

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



By

**Timothy Sichilima, Ednah Ngoma-Kasanda and
Ikabongo Ikabongo**

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Foreword

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Questions and comments should be directed to the Research Manager, 6, Tukuluh Road, Long acres, Lusaka: +260 211 253 989; fax +260 211 255 502; email: timothy@musika.org.zm

Executive Summary

Whilst agriculture provides a livelihood to over 70% of the population, it is the women who dominate the agricultural sector in Zambia. However, they remain marginalised in terms of access to resources much needed to facilitate crop production. This has not only helped to stall the growth of the agricultural sector but has also impeded crop productivity. Women have the potential to significantly steer the sector on a positive growth trajectory, given that over 78% of women actively participate in the sector compared to 69% of men.

Despite the acknowledgement of the significant impact gender differences might have on decision making, currently there exists little empirical evidence in the maize sub sector for Zambia. This study was motivated by a dearth of knowledge regarding factors which influence women's decision making in the maize sub-sector in Zambia. The study examined factors that affect female control over maize production, sales and income. A nationally representative sample of rural maize farmers was used from the RALS 2015 data for the analysis. Below were the key findings:

1. Of the total farmers producing maize in Zambia, 23% are women. Women make up 10% of primary decision makers in selling the crop, and 9% of the primary decision makers on how the proceeds from maize sales are used. The overall outlook affirms the assertion that men dominate decision making in the maize sub-sector i.e. production, selling and use of revenue.
2. In terms of factors which affect gender decision making at production, distance to agricultural extension services was found to negatively affect women's decision making regarding maize production. Access to agricultural information is critical in improving knowledge levels of the farmers, and this has the potential of affecting farmers' productivity. This finding suggests improving the accessibility of agricultural information.
3. On the other hand, the study revealed that women's groups positively facilitated women's decision-making regarding the selling of maize. Thus women's groups offer a platform for women to share information which is key in positively influencing their participation in markets.
4. Furthermore, women's groups were found to facilitate women's decision making in using revenue from crop sells. Thus women's groups contribute to increasing female control over maize sales and revenues.
5. The study also found that as the proportion of maize income contribution to the total household income increased, it also significantly increased the likelihood of the decision maker over the use of maize revenue being female.

TABLE OF CONTENTS

Foreword	ii
Acknowledgement	iii
Executive Summary	iv
Table of Contents	v
List of Tables	vi
List of Figures	vi
List of Acronyms and Abbreviations	vii
1. Introduction.....	1
1.1 Study Objectives	2
2. METHODOLOGY	3
2.1 <i>Data</i>	3
3. RESULTS AND DISCUSSIONS	4
3.1 Descriptive Analysis	4
3.2 <i>Commercialization and Gender Differences in Decision Making</i>	7
3.3 <i>Factors affecting gender decision making at production</i>	7
3.4 <i>Factors influencing gender decision making at maize selling</i>	8
3.5 <i>Factors influencing gender decision making at revenue use</i>	10
4. Conclusions and Policy Implications	11
References	12
Appendix.....	14

LIST OF TABLES

TABLE 3. 1: A COMPARISON OF SOCIO ECONOMIC CHARACTERISTICS BETWEEN MAIZE PRODUCING HOUSEHOLDS	6
TABLE 3. 2: PROPORTION OF FEMALE AND MALE FARMERS BY COMMERCIALIZATION INDEX --	7
TABLE A 1: FACTORS INFLUENCING GENDER DECISION MAKING IN MAIZE PRODUCTION, SELLING AND USE OF REVENUE FROM MAIZE.....	14

LIST OF FIGURES

FIGURE 3. 1: PROPORTION OF FEMALES MAKING ECONOMIC DECISIONS IN HOUSEHOLDS PRODUCING MAIZE	4
FIGURE 3. 2: A COMPARISON OF MAIZE AREA CULTIVATED (HA) BY GENDER OF HOUSEHOLD HEAD AGAINST THE GENDER OF THE MEMBERS	5
FIGURE 3. 3: WOMEN WHO SOLD MAIZE FROM HOUSEHOLDS WHICH SOLD MAIZE	5
FIGURE 3. 4: A COMPARISON OF SOCIO ECONOMIC CHARACTERISTICS BETWEEN MAIZE PRODUCING HOUSEHOLDS	6
FIGURE 3. 5: PROPORTION OF FEMALE AND MALE FARMERS BY COMMERCIALIZATION INDEX...	7

List of Acronyms and Abbreviations

CI	Commercialisation Index
FAO	Food Agricultural Organisation
Ha	Hactares
Kg	Kilogram
RALS	Zambia's Rural Agricultural Livelihood Survey
ZMW	Zambian Kwacha

1. Introduction

Whilst agriculture provides a livelihood to over 70% of the population, it is the women who dominate the agricultural sector in Zambia (Nicholas et al., 2011). However, they remain marginalised in terms of access to resources much needed to facilitate crop production. This has not only helped to stall the growth of the agricultural sector but has also impeded crop productivity. Women have a critical role to play in the sector; they have the potential to significantly steer the sector on a positive trajectory of growth, given that over 78% of women actively participate in the sector compared to 69% of men. (Nicholas et al., 2011).

