

Determinants of Agricultural Commercialization among Smallholder Farmers in Munyati Resettlement Area, Chikomba District, Zimbabwe

H.M. Kabiti, N.E. Raidimi, T.K. Pfumayaramba, and P.K. Chauke¹

*Department of Agricultural Economics and Agribusiness, University of Venda, P Bag X5050,
University Road, Thohoyandou, 0950, Limpopo Province, South Africa
E-mail: ¹<khazamula.chauke@univen.ac.za>*

KEYWORDS Agricultural Inputs. Commercialization Index. Tobit Regression

ABSTRACT The study was carried out in Munyati resettlement area, Chikomba district in Mashonaland East Province, Zimbabwe with the objective of determining factors that affect smallholder commercialization of farming enterprises. Both qualitative and quantitative techniques were used to collect data from 102 randomly sampled smallholder farmers using a questionnaire. Input and output commercialization indices were derived for all the participating farmers. Tobit model was used to regress the indices and farmer specific variables. The paper reveals that the farmers are fairly commercialized for both input and output sides. In addition, factors that determine input and output commercialization are varied. The paper recommends increased public and private sector contribution towards commercialization through training and financial support. Increased remittances by family members outside farming are recommended. The study concludes that smallholder farmers have a great potential for commercialization if necessary conditions are availed.

INTRODUCTION

Quite recently Muriithi and Matz (2015) correctly observed that the commercialization of smallholder farmers, especially in developing countries, could impact positively not only towards performance, but also on livelihood generation. A surge in small holder farming in Zimbabwe emerged post 2000 in response to the Fast Track Land Reform (FTLRP) policy that removed many farm workers from previously large scale white owned commercial farms (GOZ and FAO 2011). In particular this surge was prompted by observations elsewhere that commercialization of smallholder agriculture was a critical component of economic growth and development for agro-based economies (World Bank 2008), especially due to its ability to allow for effective participation in formal market opportunities and thus poverty reduction for rural communities.

Zimbabwe, as a country has recognized the importance of smallholder commercialization as evident in the Medium Term Plan (2011-2015) policy on agriculture, which reflects sustainable agricultural productivity and competitiveness as its priority areas (GOZ 2011). This priority area covers the increased agricultural commercialization within the smallholder sector as its outcome. Smallholder farmers are seen as players for eco-

nomic growth and employment creation, especially in agricultural markets. Specifically the FTLRP gave rise to new smallholder farmers, as a result of land defragmentation, who were expected to boost agricultural production in the country.

Although the government of Zimbabwe has been encouraging commercialization among smallholder farmers, challenges are still faced with regard to commercialization and participation in agricultural markets. This paper delves into the factors that could play a role in enhancing smallholder agriculture towards commercialization in Munyati resettlement area.

Studies carried out in different parts of the world have revealed some of the determinants of commercialization (Barrett 2007; Gabre-Madhin et al. 2007; Davidova et al. 2009; Berhanu and Moti 2010; Abu 2015). However, these determinants differ within and across countries due to the heterogeneous conditions faced by the smallholder farmers. A study on the commercialization of rice in Albania for example revealed level of education, farming experience, farm size and use of modern technology as major determinants (Falola et al. 2014). This necessitated a location based analysis of determinants of commercialization in order to recognize the best way to capacitate the smallholder farmers in the study area.

Objective of the Paper

The objective of this paper was to investigate the level of output and input agricultural commercialization among farmers in Munyati Resettlement area, Zimbabwe; and to ascertain the determinants at household level.

Theoretical Underpinning

Smallholder commercialization occurs when a farmer participates in agricultural markets either as a seller or buyer. This can be achieved when a portion of the agricultural produce from the farmers is marketed and/or when part of the inputs are acquired from the agricultural markets (Pingali 1997; Osmani and Hossain 2015). Agricultural commercialization can therefore be viewed from either the input or output side.

Smallholder commercialisation can occur in two ways; either by increasing productivity and marketed surplus of the food crops or by focusing on cash crops (Osmani and Hossain 2015; Sharma and Wardhan 2015). Focusing on cash crop production has given rise to arguments on the impacts of such a move on food security. This is because the smallholder farmers would have to buy food for household consumption rather than producing for themselves. However, this results in higher incomes for the farmers, because cash crops usually have higher economic benefits than the food crops.

Using the surplus production route ensures household food security while earning income for the producer. However the income may not be as much as with the cash crop production (Govereh et al. 1999). The advantage of such a route is that the farmers will capitalise on the experience they have and will continue to produce the same kind of output they have been producing. If the farmer is to produce the cash crop, they have to start to learn how to do it and this may take time before they really master how to do it.

