Determinants of Agricultural Commercialization among Smallholder Farmers in Mvurwi, Zimbabwe

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ABSTRACT

Agricultural commercialization in various third world countries has been perceived as a pathway to increasing the smallholder farmer's income. Such positive welfare outcomes lead to poverty alleviation among rural livelihoods. Some of the smallholder farmers in Mvurwi area of Mazowe district produce at subsistence level while some have varying degrees of commercialization. The purpose of this study was to analyse the determinants of agricultural commercialization among smallholder farmers of Mvurwi, Zimbabwe. The study used primary data collected from a random sample of 273 smallholder farmers using a structured household questionnaire. A Tobit regression model was used in determining the factors effecting agricultural commercialization. Results of the Tobit regression showed that gender, master farmer training and land have significant and positive influence on the degree of commercialization while access to agricultural extension and loans have a significant and negative influence. The study recommends the provision of financial support to smallholder farmers to enhance productivity through commercialization.

Keywords: Smallholder Agriculture, Commercialization, Subsistence, Tobit Regression, Mvurwi

INTRODUCTION

More than 50 percent of Africa's total population depends on agriculture for all or part of their livelihood (Myeni and Moeletsi, 2020). The agricultural sector is very important in the economies of most third world countries as it increases food security and reinforces Africa's contribution to global trade (World Bank, 2008). Fostering sustainable agricultural growth plays a key role in boosting income and improving the general living conditions of the poor (Sikwela, 2008). Moreso, promoting agricultural growth leads to economic development in both up and down stream subsectors (World Bank, 2008). As such, agriculture is an obligatory, indispensable, and priority element of economic development as it is associated with considerable job creation potential as well as elimination of hunger and malnutrition (Arias et al., 2013). In Zimbabwe, the agricultural sector supplies 60 percent of the raw materials required by the industrial sector, contributing forty percent of total export earnings (Myeni and Moeletsi, 2020).

Ogutu and Qaim (2019) define commercialization in agriculture as the advanced shift from household production for consumption to production for sale in the market. Commercialization patterns in Zimbabwe are being shaped by a new agrarian structure, and a better access to agricultural financing even though the nation is faced with an economic crisis weakening the whole process (Pingali, 2006). The government and the farmers agree on the need for agricultural commercialization, though often for different reasons. Cash crops are said to be the main drivers of commercialization given the links to global markets (Kabiti et al., 2017).

Muricho (2017) proposed that the commercialization of smallholder farmers could positively influence both performance and livelihood generation especially in the developing countries that have agriculture as the backbone of their economies. The Fast Track Land Reform Program (FTLRP) which led to a sudden increase in smallholder farmers in Zimbabwe was impelled by the idea that commercialization of smallholder agriculture

was a very important component of economic growth and development for agro-based economies (World Bank, 2015). Commercialization allows for effective participation in formal market opportunities; it also leads to reduced poverty in rural communities. The Medium-Term Plan (2015) policy on agriculture, is a clear indication that Zimbabwe, as a country has recognized the significance of smallholder commercialization as it reflects sustainable agricultural productivity and competitiveness as priority areas (Obiero, 2016).

Pingali (2012) views smallholder commercialization as an important feature of the structural transformation process considered by most development economist to be the chief pathway from a semi-subsistence agrarian society to a more varied and food secured economy with advanced general living standards. While the government of Zimbabwe has been encouraging commercialization among smallholder farmers, there are still challenges with regards to participation in agricultural markets (Kabiti et al., 2017). Muricho (2017) states that in trying to commercialize agriculture, there has been some setbacks which include lack of access to finance. This therefore holds back commercialization, especially for A2 farmers with bigger plots and also for A1 farmers who are desperate for expansion and intensifying agriculture. This research therefore explores the factors that could play a role in improving smallholder agriculture towards commercialization particularly in Mvurwi district.

Studies carried out in different parts of the world have shown some of the determinants of commercialization (Barrett, 2013). However, these determinants differ within and across countries due to the varied conditions faced by the smallholder farmers (Kabiti et al., 2017). This then qualifies a location-based analysis of determinants of commercialization, which is the main focus of the study in order to diagnose the best way to capacitate the smallholder farmers in Mvurwi.

