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**GENDER DIFFERENTIAL IN PROFITABILITY AND OTHER ASPECTS OF SMALLHOLDER
SOYABEANS PRODUCTION IN EASTERN PROVINCE, ZAMBIA**

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GENDER DIFFERENTIAL IN PROFITABILITY AND OTHER ASPECTS OF SMALLHOLDER SOYABEANS PRODUCTION IN EASTERN PROVINCE, ZAMBIA

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ABSTRACT

Even though soyabeans production in Zambia is dominated by large farmers, getting increased yield to meet national requirements can only be achieved by increased participation of the teeming smallholders in soybeans cultivation. In the light of the recent increasing cultivation of soybeans by female farmers in the Eastern Province of Zambia, this study computed and compared profitability of male-owned and female-owned soyabeans farms. The specific objectives were to analyze gender dominance in cultivation activities, compare cost and returns, identify uses of profit and isolate factors affecting profit. The analytical tools used included descriptive statistics, Z-test and regression model. Summary statistics showed that 90.0% of male farmers was married while married female farmers constituted 73.3% of respondents. About 67.0% of male and 70.0% of female farmers attended and/or completed secondary school education. Male dominated land preparation (66.7%), produce transportation to market (65.0%) and weeding (56.7%) while females were dominant in planting (74.2%), shelling, (66.7%), bagging (71.7%) and marketing (82.0%). Quantity produced and profit were significantly higher for males while cost was higher for females. Male spent 57.7% of profit realised on purchase of household production assets like bicycles while female expended 63.3% of profit on foodstuffs consumed in the household. Expenditure by women was more household-centred compared with men. The variables influencing profit included formal education, extension visits, cost of transport, quantity of soybeans harvested and price. The major problems facing farmers included poor markets, low price and scarcity/high prices of inputs. It was concluded that men grew soybeans more profitably than women. It is recommended that extension services be tailored to women for enhanced profitability. Also, for its importance as a major protein source in the livestock industry, government needs to include soybeans among priority crops supported with inputs and purchased by the Food Reserves Agency to encourage increased cultivation and assure farmers of a ready market.

Key words: Soybeans, cultivation activities, smallholders, gender dominance, cost, revenue, profitability, Eastern Province, Zambia

1.0 INTRODUCTION AND PROBLEM STATEMENT

Soyabeans (*Glycine max* L.), is a leguminous crop that originated from China but widely adapted to tropical, sub-tropical and temperate climates (Mustapha, *et al.*, 2011). Since introduction to Zambia in the 1920s after the opening up of the Copperbelt mines, soyabeans production has increased due to its nutritive, economic and social uses (Chilundika, 2011). Its production is dominated by commercial farmers (Food & Agricultural Organization [FAO], 2010). Commercial farmers' output, according to FAO, is an average of 3.5Mt/ha compared with 0.5Mt/ha for smallholder farmers. Smallholders, a considerable proportion of which are women, on the average, cultivate less than two hectares of land even with regard to maize, which is Zambia's most popular grain (FAO, 2010). Despite their low outputs compared to commercial farmers, smallholder farmers cannot be ignored in policies that can lead to agricultural development in Zambia because they preponderate in the production of food crops (Chilundika, 2011).

Soyabeans has been the major source of protein in the formulation of animal feeds in Zambia. Thus, there is no doubt that an increase in its output will have positive implications for feed quality, availability and prices (Chilundika, 2011). Despite attracting better prices compared to popularly consumed crops like maize, it is puzzling that in Zambia, the portion of land devoted to cultivating soyabeans by smallholders is very small (hardly often exceeding half an hectare). This is considered to be far below what is required to achieve self-sufficiency in production and make for a sufficiently remunerative profit that can enhance household food security.

