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DETERMINANTS OF SOCIO-ECONOMIC AND PRODUCTIVITY OF SMALLHOLDER ORGANIC CROP FARMERS IN SOUTH AFRICA

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Abstract: Though, every possible measure has been put in place to ensure that disadvantaged smallholder farmers are incorporated in the mainstream of organic agriculture. Reasons for these are poverty alleviation as well as to ensure food security. The study aims at identifying various factors affecting smallholder farmers' productivity on organic crop farming using multi-linear regression model. A sample size of 160 organic crop farmers from Amathole District Municipality was interviewed. The results revealed that gender and household size are among the major factors affecting organic crop farmers' productivity. However, to unlock the potential of smallholder organic crop farmers' farm productivity, the study suggested that these farmers should have access to extension services and support in order to assist them expand and improve their production, provide markets information about organic foods, thereby enhancing their livelihoods and market channels for organic products.

Keywords: Farm productivity; food security; livelihood; multi-linear model; organic farming; smallholder.

1. INTRODUCTION

Crop production is a key factor for rural development and poverty alleviation in Sub-Saharan Africa. However, the depletion of soil as a result of erosion, degradation of land, shortage of water, and the incidence of climate variability pose severe challenges to producing sufficient food as well as other agricultural goods to sustain rural livelihoods and meet the needs of urban populaces (Hanjra and Qureshi, 2010). However, there is the need to increase smallholder farmers' efficiency in safe-guarding long term food security in South Africa. This can be attained by inspiring smallholder farmers to opt for improved inputs and adopt new innovation to foster sustainable intensification (Nciizah and Wakindiki, 2015). The non-governmental groups (NGOs) as well as farmers' organizations are progressively embracing organic agriculture methods as a way to ensure food safety and production of nutritious food. Consequently, conventional intensive agricultural systems have a great side effect, on the production of food in relation to the quality of food and safety measures (Adebayo and Oladele, 2014). Therefore, arising problems from chemically produce foods "conventional methods" have led to the growth and enhancement of adopting organic agricultural method. This reason is accounted to the environmental surroundings and public health as the main concern (Molero, Madejon, Herencia and Porras, 2006). Organic farming is therefore an interesting option that is considered as a sustainable agriculture in less developed countries because it offers a low combination of external inputs technical know-how, conservative environment as well as efficient input/output (Maji, Meena, Paul and Rudroju, 2017).

Hellin and Higman (2002) considered organic farming as an appropriate system of production to ensure sustainability. It is an appropriate method of production for smallholder farmers. It can broadly be supported

for several reasons, either for small-scale farming in Africa as an opportunity to adopt organic farming or at commercial or subsistence level (Larson *et. al*., 2014). The reasons for these are profit opportunities, environmental sustainability and cultural factors. Since conventional farming could degrade the environment, it is essential to seek a more sustainable method of farming (Mäder *et. al*., 2002).

Onoja and Unaeze (2008) emphasized that the elementary problem by means of enhancing agricultural efficiency of smallholder farmers developed as a result of the farmers themselves (that is, access to extension support and educational level). Research findings have revealed that farmers' socio-economic features could play an important role in determining farm productivity. The study conducted by Okoruwa, Ogundele and Oyewusi (2006) while determining the efficiency of some rice farms in the North Central part of Nigeria noted that most of the socio-economic features that emerge were absolutely correlated to productivity. Furthermore, four of these features namely gender, farming skill, size of the farm and household size, were the main four variables that are statistically significant out of the six variables at different stages with a noticeable effect on all productivity procedures under lowland production scheme except for farming skill. However, much study has not been done examining systematically into the socio-economic aspect of organic crop farmers production, to the best knowledge of these scholars which has been carried out in Amathole District Municipality of the Eastern Cape Province.

Given the above contextual, it is therefore important to carry out on a research of this nature which was aimed to, determine the socioeconomic factors that influence the levels of production amongst smallholder organic crop farmers in Amathole District of Eastern Cape, South Africa.

2. METHODOLOGY

Area of Study

Amathole District is located within the Eastern Cape Province, between Port Alfred and Port St John's. The region extends from the Indian Ocean coastline in the south to the Amathole Mountains in the north. The region covers a land area of approximately 23,577.11km^2 and comprises seven Local Municipalities and one Metropolitan. It had a population of 892,637 as at 2011(Statsa census, 2011). The occupation of the dwellers differed. Though, larger numbers of the inhabitants are small-scale farmers while others involve in administrative work and petty trade.

Sampling Plan

Information regarding organic crop farmers in the study area was obtained from the department of Agriculture and Agrarian reform. The organic crop farmers constituted the population of the study. A multi-stage stratified random sampling was used for this study. Raymond Mhlaba and Amahlathi local municipalities were randomly selected from Amathole District Municipality. Four villages were randomly selected from the two local municipalities and they included: Ntselamanzi, Mathole, Mavuso and Mgayise. Forty (40) organic crop farmers were chosen from each of these villages given a total sample size of one hundred and sixty (160) rural organic crop farmers.

Data Collection

This research employed primary and secondary source of data. Primary data was collected through structured questionnaires to get information on organic crop production. The questionnaire was used for those practicing organic crop farming. Secondary data from journals, books and articles was also used for literature to get the information on organic crop farmers.

Data Analysis

A multi-linear regression model was used in evaluating the coefficients of the socio-economic variables influencing the production of organic crop farmers in the study area. The functional form that gave the finest fit in terms of value of the R^2 and better F-ratio was finally selected and used for the analysis.