According to Bernard et al. (2016) poverty and food insecurity among rural farming households in developing countries has been seen as the result of low agricultural productivity. Commercialization of smallholder agricultural producers through improved participation in output markets has been endorsed as one of the best approaches in addressing such a problem (Mahofa et al., 2022). This work therefore is an effort to cover the research gap and contributes to the generation of evidence for policy makers to realize greater market participation of smallholder farmers in Mvurwi. The main objective of this research, is therefore, to ascertain the determinants of household commercialization. Thus, the study may generate new empirical information on the determinants and effects of commercialization on income of smallholder farmers in Mvurwi.

LITERATURE REVIEW

Agricultural Commercialization

According to World Bank (2015), household producing a significant amount of cash commodities is said to be commercialized when a certain proportion of its resources are allocated to marketable commodities. Kabiti et al. (2017) defines commercialization in agriculture as an endogenous process that involves a gradual replacement of integrated farming systems and is accompanied by economic growth and urbanization. Pingali (2006) argues that, the process of commercialization should not be expected to be flawless since environmental and social consequences may occur at least in the short to medium term, especially when inappropriate policies are followed. Commercialization has been adopted as a means of improving smaller holder farmer's income and reducing rural poverty in many developing countries and it has been thought of as a way of ensuring household food security (Madududu et al., 2022).

The path of commercialization opens opportunities for economic growth by generating income, creating employment, reducing poverty and improving sustainability of agricultural systems (Pingali, 2011). Agricultural commercialization entails producing crops for household consumption and also for the market so as to generate income to sustain households (Ogutu and Qaim, 2019). It is one of the strategies used to raise resources in terms of income and also to achieve overall economic development (Sukume and Mutyasira, 2020).

Commercialization not only focuses on taking the products to the market instead, it delves deeper to a virtuous cycle through which farmers intensify their use of the productivity-enhancing technologies for them to achieve high levels of output hence improving their living standards (Madududu et al., 2022). Pingali (2006) states that

there has to be a serious consideration on both the input and output market and most importantly the farmer's behaviour on decision-making in production and marketing of agricultural products. Subsistence farmers base on production possibility and considers their subsistence household requirements and therefore would sell only whatever surplus product is left after meeting their consumption requirements (Mahofa et al., 2022). On the other extreme a market-oriented farmer targets markets in their production decisions, than relying on the amount of produce they are likely to sell after consuming some portion (Bernard et al., 2007). Production decisions of commercialized farmers are grounded on market signals and comparative advantages (Pingali, 2001).

Measuring the Level of Commercialization

There are various indicators that have been used in measuring the degree of commercialization in agriculture. Bernard et al. (2007) suggests that commercialization is measured along a continuum from zero (total subsistence-oriented production) to unity (100% production is sold). Measuring commercialization helps in gauging the extent a given farm household is commercialized in its overall production, marketing and consumption decisions, and also in analysing the determinants of household commercialization (Pingali, 2001).

Commercialization is normally measured both in terms of gross and net sales measured as the ratio of percentage value of gross marketed output to total farm production (Bernard et al., 2007). Bernard et al. (2007) further explains that the proportion of sales out of the total value of agricultural production is the most commonly used indicator for measuring the degree of commercialization at the household level. Nonetheless, households may also sell products that are not intended for markets. A basic subsistence farmer would always have some amount of produce to exchange with in the market for basic essential goods (Dillon and Barrett, 2017). This therefore gives the reason of standardizing the measurement, that, only the ratio of marketed output beyond a certain minimum level should be taken as a measure of commercialization (Pingali, 2006).

Bernard et al. (2007), constructed a commercialization index defined as the share of the total value of farm output sold (value of output sold divided by value of total farm output). In line with the above measure, Bernard et al. (2007) measured the extent of household commercialization in the following ratios

$$\text{(a) Commercialization of Agriculture (output side)} = \frac{\text{Value of agricultural sales in markets}}{\text{Agricultural production value}}$$

$$\text{(b) Commercialization of Agriculture (input side)} = \frac{\text{Value of inputs acquired from market}}{\text{Agricultural production value}}$$

However, the above measure of commercialization has its limitation in that, it ignores production decisions meant for sale and only captures the revealed marketing decisions of households (Pingali, 2001). The complex phenomenon of commercialization is not clearly shown, as the degree of diversification, introduction of new products, the extent of involvement of corporate in agri-business and changes in the farmer's attitudes cannot be captured (Pingali, 2006).