Understanding the roles of women and men in agriculture is germane in planning agricultural development (Mafimisebi, 2007; Mafimisebi and Fasina, 2009; Syampaku and Mafimisebi, 2012). Mostly, women perform repetitive, tedious and time consuming farm tasks (Ahmed and Ismail, 1998; Mafimisebi *et al.*, 2013) while men generally carry out tasks that require technical and operational skills and physical strength. These tasks include applying herbicides and insecticides, stumping and use of machine or animal powered instruments. As new technologies are introduced, men are quicker to adopt them especially if they are capable of saving time and energy (Ahmed and Ismail, 1998). In addition, men also, in most cases, handle the household's money even when the money is jointly made by both men and women. Even though the responsibilities of women have increased at the household front over the years (World Bank, 2009), yet, they tend to be disadvantaged when it comes to control of productive resources and this affects their productivity adversely in comparison with men (Alene *et al.*, 2008; Mafimisebi and Fasina, 2009; Mafimisebi *et al.*, 2013).

Of the smallholder farmers growing soyabeans in Zambia, only very few are growing it as a food crop despite its being an excellent source of protein second only to protein from meat products (Central Statistics Office [CSO], 2009). The majority of the smallholder farmers grow it as a cash crop in the manufacture of poultry feeds and only a small proportion of soyabeans produced is used for human consumption (Zambian National

Farmers' Union, [ZNFU], 2010). According to ZNFU (2010), Zambian poultry production has increased by over 500% in the last decade. This increase is partly attributed to the increase in soyabeans production (ZNFU, 2010). On the contrary, the level of protein malnutrition in Zambia, especially among children under five, is still very high owing to the prohibitive prices of animal protein sources (CSO, 2009). It is puzzling to have this malnutrition situation despite the increase in soyabeans production in Zambia. A probable cause is the fact that most households cannot appreciate the nutritional attributes of the crop, do not know how to process it for household consumption or do not have sufficient quantities to process for household consumption as the demand by feed milling industries alone presently surpasses national production (CSO, 2009). Arising from the giant stride made in the development of soybeans in Zambia, Zambian Agricultural Research Institute [ZARI], (2011) posited that current output has the potential to triple if the crop is accorded its right place in Zambia's agriculture. This stride included breeding for disease, pest, drought and shatter resistance and proven varieties that are early maturing and high yielding. The scenario captured above portrays a highly promising potential for both increasing production and consumption of soybeans.

A farmers' decision to produce a crop either for consumption or sale or both depends on many factors other than price (Chilundika, 2011). In rural areas of some developing countries, where traditions are held firmly, certain crops cannot be grown at all or their cultivation is restricted to certain sex because of beliefs and myths (Williams *et al.*, 1984; Awoyemi, 1989 and Gittinger *et al.*, 1990). In Nigeria for example, yam is a crop exclusively cultivated by males (Williams *et al.*, 1984). Owing to traditional beliefs for which scientific bases have not been established, soybeans has been traditionally cultivated by men in Zambia. Women involvement in cultivation of soybeans only recently began when farms were increasingly being left in the care of women as a result of the migration of men to the urban centres to take up more lucrative employment opportunities. Up till now, in the traditional practice of growing soyabeans, there is a difference in the behavior of men and women (Chilundika, 2011). As reported by CSO (2009), women grow it in small scattered plots alongside groundnuts and common beans to be able to have a variety of crops for households' consumption. Conversely, men grow soyabeans for cash on relatively larger acreage so that they can produce large quantities to attract enough revenue. It is clear then that the decision to grow the crop has to pass through the sieves of how important the crop is to that person making the decision, either man or woman surrounded by the prevailing socio-cultural or economic conditions.

Many studies on gender roles in agriculture focus on differences between activities performed by men and women with little or no attention to their effects on the overall profit that farmers make from the cultivation of a particular crop (Alene *et al.*, 2008). It is imperative that these activities, which are sometimes gender differentiated, are carefully analyzed to identify those activities that increase production cost and subsequently reduce profit. This gender disaggregated analysis is needed in designing cost-saving strategies for these activities. This is especially important because of the break down in the notion of male or female activities or crops in traditional agriculture which has been occasioned by change in gender roles as socio-economic or cultural situations changes (Ahmed and Ismail, 1998, Ayoade, 2010).