According to Abu (2015) smallholder commercialisation requires more than just well-functioning output markets, but also efficient and low cost factor markets that truly reflect opportunity cost of farm inputs. Such conditions are usually a problem in the poor regions especially in Africa, whereby smallholders may not be able to purchase inputs due to liquidity problems or higher transaction costs and malfunctioning

markets (Latruffe and Desjeux 2014). These farmers may not be able to access output markets due to the same problem. Given such a scenario, institutional arrangements need to be devised to solve the problem. Quite importantly, success in market participation may require either formation of partnerships with established farmers as evidenced in South Africa (Bitzer and Bijman 2014) or membership to agricultural marketing cooperatives, although very poor farmers may be left out (Bernard and Spielman 2009).

MATERIAL AND METHODS

Location of the Study

This study was carried out in Munyati resettlement area, Chikomba district in Mashonaland East Province, Zimbabwe. Chikomba District lies within Natural region III of Zimbabwe. This is a semi-intensive farming region which receives moderate rainfall (650- 800mm per year) in total amount. Severe mid-season, dry spells are experienced within this region and make it marginal for maize and tobacco, or for enterprises based on crop production alone. The farming systems are therefore, based on both livestock and crop (food crop and cash crops) production. Small scale farmers in the district produce cash crops such as soybeans, tobacco, paprika, sugar beans, sunflower, groundnuts and Irish potatoes. They produce food crops such as maize, sorghum and peanuts. The area comprises of resettled farmers who benefited from FTLRP classified as the A1 and A2 schemes. A1 scheme farmers are smallholder farmers whilst the A2 farmers are large scale commercial farmers. The former houses about 3390 farm families who own an average of 30 hectares, meant for the smallholder farmers with 5 hectares of arable land and the rest for livestock grazing. The latter comprises of large scale farm beneficiaries.

Data Collection Techniques

In this study, a mixed research design was used. Empirical evidence was collected from 102 randomly sampled smallholder (A1) farmers through household questionnaires. The respondents comprised of 30 female and 72 male who happened to be the household heads or their representative as shown in Table 1. Demographic characteristics of respondents are reflected in

Table 1. The respondents were between the age of 25 and 85. The households interviewed had an average of 10 years of farming experience, with household size of 6.

The qualitative research strategy was employed to gather and analyze data from key informant, namely the extension officer responsible for the area. This was done to strengthen and verify the data collected through questionnaires.

The Analytical Model

The commercialization index used by Govere et al. (1999); Strasberg et al. (1999) and von Braun et al. (1994) was applied in computing household input and output commercialization. This was modelled as follows:

$$HCOCi = a/b$$

Where:

HCOCi = Household crop output commercialization index

a = gross value of crop sale (in US\$)

b = gross crop production value (in US\$)

The index measures the extent to which household crop production is oriented towards the markets. It takes the values ranging from 0 (totally subsistence-oriented household) to 1 (highly commercialized household). The same formula was used for this study as it treats commercialization as a continuum, and in the process avoiding the crude distinction between commercialized and non-commercialized household.

Crop input commercialization was computed by using the formula applied by von Braun et al. (1994) in their study. This is computed as follows:

$$HCICi = a/b$$

Where:

HCICi = Household crop input commercialization index

a = gross value of crop inputs acquired from markets (in US\$)

b = gross value of crop production (in US\$)

The statistical data analyses package Stata Version 10.0 was used to analyze collected data.

The study used the Tobit /censored normal regression model to identify the factors that determine the level of input and output commercialization by smallholder farmers. The Tobit model is the most common censored regression model appropriate for analyzing dependent variables with upper or lower limits (Liu et al. 2013; Abu 2015; Tobin 1958). For this study the Tobit model was preferred because the dependent variables (input and output commercialization index) are truncated as latent variables. Specifically, the input and output commercialization indices are the dependent variables and are lower censored at zero and upper censored at 1. Farmers who do not sell any of their output or buy any of their inputs had a zero value of dependent variable. The model answers both the question on factors influencing a decision and the factors that determine such a decision. In this study, agricultural commercialization was modelled as a two-step analytic approach which involves the observable degree or extent of commercialization and the unobservable decision to commercialize. The Tobit model assumes that the observed dependent variable y for n observations satisfies the following:

$$y = \max(y^*, 0)$$

Where y^* are latent variables generated by the linear regression model:

$$y^* = \beta_0 + x\beta_1 + \mu$$

y^* = latent variable of the dependent variable

Also $y = y^*$ when $y^* \geq 0$, and

$y = 0$ when $y^* < 0$

β = estimable parameter

μ = error term

x = explanatory variable

Tobit model parameters do not directly correspond to changes in the dependent variable brought about by changes in independent variables. The marginal effect on the intensity of commercialization due to changes in the explanatory variable is given as follows:

$$(\partial E[y_i/x_i]) / (\partial x_i) = \beta \phi[\beta x_i] / \sigma$$

Table 1: Demographic background of household heads in Munyati

Attributes	N	Mean	Std.	Min deviation	Max
Age (in years)	102	48.89	11.97	25	85
Education (years of schooling)	102	10.18	2.90	2	17
Household size	102	5.57	2.51	1	15
Farming experience	102	9.81	2.75	2	12

Source: Author

The marginal effects as well as Maximum Likelihood Estimates were estimated from the Tobit model using STATA Version 10.0 computer software. The effects/coefficients indicate the commercialization index resulting from a unit change in the independent variable. The marginal effects also account for the probability of being commercialized. A Tobit model provides a single coefficient for each independent variable despite two distinct types of dependent variables (censored and uncensored). Factors considered to be the determinants of the level of output and input commercialization are shown in Tables 3 and 4. These were used for the regression model.

RESULTS AND DISCUSSION

As attested by Mathenge et al. (2015) productivity and income generation from farming activities is influenced by various factors, notably a combination of labour and other essential inputs. The statistical summary given in Table 2 indicates that a typical household in the study area has a total agricultural crop production value of US\$3405.99 (= US\$611.55 per household member). There is a notable difference between the household with the maximum (US\$24 069.33) gross production value and the household with the minimum (US\$ 114) (= US\$20.58 per household member). An average of US\$ 2143.88 worth of sales are made out of the gross household production (that is gross value of output sold). According to Zimstat (2013), the province in which the study area is located experiences the third highest level of per capita poverty, with a mean annual food poverty line of US\$31.80, higher only to that of Manicaland (US\$31.60) and Mashonaland Central (US\$31.50). The statement is compounded by the fact that there were some households which did not sell anything from their gross output, as indicated by the minimum

value of 0. It is interesting though that the average income per household member is way ahead of the provincial food poverty line of US\$ 31.8. With regards to inputs, the mean household value of inputs obtained from the markets is US\$ 756.66 with a maximum value of US\$ 5 020. Table 2 also shows that all of the sampled households used at least some inputs acquired from the market with a minimum value of US\$ 60.

Household output commercialization indicates the degree of participation of a household in output markets as a seller. Results in Table 2 displays that the mean degree of household output commercialization in Munyati resettlement area is 40.8 percent. This is a generally moderate commercialization level. The most commercialized household sold 97.6 percent of its gross production value. The mean output commercialization of 40.8 percent is 10 percent higher than the figure reported for smallholder farmers in Zambia for the 2010/2011 season (Hichaambwa and Jayne 2012). A study carried out in Ghana Nigeria, Abia State indicates that the commercialization index of the smallholder farmers is below 30 percent (Abu 2015; Agwu et al. 2012). This shows that the farmers in the study area are doing well in comparison to other farmers in the region and thus can be considered to be output commercialized and thus able to increase farm income. In line with Muriithi and Matz's (2015) study that also attested to the ability of commercialization to reduce household poverty.

Household input commercialization indicates the extent to which a household participate in input markets as a buyer. It should be mentioned upfront that positive benefits from input application will largely be impacted by produce prices (Hu and Rahman 2015). Table 2 shows that the mean degree of household input commercialization in Munyati is 42.6 percent. The least output commercialized household had a degree of 2.2 percent. This indicates that all of the sam-

Table 2: Statistical summary of input and output gross values (in US\$) and commercialization index in Munyati

<i>Variable</i>	<i>Obs</i>	<i>Mean</i>	<i>Std. dev</i>	<i>Min</i>	<i>Max</i>
Gross production value	102	3405.9	4711.2	114	24069.3
Gross value of output sold	102	2143.8	4390.2	0	23400
Gross value of inputs obtained from the markets	102	756.6	749.4	60	5020
Household output commercialization index	102	0.5	0.4	0	.98
Household input commercialization index	102	0.4	.51	.02	3.5

Source: Author

pled households used at least some inputs from the markets. This points out that the farmers are participating in agricultural input markets as buyers. The study results indicate that there is moderate degree of input commercialization in the study area. The relative usage of inputs from the markets could be attributed to the fact that the area is located close to an urban area and the farmers get all their services from the town. Likewise, the farmers are also influenced to acquire their inputs from the formal markets.