This is mainly the case for agricultural commodities that are for sale and household consumption as is the situation with most of smallholder farmers (Govereh et al., 1999). Govereh et al. (1999), indicates that, for the construction of the index, price data are required to value the quantities of farm output. Prices are not the same, even for identical commodities, and they are not captured for all households. Therefore, average sales price reported by sample households are used to value farm output for better comparison (World Bank, 2008).

Determinants of Agricultural Commercialization

Several studies have presented numerous factors influencing the ability of smallholder farmers in actively participating in output markets. Rios et al. (2009) states that transaction costs are an important component of marketing, determining the extent of commercialization. Transaction costs occur whenever a good or service is transferred across a technologically separate interface (Rios et al., 2009). Farmers are faced with high transaction costs that include costs of production and marketing costs.

Formation of collective groups however assists the smallholder farmers in participating in the market more

effectively (Stockbridge et al., 2003). By acting collectively these farmers reduce transaction costs of accessing inputs and obtaining market information, secure access to new technology and tap into high value markets. This will therefore allow them to compete with large farmers and agri-businesses (Stockbridge et al., 2003). Evaluating smallholder famer's participation in cereal markets in the eastern and southern Africa, Barrett (2008) notes that, for the producers of staple food grains, there are fairly small share, both in terms of gross as well as net sales.

There is substantial variation in terms of analytical methods employed, data coverage, and crops considered in commercialization, even though the possible factors determining the marketing behaviour of smallholder famers have been empirically presented (Key et al., 2000). In terms of data coverage, there are studies that collect survey data from a nationally representative sample of all rural households, while most others primarily focus on purposive samples (Barrett, 2008). Most studies provide crop-specific analyses, focusing on a single crop. For example, the majority of the existing studies in Zimbabwe were largely based on crop-specific and area-specific estimates (Bernard et al., 2007). The kind of analyses fails to capture the variability across regions (geographic and Agro-ecological), and they also limit the generalizability of the findings at the national level (Barrett, 2008).

Boniphace (2015) suggests that the household who actively engage in markets are those usually with access to adequate assets and infrastructure and are faced with appropriate incentive. In addition, Barrett (2008) also found that there is an association between household's asset holdings and geographical zones and household commercialization. Those that are found participating in output markets are the wealthier households and those cultivating in higher potential Agro-ecological zones. Barrett (2008) noted that technology is one of the factors determining the level of commercialization in that technical productivity of a household greatly influence its net marketable surplus. The use of improved production technologies drives a farmer to actively partake in output markets (Barrett, 2008).

INSIGHTS FROM THE LITERATURE REVIEW

The researcher concludes that commercialization has been presented as a rescuer to the third world countries as stated by Pingali (2006) that, agricultural commercialization process will lead to increased agricultural productivity there by eradicating poverty and ensure food security. Regardless of its adversity qualified by Filmer and Pritchett (2007) that, commercializing smallholder farmers means loss of ability to produce food and also loss of food productivity in a way that farmers will disregard food crop production and major in purely cash crop production. Govereh et al. (1999) explains that farmers will therefore be exposed to high risks since prices tend to fluctuate in the market, as there are of slight concern in production under subsistence farming.

In support of the Herald (2018) the research sees hope for Africa specifically for Zimbabwe whose agricultural sector alone is able to turnaround the whole economy if more is produced for the export market. For example, China in particular is able to absorb Zimbabwe's entire produce, yielding the nation with foreign currency, this therefore is a call that, there is a future for smallholder commercialization and hence the African countries should maximize on every opportunity to grow and sell a greater proportion of its produce.