As a consequence of the fore-going, research is necessary to establish whether there is a difference in performance soyabeans farms managed by women and men in terms of selected variables. Thus, the general objective of this study was to compare gender distribution in activities and profitability in male owned and female owned smallholder soyabeans farms in the study area. The specific objectives included to:

1. compare gender dominance in various activities in soyabeans cultivation;

2. compute and compare cost and returns from male owned and female owned soyabeans farms;
3. isolate factors influencing profit;
4. identify the uses of profits and
5. identify the constraints faced by soyabeans farmers.

Hypothesis

The hypothesis tested in the study is stated hereunder in both the null and alternative forms.

H₀: There is no significance difference in quantity produced, cost incurred and returns secured between male and female soyabeans farmers.

H₁: There is significant difference in quantity produced, cost incurred and returns secured between male and female soyabeans farmers.

2.0 RESEARCH METHODOLOGY

2.1 Study Area, Sampling and Data Collection

The study was carried out in Eastern Province of Zambia which has seven districts namely Chadiza, Chipata, Katete, Lundazi, Mambwe, Nyimba and Petauke. The province has a population of 1, 707,731 (CSO, 2009) and lies in the Ecological Region II that receives annual rainfall in the range of 850mm to 900mm. The soils are naturally fertile, sandy-loam making the province a very ideal one for agricultural production. The main activity and source of income is agriculture and the population is concentrated in rural areas. The major crops grown include maize, cotton, tobacco and groundnuts.

The farmers from which data were collected were selected using multi-stage sampling technique. From the seven (7) districts, 3 districts, namely Chipata, Lundazi and Petauke, were purposively selected for having the largest number of registered soyabeans farmers (Ministry of Agriculture, 2010). In the second stage, four communities with the largest volume of soybeans production from each district were sampled purposively. In the third stage, 10 respondents divided into five (5) males and five (5) females were sampled randomly from a register of soyabeans farmers got from the Extension Unit of Ministry of Agriculture and Livestock. Thus, a total of 120 respondents was sampled for the study.

Primary data analyzed in this study were collected from respondents through the use of structured and pre-tested set of questionnaires which was administered by the researchers. As most of the farmers did not keep formal records of their past production activities, they relied on memory recall in responding to the questions posed to them. However, since the memory recall was limited to operational activities of the last growing season only, most of the farmers were still able to provide the data without difficulties.

Socio-economic characteristics on which data were collected included sex, age, marital status, education and number of income-generating activities engaged in by the respondents. Data were collected on the various farm operations carried out in soybeans cultivation and extent of gender involvement and preponderance in farm operations. Data on cost and returns included cost of seed, fertilizer, land preparation, weeding, harvesting and transportation. With regard to returns items, data were collected on the quantity of produce and the selling price per unit of produce. To answer the question on which gender dominates a particular farm activity, perception

questions were posed with three possible options. Respondents also were asked to state, in percentage terms, the involvement of male or female or both in each identified farm activity.

2.2 Analytical Tools

The tools used in data analysis included descriptive statistics, z-test and regression model. Descriptive statistics such as table, frequency and percentage were used to summarize the socio-economic characteristics of respondents, gender dominance in farm operations, uses of the profit made and problems encountered by farmers. Profit made on male- and female-owned farms was computed using the budgeting model. The budgeting model is presented as:

$$\text{Net Income} = \text{TR} - \text{TC}$$

Total Revenue is the total money value of the sales of soybeans. Total Cost (TC) is normally divided into cost incurred on fixed inputs used in the production process; fixed cost (FC) and cost incurred on variable items, variable cost (VC). Variable cost items included labour, fertilizer, seed and chemicals. Since land, a fixed item, is customarily owned in Zambia and farmers do not pay rent on its use, total fixed cost was assumed to be zero in this study.

