

## Output Performance Of Food-Crop Farmers Under The Nigerian Agricultural Insurance Scheme In Imo State, South East, Nigeria

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**ABSTRACT:** The Nigerian Agricultural Insurance Scheme was established in 1984 by the Federal Government with the promotion of agricultural production as one of its specific objectives. This study was conducted to evaluate the output performance of the food-crop farmers who have embraced the scheme. The study also analysed the influence of socio-economic characteristics on the farmers output. Primary data and secondary information sources were used in the study. The primary data were obtained from 77 food-crop farmers selected through simple random sampling from a list of 145 food crop farmers under the scheme in Imo State. Data analyses were done using both descriptive and inferential statistics. The descriptive statistics such as mean, frequency were used to analyse the socio-economic characteristics of the farmers while inferential statistics (Z - test and multiple regression model) were used to determine the impact and influence of socio-economic characteristics like age, farming experience, educational background etc on the farmers' output respectively. The Z – test analysis of the impact of the scheme on the farmers' output showed that there was a positive and significant change in the farmers' output after insurance. The results of the analyses of the socio-economic characteristics of the respondent farmers showed that majority (66.23%) of the sampled farmers are males. It also showed that majority (46.75%) of the sampled farmers were within the age bracket of 41-50 years. Also, over 70% of the insured farmers had secondary school education and above. The Z – test analysis showed that there was an increase in farm output of the farmers after embracing the scheme. The average farm output was 16.01 metric tones before insurance but rose to 21.66 metric tones after insurance. The multiple regression analysis on the influence of socio-economic characteristics on the farm output after insurance showed that educational level, farming experience, farm size and number of technologies used in the farm are significant variables. While age, sex and household size are insignificant variables. The study therefore recommends that more effort should be put in to creating awareness of the laudable objectives of the insurance scheme to food-crop farmers (especially in the enhancing the nation's quest for food security. [Academia Arena, 2010;2(6):43-47] (ISSN 1553-992X).

**Key words:** Insurance, Output-Performance; Food-Crop; Food-Security, Farm- income; Nigeria

### INTRODUCTION

Agricultural production is inherently a risky business and farmers face a variety of weather, pest, disease, input supply and market related risks.(Skees et al,1999). Because of risks inherent in agricultural production which lead to farm income uncertainty, many farmers express fears on their ability to meet overhead costs, family needs, and also repay any debt. On the other hand, formal lending institutions also express apprehension on farmers' repayment ability of loans. These lenders seek to reduce the possibility of poor loan recovery by reducing amount of loan to agriculture and in some cases seek collateral from the farmers before granting a loan. This has led governments all over the world to intervene with a range of risk management programmes for farmers thereby enhancing their credit worthiness before lending institutions (Mishra, 1996; Hazell, 1992)

Agricultural Insurance, in its widest sense may be defined as the stabilization of income, employment, price and supplies of agricultural products by means of regular and deliberate savings and accumulation of funds in small installments by many in favourable time periods to defend some or few of the participants in bad time periods (Arene, 2005).The term "insurance" is simply "a risk management strategy". The Nigerian Agricultural Insurance Scheme was established in 1984 with offices in all the 36 States of the Country of which Imo State is one. It has the broad objective to offer protection to the farmer from effects of natural disasters. Specifically, the Agricultural Insurance Scheme was designed to promote agricultural production; provide financial support to farmers in the event of losses arising from natural disasters; increase the flow of agricultural credit from lending institutions to the farmers and minimize the need for emergency

assistance provided by the government during periods of agricultural disaster (NAIC2007).

The primary motive of any agricultural insurance policy is to serve as a security for losses resulting from natural disasters. It also serves as collateral for agricultural loan to the farmers from banks.(Arene, 2005; Oguoma, 2002) There are some food-crop farmers who embraced the scheme since its inception to date in Imo state, with the hope of attaining the scheme's laudable objectives at least, in terms of increased output. Therefore, the focus of this study was to evaluate the impact of the insurance scheme on the farmers' output. It will also determine the influence of identified socio-economic characteristics on the insured farmers output.