RESEARCH METHODS

Study Area

This study was carried out in Mvurwi area of Mazowe district in Mashonaland Central Province, Zimbabwe. Mvurwi lies within natural region II of Zimbabwe. The average annual rainfall in the area is approximately 1050mm (Chitapi and Shonhe, 2020). Mvurwi is characterised by sandy light-textured soils derived predominantly from granite. The granitic soils, in the area have contributed to high tobacco production (Sukume et al., 2022). The soils are also best for maize production, groundnuts and livestock ranching. The topography provides the district with a varied climatic structure. Mvurwi is located approximately 100 km north of Zimbabwe's capital, Harare (Chitapi and Shonhe, 2020; Mahofa et al., 2022).

The area comprises three farm types (commercial, new resettlement, and communal) that straddle 18 administrative wards. It has a small urban centre (Mvurwi town), which serves as one of the administrative

centres for the province (Mahofa et al., 2022). Mvurwi has become a vibrant agricultural centre, where the majority of smallholder and commercial farmers in the area are focused primarily on tobacco production. Most of the smallholders particularly A1 farmers have little in the way of capital or access to finance and are therefore contracted by tobacco buying companies in the area (Chitapi and Shonhe, 2020; Shonhe et al., 2020). The expansion of tobacco farming in Mvurwi area has resulted in an increase in the number of tobacco contracting companies (Chitapi and Shonhe, 2020).

Research Strategy, Sampling Frame and Sample Size

In this study, quantitative research strategy was employed. The strategy was used to analyse the data which was collected using structured household survey questionnaire from a representative sample of 273 household heads smallholder farmers who grow crops. Mvurwi is divided into wards which are further divided into villages; therefore, multi-stage sampling method was used as the sampling procedure for this study.

In the first stage of sampling, three wards were selected using purposive sampling on the bases of accessibility because some wards are located in areas with poor transport systems while some are in distant areas. From the selected wards, eight villages were selected (second stage) purposively also on the bases of accessibility. The sampling frame was the list of all farmers in the villages selected. In the last stage, simple random sampling was used to select 273 households from each village to be included in the study.

Table 1: Summary of Wards Covered

Ward	Number of Farmers
26	41
27	152
30	80
Total	273

Data Collection

This study is based on primary data. A sample survey was performed using structured questionnaires as the data collection tool for the study. Data was collected from two hundred and seventy-three smallholder farmers in Mvurwi. The data collected was comprised of the farmers' participation in agricultural commercialization, also on the determinants of commercialization (land size, asset endowments, gender of household head, farming experience, access to key services, etc.) and on the impacts of commercialization on household income.

Analysis

The research employed a Tobit regression model to analyse the factors influencing participation of different households in agricultural markets. The specific model was preferred because the dependent variable, the Household Commercialization Index (HCI) is bounded. Its value was constrained to fall within a range of 0 and 100. The HCI, as defined by (Govereh et al., 1999), was computed as the ratio of the gross value of all crop sales per household per year to the gross value of all crop production.

The Tobit model allows for a robust examination of the determinants of commercialization by accounting for the reason that some households might have an HCI of zero because they are not participating in agricultural markets at all whereas some households have varying levels of participation, some fully participating (100%). Tobit regression model suits well for this data set because it estimates the effect of independent variables on both the probability of market participation and the degree of participation. The research provides a comprehensive view of how different factors affect a household's overall market-oriented behaviour in Mvurwi by aggregating cash crops such as tobacco, maize, groundnuts, sugar beans, and soya beans into a single variable- HCI. The equation below shows the assumed Tobit model;

$$y_i^* = \beta_o + \beta_j x_i + \varepsilon_i = x_i'\beta + \varepsilon_i \qquad \varepsilon_i \sim N(0, \sigma^2)$$

where y_i^* is a latent variable HCI that is truncated, x_i represents independent variables, β_j's are model coefficients, and ε_i is the error term which follows a normal distribution.

RESULTS AND DISCUSSION

General Characteristics of Households

Table 2 and 3 summarize the key household demographic and socioeconomic characteristics. The main variables of the study include, age, gender, education, marital status and farming experience of the household head, as well as the household ownership of livestock, productive assets, and land.