The Z-test was used to compare the quantities produced, cost and returns because the sample size was greater than 30 per gender group. The formula of the Z-test is represented hereunder:

$$Z_{cal} = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

\bar{X}_1 = mean value for female soyabeans farmers

\bar{X}_2 = mean value for male soyabeans farmers

$\frac{S_1^2}{n_1}$ = variance for female soyabeans farmers

$\frac{S_2^2}{n_2}$ = variance for male soyabeans farmers

n_1 = number of female farmers in the sample (60)

n_2 = number male farmers in the sample (60)

The ordinary least of squares (OLS) regression was used to identify factors influencing profit in the two sets of farms. Two regression models were fitted, one for male-owned farms and the other for female owned farms. The explicit form of the regression equation is of the form.

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, U)$$

Y= income from soybeans production (in Kwacha, ZMW)

X_1 = Household size

X_2 = Number of years of formal education by farmer

X_3 = Number of extension visits per year

X_4 = Transport cost

X_5 = Number of other income generating activities

X_6 = Size of plot devoted to soybeans cultivation

X_7 = Quantity of soyabeans harvested

X_8 = Price/kilogramme of produce

U= random component that takes care of omitted variables that could affect profit.

3.0 RESULTS AND DISCUSSION

This chapter presents the results obtained from the research.

3.1 Socio–economic Characteristics of Farmers

The majority (55.0%) of male respondents in Table 1 was between 30 and 50 years and (25.0%) was above 50 years. This implied that majority of the male farmers were in the economically active age bracket. This is expected to be capable of positively influencing their decision regarding soybeans production.

Table 1: Summary of Farmers' Socio-economic Characteristics

Information on Table 1 showed that 83.3% of female soybeans farmers was aged between 21 to 50 years. In the age bracket of above 50 years, there were more male farmers than female farmers. This finding may have emanated from the fact that at older age, female farmers get more rapidly spent and worn out compared with their male counterparts. They therefore tend to loose energy for farm work faster than the male. Hence, this may be the reason why at ages above 50 years, they participate less in active farming compared with the male farmers.

Table 1: Summary of Socio-economic Characteristics of Respondents

Variable	Female Farmers		Male Farmers	
	Frequency	Percent	Frequency	Percent
Age (Years)				
<20	0	0.00	02	3.33
21 – 30	17	28.30	10	16.67
31 – 40	17	28.30	18	30.00
41 – 50	16	26.70	15	25.00
> 50	10	16.70	15	25.00
Total	60	100.00	60	100.00
Marital Status				
Single	03	5.00	01	1.70
Married	44	73.33	54	90.00
Divorced	05	8.33	01	1.70
Widowed	08	13.33	04	6.7
Total	60	100.00	60	100.00
Years of Formal Education				
No formal education	0	0.00	02	3.30
1 - 9	12	20.00	10	16.70
10 - 12	46	76.67	40	66.70
> 12	02	3.33	08	13.30
Total	60	100.00	60	100.00
Household Size				
<5	21	35.00	24	40.00
1 – 5	36	60.00	30	50.00
6 – 10	03	5.00	06	10.00
Total	60	100.00	60	100.00
Sources of Income				
Only farming	43	71.70	44	73.30
Farming and at least one source	17	28.30	16	26.70
Total	60	100.00	60	100.00

Source: Survey data, 2012.

Table 1 also revealed that 90.0% of male soybeans farmers was married while married female farmers was 73.3% of the sample. Widows constituted 13.3% while those that were divorced accounted for 8.3%. The reasons for male farmers having a smaller percentage for divorce and widowers could be that they can more easily remarry when they either divorce or lose their spouses compared with females who take longer time to do so when and if they have the opportunity.

It was also revealed that 50.0% and 60.0% of male and female farmers had between 6 and 10 members in their households. In both types of households, an average of 72.5% of members engaged in farming as their primary occupation. Since growing of soybeans is labour intensive, it is expected that bigger household sizes, which is a potential source of family labour for weeding and harvesting, may have positive implications for soybeans cultivation. This is particularly necessary because during these farm operations, oxen are not used.

