Factors Affecting Small Scale Farmers in Accessing Markets: A Case Study of Cabbage Producers in the Vhembe District, Limpopo Province of South Africa

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ABSTRACT The present study investigates factors that affect small scale cabbage farmers in accessing markets. Using discriminant analysis, data collected from 29 cabbage farmers were analysed to determine whether there are statistically significant differences that existed between the average score profiles for the two groups of farmers:- those who had access to markets and those who did not. The results indicated that the independent variables that accounted for most of the differences were, transaction costs, agricultural extension education, level of education of farmers, distance farm to market, where farmers sell their produce, and value of equipment owned by farmers. It was recommended that for small scale cabbage farmers to access markets for their agricultural produce, measures to mitigate the identified constraints need to be in place.

INTRODUCTION

Marketing contributes to the improvement of small scale farmers' livelihoods which leads to poverty reduction (Cai et al. 2012). One of the major causes of high levels of poverty among small scale farmers is low producer prices and high input costs (Reardon and Timmer 2007). Poor access to markets is a major problem in poor rural communities (Machete 2004). According to Sandal (2007) producing for the market requires production resources which include land, water, and farm infrastructure, labour force, capital and good management of the resources. Poor access to these resources affects the way in which small scale farmers can benefit from opportunities in agricultural markets, especially in terms of volume of products traded, quality and quantity of those products. Reardon (2005) argues that access to market is an essential requirement for the poor rural communities and they also have to enjoy the benefits of agricultural growth hence participation of small holder famers in accessing markets is invaluable.

According to Heinmen (2002), the reason why most rural communities cannot improve their living standards is due to the fact that they face difficulties in accessing markets. They can obtain agricultural inputs but cannot have access to sell to consumers. A major reason why even those farmers who can produce surpluses remain trapped in poverty cycle is lack of access to profitable markets and more often those farmers are forced to sell their produce to the buyer at whatever price dictates. Market access is determined by factors such as credit availability, product availability, attributes, prices, efficiency, costs of these processes and market information. One of the important constraints that contributes to this is lack of access to market information is the lack of understanding of important factors that influence market environment (Morokolo et al. 2005; Doss 2006).

Objectives of the Study

(i) To determine whether statistically significant differences exist between the average score profiles for two farmer groups, that is, those who have access to markets and those who do not.
(ii) To determine which of the independent variables account for most of the differences in the average score profiles of the two groups;
(iii) To come up with recommendations that will assist small scale cabbage farmers to access markets for their agricultural produce.

Literature Review

Waithaka et al. (2007) state that for small holder farmers to be capable of making rational

economic decisions, the economic and technical constraints that they face must be removed. In addressing constraints to smallholder agriculture, comprehensive agriculture support services become a necessity. Lack of markets and high transaction costs are some of the challenges facing smallholder farmers and this makes poor farmers to be excluded from participating in potentially remunerative commodities as a result of poor access to market and high transaction (Sendall 2007).

Gratadew et al. (2001) on their findings on international food agribusiness management noted that in Ghana for producers to create better market access for local foods they need to provide additional market services and develop trust based relationships with their buyers. In Uganda, farmers also face complex of constraints that limit their participation and benefit from agricultural market chains. Suggestions were made that the Government, civil society and all development agencies should mobilize and support farmers to form production and marketing organisations. Government should use integrated approach to marketing; increase investment in road construction and maintenance, establish market and trade centres in all rural areas and fight corruption at all levels. Poet and Obi (2007) in their study of technical constraints to small holder agriculture and their implications for market investigated factors such as equipment, information, market distance, assets value, infrastructure, total income, extension assistance and farming type. According to Lauw et al.(2007), small holder farmers are excluded from main street food markets in South Africa as a result of colonial legacy and due to the poor performance of the their production, which is characterised by high production and transaction cost and poor quality making them less competitive. Lack of assets, market information and access to services are some of the factors that hinder small holder famers in potentially lucrative markets.

In Limpopo province the participation of small-scale farmers in commercial agriculture is still a major concern since majority is excluded from supplying high value markets due to a number of challenges (Machete 2004). According to Baloyi (2010), high value markets in the Limpopo province are normally located in the shopping malls while most small scale vegetable farmers supplying agricultural produce to these stores are located in the rural areas, far from towns. This leads to the distance from the farm to the town happens to be a major problem limiting small scale farmers to market their fresh produce to retailers. Most of the literature related to smallholder agricultural marketing (Balgah and Buchenrieder 2011; Doss 2006; Waithaka et al. 2007), reiterate that the problem of market access is linked to constraints such as: price risk and uncertainty, difficulties of contract enforcement, insufficient numbers of middlemen, cost of putting small dispersed quantities of produce together and the inability to meet standards. Other problems related to physical market access like physical infrastructure include roads, market facilities, power and electricity. In rural areas, for example, small holders are often geographically dispersed, roads and communications are poor and the volumes of business are insufficient to encourage private sector service provision.