Nevertheless, a number of studies have shown that gender is a key issue that needs to be incorporated in the agricultural supply chain (Quisumbing, 1996; Shipekesa and Jayne, 2012; Ajewole et al., 2015). This is because gender inequality is a prominent challenge that has characterised the Zambian agricultural landscape. Gender in this context would mean relationships which have been established between men and women in society (Quisumbing, 1996).

Despite the acknowledgement of the significant impact gender differences might have on decision making, currently there exists little empirical evidence in the maize sub sector for Zambia. Whilst Shipekesa and Jayne (2012) focused on gender and decision making in relation to labour allocation, it is paramount to assess how gender and decision making is influenced at maize production, selling and use of revenue from maize sales. Focusing, separately, on gender decision making regarding production, selling of maize and revenue use can offer great insights. However, what would also be significantly useful is following through the different key nodes and seeing how factors influencing gender participation change. This is because different socio-economic factors could impact gender decision making differently at production, selling and revenue use.

Maize is particularly an interesting crop to look at as it is a widely cultivated crop among small scale farmers, and remains an economic, social and political crop for Zambia. For example, the grain staple accounts for about 90% of all crops grown at household level in Zambia (Chapoto and Zulu-Mbata, 2015). Thus the importance of the maize grain to the general populace cannot be downplayed as a change in its production has implications on the food security status of the country (FAO, 2016). It is therefore imperative to assess the gender dynamics regarding decision making at production, selling and use of revenue from the maize sale.

In terms of women participation in maize production, selling and revenue use, it is hypothesized that their participation in decision making deteriorates from production to revenue use. This research would specifically focus on gender and decision making at production, selling and revenue use from maize sales. In order to show dynamism in gender decision making regarding production, selling and revenue use, the study will endeavour to show how different variables affect gender decision making at the three levels, using robust statistical techniques.

1.1 Study Objectives

General Objective

The general objective of the study is to analyze factors which influence gender participation in decision making at production, selling and use of revenue.

Specific Objectives

- i. Examine factors which influence gender decision making in the production of maize.
- ii. Assess the socio-economic and demographic factors which influence gender decision making in the commercialisation of maize.
- iii. Determine the effect of women's group on decision making in the maize sector
- iv. Determine the socio-economic and demographic factors which affect gender decision making on revenue use.

Research Questions

1. Does decision making of women decline from production to revenue use?
2. Does gender of the household head significantly influence women's decision-making?
3. Does belonging to a women's group have a significant influence on women's decision-making?

The remainder of the study is organized as follows. The next section presents the methodology which gives an overview of the methodology used to estimate factors which influence gender decision making at production, selling and use of revenue from maize sales. In section three, results are presented. Conclusions and recommendations are then presented in section four.

2. METHODOLOGY

Empirical Model

The study used a probit model to model gender participation at production, selling and use of revenue from maize sales. The model is normally used to analyse individual choices with a discrete response variable. This is on the basis that gender participation in decision making at different stages of the value chain depends on the utility they derive. Following Damisa et al., (2007) the probit model can be shown in terms of the latent response variable:

$$y_i^* = \beta_0 + \sum_{k=1}^k \beta_j X_{ki} + \varepsilon_i, \quad (1)$$

where y^* represents the unobservable variable, and the observable variable y is a dummy representing gender participation in the agricultural value chain i.e. $y=1$ if the $y^* > 0$ and $y^* = 0$ otherwise. Whereas k represents the number of explanatory variables (X_i) explaining the phenomenon of individual i and β_j is the parameter estimate that explains the influence of X_i on the latent variable. Introducing the utility function and deriving the probability of gender participation in the agricultural value chain gives:

$$P(Y = 1 | X_{ij}) = \Phi(\beta_i X_i - \varepsilon_i) > 0, \quad (2)$$

where Φ is the cumulative distribution function for ε_i . The functional form Φ depends on the assumptions of residual term. This study assumes that it is normally distributed. However, the marginal effects of the regressors X_i on the probabilities are not equal to the coefficients. Marginal probabilities of choice (marginal effects) were therefore obtained to facilitate easy interpretation of the results. The marginal probabilities could be calculated from the probit model as:

$$\frac{\partial E[y = 1 | X_{ij}]}{\partial X} = \Phi(\beta' X) \beta, \quad (3)$$

where E is the expected value. The explanatory variables (X_{ij}) included: age, marital status, education level attained, lineage, region, number of male adults, number of female adults, distance, production index, membership to women groups and income index to analyse gender participation in maize production, sell and use of revenue from crop sales.