Table 1 showed that 16.7% of male soybeans farmers had attended and completed primary school education while 66.7% had attended and completed secondary school education. The proportion that attended tertiary education was 13.3%, and those that had no formal education constituted 3.3% of male farmers interviewed. The proportion of female farmers that attended and completed primary school education, secondary school education and tertiary school education was 20.0%, 76.7% and 3.3%, respectively. There was no female soybeans farmer without formal education. The higher the ability of the farmer to read, write and do little computation, the better that farmer is likely to be at following instructions and performing of farm tasks correctly. For traditional agricultural production, the result will be more yield and higher quality output which will lead to higher income more probably at relatively lower cost. The information provided above indicated that female farmers had more of primary and secondary school education than male farmers. This could have resulted from the government educational policy that is targeted at the girl-child which makes primary and secondary schools available and accessible to them (Ministry of Education, 2006). At the tertiary level, male farmers were dominant at 13.3%. The reduction in numbers of female farmers advancing to tertiary education could be due to the practice of early marriage which is still the norm in most tribes in Zambia, especially after secondary school.

Table 1 showed that only 26.7% of male farmers had an extra source of income apart from farming. For female farmers, the table showed 28.3% had an extra source of income apart from farming.

3.2 Gender Distribution in Soybeans Cultivation Operations

From the information shown in Table 2, males were dominant in land preparation at 66.7% participation. Only 15.0% of respondents attributed land preparation to women. However, 18.3% of farmers said that both male and female carried out land preparation to an equal extent. The reason for male dominance of land preparation could be that, by custom in Eastern Province, animal husbandry (especially cattle keeping) is considered a man's first economic activity. Since field cultivation is mostly animal powered in the province, it follows naturally that men are the ones that cultivate land for growing crops since it requires masculine power to handle the plough.

Table 2: Gender Dominance in Farming Activities

Activity	Male > Female		Female > Male		Equal for both Sexes	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Land Preparation	80	66.70	18	15.00	22	18.30
Planting of Seeds	07	5.80	89	74.20	24	20.00
Weeding	10	8.30	42	35.00	68	56.70
Harvesting	12	10.00	49	40.80	59	49.20
Shelling	09	7.50	80	66.67	31	25.83
Bagging	09	7.50	86	71.67	25	20.83
Transportation to the market	78	65.00	12	10.00	30	25.00
Marketing	16	12.5	98	82.00	06	5.00

Source: Survey data, 2012.

Table 2 also showed that planting was dominated by females at 74.2%. Only 5.8% of respondents opined that males are saddled with the task of planting on soybeans farms. About 20.0% of respondents reported that planting is attributed equally to both male and female. The preponderance of females in planting could have

arisen from the fact that by its nature, planting is a light non-tedious task which women are better at organizing other family members, especially children, to assist with. In most cases, it is observed that after men have cultivated the field in the mornings, females will go in to plant either following the plough behind late in the afternoon or early in the evening (Chibalani, 2013).

About 57.0% of the respondents said weeding is being equally done by both male and female. Another 35.0% of respondents attributed weeding to only females while only 8.3% traced it to only males. The reason why weeding was attributed to both male and female is that in most farms in which animal power is not used for weeding, family labour, which involves all family members, is the alternative.

Harvesting was attributed to both male and female by 49.0% of the respondents while 40.0% of the sample said harvesting was an exclusively females' task. However, 10.0% of the respondents attributed harvesting to only males. This may have been the case because harvesting, a time bound operation, needs the effort of the man and the woman and indeed, other household members, if the work is to be done quickly to prevent sustaining irreversible crop and income losses.

Transporting of the produce from field to the market was reportedly dominated by men (65.0%) while 25.0% of the respondents said that it was being undertaken collectively by both male and female. Only 10.0% of the respondents affirmed that produce transportation to the market was done by females. Male domination of transportation may have resulted from the fact that ox carts are *mostly* used to transport these produce from the farm to the house or point of sale. In the culture of the study area, it is men that mount the cart and oxen (Chibalani, 2013).

