

Determinants of Technical Efficiency Differential among Cooperative Farmers in Anambra State

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Abstract: This study examined the determinants of technical efficiency differential among cooperative farmers in Anambra State. The study specifically examined the effect of agricultural credits, high quality seeds, extension information, fertilizers, insecticides and pesticides on the output among cooperative farmers in Anambra State using descriptive statistics like frequencies, percentages, mean, and standard deviation and the inferential statistics such as t-test statistics and the linear regression model on a sample of 441 respondents. Findings revealed access to agricultural credits, high quality seeds, extension information, fertilizers and insecticides & pesticides significantly influenced the technical efficiency differential proxied by weighted mean of farmers output. The study also revealed the major determinants of technical efficiency differential among cooperative farmers in Anambra State by applying the coefficient of determination (R^2) and the F-test. In general, the joint effect of the explanatory variables-independent variables-in the model account for 0.743 or 74.3% of the variations in the technical efficiency differential proxied by weighted mean of farmers output. This implies that 75.0% of the variations in the technical efficiency differential proxied by weighted mean of farmers output are being accounted for or explained by the variations in access to agricultural credits, high quality seeds, extension information, fertilizers and insecticides & pesticides. While other independent variables not captured in the model explain just 25% of the variations in technical efficiency differential proxied by weighted mean of farmers output. Based on the findings of this study, the following recommendations are made: The Ministry in charge of cooperative in collaboration with the societies should ensure that adequate credit facilities are provided for farmers. This is because agricultural credits were found to have significant effect on the output cooperative farmers in Anambra State. The Ministry in charge of cooperative in collaboration with the societies should also ensure that high quality seeds and seedling are provided for farmers to enhance their productivity. Extension information should be readily made available to the farmers to enable have access to modern farming practices and techniques. The Ministry in charge of cooperative in collaboration with the societies should also ensure that high quality fertilizers are provided for farmers to enhance their productivity and output. To prevent insect and pest attacks on farms, the government should make available high quality insecticides and pesticides to the farmers.

Keywords: Technical Efficiency Differential, Cooperative Farmers, agricultural credits, high quality seeds, extension information, fertilizers, insecticides and pesticides.

1. INTRODUCTION

Technical efficiency (TE) refers to the ability of the farms to attain the highest level of output given a set of inputs. The estimation of the farms' TE allows understanding if the farmer's decision making allow him

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to “doing things right” (Maietta, 2007). In other words, technical efficiency aims to lower costs as much as possible while still hitting a production goal. Every business enterprise including agri-businesses has consistently strive to achieve efficiency in its activities. This is important as the business environment is becoming more vicious and competitive. Today, many people engage in one form of agricultural activities or the other to earn income for survival and for the income to be consistent, the farmer must not only be efficient but technically efficient in its operation. As a point of departure in this discuss, efficiency refers to the ability to produce something with a minimum amount of effort. That is, producing desired results with little or no waste (as of time or materials) while technical efficiency is the effectiveness with which a given set of inputs is used to produce an output.

A firm is said to be technically efficient if a firm is producing the maximum output from the minimum quantity of inputs, such as labour, capital, and technology. In this case a firm enjoys the best practices in their production processes, so that not more than the necessary amount of a given set of inputs is used in producing the “best” level of output (Okoye, Abass, Bachwenkizi, Asumugha, Alenkhe, Ranaivoson, Randrianarivelo, Rabemanantsoa & Ralimanana, 2016). Measuring farm technical efficiency stems from the perceived food demand and supply gap and the growing incidence of poverty among the resource poor rural farmers in Nigeria. Although, the Nigeria agricultural sector has remained the mainstay of the means of livelihood for its growing population. The sector has not only provided income for majority of its population who are resource poor farmers but has also been a source of employment generation, foreign exchange earnings and provider of raw material for other sectors of the economy (Anigbogu & Uzundu, 2018). Despite these important contributions of the sector to the socio-economic transformation of the economy, the sector is still dominated by small scale farmers who face multiple marketing and productivity challenges including limited access to productive inputs, output markets, extension services, credit facilities, and unavailability of improved agricultural technologies. This may lead to a reduction in agricultural incomes as well as constitute threats to the food security of rural households (Olagunju, Ogunniyi, Oyetunde- Usman, Omotayo & Awotide, 2021).