Table 2: Household Socioeconomic Characteristics

Household Characteristics	Mean	Std. Deviation	Min	Max
Household Head Age (in years)	51.07	13.32	24	93
Farming Experience (in years)	15.06	5.46	1	47
Ownership of Livestock (TLU)	5.83	6.44	0	45.86
Ownership of Land (ha)	4.91	1.91	0.50	6

N=273

Table 2 above shows that a typical household head is about 51 years of age with the youngest being 24 and the oldest 93 years old. On average the respondents have 15 years of farming experience with at least everyone having a year of experience, which is an important aspect in commercialization. A typical household head owns an average of 5.8 livestock unit and also the mean total land holding for the sample farmers is 4.909 hectares.

Table 3: Household Socioeconomic Characteristics

Household Characteristics	Frequency	Household (%)
Sex		
Female	58	21.25
Male	215	78.75
Education Level	4	1.47
No schooling	55	20.15
Primary	194	71.06
Secondary	20	7.33
Tertiary		
Marital Status	3	1.10
Single	211	77.29
Married	3	1.10
Separated	11	4.03
Divorced	45	16.48
Widowed		

Primary Activity		
Farming	259	94.87
Formal employment	13	4.76
Informal Income activity	1	0.37

N=273

Table 3 above indicates the male headed households constituting 78.75% of the sample households as compared to the 21.25% female headed homes. A greater proportion of household head (71.6%) attended secondary school whereas the range goes from those who never attended school (1.47%) to those who attended tertiary education (7.33%). A proportion of 77.29% farmers are married though there is a smaller proportion of the divorced (4.03%), single (1.1%), widowed (16.48%) and separated (1.18%). 94.87% of the household head were involved in farming activity as compared to the proportion of those who are formally employed (4.76%) and those who are into informal income activities (0.37%).

Determinants of Agricultural Commercialization

Table 4: Tobit Regression Estimates of Factors Influencing Commercialization

Variables	**Coefficients**	**Std. error**	**T**	**P>|t|**
Gender (male)	7.74	4.45	1.74	0.08*
Access to extension	-6.95	3.99	-1.74	0.08*
Access to loan	-52.74	22.41	-2.35	0.02**
Master Farmer Train	19.00	7.81	2.43	0.02**
Arable land (ha)	5.69	0.79	7.26	0.00***
Farming Experience	-0.14	0.28	-0.51	0.61
Married	-7.68	12.23	-0.63	0.53
Divorced	-1.90	6.83	-0.28	0.78
Separated	-4.90	5.80	-0.84	0.40
Widowed	-1.08	3.17	-0.34	0.74
Constant	39.24	13.04	3.01	0.00***
Sigma	20.78	0.89		

***significant at 1%, **significant at 5%, *significant at 10% level of significance

Log likelihood = -1212.483 LRchi2 (10) = 71.55 Prob > chi2 = 0.0000 Pseudo R2 = 0.0287

The results of the study in table 4 suggest that gender, having a master farmer training certificate and land, are the variables that significantly and positively influences the level of commercialization. Contrariwise, access to key agricultural services that is access to extension and access to loans were significantly and negatively affecting commercialization. This might have been because of poor delivery of these agricultural key services, that the amounts of supplied formal credit were smaller without any kind of supplementary extension services and follow-up, thereby providing opportunities to households for non-agricultural use of credit (The World Bank, 2000). Also, due to high interest rate and lower prices offered by lenders, majority of the smallholder farmers tend to sell their products from the farm to lenders as per the loan conditions, consequently sabotaging the farmer.

The likelihood ratio statistics indicated by chi-square test statistics are highly significant ($p<0.0001$), meaning that the model has a strong explanatory power (Williams and Jorgensen, 2023).

Gender was significant at 10% significance level with a positive sign. This means that commercialization level is higher by 8% if the household head is male. This is generally because of the fact presented by the society that women are always at the bottom of employment ladder whether in formal or informal sectors (Mbilinyi et al., 2015). This is also due to the fact that women are obliged to domestic activities and hence will spend most of their time doing house chores other than being involved in the processes of commercialization like man. This is in line with the study of (Mbilinyi et al., 2015) who highlighted that majority of women carry double burden of both production and reproduction, paid and unpaid work, in family and or community level and hence lowering their productive significance.