3.3 Quantity of Soybeans Produced, Cost and Returns by Gender

The results in Table 3 revealed that the total production from the sample farmers was 78,617 kg on male owned farms while that of female owned farms was 70,340kg. While female farmers incurred average operational cost of ZMW 416.67, that of males was ZMW 312.50. The average sales price per kilogramme of produce was ZMW 2.88 for males while female farmers had average sales price of ZMW 2.96. Thus, the returns or gross profit made by males was ZMW 3,461.12 while the value for females was ZMW 3053.44.

Table 3: Cost and Returns in Soybeans Production

Items of Cost	Mean Value of Items (ZMW)	
	Female Owned Farm	Male Owned Farm
Gross Income	208,206.40	226,416.96
Mean Gross Income	3470.11	3773.62
Land Preparation	3208.00	2640.00
Seeds	6390.00	5530.00
Planting	930.00	850.00
Fertilizers	4270.00	3050.00
Harvesting & Bagging	3880.00	2030.00
Transportation	2710.00	2035.00
Total Cost of Operations	25,000.00	18,750.00
Average Cost of operations	416.67	312.50
Gross Profit from Operations	3053.44	3461.12
Revenue Cost Ratio	8.33	12.08

Source: Results of survey data analysis.

The results shown in Table indicated that female soybeans farmers had a relatively higher mean cost (ZMW 416.67) compared to that of their male counterpart (ZMW 312.50). The reasons for the difference may have arisen from the fact that women spent more on hiring of labour to do the land preparation, weeding and transporting of the produce. On the contrary, men use their animals to prepare land and transport the produce to the market centres thus avoiding some expenses. By using own animal power, men mostly do not pay for the labour as women do and therefore save cost on these items. This contributes to lowering the costs of producing soybeans on farms managed by males. Average price was higher for females probably because they are usually better at bargaining skills and sales strategies and are more persevering than males thus enabling them to secure better prices. Also, yield was better on farms managed by males in comparison to those managed by females because farms operations impinging on yield may have been more promptly carried out on male owned farms because of the advantage of using animal power for farm operation or working faster than females in some farm operations. This may have led to a difference in yield of 8, 277kg. The revenue cost ratio was 12.08 on male owned farms and 8.33 on farms owned by females.

3.4 Comparison of Selected Variables in Soybeans Production

The results of the two sample test used to investigate the existence of significant difference in mean values of yield, total cost and total revenue by men and women is shown in Table 4. The Z-values rejected the null hypotheses and all of them showed that there were differences in average values of yield, revenues and production costs. These results could be traced to the differences in costs and timeliness in carrying out some of the identified farm operations. For example, while land preparation cost female farmers ZMW 3208, the value for male farmers was ZMW 2640. The differences in these cost items are big enough to have significant effects on the overall mean. The results indicated that biological and economic yield performances were better on male managed farms compared with female managed farms.

Table 4: Results of Mean Comparisons for Selected Variables

Variables		Mean	Std. Err.	Std. Dev.	Z – value	P – value
Quantity	Male	1310.28Kg	96.1	744.4	3.161	0.0872*
	Female	1172.33Kg	90.7	703.04		
Gross profit	Male	ZKW3773.6	286.3	2217.7	2.423	0.0672*
	Female	ZKW3470.1	282.6	2189.6		
Total cost	Male	ZKW 318.5	44.3	343.3	5.647	0.0102**
	Female	ZKW 416.6	39.8	308.1		

Source: Result of survey data analysis. Notes: * means significant at 5%, ** means significant at 1%.

3.5 Factors Influencing Profit from Soybeans Cultivation

The result of the double-log form of the regression models for identifying determinants of profit from soybeans farms is presented on Table 5. The F value for each gender group, which was significant at 1% indicated that the model strongly fitted the data. In both models, the same set of five variables were significant but at varying levels of significance. Table 5 showed that years of formal education, number of extension visits per year, transport cost, quantity of soybeans harvested and unit price were the important determinants of profit.