In Anambra State, a number of agricultural practices take place. The climate of the state allows for favourable cultivation and extraction of agricultural and forest products such as Oil Palm, Maize, Rice, Yam, Cassava, and Fish. Although efforts have been made by donor agencies and successive governments in the state to improve the technical efficiency of farmers by encouraging farmers to form agricultural cooperatives as a policy initiative to enhance agricultural development as well as value chain development in transition and developing economies (Anigbogu, Agbasi & Okoli, 2018; Olagunju, et al. 2021). It is however, not yet certain if this overcharging objective has been achieved as there are still very wide income differential and poverty incidence among the rural household farmers which warrants an empirical investigation into their technical efficiency differential in order to ascertain the effectiveness with which a given set of the farmers inputs in terms of labour, capital, and technology is used to produce an output. This is because, what determines a farmers ability to profitably manipulate a given set of inputs in terms of labour, capital, and technology to get a desired output with little or no waste has remained a critical issue in academic literature as this encompasses a wide range of socioeconomic, environmental and technical variable (Olarinde, 2011; Njeru, 2010; Obwona, 2006).

Statement of the Problem

Improving the technical efficiency of farmers has remained topical issue. Farmers access to agricultural credits, high quality seeds, fertilizers, insecticides, pesticides, irrigation equipment, poultry birds and products, relevant extension information, water, high technology tractors etc. are critical to successful crop production and inevitably, farm productivity and profitability thus iimproving the technical efficiency of farmers. This is because the growing incidence of poverty in the country in recent time is perceived to be

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more pervasive among the rural farm household. Anambra state hosts four agricultural zone dominated by rural farm households that are among the poverty affected farmers in Nigeria. The state is not spared in the perceived widening food demand and supply gap and the attendant hike in the cost of food stuff that have affect farmers income and food security situation in the state. It is posited that improving the technical efficiency of farmers will influence their productivity and output performance (Subedi, Ghimire, Kharel, Adhikari, Shrestha & Sapkota, 2020; Akamin, Bidogeza, Minkoua & Afari-Sefa, 2017). However, there is a myriad of factors asserted in the literature that influence the technical efficiency of farmers. These include: socioeconomic, environmental and technical factors. Membership of farmers cooperative is another important factor that is intended to be included in the model of this study as part of the social factors that enhances the technical efficiency of farmers. This is corroborated by Olagunju, et al. (2021) who noted that donor agencies and government have encouraged farmers to form agricultural cooperatives as a policy initiative to enhance agricultural development as well as value chain development in transition and developing economies. This study is imperative because of the persistent and pervasive poverty among farm household which explains the need to improve their technical efficiency of the farm household in Anambra state with the aim of addressing the challenges of food security and poverty incidence ravaging the rural farm household in the state. This study therefore examines the determinants of technical efficiency differential among cooperative farmers in Anambra State.

Objectives of the Study

The main objective of this study is to examine the determinants of technical efficiency differential among cooperative farmers in Anambra State. Specifically, the study intends to:

1. Determine the effect of agricultural credits on the output among cooperative farmers in Anambra State.
2. Ascertain the effect of high quality seeds on the output among cooperative farmers in Anambra State.
3. Evaluate the effect of extension information on the output among cooperative farmers in Anambra State.
4. Examine the effect of fertilizers on the output among cooperative farmers in Anambra State.
5. Ascertain the effect of insecticides and pesticides on the output among cooperative farmers in Anambra State.

Research Questions

The present study was guided by following research questions:

1. What is the effect of agricultural credits on the output among cooperative farmers in Anambra State?
2. What is the effect of high quality seeds on the output among cooperative farmers in Anambra State?
3. What is the effect of extension information on the output among cooperative farmers in Anambra State?
4. What is the effect of fertilizers on the output among cooperative farmers in Anambra State?
5. What is the effect of insecticides and pesticides on the output among cooperative farmers in Anambra State?

Hypotheses

The following null hypotheses were formulated and tested in the study:

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Hypothesis One

Ho₁: Agricultural credits have no significant effect on the output cooperative farmers in Anambra State.