Assuming that overall output Y, is a function of household size, age, gender, educational level and access to extension contact following Gido *et. al*., (2013) that uses similar variables to determine agricultural innovation of maize growers' perceptions to organic soil management practices.

Thus the implicit model is:

$$Y = f(X_1, X_2, X_3, X_4, X_5 + U).$$

where, Y = Production output (Kgs),

X_1 = household size (Hs)

X_2 = age

X_3 = gender

X_4 = years of formal education

X_5 = access to extension services

U = error of disturbance term.

3. RESULTS AND DISCUSSION

According to the results summarized in Table 1, R-Square (i.e. coefficient of determination) is 0.115. This means that as much as 12% of the variation in the output is elucidated by the explanatory variables included in the model. The remaining 88% is elucidated by other factors not included in the model. Adjusted R-Squared is lower than R square which shows a good model. This suggests that the Adjusted R-Squared value of 0.074 explains 7% of the variation in the dependent variable. It takes into account the number of variables entered into the model and does not necessarily increase as more variables are added. It further suggests that correction has been made to reflect the number of variables in the equation and an estimate of variance explained and removes variability that is likely due to chance. F-Value (2.822) is significant at one percent implying that the model is statistically significant. This means all the independent variables together predict the output of the smallholder organic crop farmers.

Table 1
Model summary on production output

Model	*R*	*R square*	*Adjusted R square*	*Std. Error of the estimate*	*R square change*	*F change*	*Sig*
1	0.339[a]	0.115	0.074	1490.995	0.115	2.822	0.009***

[a]*Predictors:* (Constant), Household size, Gender, Age, Number of school year, Access to extension service.
[b]*Dependent Variable:* Production output.
Source: Results from SPSS generated from Field Survey, 2016 where Std. Error = Standard Error.

Table 2: Test of variation in model (ANOVA)

Model	*Sum of squares*	*Df*	*Mean Square*	*F-value*	*Sig*
Regression	43909210.000	7	6272744.286	2.534	0.009***
Residual	337905918.400	152	2223065.252		
Total	381815128.400	159			

[a]*Dependent Variable:* Production output.
[b]*Predictors:* (Constant), Household size, Gender, Age, Number of school year, Access to extension service.
Source: Results from SPSS generated from Field Survey, 2016 where *** 1% significance level. Df = Degree of freedom.

According to Table 2, the analysis of variance shows there are variations in the output of the smallholder organic crop farmers. The significance shows variation in the output of the smallholder organic crop farmers. F-Value gives overall adequacy and significant at 0.009. The higher the F-Value the better the overall model of the OLS equation.

Table 3
Socio-economic determinants of smallholder organic crop farmers' output

Model	*Unstandardized Coefficients*		*Standardized Coefficients*	*T*	*Sig*
	B	*Std. Error*	*Beta*		
(Constant)	–464.786	1649.280		–.282	.778
Household Size	167.730	68.454	.197	2.450	0.015**
Gender	770.385	256.445	.249	3.004	0.003***
Age	–10.717	11.396	–.084	–.940	0.348
Number of year in school	22.764	33.807	.058	.673	0.502
Access to Extension Service	321.850	304.714	.086	1.056	0.293

[a]*Dependent Variable:* Production output.
Source: Results from SPSS generated from Field Survey, 2016 where ***, and ** represents significance level at 1%, and 5%, respectively. Std. Error = Standard Error.

Table 3 presents the results of the estimation of the OLS model. The results suggest that production output of the smallholder organic crop farmers is significantly affected by the household size, gender of the household head at 1%, and 5% respectively. According to the analysis, coefficient of household size is positive and significant at 0.015 levels suggesting that a unit change in the household size will change production output by 2.450. This implies that there will be more family labour

available to work on the farm to increase output of the smallholder organic crop farms. However, according to Paddy (2003), large household size increases the rate of consumption than labour it contributes to farming operations. The role of household size is very important in small-scale agriculture as it determines the capability of the household farm output (Hayes *et. al.*, 1997).

The coefficient of gender is positive and significant at 0.003 levels suggesting that a unit change in the gender will increase production output by 3.004. This implies that gender of the households head especially female-headed household are more likely to have a higher output and adopt organic crop farming as a way of improving their livelihood and also become food secured. Chizimba (2010) states that it is broadly recognised that women especially in Africa dominate agricultural production. This is explained by the fact that in the study area most of the men have migrated to the cities in search of white-collar jobs in other parts of South Africa. Farming is hence undertaken by female members of the household.

4. CONCLUSION

This research has shown the magnitude to which socio-economic variables could influence on smallholder organic crop farmer's productivity in Amathole District Municipality of South Africa. The influence of the socio-economic variables on organic crop farmers productivity tested in this study was quite significant. The findings have a lot of insinuations for policy making. Organic farming must be improved to lessen hunger in the face of the teething global food crisis and also must be encourage by the South African government as a way to tackle the menace of climate change for rural farmers. However, in order to overcome this challenge, the following approbations must be considered.

Recommendations

Rural organic crop farmers in South Africa and Amathole District in precise need to be motivated by government to encourage more women to partake in organic farming so as to boost their productivity and improve their livelihood.

South African government need to lay down operative programme that will ensure that agricultural inputs are subsides and are enjoyed by the resource-poor farmers in the provision of enhanced seedlings and credits facilities in the rural communities so as encourage more household to partake in organic crop farming.

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