively affect female decision making. This is because very old individuals are normally taken up as dependents by other family members and therefore are unable to have control over the household's economic activities.

- *prodasset:* is the value of production assets that a household owns. Households with more productive assets were likely to have more women engaged in controlling

11

groundnut production because wealthier households have the capacity to embark on multiple production activities, which women can take part in controlling (Maluccio and Quisumbing 2000).

- *HHsex:* is sex of the household head, a binary variable that denotes whether the household head is male or female. Female headship was used as the reference to which male headship was compared. Male headed households tend to have male dominance over production (Shafaq, et al. 2010) therefore male headship was anticipated to negatively affect female decision-making over production compared to female headship.

- *wom_gpf:* is affiliation to community women's groups. Women's groups are networks within the farming communities through which knowledge and experiences on issues of women's economic empowerment are enhanced (Markel 2014). It was expected therefore that households whose members are affiliated to a women's group will be more open to having female members controlling groundnut production.

- *pci*: is production contribution index, which is the size of a groundnut field relative to the total of own land cultivated per household. To calculate pci, the size of the groundnut field a household member controls was divided by the amount of total own land cultivated by the whole household. *pci* will help to determine whether fields that contribute largely to the household's total production were more likely to be controlled by men. Men tend to assume the role of breadwinner (Bianchi 2011), therefore it was expected that fields that largely contribute to total household production were more likely to be controlled by men.

- *prov*: is province. There are 10 provinces in Zambia, namely Lusaka, Southern, Western, North Western, Copperbelt, Central, Northern, Luapula, Muchinga and Eastern province. According to Shafaq et al., (2010) a society's culture and norms can affect female control over production. In Zambian, rural settlement clusters common ancestry along geographical lines, therefore provincial variables were used to account for the effect of cultural and regional variation, ancestry and tribal norms on female decision-making power. Province dummy variables were created and Lusaka was used as a reference province to which the other nine provinces were compared.

- *dist_ext:* distance to extension services. Women who reside further away from points of accessing extension services are not able to access the knowledge and confidence needed to embark on production activities therefore they are less likely to control production activities (CIMMYT 1999).

- *dist_plot*: distance between the field plot and the homestead. It is expected that field plots that are further from the homestead are less likely to be controlled by women. Women are assigned with reproductive roles and household duties that take up much of their time. Therefore, their participation in production activities can be adversely affected if they have to spend a lot of time moving long distances to the farm plot (CIMMYT 1999).

- *lineage:* According to Maluccio and Quisumbing, (2000), a matrilineal decent positively influences female control over production. Therefore it was expected that women from a matrilineal society were more likely to control field plots than those

who were not. Lineage dummies were created and a patrilineal lineage was used as a reference to which a matrilineal lineage was compared.

- *mstatus:* is marital status of the decision-maker, which considered two categories: married and not married. According to CIMMYT (1999), being married negatively influences female control over production. Therefore it was expected that women who were not married were more likely to control production activities on groundnut field plots than those who were married. Being married was used as a reference to which not being married was compared.

- *edu_levelf*: is education attainment of the decision-maker, which considered the following categories: no education, primary, junior secondary, senior secondary and tertiary education. 'No education was used as a reference period to which the other categories were compared. Shafaq, et al. (2010) found that education had a positive effect on female control over production activities. It was therefore expected that women that achieve higher levels of education were more likely to control groundnut production.

- *ci*: is commercialization index. It was computed at field level, and it measures the quantity of groundnuts sold relative to the quantity produced per field. According to Njuki et al. (2011), commodities that are traded in formal markets are more likely to be controlled by men, therefore it was anticipated that the probability of female control over groundnut production reduces with an increase in *ci*.

CHAPTER IV: RESULTS AND DISCUSSION

This chapter discusses the main findings derived from the data analysis. It begins with a presentation of the general characteristics of groundnut producers and a discussion on the gender differences across regions. The chapter concludes with a discussion on the probit results.

4.1 Descriptive Statistics

4.1.1 General Characteristics of Groundnut farmers and Households

Table 4.1 shows the summary statistics for groundnut producing households at household and member level. The table shows that about 78.5% of the households were male headed while about 27% of households were affiliated with women organizations. The foregoing implies that a little over 20% of households were headed by a woman while the majority of women farmers were not affiliated with any women's organization. This is curious given the over-emphasis on the importance of women's organizations supporting the empowerment of women. In addition, the average age of farmers in the sample was 47 years, with a minimum of 13 years and a maximum of 96 years. Respondents had received, on average, six years of formal education, with a standard deviation of about 3.8 years. The average own owned land was 2.90 ha, with a standard deviation of 2.40 ha. The average land under groundnut production was about 0.37 ha, with a standard deviation of 0.34 ha. The average quantities of groundnut produced and sold per household were about 209 kg and 149 kg respectively. Finally, the value of productive assets in the household averaged about ZMW 23,296.