Hypothesis Two

Ho₂: High quality seeds have no significant influence on the output cooperative farmers in Anambra State.

Hypothesis Three

Ho₃: Extension information have no significant influence on the output cooperative farmers in Anambra State.

Hypothesis Four

Ho₄: Fertilizers have no significant influence on the output cooperative farmers in Anambra State.

Hypothesis Five

Ho₅: Insecticides and pesticides have no significant influence on the output cooperative farmers in Anambra State.

2. METHODOLOGY

Research Design

This study adopts a descriptive survey research design. According to Micheal, Oparaku and Oparaku (2012), in a descriptive survey research design the researcher's aim is to determine the relationship between the independent variables and dependent variable in a population. Descriptive survey research design involves asking questions, collecting and analyzing data from a supposedly representative members of the population at a single point in time with a view to determine the current situation of that population with respect to one or more variable under investigation (Okeke, Olise & Eze, 2008; Chukwuemeka, 2002; Chukwuemeka & Oji, 1999). The questions asked are to elicit responses that will answer the research questions and address the objectives of the research.

Area of Study

The area of study is the geographical area or boundaries where the study is carried out (Uzoagulu, 1998). This study was carried out in Anambra state. Anambra State is a state in south-eastern Nigeria. Its name is an anglicized version of the original 'Oma Mbala', the native name of the Anambra River which is a tributary of the famous River Niger. The Capital and the Seat of Government is Awka. Onitsha and Nnewi are the biggest commercial and industrial cities. The state's theme is "Light of the Nation". The boundaries are formed by Delta State to the west, Imo State and Rivers State to the south, Enugu State to the east and Kogi State to the north.

The indigenous ethnic group in Anambra state are the Igbo (98% of population) and a small population of Igala (2% of the population) who live mainly in the north-western part of the state. Anambra is the eighth most populated state in the Federal Republic of Nigeria and the second most densely populated state in Nigeria after Lagos State. The stretch of more than 45 km between Oba and Amorka contains a cluster of numerous thickly populated villages and small towns giving the area an estimated average density of 1,500–2,000 persons per square kilometre.

Anambra is rich in natural gas, crude oil, bauxite, ceramic and has an almost 100 percent arable soil. In the year 2006, foundation laying ceremony for the first Nigerian private refinery Orient Petroleum Refinery (OPR) was made at Aguleri area. The Orient Petroleum Resource Ltd, (OPRL) owners of OPR, was

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licensed in June 2002, by the Federal Government to construct a private refinery with a capacity of 55,000 barrels per day. Furthermore, Anambra state is a state that has many other resources in terms of agro-based activities like fishery and farming, as well as land cultivated for pasturing and animal husbandry. Currently, Anambra State has the lowest poverty rate in Nigeria.

Population of the Study

The population of the study is made up all the members of agricultural cooperatives in Anambra state. Anambra state has three senatorial zone with great agricultural potentials. The state has a total of three thousand four hundred and eighty-six (3486) registered cooperative societies with a membership strength of seventeen thousand four hundred and thirty-six (17436) out of which Two Thousand Eight Hundred and Fifty Six (2856) are agricultural cooperative with a membership of thirteen thousand four hundred and eighty four (13484). (Cooperative Department Ministry of Commerce and Industry, Awka, Anambra State).

Sample Size and Sampling Procedure

Multi-staged sampling technique was used to determine the sample size of the study. This was carried in four stages. According to Chukwuemeka (2002), multi-stage sampling is somewhat the combination of the other sampling techniques. At least, it combines two methods. The first stage was the division of the state into three zones using base on the senatorial zones using purposive or judgmental sampling. Judgmental sampling is a non probability sampling that makes use of typical cases among the population to be studied, which the researcher believes will provide him or her with the necessary data needed (Micheal et al, 2012). The second stage was a sub-sampling also called a two-stage sampling. This was a random selection of selecting two local governments each (Orumba South L.G.A; Orumba North L.G.A; Awka North; Idemili South L.G.A; Anambra West L.G.A and Ogbaru L.G.A) from the zones. Making a total of six local governments. In the third stage otherwise called the three-stage sampling, the simple random sampling technique was also used to select two towns each from each of the six selected local governments in the zones. Making a total of twelve towns. In the fourth stage, simple random sampling technique was again used to select two cooperative societies from each of the twelve towns. Making a total of twenty-four (24) cooperative societies. The table below shows the LGAs Selected, Towns, Names of societies, their membership strength and sample size.