**MATERIALS AND METHODS**

This study was conducted in Imo State, Nigeria. The State has a land area of 5,530 square kilometers

and a population of 3.38 million people.(ISPEC,2008) The major food-crops grown in the state are yam, cassava, cocoyam, maize beans and melon.(MANR,2008) The state is divided into 27 local government areas and these are grouped into 3 Agricultural Zones – Okigwe, Orlu and Owerri. The sampling frame was the list of 145 insured Food Crop farmers obtained from the Nigerian Agricultural Insurance Company (the Scheme's operating agency). From the list, 77 farmers were selected through simple random sampling technique and a structured questionnaire administered on them by the researchers. The impact of the scheme on the farmers' output was determined using the Z – test statistic formula

$$Z = \frac{\bar{X}_2 - \bar{X}_1}{\sqrt{\frac{S_2^2 + S_1^2}{n_2 + n_1}}}$$

Where

- $\bar{X}_2$  = average farm output after insurance (in metric tones)
- $\bar{X}_1$  = average farm output before insurance (in metric tones)
- $S_2$  = output variance after insurance
- $S_1$  = output variance before insurance
- $n_1, n_2$  = Sample size

The influence of the identified socio-economic characteristics of the sampled farmers on their farm output was determined using the multiple regression model which is implicitly stated thus

$$Q = f(x_1, x_2, x_3, x_4, x_5, x_6, e)$$

Where

Q = farm output after insurance (in metric tones)

- $X_1$  = Age
- $X_2$  = Gender (dumng, 1 = Male 0 = female)
- $X_3$  = Household size
- $X_4$  = Farming experience (in years)
- $X_5$  = Educational level (in years)
- $X_6$  = Farm size (in hectares)

The above model was tried on four (4) functional forms as stated by Olayemi (1998)

i. Linear

$$Q = a_0 + a_1 x_1 + a_2 x_2 + a_3 x_3 + a_4 x_4 + a_5 x_5 + a_6 x_6 + e$$

ii. Double log

$$\log Q = a_0 + a_1 \log X_1 + a_2 \log x_2 + a_3 \log x_3 + a_4 \log x_4 + a_5 \log x_5 + a_6 \log x_6 + e$$

iii Exponential

$$\log Q = a_0 + a_1 x_1 + a_2 x_2 + a_3 x_3 + a_4 x_4 + a_5 x_5 + a_6 x_6 + e$$

iv. Semi log

$$Q = a_0 + a_1 \log x_1 + a_2 \log x_2 + a_3 \log x_3 + a_4 \log x_4 + a_5 \log x_5 + a_6 \log x_6 + e$$

The chosen functional form is the one that gives the best fit to the data based on number of significant variables, magnitude and conformity of the signs of the coefficients of the variables to *a priori* expectations and the value of the coefficient of determination ( $R^2$ ). (Olayemi, 1998)

**RESULTS**

Table 1 shows a summary of the socio-economic characteristics of sampled farmers .

**Table 1: Socio-Economic Characteristics Of Sampled Insured Farmers In Imo State.**

Variable	Frequency	Percentage
Age (in years)31-40		
31-50	5	6.49
51-60	36	46.75
61-70	26	33.77
<b>Total</b>	<b>10</b>	<b>12.99</b>
	<b>77</b>	<b>100</b>
Gender		
Male		
Female	51	66.23
<b>Total</b>	<b>26</b>	<b>33.77</b>
	<b>77</b>	<b>100</b>
Educational level		
Primary (1-6 years)		
Secondary(7 – 11 years)	18	23.38
Tertiary (12-15 years)	42	54.56
<b>Total</b>	<b>17</b>	<b>22.08</b>
	<b>77</b>	<b>100</b>
<b>Farming experience (in years)</b>		
1-10		
11-20	18	23.38
21-30	38	49.35
31-40	16	20.77
41-50	3	3.90
<b>Total</b>	<b>2</b>	<b>2.60</b>
	<b>77</b>	<b>100</b>
<b>Household Size</b>		
1-3		
4-6	14	18.18
7-9	31	40.26
10-12	26	33.77
13-15	5	6.49
<b>Total</b>	<b>1</b>	<b>1.30</b>
	<b>77</b>	<b>100</b>

Source: Field Survey data, 2008

The identified socio-economic characteristics of the farmers are age, sex, household size, farming experience, educational background and farm size: The result analysis shows that majority (46.75%) of the insured farmers are within the age bracket of 41-50 years while the least (6.49%) are with the age bracket of 31-40 years. It also showed that 66.23% of the sampled farmers are males while 33.77% are females. Also, from the analysis of socio-economic characteristics of farmers, 76.64% of the farmers had secondary school education and above. The result analysis also showed that majority (49.35%) of the insured farmers had farming experience of 11-20 years. The analysis also showed that majority(40.26%) of the insured farmers have a household size of 4-6 persons.

The impact of the scheme on the farm output was determined using the  $Z$  – test statistic model. The following data obtained were fitted into the model in order to determine the impact of the scheme on the farmers' output.

Average farm output after insurance ( $X_2$ ) = 21.66 metric tonnes

Average farm output before insurance ( $X_1$ ) = 16.01 metric

Output variance after insurance ( $S_2^2$ ) = 18.85

Output variance before insurance( $S_1^2$ ) = 57.46

Number of respondents ( $n_1, n_2$ ) = 77

This implies that

$$Z = \frac{21.66 - 16.01}{\frac{17.85}{77} + \frac{57.46}{77}} = 5.91$$

$$\frac{17.85}{77} + \frac{57.46}{77}$$

The farm output performance of the sampled farmers before and after the insurance is presented in table 2.