**Table 4.1: Summary Statistics of Groundnut Producing Farmers and Households**

Farmer Level Summary Statistics	Mean	SD	Min	Max
Age (years)	47.00	14.38	13	96
Years spent in formal education (years)	6.00	3.75	0	18
Household level Summary Statistics				
Land under groundnut cultivation (ha)	0.37	0.34	0.001	5.00
Size of own land cultivated (ha)	2.90	2.40	0.625	23.02
Groundnut production per household (kg)	208.58	275.04	0	5,244
Groundnut sales among households that sold the crop (kg)	148.88	205.64	3	2,327.5
Age of the household head (years)	48.13	14.37	13	96.00
Value of productive assets (all animal / equipment assets) in ZMW	23,296.39	77,802.56	0	2,724,650.00
Proportion of households affiliated to women's group (%)	26.80			
Proportion of male headed households (%)	78.50			
Proportion of female headed households (%)	21.50			

4.1.2 Gender Differences in Decision Making by Region

Figure 4.1 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 groundnut production is male dominated. On the other hand, there was an almost equal distribution of male and female control over groundnut sales 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 4.1: Proportion of Women Making Economic Decisions Among Groundnut Producers
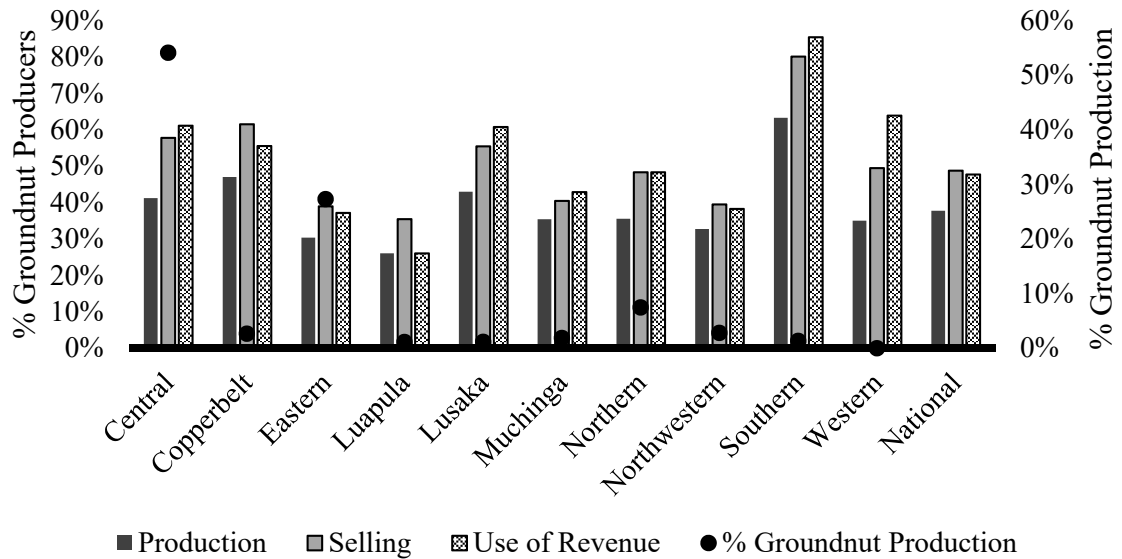
Interesting dynamics were observed when female control was also matched against the regional level of production. For instance, even though Eastern province accounted for the second largest groundnut production at 13,712 MT (IAPRI/MAL/CSO 2015) , it accounted for the second lowest proportion of female 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.

4.2 Econometric Results: Factors Affecting Female Control over Groundnut Production

4.2.1 Decision Making at Production Level

The probit results presented in Table 4.4 indicated that male headship negatively affects female decision-making in households producing groundnuts. Male headship reduced the probability of female control over groundnut production by 80%. This was statistically significant at the 1% level. In addition, regional and cultural differences as well were observed to have an effect on female control over production. Particularly, it was found that women hailing from Eastern, Muchinga, Luapula, Northern and Northwestern were less likely to control production by 27%, 15%, 16%, 10% and 17% respectively, while those from Southern province were more likely to control production by 23%. This was statistically significant at the 1% level. This supports the earlier findings in the descriptive section, which showed more women decision makers in the Southern Province.