The table 1: The LGAs Selected, Towns, Names of societies, their membership strength and sample size

	Names of societies	L.G.A	Towns	Membership		Total
				Males	Females	
1	Ugocheke Umunze Fmcs Ltd	Orumba South	Umunze	9	11	20
2	Umunze Vas Fmcs Ltd	Orumba South	Umunze	22	10	32
3	Umunebo Ogbunka Fmcs Ltd	Orumba South	Ogbunka	11	4	15
4	Allied (Ogbunka) Fmcs Ltd	Orumba South	Ogbunka	9	6	15
5	Njikoka Okpeze Fmcs Ltd	Orumba North	Okpeze	15	11	26
6	Igwemma Okpeze Fmcs Ltd	Orumba North	Okpeze	17	11	28
7	Ugwumba Omoh Fmcs Ltd	Orumba North	Omoh	23	14	37
8	Allied (Ogbunka) Fmcs Ltd	Orumba North	Omoh	15	12	27
9	Omoh Fmcs Ltd	Awka North	Achalla	11	14	25
10	Uthoko (Achalla) Fmcs Ltd	Awka North	Achalla	19	12	31
11	Anibueze (Ugbenu) Fadama Fmcs Ltd	Awka North	Ugbenu	7	3	10

12	Nuke Ugbene Fmcs Ltd	Awka North	Ugbenu	7	5	12
13	Nwanneamaka Akwukwu Fmcs Ltd	Idemili South	Akwukwu	17	3	20
14	Umuzemeeoaka Akwukwu Fmcs Ltd	Idemili South	Akwukwu	25	19	44
15	Chizoba Oba Fmcs Ltd	Idemili South	Oba	11	4	15
16	Ofuokwu Oba Fmcs Ltd	Idemili South	Oba	12	6	18
17	Igwebuike Nzam (Fug) Mcs Ltd	Anambra West	Nzam	18	11	29
18	Oluchukwu Nzam(Fug) Mcs Ltd	Anambra West	Nzam	12	9	21
19	Oluchukwu Nzam(Fug) Mcs Ltd	Anambra West	Ukwalla	18	13	31
20	Ifunanya Ukwalla(Fug) Mcs Ltd	Anambra West	Ukwalla	11	11	22
21	Obidimma Atani Ogbaru Mcs Ltd	Ogbaru	Atani	6	5	11
22	Onuko Atani Ogbaru Fadama Fcs Ltd	Ogbaru	Atani	7	6	13
23	Nkiruka Odekpe Ogbaru Fmcs Ltd	Ogbaru	Odekpe	7	3	10
24	Ifeatu Odekpe Ogbaru Fmcs Ltd	Ogbaru	Odekpe	7	5	12
				316	208	524

Source: Computation from survey 2023

Data Collection

Data for the study were obtained from members of the selected Cooperative Societies through the use of a structured questionnaire that was administered them.

Data Collection Instrument

The researcher developed a structured questionnaire that will be administered to members of the selected cooperative societies. The questionnaire has two sections; section A and section B. Section A sought information on socio-economic background of respondents while section B was on items relating to core research questions and objectives. Out of the 524 questionnaires distributed only 441 was returned.

Method of Data Analysis

Data collected will be analyzed using descriptive statistics (frequencies and percentages) and the inferential statistics such as test statistics and the linear regression model. The demographic profiles will be processed using descriptive statistics. Thereafter, the seven objectives was processed using the regression model of the Ordinary Least Square (OLS). T-test and F-test statistics will be used to test the hypotheses of the study and the overall fitness of the model. All the analyses will be done using SPSS version 23. Linear regression model of the Ordinary Least Square (OLS) approach was used to analyse the objectives in order to ascertain the influence and also determine the relationship between the independent variables and dependent variable in the conceptualized model of the study. The use of Ordinary Least Square (OLS), is informed by the fact that under normality assumption for α_i , the Ordinary Least Square (OLS) estimator is normally distributed and is said to be best, unbiased linear estimator (Gujarati and Porter, 2008).

