



## **An Evaluation of the Performance of Nigeria Agricultural Insurance Scheme in Kogi State, Nigeria**

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### **Authors' contributions**

*This work was carried out in collaboration between both authors. Author SJI designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author OJS managed the analyses of the study. Author OJS managed the literature searches. Both authors read and approved the final manuscript.*

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### **ABSTRACT**

The study evaluated the performance of Nigeria Agricultural Insurance Scheme in Kogi State, Nigeria. A multi-stage random sampling technique was used to select 300 insured farmers. Primary and secondary data were used for the study. Data obtained were subjected to statistical analysis using both descriptive and inferential statistical tools. The services provided by the scheme include; subsidized livestock, subsidized crops, commercial livestock, commercial crops, multiple cover, motor liability, fire, and special peril, general accident, engineering and bonds, and special risks. However, the study showed that insured farmers in the state were only engaged in subsidized crops (94.7%), subsidized livestock (44.3%), multiple covers (17.7%), and commercial crops (1.7%). The findings further showed that 92.7% of the insured farmers used the scheme occasionally. Commercial banks (99.3%) and cooperative societies (92%) were the major sources of information on agricultural insurance among the insured farmers. The study showed an improvement in the income of insured farmers after the scheme, though the marginal increase was not significant. Conclusively, the insurance scheme has not brought about the desired increase in farmers' income.

**Keywords:** *Agricultural Insurance; farmers; improvement; risk.*

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## 1. INTRODUCTION

Agriculture has been provider of food for the teeming population and the largest employer of labor force in the country [1]. Agriculture also helps to generate foreign exchange. Nigeria economy is still influence by agriculture despite the discovery of crude petroleum and rapid industrial development witnessed in the recent years.

However, the Nigerian agriculture is still depending mainly on subsistence farming. This method involved small scale farmers operating fragmented farmland of between 0. – 3 hectares and producing about 80 percent of the total food output for the country [2]. They further stressed that the rate of growth of Nigeria's food production has been slow. As a result of this, food demand has been growing at a rate higher than food production. In other to bridge the gap between food production and demand, government of Nigeria had put in place a number of rural developments strategies. One of these strategies is the Nigeria Agricultural Insurance Corporation (NAIC). Risk according to Gupta [3] is the probability of incurring a loss and insurance is the act of providing financial protection for property and life against death. Gupta [3] also define insurance as the equitable transfer of a risk of loss from one entity to another in exchange for a premium or a guaranteed and quantifiable small loss to prevent a large and possibly devastating loss.

Agricultural insurance according to Ahmed [4] is designed to provide covers for financial losses incurred due to unexpected reduction in output from agricultural products. Agriculture, unlike many other investment activities, is faced with problems ranging from instabilities in input subsidies, agricultural yields. Product prices to post harvest losses and the invasion of pests and diseases. In other to boost agricultural production, it is important to reduce the impact of these risks and uncertainties to the barest minimum.

In Nigeria, the idea of agricultural insurance for farmers was first noted in 1978 by the Agricultural Credit Guarantee Scheme Fund (ACGSF) of Central Bank of Nigeria (CBN). The Federal Government of Nigeria eventually established the Nigeria Agricultural Insurance Corporation (NAIC) following its formal launching on the 15<sup>th</sup> December, 1987. The broad objective of NAIC is to offer protection for the farmers from the effects of natural disasters and to make sure

that appropriate compensations are paid to keep the farmers in business after loses. It was designed so that small, medium and large-scale farmers will benefit from the scheme either as individuals or groups [2].

The primary motive of any agricultural insurance policy is to serve as a security for losses resulting from diseases, bush burning, crop failure, flooding and other natural disasters especially in this era of climate change that is affecting time of planting and type of crop to plant. It also serves as collateral for agricultural loan to the farmers from banks. The aforementioned risk (flooding, bush burning, crop failure etc) are common features in savanna agro ecological zone where Kogi State is located. Low output and low income are consequences of these hazards. To reduce the effect, some farmers have embraced the scheme in Kogi State since its inception. Some of those that used the scheme do so because they were compelled by bank as a condition for benefiting from their loans. Some other farmers still showed apathy to the scheme and refused to embrace it [5]. Social economic variables could have been responsible for the apathy. Low level of awareness may also not put them in vantage position to use the insurance services. Studies on the activities of agricultural insurance scheme are still very scanty in Nigeria. Most of the few available studies were done outside Kogi State. It is in the light of this and other undocumented claims about agricultural insurance scheme that forms the thrust of this study.

## 2. OBJECTIVES OF THE STUDY

The main objective of the study was to evaluate the performance of Nigeria Agricultural Insurance Scheme (NAIS) in Kogi State, Nigeria. The specific objectives are to:

1. Identify the services provided by NAIS;
2. Ascertain the frequency of use and source of information on agricultural insurance;
3. Determine the improvement made on the income of insured farmers in the state.

## 3. METHODOLOGY

The study area was Kogi State, Nigeria. Geographically, the state is located between latitude 6°30'N and 8°5'N and longitude 5°51'E and 8°00'E. Kogi State has a total population of about 4,205,546 people in 2014 (using the state

projected growth rate) [6] and land area of about 30, 354, 74 square kilometers.