An additional kilometer between the household and groundnut field was found to reduce the probability of a female controlling production by 0.7%. This was statistically significant at the 1% level. Similarly, an additional kilometer between the household and extension service access point also reduces female control, though the effect was very negligible at 0.1%. This was statistically significant at 10%. 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. Attaining primary education reduces female control over production by 15%, attaining junior secondary education reduces chances of female control by 24%, attaining senior secondary education reduces chances of female control by 34%

and attaining tertiary education reduces chances of female control by 33%. These results were significant at 1%. 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. This is contrary to the hypothesis that women that achieve higher levels of education are more likely to control groundnut production.

Table 4.2: Factors Influencing Female Control over Groundnut Production

Variables	ME	SE
Age	-0.005	(0.004)
Age (squared)	-0.000	(0.000)
CI	-0.030	(0.034)
Production assets	0.000***	(0.000)
Male household head	-0.798***	(0.011)
Affiliation to women's group	0.054**	(0.023)
Production contribution index	-0.121	(0.094)
Central	-0.010	(0.053)
Copperbelt	0.045	(0.062)
Eastern	-0.272***	(0.042)
Luapula	-0.148***	(0.051)
Muchinga	-0.159***	(0.047)
Northern	-0.096**	(0.049)
Northwestern	-0.168***	(0.055)
Southern	0.232***	(0.049)
Western	-0.069	(0.072)
Distance to extension services	-0.001*	(0.000)
Distance to field plot	-0.007***	(0.002)
Lineage	-0.024	(0.024)
Married	-0.058	(0.037)
Primary education	-0.152***	(0.031)
Junior secondary education	-0.241***	(0.030)
Senior secondary education	-0.343***	(0.026)
Tertiary education	-0.331***	(0.033)
Observations	4010	
Pseudo R^2	0.443	

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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 5%. This was statistically significant at 5%. Another observation was that possession of production assets positively affects female control over production, though the size of the effect was very negligible. This was statistically significant at the 1% level. This is because wealthier households have the capacity to embark on multiple production activities, which women can be part of.

The findings also showed that the commercialization of groundnuts had no effect on female control over production. This is contrary to the findings by Sipekesha and Jayne (2012), who found that an increase in cereal commercialization negatively affected female control over cereal production.

All in all these results show that there are a number of factors that influence female control over groundnut production. Therefore in order to achieve beneficial outcomes from initiatives, program planning should be conducted in cognizance of the effect of these factors.

CHAPTER V: CONCLUSIONS

5.1 Summary and Conclusions

The study was motivated by the literature indicating that women often did not have control over their decisions regarding what they produced, what they sold out of their production and what they did with the income they generated from the sale of their production. Against this backdrop, this study sought to identify the factors that influenced female control over groundnut production in Zambia. Specifically, the study sought to determine the effect of women's groups on female control over groundnut production and to examine the relationship between groundnut commercialization and female control over its production.

The results showed that about 78.5% of the households in the study were male headed while about 27% of households were affiliated with women organizations. The average age of respondents in the sample was 47 years and they had on average received six years of formal education. Land cultivated to groundnuts was relatively small, averaging about 0.37 ha. On average, groundnut producers controlled productive assets valued at about ZMW 23,296 and sold about 79% of their production.

The study showed that affiliation with women's organizations did have a positive marginal effect on women's control over groundnut production. Indeed, women in households with affiliation to women's organizations had about 5.4% higher control over groundnut production than those who did not. This was statistically significant at the 5% level. The study showed that commercialization of groundnuts did not exhibit a statistically significant influence on women's control over production despite its positive sign.

The following factors were shown to influence women's control over production:

- The gender of the household head: The marginal effect of a male household head instead of a female household head on women's control over groundnut production decision was -79.8%, statistically significant at the 1% level.

- Distance to field plot and to extension services: Both of these had negative effects on women's control over groundnut production, albeit small marginal effects.

- Education: The more educated the woman, the less control the woman groundnut farmer has over her production decisions. All four levels of education were statistically different from the reference point of no education at the 1% level. This result was counterintuitive given that education is expected to empower women in their choices and their decisions.