Thus, the model of this study, is stated as follows:

The functional form of the model is

$$TED = f(AGC, HQS, EXI, FER, IAP) \dots\dots\dots(1)$$

The mathematical form of the model is

$$TED = \beta_0 + \beta_1 AGC + \beta_2 HQS + \beta_3 EXI + \beta_4 FER + \beta_5 IAP \dots\dots\dots(2)$$

The econometric form of the model is

$$TED = \beta_0 + \beta_1 AGC + \beta_2 HQS + \beta_3 EXI + \beta_4 FER + \beta_5 IAP + \alpha_i \dots\dots\dots (3)$$

Where; TED = Technical Efficiency Differential proxied by output among cooperative farmers

AGC = Agricultural credits

HQS = High quality seeds

EXI = Extension Information

FER = Fertilizers

IAP = Insecticides and Pesticides

β_0 = Intercept of the model

$\beta_1 - \beta_5$ = Parameters of the model

α_i = Stochastic error term

3. DATA PRESENTATION AND ANALYSIS

4.1 Table 2: Demographic Profile of the Respondents

Variable	Frequency	Percent (%)	Cumulative (%)
Gender			
Male	277	62.8	62.8
Female	161	37.2	100
Total	441	100	
Age			
18-32	11	2.5	2.5
31-40	47	10.7	13.2
41-50	237	53.7	66.9
51-60	88	20.0	86.9
61-70	58	13.1	100.0
Total	441	100.0	
Educational Qualification			
Primary	19	4.3	4.3
Secondary	330	74.8	79.1
Tertiary	92	20.9	100.0
Total	441	100.0	
Years of Cooperative Experience			
1-5	89	20.2	20.2
6-10	101	22.9	43.1
11-15	77	17.5	60.6
15-30	174	49.4	100.0
Total	441	100.0	
Marital Status			
Married	364	82.5	82.5
Single	56	12.7	95.2
Widow/Widower	21	4.8	100.0

Total	441	100.0	
Income of Farmers			
10,000 - 50,000 naira	31	7.0	7.0
51,000 - 100,000 naira	32	7.3	14.3
101,000- 150,000 naira	144	32.7	47.0
151,000 - 200,000 naira	156	35.4	82.4
Above 200,000 naira	78	17.6	100
Total	441	100.0	
Farm size			
1-5 plots	19	4.3	4.3
6-10 plots	188	42.6	46.9
11-15 plots	167	37.9	84.8
15-30 plots	46	10.4	95.2
Above 30plots	21	4.8	100
Total	441	100.0	
Farmers Output			
10,000 - 50,000 naira	31	7.0	7.0
51,000 - 100,000 naira	32	7.3	14.3
101,000- 150,000 naira	144	32.7	47.0
151,000 - 200,000 naira	156	35.4	82.4
Above 200,000 naira	78	17.6	100
Total	441	100.0	

Source: Field Survey, 2023

With respect to gender of the respondents, Table 2 shows that 62.8% of the respondents are males while 37.2% of the respondents are females. The table revealed that 2.5% of the respondents are between the ages of 18-32. 10.7% of the respondents are between the ages of 31-40. 53.7% of the respondents are between the ages of 41-50. 20.0% of the respondents between the ages of 51-60 while 13.1% of the respondents, are between the ages of 61-70.

From table 2, all the respondents had formal education. 4.3% of the respondents had primary education. 74.8% had secondary education while 20.9% had tertiary education. With respect to years of cooperative experience, table 4.1 reveals that 20.2% of the respondents had 1-5 years of cooperative experience. 22.9% of the respondents had 6-10 years of cooperative experience. 17.5% of the respondents had 11-15 years of cooperative experience, while 49.4% of the respondents had 15-30 years of cooperative experience.

With respect to marital status, table 2, 82.5% of the respondents are married. 12.7% of the respondents are single, while five respondents representing 4.8% of the respondents are widow/widower. Table 4.1 also shows that 7.0% of the respondents earn between ₦1000 - ₦ 20,000 as income per month. 7.3% of the respondents earn between 51,000 - 100,000 naira as income per month. 32.7% of the respondents earn between 101,000- 150,000 naira as income per month. 35.4% of the respondents earn between 151,000 - 200,000 naira as income per month while 17.6% of the respondents earn between Above 200,000 naira as income per month.

