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SMALLHOLDER FARMERS' ATTITUDE TOWARDS ORGANIC FARMING AND FACTORS INFLUENCING THEIR ATTITUDE: THE CASE OF KWAZULU-NATAL PROVINCE, SOUTH AFRICA

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ABSTRACT

This study assessed the South African farmer's attitude towards organic farming. A pre-tested structured questionnaire was used to collect data from 270 sampled smallholder farmers. The attitude was measured against statements that specifically focused on aspects of organic farming and its environmental and cost-benefit aspects. The five-point Likert scale was the instrument used to measure farmers' perceptions. To check the survey questionnaire reliability, a Cronbach's alpha coefficient was calculated and found to be equal to 0.8. To explore the relationship between the variables correlation coefficient (r^2) was computed using STATA statistical software. The Tobit Regression test showed that farmers' age (negatively), farming experience (positively) and distance from the nearest town (positively) influenced smallholders' attitude towards organic farming. The nested regression result indicated that the age and product type of the respondents had a negative and statistically significant ($P < 0.05$) effect on farmers' attitudes towards the environmental benefits of organic farming. Farming experience and distance from the nearest town had a positive and significant ($P < 0.01$) effect on smallholders' attitude towards environmental and cost-benefit aspects of organic agriculture. In conclusion, the age of farmers had negative and significant ($P < 0.05$) effects on organic farming while the experience of farmers had a positive influence on the attitude of the farmers. Environmental and cost-benefit aspects were negatively correlated with age while on the other hand the farmers' experience was found to be positively correlated with these factors.

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INTRODUCTION

Smallholder farmers produce vegetables by integrating indigenous, adopted and scientific agricultural practices. The attitude and knowledge of smallholder farmers towards their agricultural production and practices influence how they think and perceive their decisions. Literature shows that organic farming is a natural way of farming and it is good for the ecosystem and human

health (Reganold and Wachter, 2016). Implementing natural farming and its practices, which include indigenous and scientifically-researched knowledge, could be a basis for sustainable and environmentally-friendly farming (Priyadharshini and Venkatapirabu, 2016). Natural farming and using available innovative relevant technology are reliable means of ensuring sustainable ecosystem management and food security

(Badgley *et al.*, 2007), and could increase the smallholders' incomes and thereby help eradicate poverty. There are indications that the demand for organic food and beverages is increasing in food markets all over the world (Willer and Lernoud, 2016; Willer *et al.*, 2018).

Studies have revealed that environmental wellbeing, as well as the rural economy and community health, could be strengthened through the implementation of environmentally-friendly production systems (organic farming) (Patle *et al.*, 2014; Reganold and Wachter, 2016). The expense and accessibility of agricultural input, as well as smallholder farmers' knowledge of organic farming, can affect their decisions and choices. Farmers are researchers and learn from their experiences and decisions. Therefore, identifying the factors that influence smallholder farmers' attitudes towards Organic Agriculture (OA), could directly change their attitude towards producing OA and its environmental and economic benefits.

Study Objectives

This study investigated the factors that influence the attitude of smallholder farmers towards OA. More specifically, the study sought to determine whether the identified factors would have a positive or negative effect on the farmers' attitudes towards OA and its environmental and economic benefits.

METHODOLOGY

Data Sources

The study was conducted in KwaZulu-Natal, South Africa. A total sample of 270 smallholder farmers from 23 community villages were randomly selected as the sample group for this study, using the methodology as described by Creswell and Clark (2017). The 23 farming communities were selected purposively. They were the active farmers who are engaged in the production of vegetables, crops and mixed vegetables and crops in the selected communities.

In addition, the 270 sample respondents were selected using the probability sampling technique. The list of farmers was prepared to ensure that everyone can have an equal chance of being selected for this study as a respondent. Then, the 270 sample respondents were randomly selected from the original list that was prepared from 23 farming communities. To explore the relationship between the concerned variables, the

correlation coefficient was computed by using the Censored Tobit Regression Model in the STATA statistical software.