Study results indicate that the farmers in the study area can be described as semi commercialized. This is because they fall under that category as described by Pingali and Rosegrant (1995) in their study, described as farming with three basic objectives, that is surplus generation, mix trade and untraded inputs, while relying heavily on both on-farm and off-farm income. All these characteristics were observed within the study participants. However, these farmers can be viewed differently if the World Development Report (2008) is to be considered. The report stipulates that a producers who sells more than 50 percent of their agricultural production on the market is market-oriented (World Bank 2007). According to Mmari (2015) such an

orientation is considered not only as key determinant for driving economic transformation but also as a critical element for fostering innovation and competitiveness.

A study conducted by Agarwal and Singh (2015) detected that smaller farmers had lower input output ratios compared to their medium sized counterparts. Table 3 shows that household input commercialization, in the study area, is influenced by means of land cultivation ($p<0.05$), years of formal education of the household head ($p<0.05$), irrigation availability ($p<0.05$), distance to input market ($p<0.05$), road access ($p<0.05$) and gross production value ($p<0.01$). All the significant variables have the expected sign except distance to input markets which was found to have a positive influence on the level of commercialization.

Method of land cultivation had significant influence on the level of input commercialization of a household in the study area. The marginal effect was found to be negative indicating that shifting from tractor cultivation to animal cultivation will result in decrease in level of input commercialization. Farmers who cultivate their land by tractor are more likely to use inputs from the formal markets. The fact that a farmer would opt to use a tractor for cultivation could

Table 3: Tobit estimates of the determinants of level of input commercialization in Munyati Village

<i>Explanatory variable</i>	<i>Marginal effect</i>	<i>Standard error</i>	<i>t- Value</i>	<i>P> t_i </i>
Farm size	-0.0014792	0.0045	-0.33	0.742
Method of Land cultivation	-0.1313992*	0.0527	-2.49	0.015
Gender(sex)	0.0427672	0.0588	0.73	0.469
Age of household head	0.0012709	0.0023	0.55	0.583
Household head years of schooling	0.0236298*	0.0099	2.37	0.020
Marital status	0.0017731	0.0479	0.04	0.971
Off farm income	0.0217864	0.0282	0.77	0.442
Farming experience	0.0042012	0.0098	0.43	0.671
Irrigation availability	0.3394227*	0.1562	2.17	0.033
Access to credit in previous season	-0.0188356	0.0969	-0.19	0.846
Distance to input market	0.0015977*	0.0007	2.27	0.022
Access to road	0.2562112*	0.1019	2.51	0.014
Access to transport	-0.059965	0.0628	-0.96	0.342
Access to market information	-0.0475563	0.0522	-0.91	0.365
Access to extension services	0.0666279	0.0671	0.99	0.324
Total area under crop production	-0.0009408	0.0093	-0.10	0.919
Household gross production value	-0.0000462***	9.2500	-4.99	0.000
Constant	0.137701	0.2801	0.49	0.624
Number of observations			102	
LR chi2(17)			49.05	
Prob > chi2			0.0001	
Pseudo R2			0.8198	
Log likelihood				-5.3909034

Source: Author * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Note: 0 left-censored observations

94 uncensored observations

8 right-censored observations at HCICI>=1

be an indicator that the farmer is not poor and has capital to finance input acquisition. Farmers who afford to use tractor are also likely to acquire inputs from the market.

Years of formal education of the household head was found to have significant positive influence ($p < 0.05$) on the level of input commercialization of a household in the study area. The marginal effect from Table 3 indicates that a year increase in formal education acquired by the household head will result in 0.024 unit increase in the level of commercialization. Education is theorized to have a positive impact on the farmers' understanding of production and market dynamics and hence, influence farmers' level of input commercialization (Martey et al. 2012). Educational attainment enhances the farmers' ability to appreciate the essence of credit, new techniques and information disseminated from extension agents which impacts positively on commercialization (Tolno et al. 2015). The study carried out by Randela et al. (2008) highlights that farmers with higher educational levels are more likely to understand and interpret information better than others and thus experience reduced search, screening and information costs. The above findings are further validated by the study conducted by Yu and Yu (2015) that confirmed that the distribution of educational resources, especially in less developed areas had the impact of achieving higher growth rates.