- Region: All provinces, with the exception of Southern Province, had a negative impact vis-à-vis Lusaka Region regarding women's groundnut production decisions. This would suggest that women in Southern Province and Lusaka Province had the most "freedom" in their decision to produce groundnut in Zambia.

- A larger proportion of women had control over groundnut revenue than groundnut production. The proportion of women controlling groundnut income was highest in the Southern Province, where control over production and selling decisions were also highest.

5.2 Limitations of the Study and Further Research

The data used in this study lacked information on shared decision-making, therefore the analysis undertaken could only model two decision-making scenarios: female control or male control over production. However, since shared decision-making is common amongst households, future research should endeavor to collect data that can provide insight into it.

The results from this thesis can also be looked into further by including a qualitative analysis. This could possibly be achieved by conducting focused group discussions (FGDs) in the various areas in which the survey was conducted. Information from the FGDs would help to shed more light on the perceptions and reasons behind some of the findings from the econometric analysis. In addition, the inclusion of variables that indicate the change in economic conditions, such as immigration, could help to improve the model results.

5.3 Recommendations

The results from this thesis demonstrate that women's organizations do have a positive impact on decision control. 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 decisions. We had defined commercialization index as the quantity of groundnuts sold relative to the quantity produced per field. 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. That notwithstanding 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 more to sell more. Furthermore, the absence of evidence that groundnut

commercialization substitutes women out of production should provide a foundation for

market development programs that promote groundnut commercialization as a means to

achieving women's economic empowerment.

BIBLIOGRAPHY

Abbott, S. 1976. "Full-time farmers and week-end wives: Ananalysis of altering conjugal roles." *Journal of Marriage and the Family* 165–73.

Bianchi, Susan. 2011. "Changing Families, Changing Workplaces." *Princeton.*

Blackden, M. 1999. "All Work and No Time: The Relevance of Gender Differences in Time Allocation for Agricultural Development in Zambia."

Brauw, Alan De. 2014. "Gender Control and Crop Choice in Northern Mozambique." *Agricultural Economics.*

Brown, Bill. 2009. "The History of Economics." *Economics Journal of History* 4-12.

Chete, Oluwatoyin. 2013. "A Gender Analysis of Maize Marketing by Farmers in Oyo State." *European Scientific Journal* 269.

CIMMYT. 1999. "Twenty Five Years of Research on Women Farmers in Africa: Lessons and Implications for Agriculture Research Institutions." CIMMYT.

CSO. 2014. "Zambia Labour Force Survey." Central Statistical Office.

DFID , and SDC. 2008. "A Synthesis Of The Making Markets Work For The Poor Approach (M4P)." UK Department for International Development (DFID) and the Swiss Agency for Development and Cooperation (SDC).

DFID; SDC. 2015. "M4P Operational Guide: Second Edition." UK Department for International Development (DFID) and the Swiss Agency for Development and Cooperation (SDC).

DFID; SDC;. 2008. "M4P Opertaional Guide: First Edition." UK Department for International Development (DFID) and the Swiss Agency for Development and Cooperation (SDC).

FAO. 2010. "The Stae Of Food and Agriculture: Women in Agriculture." The Food And Agriculture Organization.

—. 2017. *www.fao.org.* Accessed May 2017. http://www.fao.org/docrep/007/y5608e/y5608e01.htm.

Gilbert, R.A, W.D Sakala, and T.D Benson . 2002. "Gender Analaysi of a Nationwide Cropping Trial Survey in Malawi." *African Studies Quarterly* Journal Series No. R-08956.

Greene, W H. 1997. *Econometric Analysis.* NJ:Prentice Hall: Upper Saddle River.

Guyer, J. 1980. "Household Budgets and Women's Income." In *Household Budgets and Women's Income*, by Guyer.J.

Haddad, Hoddinott, and Alderman. 1994. "Intrahousehold Resource Allocation: An Overview." *Policy Research Working Paper 1255.*

Hanger, J, and J Morris. 1973. "Women and the Household Economy." *Weltforum Verlag.*

Holmboe-Ottesen, and Wandel. 1991. "Men's contribution to the food and nutritional situation in the Tanzanian household." *Ecology of Food and Nutrition* 26: 83 - 89.

Humphrey, John. 2014. "Market Systems Approaches: A Literature Review." Beam Exchange.

IAPRI/MAL/CSO. 2015. "Rural Agricultural Livelihoods Survey Report." Indaba Agriculture Policy Research Institute.