2.1 Data

Zambia's Rural Agricultural Livelihood Survey 2015 (RALS) data was used to conduct the analysis. The nationally representative sample had a total sample size of 9,520 households, and covered the 2013/2014 agricultural season. However, this study is based on a sub-sample of 7,033 households which were involved in the production of maize.

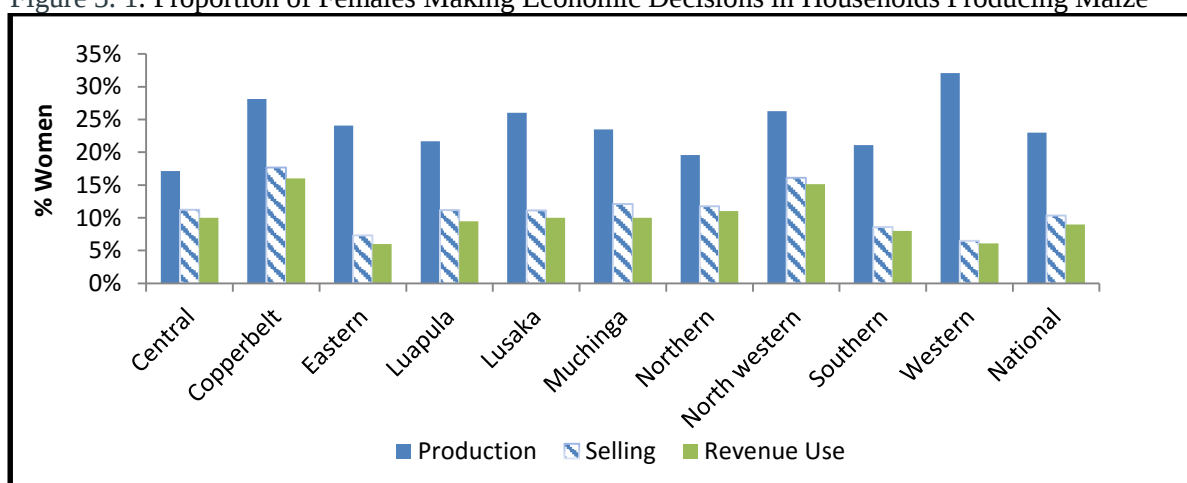
3. RESULTS AND DISCUSSIONS

This section presents the study results. The section starts by giving an overview of descriptive statistics, displayed as tables and figures. Empirical results will then be presented from regression models.

3.1 Descriptive Analysis

Of the total farmers producing maize in Zambia, 23% are women. Women also make up 10% of primary decision makers who sold the crop, and 9% of the primary decision makers on how the proceeds from maize sales should be used. While the difference between the number of women who made the decision to sell maize and those who made decisions on how to use revenue was minimal, the overall outlook affirms the assertion that there is a decline in the number of women who make decisions from production to use of revenue from maize sales. This finding is supported by Kiriti and Tisdell (2002) who observed that while female farmers might have control over the production of the crop, their decision making power is eroded at crop revenue. However, this is in contrast to findings by Ngoma-Kasanda et al., (2016) who found decision making of women to improve from groundnuts production up to the use of revenue from groundnut sales. Therefore, interventions should be designed in a way that closes the gap between decision making at production and selling. One way of doing this could be through setting up deliberate trainings for women with a focus beyond agronomic practices, but marketing as well.

Figure 3. 1: Proportion of Females Making Economic Decisions in Households Producing Maize



Source: RALS, 2015.

A look at decision making by gender of the household head against the gender of the members, reveals that women cultivated less area for maize than men, see figure 3.2. Men had bigger proportions of maize area cultivated than females. This again echoes men's dominance in sizes of maize fields cultivated. This statistic further shows that the grain staple is not produced exclusively by men or women, both sexes are largely involved in the cultivation of the crop. However, one striking difference is that women cultivated bigger fields under female headed households than under male headed households, see figure 3.2 with "D" denoting the difference. This affirms Nicholas et al., (2011) and Chapoto and Zulu-Mbata (2015) finding that female headed households cultivated smaller areas for maize than male headed households. This finding further suggests that household headship by gender affects how resources are

allocated and utilized. Women headed households have females cultivating more land than females under male headed households. Therefore, interventions which aim to encourage women participation in maize production would have more effect in capturing female headed households.