As shown in table 2, 4.3% of the respondents had between 10,000 - 50,000 naira as output. 4.3% of the respondents had between 1-5 plots of land as farm size. 42.6% of the respondents had between 6-10 plots of land as farm size. 37.9% of the respondents had between 11-15 plots of land as farm size. 10.4% of the

respondents had between 15-30 plots of land as farm size. 4.8% of the respondents had between above 30 plots of land as farm size. Table 2 also shows that 7.0% of the respondents earn between ₦1000 - ₦20,000 as farm output per month. 7.3% of the respondents earn between 51,000 - 100,000 naira as farm output. 32.7% of the respondents earn between 101,000- 150,000 naira as farm output. 35.4% of the respondents earn between 151,000 - 200,000 naira as farm output while 17.6% of the respondents earn between Above 200,000 naira as farm output per month.

Regression Analysis Result

Table 3: Regression result on determinants of technical efficiency differential among cooperative farmers in Anambra State

Model	B	Std. error	T	Sig.
Constant(C)	0.175	0.068	2.579	0.110
Agricultural credits	0.319	0.318	5.098	0.003
High quality seeds	0.426	0.278	8.639	0.000
Extension information	0.520	0.287	4.881	0.007
Fertilizers	0.516	0.065	8.056	0.006
Insecticides and pesticides	0.359	0.068	11.301	0.000
R	0.849			
R²	0.743			
Adj. R²	0.730			
F-statistic	231.201			0.000

Source: Field Survey, 2023

Dependent Variable: Technical Efficiency Differential proxied by weighted mean of farmers output

The regression table revealed the analysis of the five technical efficiency differential indicators modeled in this study and their regression coefficients, standard error, t-test statistics, and the probability value of each of the individual regression coefficient. The R, R², adjusted R² and F-Statistics was also included in the table.

The regression coefficients which includes access to agricultural credits, high quality seeds, extension information, fertilizers and insecticides & pesticides represent by the heading "B" in the regression table explains the extent to which agricultural credits, high quality seeds, extension information, fertilizers and insecticides & pesticides influence the output of farmer in Anambra State. The regression result tells us the nature of relationship between the regression coefficients and the dependent variable which is the technical efficiency differential proxied by weighted mean of farmers output. From the result, all the regression coefficients have positive relationship with the technical efficiency differential proxied by weighted mean of farmers output. Again, the table revealed that a unit increase in terms of access to agricultural credits will bring about 31.9% increases in the technical efficiency differential proxied by weighted mean of farmers output. A unit increase in terms of access to High quality seeds will bring about 42.6%. A unit increase in terms of access to extension information will bring about 52.0% increases in the technical efficiency differential proxied by weighted mean of farmers output. The table revealed that a unit increase in terms of access to fertilizers will bring about 51.6% increases in the technical efficiency differential proxied by weighted mean of farmers output and unit increase in terms of Insecticides and pesticides will bring about 35.9% increases in the technical efficiency differential proxied by weighted mean of farmers output.

Test of Hypotheses

The t-test is used to find out the statistical significance of the individual parameters at 5% significance level. The result is showed on table 4 below.

Table 4: Summary of t-statistic

Variables	t-cal (t_{cal})	Sig.	Conclusion
Constant(C)	2.579	0.110	Statistically Insignificance
Agricultural credits	5.098	0.003	Statistically Significance
High quality seeds	8.639	0.000	Statistically Significance
Extension information	4.881	0.007	Statistically Significance
Fertilizers	8.056	0.006	Statistically Significance
Insecticides and pesticides	11.301	0.000	Statistically Significance
F-statistics	231.201	0.000	Statistically Significance

Source: Researcher’s computation 2023

From table 4, the t-test result is interpreted below:

The following null hypotheses were formulated and tested in the study:

Hypothesis One

Table 5: Summary of t-statistic on Agricultural credits

Variables	t-cal (t_{cal})	Sig.	Conclusion
Constant(C)	2.579	0.110	Statistically Insignificance
Agricultural credits	5.098	0.003	Statistically Significance

Source: Researcher’s computation 2023

Ho₁: Agricultural credits have no significant effect on the output cooperative farmers in Anambra State.