Dependent and independent variables

Attitude was taken as the dependent variable in the model. Attitude is the inner learning of a person expressed by personal evaluative response towards a specific idea or thing (Eagly and Chaiken, 2007), and as a result of the direct exposure to the attitude's object or ideas (Maio *et al.*, 2018). The individual knowledge and experience acceptance about anything and refusal depends on once attitude (Priyadharshini and Venkatapirabu, 2016). The attitude measurement was used by adding the total scores obtained for the attitude statements in the case of positive items as follows: attributing a 3 score for agree; 2 scores for undecided; and 1 score for disagree responses. In the case of negative attitude statements, the scoring pattern was reversed.

The independent variables included in the study were selected based on an extensive review of literature, personal discussion with research scientists, extension personnel and experts. The independent variables were selected from the literature review and experts rating. The relevancy coefficients were calculated. Based on this process, seven independent variables were selected namely; income, education, distance from town, product type, family size, farming experience and age.

These were defined as follows:

- Income is referred to the monthly income of the farmers. South African currency which is Rand (R) was used in this study. The groupings were: R0-500 (1), R501-2000 (2), R2000-5000(3) and above R10000 (4). All farmers' income was expected to influence the dependent variable positively and was measured as a discrete variable.
- Education is the level of formal education farmers peruse. The groupings were: (1) No formal education, (2) Primary education, (3) High school level, (4) Higher education. The variable was expected to influence the dependent variable positively and was measured as a discrete variable.
- Distance from town referred to how far the farmers are from the nearest town. It is measured in kilometres. This variable is discrete and expected to have a positive influence on the dependent variable.
- Product type is referred to the type of production

farmers produce. The groupings were: Vegetable (1), Crop and vegetable (2), Crop vegetable and livestock (3) and Crop (4). This variable was discrete and expected to have a positive influence on the dependent variable.

- Family size referred to the total number of the family each smallholder farmer possess. The variable is discrete and expected to have a positive influence on the dependant variables
- Farming experience referred to the experience of farmers in farming. The variable is discrete and expected to have a positive influence on the dependant variables.
- Age is referred to the age of farmers. Age was a discrete variable and was expected to positively influence the dependant variables.

The selected independent variables were used to measure and evaluate the positive or negative effect on the farmers' attitudes towards OA and its environmental and economic benefits. These variables were entered in Tobit Regression Models and computerized.

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7$$

Where;

Y = Estimated value of attitude of farmers towards OA

a = the intercept

b₁ = coefficient of partial regression of y on x₁ (age)

b₂ = coefficient of partial regression of y on x₂ (income)

b₃ = coefficient of partial regression of y on x₃ (education level)

b₄ = coefficient of partial regression of y on x₄ (distance from town)

b₅ = coefficient of partial regression of y on x₅ (product type)

b₆ = coefficient of partial regression of y on x₆ (family size)

b₇ = coefficient of partial regression of y on x₇ (farming experience)

RESULTS AND DISCUSSION

The majority (84 %) of the respondents are female while 16 % of them are male small-scale farmers. Out of the total respondent population, 32 % are vegetable producers. Whereas, 53 % of them are vegetable and crop producers. 13 % of the respondents are vegetable, crop and livestock producers and 2% of the sample population are crop producers. The age of the farmers stretches from age 21 to 87 years. Out of the total respondent farmers population, 49 % of the respondents are 51 to 70 years of age, while 11 % of them are the youngest with the age varying from 21 to 30 years of

age. Although, 28 % of the respondent are 31 to 50 years of age. The majority, 90 % of the respondents own less than one-hectare farming land. The association between attitude of smallholder farmers towards organic farming practices and the selected seven independent variables such as age, income, education, distance from town, product type, family size and farming experience were tested with the help of 'correlation coefficient' and the results have been presented in Table 1.