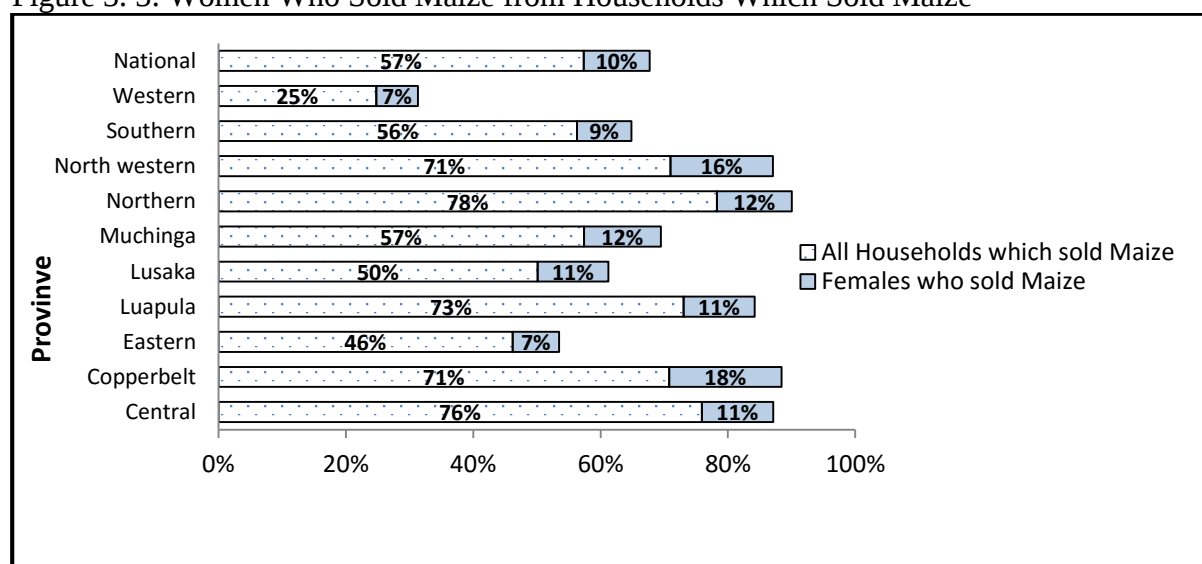
Figure 3. 2: A Comparison of Maize Area Cultivated (Ha) by Gender of Household Head Against the Gender of the Members



Source: RALS, 2015.

In terms of farmer participation in maize marketing, it was observed that over 50% of the households had sold maize. However, an estimated 10% of the females had made decisions to sale the crop for the households which sold maize, see figure 3.3.

Figure 3. 3: Women Who Sold Maize from Households Which Sold Maize



Source: RALS, 2015.

The low participation by women in making decisions regarding the sale of maize suggests that men take the central role in making decision in the commercialisation¹ of maize. The statistic

¹ The commercialisation term was adapted from Adong et al., (2014) to mean either the “incidence” or “intensity” of household’s market participation. In this particular case, the concentration is on the “incidence”.

reflects further the need to have interventions tailored towards encouraging women to participate in maize marketing beyond production. Hill and Vigneri (2011) alludes this large discrepancy in decision making by gender to women lacking access to markets, and this further limits their revenue gains.

Some key variables were also compared between female and male headed households, see Table 3.1. Female headed households had older members than male headed households. The study further revealed that while female headed households had about 9% of total household income coming from maize sells, male headed households had about 14%. This difference in income index between the two households might also suggest marketing challenges for females; considering that over 60% of household income for smallholder farmers comes from crops as noted by Chapoto and Zulu-Mbata, (2015). Distance to the market was found to be shorter for female headed households than male headed households. Furthermore, female headed households allocated more land towards maize production than the male headed households, out of the total area cultivated by the household. Even so, female headed households had lower yields than male headed households by over 400 kilograms. This supports Chapoto and Zulu-Mbata (2015) finding that women generally had lower yields for maize than men. From the study, it was also noted that female headed households had less adult males than male headed households. The presence and also number of male adults under a household can influence decision making with regard to type of crop grown and proportion produced from total farm land for the household.

Table 3. 1 :A Comparison of Socio Economic Characteristics between Maize Producing Households

Variable	Overall Mean	Female headed households	Male headed households	t-statistic
Age	48.386	52.522	47.302	12.026***
Production index	0.683	0.697	0.679	2.394**
Income index	0.127	0.094	0.136	-8.249***
Number of male adults	1.661	1.003	1.834	-24.369***
Value of agricultural assets (ZMW)	1085.789	460.577	1249.631	-6.767***
Distance to Market (Km)	16.738	15.963	16.941	-2.141**
Yield (Kg per Ha)	2558.002	2196.423	2652.756	-7.758***

Source: RALS, 2015.