Poet and Obi (2007), in their study of technical constraints to smallholder farmers and their implications for market access, collected data based on the equipment used by small scale farmers, access to market information, market distance, asset values and the demographic and socio economic variables, concluded that that access to information, total asset ownership, income and extension and farming type are the most important factors that influence market access by small scale farmers. Equipment use, public infrastructure and market distance did not seem to be the important factors affecting market access. Road conditions to the public stores, road conditions to the local fresh produce market, road conditions to family and friends, distance to the output market, percent of the produce to the market were some of the factors that affected small scale farmers in accessing markets.

METHODOLOGY

The study took place in Tshiombo irrigation scheme in Vhembe district, Limpopo Province which is located 30 Km north-east of Thohoyandou Town and occupy an area of 17.77km² (Fig. 1).

Sampling and Data Collection

In all, 29 small scale cabbage producers were selected using convenient sampling and further,

Fig. 1. Map of South Africa showing Limpopo Province

they all were interviewed. The convenient sampling was used for the easy accessibility of the cabbage farmers in the irrigation scheme. Questionnaires were designed to ask small scale farmers on the questions related to whether they have access to market or not. Closed ended questionnaire and open ended questionnaire were used to collect qualitative and quantitative data.

Econometric Model

Discriminant Analysis (DA) method was used to analyze the data. DA undertakes the same task as multiple linear regressions by predicting an outcome. DA involves the determination of a linear equation like regression that will predict which group a case belongs to. The form of the equation or function employed can be stated as:

$$D = v_1X_1 + v_2X_2 + v_3X_3 + v_iX_1 + \ldots + v_nX_n + a$$

Where D = discriminate function

V_i = the discriminant coefficients or weights for that variables

X_i = respondent's score for that variables

a = constant

i = the number of predictor variables.

This function is similar to a regression equation or function. The v's are unstandardized discriminant coefficients analogous to the b's in the regression equation. These v's maximize the distance between the means of the criterion (dependent) variable. Standardized discriminant coefficients can also be used like beta weight in regression. Good predictors tend to have large weights. The objective is to maximize the distance between the categories, that is, come up with an equation that has strong discriminatory power between the two groups. The number of discriminant functions is one less the number of groups. There is only one function for the basic two group discriminant analysis. In this study the estimated DA model can be written as:

ACCESS = GEN + AGE + EDU + INC + EVALUE + HCAB + PRICE + PCOS + SELL + DIST + TRCOST + EXTED + TNCOST + QUAL + DPROF

These variables are described in Table 1.

RESULTS

The description of the dependent and independent variables and their expected signs are displayed in Table 1.

Table 2 presents the group means, including the pooled sample means, of the variables employed on the analysis. Their significant difference levels are indicated by their P-values. The results presented in the table shows a significant difference at the 10% level in the levels of education of the two groups of farmers. Value of equipment owned by farmers, where they sell their produce, distance from farm to markets, extension education received and high transaction costs were significantly different in the two groups at the 1% level of significance. This table provides the results of p-value test for the independent variables. In particular, the group of farmers who indicated that they had access to markets, had higher educational levels, higher values of equipment than those who did not have access to markets. Furthermore, the group which had access to markets sold their produce

Table 1: Variables description

Variable name	Description	Types of measure	Expected sign
ACCESS	access to markets	1=Yes; 0 otherwise	
GEN	gender of the respondent	1=male, 0=female	+
AGE	age of the respondent	actual age of the respondent	+
EDU	level of education	1=grd0-11, 2=grd 12, 3=diploma, 4=degree	+
INC	income earned	actual amount of money (Rand)	+
EVALUE	value of equipment (R x 10³)	actual number of members	+
HCAB	heads of cabbages per season	actual number of cabbages	+/-
PRICE	price of cabbage per head	actual price of cabbage (Rand)	+/-
PCOS	production cost	actual amount (Rand)	+
SELL	where produce sold	1=farm gate, 2=road side, 3=fresh produce market	
		4=retailers, 5=institutions	+
DIST	distance from farm to market (km)	1= >50, 2= <50	+
TCOST	transportation costs	actual amount of money (Rand)	+
EXTED	extension education received	1=yes, 0=no	+
TRCOST	high transaction cost	1=yes, 0=no	+/-
QUAL	quality of the cabbages	1=fair, 2=good, 3=good	+
DPROF	differentiation between profit and loss	1=yes, 0=no	+/ -

Table 2: Group means of variables employed in the analysis

Variable	Market access		All	p-value
	No	Yes		
GEN	0.54	0.69	0.63	0.429
AGE	47.46	48.31	47.93	0.891
EDU	1.54	2.06	1.83	0.081*
INC	8370.77	10850.00	9738.62	0.417
EVALUE	2.38	4.19	3.37	0.009***
HCAB	5738.46	5746.88	5743.10	0.996
PRICE	59.31	6.44	30.13	0.280
PCOS	5605.00	18978.75	12983.62	0.364
SELL	1.62	3.50	2.65	0.000***
DIST	0.77	0.62	0.38	0.006***
TRCOST	292.31	396.87	350.00	0.71
EXTED	0.38	0.75	0.59	0.49
TNCOST	0.38	0.31	0.34	0.697
QUAL	2.4615	2.38	2.41	0.691
DPROF	0.92	0.94	0.93	0.884
Number of respondents:16	13	29		

Dependent variable = Market access (1, 0); ***P<0.01;*P<0.10

mostly to institutions, retailers and fresh produce markets as indicated by the mean value of 3.50. The results also showed that those who did not have access to markets had less extension education and but with high transaction costs and higher distance levels from their farms to the market places.