The results shown on table 4 show that land is significant at 1% significance level and has a strong positive relationship ($p=0.000$) with household commercialization. This means that for every unit increase of land size there will be a result increase in household commercialization by a proportion of 6%. This might be due to the significance of land as a vital factor of agricultural commercialization. This is also related to the study done by (Nguyen Do Anh Tuan, 2006) which emphasized that land accumulation is the major factor that promotes land productivity and agricultural commercialization. Another finding from the same study points out that land accumulation requires development of land market which will inspire skilful farmers to make further investments in agriculture and the transfer of land surplus to non-agricultural sectors therefore resulting in the growth of agricultural commercialization (Nguyen Do Anh Tuan, 2006).

The coefficient of master farmer training was significant at 5% significance level with a positive sign. A possible explanation for this is that master farmer training yields competent farmers (Rusike et al., 2006). The objective of master farmer training is to spread modern, scientific farming techniques in communal areas. One of the methods that has been used is the 'trickle-down' theory of extension where by a few progressive farmers receive extension and information, which they are to pass on to other farmers using the method of farmer to farmer dissemination and demonstration(Scoones et al., 2020) . That itself results in a successful adoption of new agricultural technologies and thus increase in the probability of household commercialization (Train et al., 2005).

However, results show that access to extension affects the level of commercialization negatively. This contradicts with the findings of Martey et al. (2012) who argued that agricultural services provide advice, information and other support to farmers, enabling them to improve the productivity of their crop and animal enterprises contributing to their farm and nonfarm incomes. Therefore, it should impact the level of commercialization positively (Martey et al., 2012).

Access to loans was found to be one of the significant factors negatively affecting the level of commercialization. This however is a dissimilarity to most studies. Tirkaso (2013) opined that agricultural loans can help the farmer in covering operating expenses including purchasing the necessary inputs for production. Loans can also assist the farmers in purchasing farm land and also help in the marketing costs (Tirkaso, 2013). It is therefore expected to positively influence the level of commercialization.

Policy Implications

The study brings out several important policy implications for promoting agricultural commercialization among smallholder farmers in Zimbabwe. The positive correlation between access to arable land market participation indicates the need for policy makers to facilitate access to larger landholdings, and more productive plots for smallholder farmers. The positive effect of master farmer training on HCI emphasises the importance of investing in agricultural extension services that are delivered promptly and the importance of specialised training programs. There is need for policies to focus on accessibility and affordability of these programs, especially for smallholder farmers. This will equip them with necessary skills and knowledge to transition from subsistence farming to commercialization.

The finding from the study also indicates that, access to extension and loans were perceived as obstacles to commercialisation for Mvurwi farmer which is a crucial policy concern. Re-evaluation and reforming of existing

credit and extension systems must be employed by government sand development organisations. These organisations can create more flexible and farmer-friendly loan schemes with lower interest rates and less collateral requirements which will attract smallholder farmers into market participation. Extension services need to be strengthened to ensure they are responsive to the specific needs of the famers. Policy makers should support the formation of digital platforms and communication networks that provide farmers with timely information on commodity prices, demand trends, and potential buyers. This will therefore reduce transaction costs and aid market participation.

CONCLUSIONS

This research makes a significant contribution to the existing literature by examining the determinants of agricultural commercialization among smallholder farmers in Mvurwi, Zimbabwe. Dissimilar to most previous studies which focused on single crops, this study utilised an aggregated HCI encompassing maize, tobacco, soya bean, sugar bean and groundnut. The results revealed that access to arable land is likely to encourage the farm household's participation in markets; the farm households with a huge piece of land are very likely to produce crops for commercial purpose. In addition, master farmer training and gender had a positive effect on the farm household's commercialization. Moreover, access to extension and access to loan were perceived as obstacles to commercialization of agriculture in Mvurwi. The study therefore recommends that, efforts be made on the accessibility of master farmer training, market information and information on potential trade partners to aid agricultural commercialization among the smallholder farmers.

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