, *Significant at 5 % and 1 % respectively.

Maize production was found to dominate total land cultivated by the household, see table 3.1. For instance, over two-thirds of the land was apportioned to maize cultivation. This is understandable given the role maize plays in the social and economic situations of the households. It can further be shown that men have a bigger share of income from maize sales than women. This disparity is consistent with the proportions of size of maize field cultivated by men against women. This suggests that income gotten from crop production might be a function of maize field controlled. However, a look at maize income contribution to total household income reveals that it contributes about 13% of the total household income. This implies that maize is not the major source of income for most households; this relegates maize to the status quo of being a subsistence crop.

3.2 Commercialization and Gender Differences in Decision Making

Table 3.2 reveals that female farmers drop out of decision making as the crop is commercialized. This was consistent from production up to revenue use. Commercialization Index (CI) is computed as a ratio of quantity of maize sold against the quantity harvested.

Table 3. 2 :Proportion of Female and Male farmers by Commercialization Index²

Maize CI* (%)	Control of production (%)		Control of Selling (%)		Control of Revenue (%)	
	Male	Female	Male	Female	Male	Female
0-10	70%	30%	98%	2%	99%	1%
10-25	68%	32%	69%	31%	70%	30%
25-50	79%	21%	79%	21%	79%	21%
50-75	83%	17%	83%	17%	84%	16%
75-100	88%	12%	88%	12%	89%	11%
Average CI	78%	22%	84%	16%	84%	16%

Source: RALS, 2015.

Empirical model results on factors which influence decision making of women in maize production, selling and use of revenue are discussed in the next sub-sections, and these discussions are based on table A1 at the annex. The results presented in the annex are the marginal effects of the explanatory variables. In explaining the marginal effect for a particular covariate, the ceteris paribus condition is assumed for all other variables.

3.3 Factors affecting gender decision making at production

From the results gleaned from the probit model, it was revealed that male headship of a household decreases the likelihood of the decision maker at maize production being female. These findings are supported by Shipekesa and Jayne (2012) who found gender of the household head to be one of the major factors which influences the gender of the person controlling the field plot. This implies that interventions which seek to encourage women decision making in production might realize a quicker impact if they targeted female headed households. Similarly, distance to plot and extension services were also found to significantly reduce the likelihood of women deciding to produce maize. Although distance had a small effect on gender decision making, the finding on distance to plot suggests time constraint for women against other demanding household responsibilities, while the finding on distance to extension service implies challenges women face in terms of access to agricultural information. Bassey (2002) also found that close proximity of the farm plot to household helped women to easily manage their household responsibilities with farm activities. On the other hand, being married was found to significantly and negatively affect the likelihood of women engaging in the production of maize. This suggests that traditional norms relegate women decision making on production, husbands make decisions regarding production. For instance, Doss (1999) affirms that decision making power of women depends on their status in the household. The study also found attainment of formal education by the primary decision maker to significantly

² The statistics were computed at field level except for crop selling, this was done at household level.

reduce the likelihood of the decision maker being female. Education in this study has been used as a proxy for an individual's ability to obtain, process and use information for decision making. The finding on this was counter intuitive as it suggested that attainment of formal education causes women to diversify to other income generating enterprises rather than engage in the production of maize. However, this might also mean that women with education understand the production challenges in the maize sub-sector and would thus opt for other ventures. This negative relationship between education and women involvement in decision making at maize production is in sharp contrast to a positive relationship between household head's education and women's decision making. For instance, including education of the household head in the model, showed a positive influence on women's decision making at maize production, see table A1 in the annex. Nevertheless, household gender composition was also found to be a significant factor in decision making. For instance, an increase in the number of adult females in the household was found to increase the likelihood of the decision maker being a woman in the production of maize. This could be attributed to cultural norms whereby women would encourage fellow women to make decisions regarding maize production. However, an increase in the number of men in a given household discourages women in making production decisions. The later finding resonates well with Kiriti and Tisdell (2002) who found Kenyan male farmers to pre-empt women's decision making over maize production especially when the crop became commercialized. This then means that interventions which targets households with more females are bound to be more effective in encouraging women decision making. On the other hand, regionalism was also found to significantly influence the gender of the decision maker regarding crop production. For instance, the study found that residing in central, eastern, northern and southern province significantly reduced the chances of the decision maker being female. This suggests that cultural barriers, in different provinces, pose a challenge for women in making production decisions. This conforms to the findings by Kiriti and Tisdell (2002) who found regionalism to affect women's decision regarding field labour allocation and use of land for farming. Thus efforts which seek to encourage women decision making in different provinces should consider cultural issues in the design. A further analysis which included rural area as a variable showed that residing in the rural area has a negative effect on decision making over the production of maize, see table A1 in the appendix.