Age of farmers

The result showed that the farmers' age had a negative and significant ($P < 0.05$) influence on the farmers' attitudes towards OA. A unit increase in the farmers' age is correlated with a -0.094 unit decrease in the interest of smallholder farmers attitude towards OA. This implies that the age of the respondent correlated negatively with the attitude towards OA. The older the farmer the negative attitude the farmer had on organic agricultural productions. Similar findings were reported by Rangkuti *et al.* (2018), who indicated that ages on the farmers' perceptions influenced organic agricultural productions. The amount of information and experience farmers can accumulate and access through different information sources can shape and direct the perception of a farmer towards OA. Therefore, the result indicates that older farmers' seem to have less access to agricultural information sources and hence have limited knowledge on the benefits of producing food organically.

Farming experience of farmers

Farming experience had a positive and significant ($P \leq 0.01$) effect on the smallholder farmers' attitudes towards OA. A one-unit increase in the experience of farmers towards OA correlates and increases by 0.16 units. This indicates that the farming experience has a positive and significant influence on farmers' attitudes towards organic farming.

Farm location distance from town

Distance from the nearest towns had a positive and significant ($P \leq 0.01$) effect on the smallholder farmers' attitudes towards OA. A one-unit increase of distance from the town correlates with a 7.6 unit increase in farmers' attitudes towards OA (Table 2). As the distance increase from the center of the town the perception of farmers positively increases towards natural farming.

Table 1. Tobit regression analysis output.

	Coef.	St.Err	t-value	p-value	Sig.
Age	-0.094	0.046	-2.04	0.042	**
FE	0.162	0.040	4.04	0.000	***
FS	0.012	0.152	0.08	0.935	ns
ProTyp1	-1.089	1.736	-0.63	0.531	ns
ProTyp2	-3.187	3.182	-1.00	0.317	ns
ProTyp3	-1.329	1.515	-0.88	0.381	ns
ED1	-1.483	7.579	-0.20	0.845	ns
ED2	-0.866	7.734	-0.11	0.911	ns
ED3	-0.681	7.743	-0.09	0.930	ns
Inc1	-3.459	5.477	-0.63	0.528	ns
Inc2	-3.537	5.490	-0.64	0.520	ns
Inc3	-4.244	5.530	-0.77	0.444	ns
Inc4	-7.539	6.157	-1.23	0.222	ns
Inc5	-5.983	7.531	-0.79	0.428	ns
Cons	55.406	5.908	9.38	0.000	***
Variance (pooled data)	44.252	6.305	6.30	6.305	ns
Chi-square	71.418		Prob > chi ²	0.000	

***, **, *, are significant at $p < 0.01$, $p < 0.05$, $p < 0.1$. ns is not significant at $P < 0.05$. FE, Years of experience in farming; FS, Family members; ProTyp1, Vegetable, ProTyp2, Crop; ProTyp3, Vegetable and crop; ED1, Education, Uneducated; ED2, Education, Elementary school, ED3, Education, High school, Inc1, Unemployed; Inc2, R 500-1 500; Inc3, R1 501-2 500; Inc4, R2 501-5 000; Inc5, R5 001-10 000; Inc6, Above R 10 001; cons, variance (pooled data)

Nest regression of factors analysis

Age of farmers

A unit increase of the farmers' age correlated with a 0.081-unit negative increase in the attitude of farmers towards environmental aspects of organic farming (Table 2). The pooled data showed that age had a negative and significant ($P < 0.05$) influence on the farmers' attitudes towards the environmental aspects of OA. This indicates that the increasing farmers' age was correlated with the negatively increasing attitude of smallholder farmers towards environmental aspects of natural farming.

Farming experience of farmers

Farming experience had a positive and significant ($P < 0.01$) influence on smallholders' attitude towards the environment and cost-benefits of OA. A unit increase in the farmers' farming experience correlated with a 0.141 and 0.08 increase, respectively, in their attitude towards the environmental aspects and cost-benefits of OA. A unit increase in the smallholder's farming experience

positively correlated with the increasing attitude towards the environment and cost-benefits of OA. Farmers' experiences have affected farmers' attitudes towards the cost and benefits of organic agricultural practices. Experience affects the increasing knowledge and skill on how they can make a profit from their farming practices and protect the environment.