Irrigation availability was found to significantly ($p < 0.05$) influence the level of household input commercialization in Munyati. From Table 3, when a household shifts from non-irrigation to irrigation, the level of input commercialization increases. This could be attributed to reduced rainfall risk faced by irrigators. Farmers who irrigate their crops can control the amount and frequency of water available to their fields. Reduced rainfall risk means that farmers can be more willing to invest more in agricultural activities, (in the form of inputs), as they will expect a good harvest. The results from the key informant interviews with the extension officers are in agreement with this result. The extension officers indicated that irrigation availability would contribute a lot towards commercialization.

Marginal effect of distance of the farm from the input market indicates that 1 kilometer increase in the distance will result in 0.002 unit increase in the level of input commercialization in the study area. Households which are located closer to the markets are more likely to have a

lower level of input commercialization than those which are further away. This is however a deviation from expected result and findings from previous studies. The expectation, according to Sharma and Wardhan (2015) would be that the closer the farmer is to the input markets the higher their input commercialization level due to reduced transportation and other transaction costs. This could be attributed to the fact that farmers who stay far from the town (where markets are located) are more likely to go there less than those who stay closer. The farmers who stay a distant from the input market are prone to buy their inputs earlier, than those who are in the proximity of the market. This protects the farmers who stay far away from the town from the last minute input rush, which is usually characterized by unavailability of inputs on the market. Also, the farmers who buy early are more likely to get cheaper prices and thus, they acquire more inputs from the market at a given amount of money.

Access to road is another variable which was found to be significant ($p < 0.05$) in this study. Households with access to a road are more likely to have a higher level of input commercialization. A road serves as a linkage between the farm and the input market. Therefore, this means that farms with access to roads can also easily access input markets and thus have a higher input commercialization. Access to road also enables input marketers to easily get to the farm.

The study results also indicate that household gross production value is a highly significant variable ($p < 0.001$). An increase in gross production value is expected to reduce the value of input commercialization. This is in line with the computation of the input commercialization index, whereby gross production value is a divisor in the equation and thus increasing the production value results in a decrease in input commercialization.

The study however, indicates that off-farm household income is an insignificant variable. This is inconsistent with what the extension officers indicated during the key informant interviews. They highlighted that the level of commercialization is determined by the amount of money earned by a household. This is also surprising as input commercialization is dependent upon the amount of capital available for input acquisition. Households with higher off farm income are expected to have a higher input commercialization index.

The household output commercialization index is influenced by household labour size, irrigation availability, gross agricultural production value, farming experience of the household head and the non-farm income (Table 4) in this study. All the significant variables have the expected sign, except for irrigation availability which impacts negatively on output commercialization.

From the results in Table 4, an increase in the size of a household labour by one member will cause a 0.046 unit increase in output commercialization. This positive relationship was expected as an increased household labor size means that more human resource is available for agricultural activities ranging from production to marketing. A large household labor size in the study area also means that fewer funds are directed towards hiring labor. The saved funds can thus be used for increasing crop area planted, increasing the inputs acquired from the market or any other agricultural activity which can result in increased household commercialization index. This result is in line with the findings by Sharma and Wardhan (2015) which alludes to the fact that increasing household labor size results in increase in productivity. This in turn

results in increased output commercialization.

Irrigation availability is statistically significant at 1percent but has a negative effect. When a household moves from being a non-irrigator to an irrigator, the output commercialization level is expected to decrease by 0.884 units. This is a diversion from the findings from a number of studies which realized a positive relationship between irrigation availability and level of commercialization (Kumar and Vipani 2015). This could be as a result of high installation and maintenance costs of the irrigation facilities which use up some of the production capital which would otherwise be used for increased crop production. In other words, setting up an irrigation facility would mean that the households' investment in fixed assets would have increased, in the process reducing the amount of investment in current assets. Such a relationship can also be due to the erratic rainfall patterns which are sometimes faced in the area. Irrigation water is supplied by the rainfall and in the event of a drought, benefits from ownership of irrigation facilities may not be achieved in the process creating an extra expense for system maintenance. Padhy and Jena (2015) indicate that technology on its own does not lead to increase

Table 4: Tobit estimates of the determinants of level of output commercialization in Munyati