This node has shown the need to have women tailored interventions which are alive to the challenges faced by women in decision making in the production of maize. For instance, taking extension services closer to rural households has the potential of encouraging women's participation in maize production as this can reduce distances covered to access extension information. Furthermore, attention should be given to the traditional norms in different provinces as this might also affect the success of women-tailored interventions.

3.4 Factors influencing gender decision making at maize selling

A number of factors were found to influence gender decision making at selling. For instance, male headed households were found to reduce the likelihood of a primary decision maker being a woman. This points out to the critical role household headship plays in influencing decision making not only at production but also the commercialisation of the crops (Kiriti and Tisdell,

2002). Thus interventions which deliberately target female headed households are more likely to increase women decision making regarding the marketing of maize than male headed households. On the other hand, being in a monogamous marriage reduced the probability of a woman making a decision to sell maize. This could be attributed to strong cultural norms which place husbands at the centre of decision making at household level. Although there is limited literature on this, Kiriti and Tisdell (2002) also found that only a small proportion of farmers engaged in the production of subsistence crops were also involved in the selling of the crops. The implication of this is that married women have a challenge in engaging themselves in the commercialisation of maize; this decision might rest on the household head. In contrast, attainment of tertiary education was found to significantly increase the chances of a decision maker being female regarding the sale of maize; Damisa et al., (2007) also obtained similar findings. This is especially important in reading and interpreting the agricultural marketing dynamics. The study also found decision maker membership to women groups to play a critical role in influencing gender decision making. For example, belonging to a women's group increases the probability of the decision maker being a female. Women group membership was included as a proxy for access to market information. This has been found to be important as it offers a platform for shared information (Muhammad *et al.*, 2003). Other than that, women groups might also provide women with an opportunity to build collective capital and negotiate prices. Therefore, working through women groups can help improve women participation in decision making regarding the selling of maize. Household and female ownership of agricultural assets was also found to significantly increase the chances of the decision maker being female at maize selling. Although, the effect of asset ownership on gender decision making was small, this denotes that households with more valuable agricultural assets are likely to let females make decisions at selling. Banerjee et al., (2014) alludes the gender gap in decision making to differences in income and ownership of assets. This plays a role in intra-household bargaining and could affect gender decision making regarding the commercialisation of the staple. This finding point to the importance of access and availability of assets which can help improve the participation of women in the marketing of maize. Furthermore, ownership of agricultural assets by the women folk could increase their intra-household bargaining power, which could consequently lead to women making decisions regarding the sale of maize. Therefore, interventions with a high end of encouraging women participation in decision making regarding crop marketing need to consider resource base of the potential decision makers. The study further found that residing in eastern and western province significantly reduced the probability of the decision maker being female at maize production. However, women from Central, Copperbelt, Luapula, Northern and North-Western were likely to be involved in the selling of maize. This is also indicative of the traditional norms laid in different provinces which influences women decision making in the commercialisation of the grain staple. This needs consideration in shaping interventions which seek to encourage women participation in decision making in the marketing of maize. Therefore, interventions need to consider special constraints faced by women in the selling of maize in order to realise improved participation of women in the maize sub-sector.

This phase has shown that maize interventions should consider paying particular attention to cultural norms as they can play a key role in encouraging women participation in the selling of

maize. The study has further revealed that going through women groups or association for trainings can significantly and positively facilitate women decision making regarding the selling of maize.

3.5 Factors influencing gender decision making at revenue use

Doss (1999) acknowledges that even though women might be major producers of primary crops they are socially constrained in terms of access to crop revenue. Therefore, it is of great significance to look at factors which do not only affect women's decision making in production and selling of the crops but also the use of the crop revenue. Male headed households were found to significantly reduce the likelihood of the decision maker being female by 55% over the use of revenue from maize sales. However, attainment of formal education was found to positively and significantly affect the probability of the decision maker being female over revenue use. Although its magnitude in effect was found to be small, education is critical in gender decision making. This is affirmed by Damisa et al., (2007) that education positively affects women's decision making at household level regarding how income is used. On the other hand, belonging to a women's group was also found to positively affect the likelihood of the decision maker being female. Despite the small effect, this entails that groupings are important for information sharing and can help women access important information through peer learning. In contrast, residing in eastern and western province, like it was at the selling node, discourages women decision making. This again suggests cultural related barriers which relegates women's decision making in these areas. The study also found that as the proportion of maize income contribution to the total household income increased, it also significantly increased the likelihood of the decision maker over the use of revenue being female. This finding is supported by Njuki et al., (2011) who found that women's control of income was also largely dependent on its contribution to food security; women were likely to engage more in decision making regarding crops which had a food security connotation.