There was positive relationship between each of these variables; education, extension visits, unit price and quantity harvested and profit indicating that as these variables increased, the profit from soybeans cultivation also increased. For female farmers, a unit increase in each of these variables will increase profit by 1.9%, 7.1%, 11.1% and 2.7%, respectively. The corresponding value for male farmers was 3.1%, 4.8%, 16.5% and 2.2%, respectively. On the other hand, the relationship between transport cost and profit bore a negative sign. This means that as transport cost increased, profit from soybean cultivation decreased. In fact, a unit increase in transport cost will decrease profit by 17.4% for female farmers and 12.8% for male farmers.

Table 5: Estimates of Determinants of Profit from Soybeans Cultivation

Variable		Female Farmers		Male Farmers	
		Coefficient	Standard error	Coefficient	Standard error
Household size	X ₁	0.0338	0.0165	0.0277	0.0135
Number of years of formal education	X ₂	0.0186**	0.0098	0.0307*	0.0084
Number of extension visits per year	X ₃	0.0705**	0.0017	0.0484*	0.0019
Transport cost	X ₄	-0.1738**	0.0672	-0.1275**	0.0429
Number of income-generating activities	X ₅	-0.05424	0.02056	-0.07328	0.03065
Age of respondent	X ₆	-0.07218	0.02737	-0.06943	0.02632
Quantity of soybean harvested	X ₇	0.11118**	0.09436	0.16451**	0.01042
Price per kg	X ₈	0.02745*	0.00844	0.02186**	0.0019
Constant	b ₀	0.08899	0.05278	0.06972	0.04135
R ²		0.76847		0.7194	
Adjusted R ²		0.7314		0.6932	
F value		0.86970**		0.7742**	

Source: Compiled from output of OLS Regression analysis. Notes ** and * denote 1% and 5% level of significance, respectively.

3.6 Uses of Profit Made from Soybeans Cultivation

Table 6 brings into perspective the uses of profit by soybeans farmers. The result revealed marked gendered differences in the spending priorities by male and female farmers. While majority of male farmers spent the greatest proportion (57.7%) of their gross profit on purchase of household assets such as bicycles, televisions or radios, most (63.3%) of the profit made by women was expended on foodstuffs and kitchen wares.

Table 6: Uses of Profit from Soybeans Cultivation

Uses	Female Owned Farms		Male Owned Farms	
	Amount (ZMW)	Percentage	Amount (ZMW)	Percentage
School and other educational needs	629.00	20.6	501.86	14.5
Household food consumption & kitchen wares	1932.83	63.3	301.12	8.7
Household assets	238.17	7.8	1997.07	57.7
Savings for re-investment	253.44	8.3	543.40	15.7
Others	-	-	117.81	3.4
Grand Total	3053.44	100.0	3461.12	100.00

Source: Result of survey data analysis.

The second most important expenditure item to women was school fees and school-related needs (20.7%) while for males, it was savings for re-investment into the farm firm (15.7%). Thus, it seems that there is a higher welfare enhancing effects of the income made by the women compared with the men as observed by (Peterman, 2011) and as reported for women’s application of profit made from farm related income generating ventures (Alene *et al.*, 2008; Mafimisebi *et al.*, 2013). However, the distribution of expended income tends to reveal that while the men seemed to be more interested in households’ capital goods related to farm firm investment, the females were more concerned with household’s food, kitchen wares acquisition and educational investment. It was noted that while male farmers had a group of items lumped under “others” which in this study included social participation and a miscellany of personal consumption items, female soybeans farmers did not have any of such. Expenditure by females was more household-centred compared with men. Other items that are important to each gender group are shown on Table 6.

3.7 Constraints to Soybeans Cultivation

As with all business enterprises that are tailored at generating some income for the household, soybeans farmers in the study area were confronted with a number of constraints shown in Table 7. There were notable differences between men and women in terms of the proportion of farmers who identified a particular constraint as a hindrance to higher performance. For example, while only 20.0% of male farmers were faced with the problem of poor availability of improved inputs, 55.0% of female farmers were confronted with that problem. The improved inputs needed to grow soybeans more profitably by the farmers included certified seeds, inoculum and herbicides. These inputs are not well stocked and are often available in limited quantity (Agricultural Marketing Information Center [AMIC], 2013). Where and when available, they are too expensive for the smallholder farmer to afford.