Explanatory variable	Marginal effect	Standard error	t- Value	P> t _i
Age of household head	-0.002	0.0032	-0.80	0.428
Gender(sex)	-.0580642	0.0824	-0.71	0.483
Marital status	.0305217	0.0666	0.46	0.648
Household head years of schooling	-.0141536	0.0141	-1.01	0.318
Farm size	-.0019323	0.0665	-0.30	0.768
Household labor size	.0456365**	0.0158	2.89	0.005
Irrigation availability	-.8842449**	0.2670	-3.31	0.001
Household gross production value	.0000341*	0.000014	2.44	0.017
Access to extension services	.1171282	0.0993	1.18	0.241
Farming experience	.0296723*	0.0145	2.04	0.044
Access to credit in previous season	.0380626	0.1468	0.26	0.796
Access to market information	-.0538615	0.0689	-0.78	0.436
Distance to nearest output market	.00201	0.0012	1.64	0.105
Household off farm income	.0815422*	0.0403	2.02	0.046
Access to transport	.1103205	0.0861	1.28	0.203
Household input commercialization index	-.1050506	0.0794	-1.32	0.189
Constant	-.2853493	0.3607	-0.79	0.431
LRchi2(16)	57.99			
Number of observations		102		
Prob > chi2	0.0000			
Pseudo R2	0.4085			
Log likelihood	-41.980327			

Source: Author * p<.05; ** p<.01; *** p<.001

Note: 28 left-censored observations at hcoci<=0

74 uncensored observations

0 right-censored observations at hcoci>=1

production level and commercialization. It should be coupled with market opportunities which lure farmers into adoption.

The study results show that gross production value is significant at 5 percent significance level. As expected, an increase in household gross production value will result in an increase in the household output commercialization level. An increase in household gross production value necessitates the producer to market the excess after taking away the portion for household consumption. The marginal effect is relatively lower than expected. This could be due to the fact that a number of farmers in the study area indicated that they kept livestock (mainly pigs, poultry and cattle) which they feed from the crop production output. This means that an increase in gross production value may result in increases in gross farm output commercialization index, but not its crop output commercialization counterpart.

The farming experience of a household head is a significant positive contributor at 5 percent level. A unit increase in farming experience of the household head results in 0.0297 unit increase in output commercialization. Previous researches indicate that an increase in experience also increases perfection. This resultantly manifest as increased knowledge of farming techniques which results in increased household output commercialization. Previous research indicate that an increase in experience also increases perfection (Abu 2015) This resultantly manifest as increased knowledge of farming techniques which results in increased household output commercialization. This result is consistent with the finding of Martey et al. (2012) who argue that the more farming experience the household head possesses, the more trading partners they can attract at relatively lower costs. This enhances output commercialization as the produce markets will be more available for the experienced farmers than the less experienced ones. The extension officers in the study area also alluded to the fact that farming experience enhances output commercialization.

Household off farm income was significant at 5 percent level of significance with a positive sign. This implies that an increase in household off farm income would result in an increase in the level of output commercialization in the study area. This could be due to the fact that household income can impact on the size (land size

cultivated) and operations (type of cultivation, inputs, access to transport) of the agricultural enterprise which thus impact on commercialization. Household income also has the potential of reducing the dependency on agricultural produce as food and income sources; and hence increased commercialization.

The results also indicate that household level of input commercialization, distance to formal output market and access to market information are insignificant variables. Level of input commercialization can be an indicator of the amount of investment placed by the farmer for agricultural production over a particular year. Higher investments are expected to have higher returns. However the study results show that the level of input commercialization does not determine the level of output commercialization. This result is inconsistent with the findings from other studies which reflect that output commercialization should move along with input commercialization (Melesse 2015). This could be due to inefficiencies in production and erratic weather conditions which reduces the output.

Access to market information is an important factor in commercialization because it presents the farmers with all the options which are available for them to choose from so as to get higher returns. However this study reveals that access to market information is an insignificant factor in the study area. This was attributed to the fact that the farmers were participating in agricultural markets as maize traders and there is almost a sole market of the produce, in the study area, which is the Grain Marketing Board. Distance to output market is an indicator of the transportation cost and thus farmers who stay far from the market are more likely to have low levels of output commercialization. The study however indicates that this is not the case in Muniyati resettlement area as distance to output market was found to be an insignificant factor. This can be due to irregularities in the pricing system within the transport industry operating in the area.

CONCLUSION

This study identified the factors that play significant roles in determining the level of farming enterprises commercialization, on the input and output side. Smallholder farmers in Muniyati resettlement area were found to be moder-

ately input commercialized, determined by area under cultivation, irrigation availability, distance to input market and gross production value as determinants of household level regards to inputs and outputs. Output commercialization was found to be moderate as well; but determined by household labor size, irrigation availability, gross agricultural production value, farming experience of the household head and non-farm income.