IFAD. 2010. "Promoting Women's Leadership in Farmers' and Rural Producers' Organization." IFAD Head Quarters, Rome.

ILRI. 2013. *Bridging the Gender Gap: Women, Livestock Ownership and Markets in Eastern and Southern Africa.* Edited by Jemimah Njuki and Pascal Sanginga. WRENmedia (www.wrenmedia.co.uk).

Jayne, T.S, David Mather , and Elliot Mghenyi. 2010. "Principal Challenges Confronting Smallholder Agriculture in Sub-Saharan Africa." *World Development* 1386-1394.

Jones, Linda. 2012. *Discussion Paper for an M4P WEE Framework: How can the Making Markets Work for the Poor Framework work for poor women and for poor men?* The Springfield Centre for Business in Development.

Kaaria, S.K, and J.A Ashby. 2001. *An Approach to Technological Innovation that Benefits Rural Women: The Resource-to-Consumption System.* Cali.

Maluccio, J, and A Quisumbing. 2000. "Intrahousehold Allocation and Gender Relations: New Empirical Evidence from Four Developing Countries." *FCND Discussion Paper IFPRI.*

Markel, Erin. 2014. "Measuring Women's Economic Empowerment in Private Sector Development: Guidelines for Practioners." DCED.

MGCD. 2014. "National Gender Policy." Ministry Of Gender And Child Development.

Mofya-Mukuka, Rhoda, and Arthur Shipekesa. 2013. "Value Chain Analysis of the Groundnuts Sector in the Eastern Province of Zambia." (IAPRI) Working Paper No. 78.

Musika. 2015. *Musika Annual Report: Annex 1 2015 Results.* Annual Report, Musika Development Initiatives, Musika.

Musika. 2015. "Musika Gender Strategy: 3rd Edition." Musika Development Initiatives.

Namonje-Kapembwa, Thelma, and Anthony Chapoto. 2016. "Improved Agricultural Technology Adoption in Zambia: Are Women Farmers Being Left Behind?" Working paper No.106, Indaba Agricultural Policy Research Institute.

Njuki, Jemimah, Susan Kaaria, Angeline Chamunorwa, and Wanjiku Chiuri. 2011. "Linking Smallholder Farmers to Markets, Gender and Intra-Household." *European Journal of Development Research* 427.

Peterman, A, J Behrman, and A Quisumbi. 2010. "A Review of Empirical Evidence on Gender Differences in Non-land Agricultural Inputs, Technology, and Services in Developing Countries." Working Paper No 11-11, International Food Policy Research Institute, Washington, DC.

Petersen, and Hyde. 2014. "Gender-related academic and occupational interests and goals." *PubMed* 47:43-76.

Rahm, M, and W Huffman. 1984. "The adoption of Reduced Tillage-The Role of Human Capital." *American Journal of Agrucltural Economics* 405-413.

Shafaq, Muhammad, Aqeela, and Mudassar. 2010. "Gender and Decision Making Process in Livestock Management." *Sarhad J Agric* 3.

Shipekesa , Arthur, and T.S Jayne. 2012. "Gender Control and Labour Input: Who Controls the Proceeds." Working Paper No.68, Indaba Agricultural Policy Research Institute.

Sichilima, Timothy, Ednah Ngoma-Kasanda, and Ikabongo Ikabongo. 2016. "Gender and Decision Making in the Maize Sector."

Sitko, Nicholas J, Anthony Chapoto, Steven Kabwe, Solomon Tembo, Munguzwe Hichambwa, Rabecca Lubinda, Harrison Chiwawa, Mebelo Mata, Simon Heck , and Dorothy Nthani. 2011. "Technical Compendium: Descriptive Agricultural

Statistics and Analysis for Zambia in Support of the USAID Mission's Feed the Future Strategic Review." Food Security Research Project.

USAID. 2015. "Intervention Guide for Women's Empowerment in Agriculture Index: Practioner's Guide to Selecting and Designing WEAI Iterventions." Unites States Agency for International Developmnet.

World Bank. 2002. "Empowerment and Poverty Reduction." World Bank.

—. 2004. "Zambia:Strategic Country Gender Assessment." 15-17.

APPENDIX A

Sample Distribution by Province and Household Headship

Province	All Farmers	Female Farmers	Male Farmers	Female farmers in		Male Farmers in	
				Female Headed Households	Male Headed Households	Female Headed Households	Male Headed 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
Northwestern	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	100.0	100.0	100.0	100.0	100.0	100.0	100.0