Table 7: Major Challenges facing Soybeans Farmers

Constraints	Male farmers		Female farmers	
	Number	Percent	Number	Percent
Poor Price	12	20.0	03	5.0
Poorly organized market	33	55.0	18	30.0
Scarcity of improved inputs	12	20.0	33	55.0
Labour	03	5.0	06	10.0
Total	60	100.00	60	100.00

Source: Survey data, 2012.

The scarcity and high cost of inputs has compelled farmers to use recycled seeds that are not inoculated and a good proportion of farmers do not apply fertilizers at all or they apply insufficient quantities. The logical consequences of these are low harvests and poor quality produce. Also, while 30.0% of female farmers described poor organization of soybeans market as problem, about 55.0% of male farmers identified it as the major constraint encountered. Poor organization of the soybean market causes anxiety to farmers and compels them to sell their produce to vendors (briefcase businessmen) at ridiculously low price. The arguments that the vendors put up for the low price offered farmers are that their crop is of poor quality and high moisture content. Poor price was identified by 20.0% of men while the same problem was seen as hampering production only by 5.0% of women. The differences in the proportion of farmers that identified each type of constraint as a major issue means that there must be gender-specific solutions to these constraints faced by farmers.

About 5.0% male and 10.0% of female farmers pointed out that labour is another constraint in growing soyabeans. The growing of soyabeans is labour intensive at weed control and harvesting stages (Chilundika, 2011). The gravity is intense as the farmers in the Eastern Province of Zambia rely on oxen as source of farm-power. However, during weeding, the animals are not used to avoid crop damage. Therefore, hand hoe is used. This type of weeding is tedious and difficult for especially male farmers who are used to animal drawn equipment when working the field. There is also intensive labour required during harvesting, cutting the crop and moving it to a central place to avoid shattering of pods. During harvesting, soybeans cannot be subjected to long distance and careless handling as pods easily explode scattering the seeds. Pod splitting leads to considerable on-farm crop losses. In soyabeans cultivation, loss of the pulse is the major source of yield loss which can be up to 20.0% of the harvestable grain (Chilundika, 2011; Ayoade, 2010; Manond and Aemprapa, 2010).

CONCLUSION AND RECOMMENDATIONS

Conclusion

The study focused on comparing profitability of male owned and female owned soyabeans farms in Eastern Province of Zambia. The study interviewed equal numbers (60) of male and female soyabeans farmers using structured questionnaire. The cost and returns of male and female farmers on one hectare of land was computed and compared. Descriptive statistics showed that more male farmers were exposed to tertiary education than the

female farmers while more female farmers attained secondary school education compared to men. About 90.0% of male and 73.0% of female farmers were married.

The various farm activities in soybeans cultivation were performed to different extents by male and females. For example, weeding was done by both men and women while harvesting and processing were collectively done by both men and women (49.2%). Men dominated land preparation and transportation of produce to the market. Planting, shelling, bagging and sales of soybeans was dominated by female farmers. Male farmers were found to have lower cost of producing soybeans compared to female farmers. The z-test result showed that there was significant difference in yield of soybeans, cost and revenues between male and female farmers in the study area. It can thus be concluded that males are growing soybeans more profitably than females.

The regression result showed that education, extension visits, unit price and quantity harvested were the strongest determinants of profit from soybeans cultivation.

Recommendations

Extension services should be inclusive to have a gender balanced targeted audience in disseminating soybeans information since a good proportion of both men and women farmers have acquired secondary school education. Since research results showed that there were significant differences in average costs, quantity produced and gross profit from soybeans production of male and female farmers, extension should give better attention to female farmers to make them catch up with males in terms of productivity increases.

Government needs to re-designate soybeans as a major crop as it drives the livestock industry being a major source of protein in compounding animal feeds. This can be done by making it part of the crops that the Food Reserves Agency provides subsidized inputs to and purchase from farmers. In doing this, farmers will be assured of a ready input source and market for their crop.

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