RECOMMENDATIONS

On the basis of these findings, this study forwards the following recommendations:

Support to Smallholder Farmers: The above poverty line income generation emanating from increased input usage and surplus marketing of agricultural produce in the study area needs to be appreciated and promoted via appropriate policy interventions strategies. The role that can be played by both public and private sector stakeholders cannot be sufficiently emphasized.

Public and Private Sector Contribution: To further enhance factors that were found critical contributors to increased commercialization, there will be need for both public and private sector stakeholders to provide financial support to enhance productivity through increased land and irrigation infrastructure acquisition.

Role of Non-Farm Income: The importance accorded by increased productivity and commercialization from non-farm income will also call for awareness campaigns directed at family members that are working outside the agricultural sector, to increase their monthly household remittances.

ACKNOWLEDGEMENTS

We would like to acknowledge the University of Venda and the Land Bank of South Africa for the provision of Research grants to fund this study. We would also like to acknowledge the smallholder farmers in Munyati resettlement area for their participation in this study as crucial information source.

REFERENCES

- Agwu N, Anyanwu C, Mendie E 2012. Socio-economic determinants of commercialization among small holder farmers in Abia State, Nigeria. *Greener Journal of Agricultural Sciences*, 2(8): 392-397.
- Abu B 2015. Groundnut market participation in the Upper West Region of Ghana. *Ghana Journal of Development Studies*, 12(1): 106-124.
- Barrett CB 2007. Smallholder market participation: Concepts and evidence from Eastern and Southern Africa. *Food Policy*, 33(4): 299-317.
- Berhanu G, Moti J 2010. Commercialisation of Smallholders: Does Market Orientation Translate into Market Participation? Improving Productivity and Market Access (IPMS). *Ethiopian Farmers Project Working Paper* 22. Nairobi, Kenya: ILRI.
- Bernard T, Spielman DJ 2009. Reaching the rural poor through rural producer organizations? A study of agricultural marketing cooperatives in Ethiopia. *Food Policy*, 34(1): 60-69.
- Bitzer V, Bijman J 2014. Old oranges in new boxes? Strategic partnerships between emerging farmers and agribusinesses in South Africa. *Journal of Southern African Studies*, 40(1): 167-183.
- Davidova S, Fredriksson L, Bailey A 2009. Subsistence and Semi-subsistence Farming in Selected EU New Member States. 111 *EAAE-IAAE Seminar 'Small Farms: Decline or Persistence'*. Canterbury, UK, 26-27 June 2001.
- Falola A, Animashaun JO, Olorunfemi OD 2014. Determinants of commercial production of rice in rice-producing areas of Kwara State, Nigeria. *Albanian Journal of Agricultural Sciences*, 13(2): 59-65.
- Gabre-Madhin EZ, Alemu D, Dejene S 2007. From Farmer to Market: Smallholder Commercialization of Food Crops in Ethiopia. *Draft ESSP Working Paper*. IFPRI, Addis Ababa, Ethiopia.
- Govere J, Jayne TS, Nyoro J 1999. *Smallholder Commercialisation, Interlinked Markets and Food Productivity: Cross Country Evidence in Eastern and Southern Africa*. Department of Agricultural Economics. Michigan, USA: Michigan State University.
- GOZ 2011. *Smallholder Farmer Agriculture Inputs, Extension and Market Support Program*. Harare, Zimbabwe: Government Publishers.
- GOZ 2011. *Zimbabwe Medium Term Plan 2011-2015*. Harare, Zimbabwe: Government Publishers.
- Hichaambwa M, Jayne T 2012. *Smallholder Commercialisation Trends as Affected by Land Constraints in Zambia: What Are The Policy Implications?* Lusaka, Zambia: Indaba Agricultural Policy Research Institute (IAPRI).
- Hu Z, Rahman S 2015. Economic drivers of contemporary smallholder agriculture in a transitional economy: A case study of Hu Village from southwest China. *Singapore Journal of Tropical Geography*, 36(3): 324-341.
- Kumar M, Vipin 2015. Review of challenges and reforms for Punjab agricultural economy. *International Journal of Multidisciplinary and Current Research*, 3: 629-634.
- Latruffe L, Desjeux Y 2014. Perpetuation of subsistence farming in Kosovo: The role of farm integration in input markets. *Journal of Post-Communist Economies*, 26(1): 137-148.
- Liu X, Wang Z, Wu Y 2013. Group variable selection and estimation in the Tobit censored response model. *Computational Statistics and Data Analysis*, 60: 80-89.
- Martey E, Al-Hassan RM, Kuwornu J 2012. Commercialization of smallholder agriculture in Ghana: A Tobit regression analysis. *African Journal of Agricultural Research*, 7(14): 2131-2141.