These findings from this node implies that targeting or encouraging formation of women's groups can also facilitate the realisation of full benefits on the side of women as this could be a conduit of vital agricultural information sharing. The aforementioned factors can bolster the already existing support given to women in rural areas by various stakeholders.

4. Conclusions and Policy Implications

A number of lessons can be drawn from this study. For example, there is need to pay attention to the traditional norms in different provinces as this might also affect the success of women-tailored interventions; women in Central, Eastern, Northern and Southern province were unlikely to control the production of maize. It has also been established that extension provision needs to be enhanced by taking such services closer to the farmers as this can reduce distances covered by farmers to access such services.

In terms of factors which affect gender decision making at selling, it has been revealed that paying attention to cultural norms can also play a role in encouraging women participation in maize marketing. The study further revealed that going through women groups or association for agricultural trainings can significantly and positively facilitate women decision making regarding the selling of maize. Interventions also need to address challenges faced by women in accessing resources which facilitate the marketing of maize.

Results on factors which affect gender decision making regarding the use of revenue showed that interventions also need to consider education levels of the potential beneficiaries in the targeted areas in planning and designing of maize related interventions. Furthermore, targeting or encouraging formation of women's groups can also facilitate the participation of women at both selling and use of revenue; women groupings can be a conduit of vital agricultural information sharing. There was also need to consider the cultural norms in different provinces as they were also likely to affect the likelihood of women making selling decisions.

These findings are critical in understanding factors which influence women's participation in the agricultural sector and in advocating for policies which recognises women's needs. This suggests the need to provide platforms through which women can receive vital information critical for decision making. If leveraged correctly, the aforementioned factors can further bolster the already existing support given to women in rural areas by key stakeholders for them to be fully engaged in making key decisions over the maize production, selling and use of revenue from crop sales.

References

- Ajewole, O., Eyitayo, O. A., Ojehomon, V., Agboh-Noameshie, R., Diagne, A. (2015) Gender Analysis of Agricultural Innovation and Decision Making among Rice Farming Household in Nigeria. *Journal of Agricultural Informatics*. Vol. 6, No. 2.
- Banerjee, D., Klasen, S., and Wollni, M. (2014) Market Discrimination, Market Participation and Control over Revenue: A gendered analysis of Cameroon's cocoa producers.
- Bassey, C. (2002). Women and Food Security: A Study of Vegetable Farming in Calabar Metropolis. A Dissertation Submitted To The Department of Sociology, University of Calabar in Partial Fulfilment Of the Requirements for the Award of Master Of Science Degree In Sociology.
- Becker, G.S. 1962. "Irrational Behaviour and Economic Theory". *The Journal of Political Economy* 70.1:1-13.
- Chapoto, A., and Zulu-Mbata, O. (2015). Rural Agricultural Livelihoods Survey 2015 Survey Report. Indaba Agricultural Policy Research Institute (IAPRI). Lusaka, Zambia
- Damisa, M, A., Samndi, R., and Yohanna, M. (2007). Women Participation in Agricultural Production: A probit Analysis. *Journal of Applied Sciences* 7(3): 412-416.
- De Brauw, A. (2014). Gender, control, and crop choice in northern Mozambique. International Food Policy Research Institute, *Agricultural Economics* 46 (2015) 435–448.
- Doss, C.R. (1999). Twenty-five years of research on women farmers in Africa: Lessons and implications for agricultural research institutions -- With an annotated bibliography. CIMMYT.
- Food Agricultural Organisation. (2016). GIEWS Country Brief, Zambia
- Hill, R.V., and Vigneri, M. (2011). Mainstreaming gender sensitivity in cash crop market supply chains. ESA Working Paper No. 11-08. Food and Agriculture Organization of the United Nations
- Kiriti, T., and Tisdell, C. (2002). Gender, Marital Status, Farm Size and Other Factors Influencing the Extent of Cash Cropping in Kenya: Working Paper No. 26, Social Economics, Policy and Development, the University Of Queensland.
- Nicholas, J. S., Chapoto, A., Kabwe, S., Tembo, S., Hichaambwa, M., Lubinda, R., Harrison Chiwawa, Mataa, M., Heck, S., and Nthani, D. (2011). Technical Compendium: Descriptive Agricultural Statistics and Analysis for Zambia in Support of the USAID Mission's Feed the Future Strategic Review. Working Paper No. 52. Food Security Research Project Lusaka, Zambia