**TABLE 2: FARM OUTPUT OF SAMPLED FARMERS BEFORE AND AFTER INSURANCE**

Farm Output (in Metric, tones)	Number of farmers before Insurance	Number of farmers after Insurance
<b>1.0-10.0</b>	24	18
<b>11.0-20.0</b>	34	31
<b>21.0-30.0</b>	14	1
<b>31.0-40.0</b>	7	5
<b>41.0-50.0</b>	0	<b>77</b>
<b>Total</b>	<b>77</b>	

Field survey data, 2008

The results of the multiple regression analysis on the influence of identified socio-economic variables on farm output are presented in table 3.

**TABLE 3: RESULTS OF MULTIPLE REGRESSION ANALYSIS ON INFLUENCE OF SOCIO-ECONOMIC CHARACTERISTICS ON OUTPUT OF INSURED FARMERS IN IMO STATE**

Variable	Linear function	Double -log function	Exponential function	Semi-log function
Constant	-36.9822	0.401	-37.30	-37.30
Age (X <sub>1</sub> )	2.951 (3.595)**	0.493 (3.964)**	11.076 (3.551)**	11.076 (3.551)**
Sex (x <sub>2</sub> )	-0.000 (-0.389)	0.002 (0.684)	-0.102 ?(-0.105)	-0.103 (-0.105)
Household size (x <sub>3</sub> )	0.060 (0.347)	0.057 (0.421)	1.996 0.591	1.996 (0.592)
Farming experience (x <sub>4</sub> )	11.684 (2.662)**	0.721 (“2.972)**	18.553 (3.049)**	18.553 (3.049)**
Educational level (x <sub>5</sub> )	0.279 (0.604)	0.169 (1.179)	3.650 (1.018)	3.650 (1.017)
Farm Size (x <sub>6</sub> )	7.498 (2.843)**	0.835 (2.694)**	19.704 (2.533)**	19.704 (2.532)**
(R <sub>6</sub> )	0.349	0.408	0.374	0.374
t <sub>(tab)</sub>	1.668 (5%)			

( ) = t-ratio of coefficient

\*\* = Significant variable at 5%

Source: field survey 2008

From the results, the double-log form was chosen as it performed better than the other forms in terms of value of coefficient of multiple determination (R<sup>2</sup>), number of significant variables and conformity of the signs of the coefficients to *a priori* expectations.

A variable is termed “significant” if its t - coefficient is greater than the tabulated t – coefficient at a chosen level of significance.

From the results, the significant variables at 5% level of significance are age, farming experience and farm size while, sex, household size, and educational level

are insignificant variables in the determination of farm output of the insured farmers.

**DISCUSSION**

From the study, it can be inferred that majority of the insured food-crop farmers are middle aged. This may be due to the fact that it is within the age bracket that people are innovative.(Asiabaka,1998) Also, the study shows that the majority of the farmers had secondary school education and above. This is acceptable on the ground that education affects the way

farms are managed as well as overall production. (Nkang et al, 2009) Educational level plays a good role in adoption of new policy and undertaking risks.

The Z – test analysis on the impact of the scheme gave a Z – calculated value of 5.91. At 5% level of significance, Z value at 76 degrees of freedom is 1.67 it is therefore inferred that at this insured level of significance farmers had increased farm output after insurance. This is based on the ground that the Z – calculated (5.91) is greater than the Z – tabulated (1.67). It is in agreement with a study by Arene and Tee (1996) which posited that agricultural insurance enhances farm output. This is attributable to the fact that upon adoption of an agricultural insurance policy, the farmers become confident that in the event of any loss from risks and uncertainties in their operations, they will be indemnified by the insurer.

The double log multiple regression analysis which was chosen as the best fit from the results show that age, farming Age and farming experience are significant variables in output determination of a farm. (Obasi, 2000). Also, it is agreeable that if a farm is managed well, an increase in the farm size will significantly increase the farm output. Experience and farm size are significant variables that affect farm output of insured farmers at 5% level of significance. This result agrees with *a priori* expectations that age, farming experience and farm size significantly influence farm output *ceteris paribus*.

## CONCLUSION

The results of the analysis show that food crop farmers in the study area had increased farm output after insurance. It is therefore posited that the agricultural insurance scheme is promoting agricultural production in line with its specific objective. The study therefore recommends that more efforts should be put into creating awareness of the insurance scheme especially to farmers in the rural areas to enhance their output. This will go a long way in making the nation achieve its agenda on food security.

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