- Mathenge MK, Smale M, Tschirley D 2015. Off-farm employment and input intensification among smallholder maize farmers in Kenya. *Journal of Agricultural Economics*, 66(2): 519-536.
- Melesse TM 2015. Agricultural Technology Adoption and Market Participation Under Learning Externalities: Impact Evaluation on Small-Scale Agriculture from Rural Ethiopia. Maastricht School of Management, Working Paper No. 2015/06. From <<http://www.msm.nl/resources/uploads/2015/09/MSM-WP2015-06.pdf>> (Retrieved on 1 December 2015).
- Mmari DE 2015. The challenge of intermediary coordination in smallholder sugarcane production in Tanzania. *Journal of Modern African Studies*, 53(1): 51-68.
- Muriithii BW, Matz JA 2014. Welfare effects of vegetable commercialization: Evidence from smallholder producers in Kenya. *Food policy*, 50(2015): 80-91.
- Osmani AG, Hossain E 2015. Market participation decision of smallholder farmers and its determinants in Bangladesh. *Journal of Economics of Agriculture*, 62(1): 163-179.
- Padhy C, Jena BK 2015. Effect of agricultural education on farmers efficiency: A review. *International Journal of Engineering Technology, Management and Applied Sciences*, 3(2): 247-258.
- Pingail LP, Rosegrant MW 1995. Agricultural commercialization and diversification: Process and policies. *Food Policy*, 20(3): 171-185.
- Pingali P 1997. From subsistence to commercial production system: The transformation of Asian agriculture. *American Journal of Agricultural Economics*, 79(2): 628-634.
- Randela R, Alemu ZG, Groenewald JA 2008. Factors enhancing market participation by small-scale cotton farmers. *Agrekon*, 47(4): 451-469.
- Scoones I 2015. Zimbabwe's land reform: New political dynamics in the countryside. *Review of African Political Economy*, 42(144): 190-205.
- Sharma PV, Wardhan H 2015. Assessment of Marketed and Marketable Surplus of Major Foodgrains in India. Centre for Management in Agriculture (CMA) Indian Institute of Management. From <<http://www.iimahd.ernet.in/users/webrequest/files/cmareports/cma-17.pdf>> (Retrieved on 2 December 2015).
- Strasberg PJ, Jayne T, Yamano T, Nyoro J, Karanja D, Strauss J 1999. Effects of Agricultural Commercialization on Food Crop Input Use and Productivity in Kenya. *International Development Working Papers No. 71*. Michigan State University, Michigan, USA.
- Tobin J 1958. Estimation of relationship for limited dependent variable. *Econometrics*, 26: 26-36.
- Tolno E, Kobayashi H, Ichizen M, Esham M, Balde BS 2015. Economic analysis of the role of farmer organizations in enhancing smallholder potato farmers' income in Middle Guinea. *Journal of Agricultural Science*, 7(3): 123-127.
- von Braun J, Kennedy E 1994. *Agricultural Commercialisation, Economic Development and Nutrition*. Baltimore, Maryland, USA: Hopkins University Press.
- World Bank 2007. World Bank Assistance to Agriculture in Sub Saharan Africa: An IEG Review. Washington DC. From <[http://www.reliefweb.int/rw/lib.nsf/db900sid/AMMF-78HJPY/\\$file/worldbank-oct2007.pdf?openelement](http://www.reliefweb.int/rw/lib.nsf/db900sid/AMMF-78HJPY/$file/worldbank-oct2007.pdf?openelement)> (Retrieved on 22 January 2015).
- World Bank 2008. *World Development Report: Agriculture for Development*. Washington, DC, USA: World Bank.
- Yu N, Yu B 2015. Does inequality in educational attainment matter for China's economic growth? *International Journal of Educational Development*, 41: 164-173.
- Zimbabwe National Statistics Agency (Zimstat) 2013. Poverty and Poverty Datum Line Analysis in Zimbabwe 2011/12. Causeway, Harare. From <<http://www.zimstat.co.zw>> (Retrieved on 20 January 2015).

Paper received for publication on January 2015

Paper accepted for publication on October 2015