- Njuki, J., Kaaria, S., Chamunorwa, A., and Chiuri, W. (2011). Linking Smallholder Farmers to Markets, Gender and Intra-Household Dynamics: Does the Choice of Commodity Matter? *European Journal of Development Research* (2011) 23, 426–443.
- Ngoma-Kasanda, E., Sichilima, T., and Ikabongo, I (2016). Factors Influencing Gender Decision Making in the Zambian Groundnuts Sub-Sector. Working Paper No1, Musika Development Initiative.
- Muhammad, L., Njoroge, K., Bett, C., Mwangi, W., Verkuijl, H. and De Groote, H. (2003). *The Seed Industry for Dry land Crops in Eastern Kenya*. Mexico, D.F.: CIMMYT and Kenya Agricultural Research Institute (KARI).
- Quisumbing, A.R. (1996). Male-Female Differences in Agricultural Productivity: Methodological Issues and Empirical Evidence. International Food Policy Research Institute, Washington, DC, USA. *World Development*, Vol. 24, No. 10, pp. 1579-1595.
- Shipekesa, A, M., and Jayne, T.S. (2012). Gender Control and Labour Input: Who Controls the Proceeds from Staple Crop Production among Zambian Farmers? Working Paper 68 Indaba Agricultural Policy Research Institute (IAPRI).

Appendix

Table A 1: Factors Influencing Gender Decision Making in Maize Production, Selling and Use of Revenue from Maize⁺

	Production		Selling		Revenue Use	
Age (years)	-0.003	(0.003)	0.001	(0.001)	-0.000	(0.000)
Age squared (years)	0.000	(0.000)	-0.000	(0.000)	0.000	(0.000)
Household head sex (base=male)	-0.926***	(0.009)	-0.425***	(0.030)	-0.553***	(0.036)
Distance to farm plot (km)	-0.003**	(0.002)				
Distance to extension services (km)	-0.001*	(0.000)				
Marital status (base= not married)						
Monogamous	-0.092***	(0.023)	-0.018**	(0.007)	-0.001	(0.001)
Polygamous	-0.020	(0.027)	-0.007	(0.004)	-0.000	(0.000)
Education (base=no education)						
Primary	-0.289***	(0.096)	-0.024	(0.049)	-0.010	(0.011)
Secondary	-0.386***	(0.046)	0.039	(0.025)	0.009*	(0.005)
Tertiary	-0.202***	(0.009)	0.027***	(0.004)	0.003	(0.009)
House head Primary education	0.185**	(0.081)	0.028	(0.039)	0.008	(0.007)
House head Secondary education	0.690***	(0.121)	0.149	(0.163)	0.229	(0.153)
House head Tertiary education	0.878***	(0.010)	0.881***	(0.174)	0.001	(0.004)
Number of adult male	-0.010	(0.007)	0.002	(0.001)	0.000	(0.000)
Number of adult female	0.032***	(0.007)	0.001	(0.002)	0.000	(0.000)
Matrilineal (base=Patrilineal)	0.012	(0.016)	-0.001	(0.003)	-0.000	(0.000)
Production Index	-0.030	(0.032)	-0.008	(0.007)		
Membership to women's group	0.006	(0.017)	0.016***	(0.005)	0.001*	(0.001)
Ownership of agricultural assets (ZMW)	-0.000	(0.000)	0.000***	(0.000)	0.000	(0.000)
Rural (base=Urban)	-0.125***	(0.037)	0.002	(0.005)	-0.001	(0.001)
Province (base=Lusaka)						
Central	-0.114***	(0.021)	0.029*	(0.015)	0.001	(0.001)
Copperbelt	-0.020	(0.033)	0.051***	(0.020)	0.004	(0.003)
Eastern	-0.123***	(0.024)	-0.014**	(0.006)	-0.001**	(0.001)
Luapula	-0.046	(0.030)	0.024	(0.016)	0.001	(0.001)
Muchinga	-0.062**	(0.028)	0.018	(0.013)	-0.001	(0.000)
Northern	-0.067**	(0.028)	0.032*	(0.016)	0.001	(0.001)
North-western	-0.038	(0.034)	0.044**	(0.020)	0.002	(0.002)
Southern	-0.105***	(0.022)	-0.003	(0.007)	-0.001	(0.000)
Western	0.001	(0.036)	-0.017***	(0.004)	-0.001**	(0.000)
Distance to Market (km)			-0.000	(0.000)		
Income index					0.014***	(0.004)

⁺For each node, marginal effects are presented followed by the standard errors in Parenthesis