Product type

A unit increase in vegetable, crop, combined crop and vegetable producers negatively correlated at 4.7, 6.76 and 4.2 level smallholder's attitude towards environmental aspects of organic farming, respectively. The relation is significant at the $P < 0.05$ level. Crop producer farmers' attitudes had a 6.76 unit decreasing attitude towards environmental aspects of OA compared to vegetable, crop, and combined crop and vegetable producers. The increasing and negative perception of farmers depends on the type of produces they were producing.

Table 2. Nest regression analysis output (standard errors are in parenthesis) (n=270).

Parameters	Environmental Asp	Cost Benefit Aspect
Age	-0.081** (0.038)	-0.031* (0.040)
FE	0.141*** (0.033)	0.080** (0.035)
FS	0.111 (0.131)	0.037 (0.132)
1bn.ProTyp	-4.730** (1.952)	-0.636 (1.455)
2.ProTyp	-6.760** (2.632)	-1.751 (2.684)
3.ProTyp	-4.237** (1.807)	-0.505 (1.248)
1bn.Location	2.598** (1.084)	7.683*** (1.231)
1. ED	0.188 (1683.895)	-1.370 (6.197)
2.ED	2.146 (1683.895)	-1.567 (6.331)
3.ED	1.224 (1683.895)	-0.296 (6.355)
0bn.Inc	-17.815 (1164.339)	-2.477 (4.494)
1.Inc	-22.816 (1164.340)	-1.284 (4.518)
2.Inc	-22.991 (1164.340)	-2.016 (4.556)
3.Inc	-25.026 (1164.342)	-4.489 (5.097)
4.Inc	-3.936 (1661.357)	-4.484 (6.168)
Cons	55.117 (1216.485)	24.973*** (4.857)
var(Environment)	19.787*** (4.466)	
Var(BenefitCos)		29.851*** (4.684)

***, **, *, are significant at $P < 0.01$, $P < 0.05$, $p < 0.1$. ns is not significant at $P < 0.05$. FE, Years of experience in farming; FS, Family members; ProTyp1, Vegetable, ProTyp2, Crop; ProTyp3, Vegetable and crop; ED1, Education, Uneducated; ED2, Education, Elementary school, ED3, Education, High school, Inc1, Unemployed; Inc2, R 500-1 500; Inc3, R1 501-2 500; Inc4, R2 501-5 000; Inc5, R5 001-10 000; Inc6, Above R 10 001; Cons, Variance (pooled data).

CONCLUSIONS AND RECOMMENDATIONS

Organic farming is natural farming that has a great benefit to the ecosystem, environment, and human health. The results indicated that the age of farmers had a significant and negative influence on organic farming. The experience of farmers, however, had positive and significant effects on the attitude of the respondent sample population towards organic agriculture. The

correlation between environmental and cost-benefit aspects with the age factor of farmers showed that there was a negative relationship for farmers who were involved in organic crop production. The respondent farmers' experience was found to be positively correlated with the environmental and cost-benefit aspects of organic production. The result showed that there are negative correlations between the perception

of respondent farmers.

It is recommended that the relevant governmental and non-governmental organizations and provincial departments should collaborate to assist smallholder farmers in natural farming. The identified areas in which smallholders can collaborate include acquiring the knowledge and skills required to produce vegetables, crops, and livestock using organic farming. In this process, the general and specific conditions that influence the smallholder farmers' attitudes towards OA, and its impact on the environment and economic benefits, should be addressed.

Training and support should consider the farmer's age and experience, the product type, and the distance from the nearest town and capitalize on the factors that influence attitudes to OA. The resulting training could be in the form of short-term and long-term training programs that address technical aspects of organic production, but with a strong focus on the environmental and economic benefits of OA, including developing knowledge and skills relevant to environmental protection, economic wellbeing, and human health. Through such interventions, it will be possible to help alleviate poverty (through income generation), protect the environment, and increase food security in South Africa.

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