The discriminant analysis was conducted to predict group membership from a set of statistically significant predictors. Table 3 presents the results of the discriminant scores and the levels of the dependent variable are highly correlated. The Eigen value is one of the statistics used to evaluate the magnitude of the discriminant analysis model. The results presented in Table 3 indicated that the Eigen value was very high (3.50). This implies that the between-groups differences were much wider than the within-groups differences.

Wilks' lambda indicates of the accuracy of the discriminant model used. Therefore this measure is reflective of the variables' importance. A low value of Wilk's lambda is an indication of a high percentage of explained variance of the dependent variable, in this case, access to markets. The percent of explained variable is calculated as [1-(Wilks' lambda] x 100.Wilks' Lambda in the case where all the functions are in the analysis was estimates as 0.220, and indicates

Table 3: Standardized canonical discriminant function coefficients

Independent variable	Coefficient	Wilks' Lambda
GEN	0.206	0.977
AGE	0.348	0.999
EDU	0.815	0.891
INC	0.385	0.975
EVALUE	0.437	0.773
HCAB	-0.204	1.000
PRICE	-0.195	0.957
PCOS	0.180	0.969
SELL	0.555	0.565
DIST	0.613	0.756
TRCOST	-0.060	0.884
EXTED	0.820	0.864
TNCOST	-0.997	0.994
QUAL	0.343	0.994
DROP	-0.100	0.999
Statistics:		
Eigen value	= 3.50	
Canonical correlation	= 0.883	
Wilks' Lambda	= 0.220	
Chi-square	= 29.503	
df	= 15	
P-value	= 0.014	
%grouped cases correctly classified	= 93.3%	

that differences between the two groups of farmers account for 77.8% of the variance in the predicting variables.

A high value of the significance of the Chi-square implies that the discriminant functions discriminate well between the two groups of farmers. The discriminant analysis also revealed that in all, 93.3% of the original cases was correctly classified.

The weighting of the standardized canonical discriminant coefficients of the independent variables showed that the variables that separated the two groups of farmers the most were: transaction cost (-0.997), extension education received (0.820), level of education (0.815), distance from farm to market (0.613), volume of sale of produce (0.555) and value of equipment owned by the farmers (0.437) in order of magnitude.

DISCUSSION

The results of the study indicate that cabbage farmers who had access to markets were fewer than those who did not have access to markets (Table 2). The results also showed that farmers who had access to market were more educated than those who did not. This finding is in line with Gilbert et al. (2002) who found out that education played important role in the marketing of farm produce by reducing high transaction costs. Value of equipment owned by farmers, where they sell their produce, distance from farm to markets, extension education received and high transaction costs were all significantly different in the two groups of farmers. Again, the findings agreed with those of other researchers. For example, Makura et al. (2004) found the distance from the farm to the market place to be negatively correlated with market access with the resulting reduction in the sale of produce. The quality of equipment owned by the farmer has been noted to affect quality of produce (Omiti et al. 2009). The results of this study indicated that those farmers who had access to markets were those who had higher value of inputs. Consequently, through multiplier effects, availability of inputs could have severe implications for quality of produce for market access.

In general, the variable that accounted for most of the differences in the average scores profiles of the two groups of farmers were: transaction costs, agricultural extension education, level of education of farmers, distance farm to market, where farmers sell their produce, and value of equipment owned by farmers. As indicated by Waithaka et al. (2007), smallholder farm-

ers often face high transaction costs, and other technical and economic constraints such as lack of equipment and long distances from farm to market places making it difficult to produce quality produce and access markets. The results of the study also are in line with Louw et al. (2007) who found out that small scale farmers are not able to access lucrative markets due to lack of assets and market information.

CONCLUSION

The present paper substantially analyses that there were statistically significant differences between the average score profiles for two farmer groups of farmers, that is, those who have access to markets and those who do not. In particular, there were statistical differences in the average scores for level of education, value of equipment owned, sale of produce and distance from farm to market place. Among the independent variables that separated the two groups of farmers, transaction cost, extension education received, level of education, distance from farm to market, and value of equipment owned by the farmers accounted for most of the differences.

RECOMMENDATIONS

Due to the predetermined selection of only market participants in this study, the data collected did not allow the use of selectivity models such as those applied in similar studies. Nonetheless, this study builds on previous work by estimating the relative influence of some variables used in past studies on market access of rural market participation. Further studies can be done on the factors that affect access to markets with a larger sample in order to obtain accurate results on the study. Further studies can also be done with reference to information from the retailers to obtain results from both the small scale farmers and the high value markets.

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