Ha₁: Agricultural credits have significant effect on the output cooperative farmers in Anambra State.

From table 5, the t-test value of Agricultural credits is significant. Therefore the null hypothesis is rejected and alternate accepted by concluding that agricultural credits have significant effect on the output cooperative farmers in Anambra State.

Hypothesis Two

Table 6: Summary of t-statistic on high quality seeds

Variables	t-cal (t_{cal})	Sig.	Conclusion
Constant(C)	2.579	0.110	Statistically Insignificance
High quality seeds	8.639	0.000	Statistically Significance

Source: Researcher’s computation 2023

Ho₂: High quality seeds have no significant influence on the output cooperative farmers in Anambra State.

Ha₂: High quality seeds have significant influence on the output cooperative farmers in Anambra State.

From table 6, the t-test value of High quality seeds is significant at 0.000 level of significant. Therefore the null hypothesis is rejected by concluding that high quality seeds have significant influence on the output cooperative farmers in Anambra State.

Hypothesis Three

Table 7: Summary of t-statistic on Extension information

Variables	t-cal (t _{cal})	Sig.	Conclusion
Constant(C)	2.579	0.110	Statistically Insignificance
Extension information	4.881	0.007	Statistically Significance

Source: Researcher’s computation 2023

Ho₃: Extension information has no significant influence on the output cooperative farmers in Anambra State.

Ha₃: Extension information has significant influence on the output cooperative farmers in Anambra State.

From table 7, the t-test value of extension information is significant at 0.007 level of significant therefore we to reject the null hypothesis and accepted the alternate by concluding that Extension information has significant influence on the output cooperative farmers in Anambra State.

Hypothesis Four

Table 8: Summary of t-statistic on fertilizers

Variables	t-cal (t _{cal})	Sig.	Conclusion
Constant(C)	2.579	0.110	Statistically Insignificance
Fertilizers	8.056	0.006	Statistically Significance

Source: Researcher’s computation 2023

Ho₄: Fertilizers has no significant influence on the output cooperative farmers in Anambra State.

Ha₄: Fertilizers has significant influence on the output cooperative farmers in Anambra State.

From table 8, the t-test value of fertilizers is significant we therefore reject the null hypothesis and accept the alternate by concluding that fertilizers has significant influence on the output cooperative farmers in Anambra State.

Hypothesis Five

Table 9: Summary of t-statistic on insecticides and pesticides

Variables	t-cal (t _{cal})	Sig.	Conclusion
Constant(C)	2.579	0.110	Statistically Insignificance
Insecticides and pesticides	11.301	0.000	Statistically Significance

Source: Researcher’s computation 2023

Ho₅: Insecticides and pesticides have no significant influence on the output cooperative farmers in Anambra State.

Ha₅: Insecticides and pesticides have significant influence on the output cooperative farmers in Anambra State.

From table 9, the t-test value of insecticides and pesticides is significant. We therefore reject the null hypothesis and accept the alternate by concluding that fertilizers have significant influence on the output cooperative farmers in Anambra State.

4. CONCLUSION AND RECOMMENDATIONS

1. Agricultural credits have significant effect on the output cooperative farmers in Anambra State.
2. High quality seeds have significant influence on the output cooperative farmers in Anambra State.
3. Extension information has significant influence on the output cooperative farmers in Anambra State.
4. Fertilizers have significant influence on the output cooperative farmers in Anambra State.
5. Insecticides and pesticides have no significant influence on the output cooperative farmers in Anambra State.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. The Ministry in charge of cooperative in collaboration with the societies should ensure that adequate credit facilities are provided for farmers. This is because agricultural credits were found to have significant effect on the output cooperative farmers in Anambra State.
2. The Ministry in charge of cooperative in collaboration with the societies should also ensure that high quality seeds and seedling are provided for farmers to enhance their productivity.
3. Extension information should be readily made available to the farmers to enable have access to modern farming practices and techniques.
4. The Ministry in charge of cooperative in collaboration with the societies should also ensure that high quality fertilizers are provided for farmers to enhance their productivity and output.
5. To prevent insect and pest attacks on farms, the government should make available high quality insecticides and pesticides to the farmers.

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