Kogi State is divided into four agricultural zones (A, B, C and D). Kogi State Agricultural Development Project (KADP) delineated the zones into 6 blocks and 8 cells per block. A multi-stage sampling technique was used for the study. In the first stage, one block was randomly selected from each of the four zones. Secondly, 15 cells were randomly selected from each block. This gives a total of four extension blocks and 60 extension cells for the study. From the list of insured farmers at the National Agricultural Insurance Corporation office in Lokoja, five insured farmers were randomly selected from each of the 60 extension cells to give a total of 300 insured farmers. In all a total of 300 respondents were engaged in the study.

The data for the study was obtained from primary sources through the use of structured interview schedule by trained enumerators. Personal discussions and physical observations were also used to complement the data for accuracy and reliability. The instrument was divided into sections in line with the objectives of the study. Secondary data were collected from the office of National Agricultural Insurance Corporation in Lokoja.

The content validity of the research instrument (questionnaire) was determined by some experts in the Department of Agricultural Economics and Extension, Kogi State University, Anyigba, Nigeria through proper scrutiny. Test retest method was used to carry out reliability test, by administering the questionnaire to the same group of respondents two times on different occasion so as to reduce error within a short time and also ensure consistency. Data gathered were subjected to correlation analysis and coefficient of 0.88 was obtained, which confirms the reliability of the instrument.

Data collected were analyzed using both descriptive and inferential analysis techniques.

**Z-test:** Z-test was used to compare farm income of before and after the agricultural insurance scheme. The simple model used is as given below;

$$= \frac{\bar{X}_2 - \bar{X}_1}{\sqrt{\frac{S_2 + S_1}{N_2 + N_1}}}$$

where

$\bar{X}_2$  = average farm income of farmers after the insurance scheme

$\bar{X}_1$  = average farm income of farmers before the insurance scheme

$S_2$  = variance of farm income of farmers after the insurance scheme

$S_1$  = variance of farm income of farmers before the insurance scheme

$N$  = Sample size

**Mean Score:** Constraints to the use of agricultural insurance scheme among the insured farmers were identified using mean score from a three-point Likert type scale. Likert scale was developed by Rensis Likert in the 1930s to measure the mean scores of variables. The three-point Likert type of scale is as specified below:

Opinion	Point
Very Serious (VS)	3
Serious (S)	2
Not Serious (NS)	1

The mean response to each item was calculated using the following formula:

$$\bar{X} = \frac{\sum FX}{N}$$

Where:  $\bar{X}$  = means response,  $\sum$  = summation,  $F$  = number of respondents choosing a particular scale point,  $X$  = numerical value of the scale point and  $N$  = total number of respondents to the item.

The mean response to each item was interpreted using the concept of real limits of numbers.

The numerical value of the scale points (Response modes) and their respective real limits are as follows:

Not Serious (NS) = 1 point with real limits of 0.5 - 1.49

Serious (S) = 2 points with real limits of 1.50 - 2.49

Very Serious (VS) = 3 points with real limits of 2.50 - 3.49

**Decision Rule:** The mean of these weights is 2 [(3 + 2 + 1) ÷ 3 = 2]. A mean score of 2 or more

implied that the constraint had a serious effect on the use of NAIS while a mean score of less than 2 implied that the item associated with that mean score had no serious effect on the use of NAIS by the farmers.

#### 4. RESULTS AND DISCUSSION

##### 4.1 Socioeconomic and Institutional Characteristics

The socioeconomic and institutional characteristics of farmers in Kogi State are presented in Table 1 and Table 2 respectively.

The dominance of male is not surprising as males are regarded as household head and decision makers in most African homes. This could also be attributed to the labour requirement in farming activities. Farming operations such as land clearing, cultivation, weeding, and harvesting are labour intensive and require the effort which could be provided by male farmers. The finding supports Ibitoye [7]

who reported that more men were found in farming than women in Kogi State.

The mean age recorded among farmers in the state could be regarded as a productive age. However, most of the farmers seem to be tilting towards the aged category which may have negative implication on farming activities in the state. Shaibu [8] stated that old age might pose problem in agriculture because most of the work is physically demanding.

The result in Table 1 indicates that the majority (83.3%) of the respondents were married. Marriage is an indication of an individual's decision to demonstrate a mark of social responsibility. It could have positive implication to agricultural production, especially in labour supply. Family labour is considered to be the most important component of labour in subsistence agriculture which is the most predominant in Kogi State and most parts of Nigeria. This finding agrees with Adefarasin [9] and [10] who reported that larger percentages of their respondents were married.

**Table 1. Socioeconomic characteristics of farmers in Kogi State (N = 300)**

Socioeconomic variables	Percentage	Mean/Mode
<b>Sex</b>		
Male	85.0	Male
Female	15.0	
<b>Age (years)</b>		
25 – 45	33.0	
46 – 65	48.7	53.7±14.1
66 – 85	18.3	
<b>Marital status</b>		
Single	5.3	
Married	83.3	Married
Divorced	3.7	
Widowed	2.0	
Widower	5.7	
<b>Household size (numbers)</b>		
1 – 5	39.7	
6 – 10	54.3	6±2.2
11 – 15	6.0	
<b>Educational qualification</b>		
No formal education	2.7	
Primary education	47.7	Primary education
Secondary education	30.3	
Tertiary education	19.3	
<b>Secondary occupation</b>		
None	24.0	
Food processing	11.7	
Civil service	35.7	Civil service
Trading	23.3	
Artisanship	5.3	

Source: Field survey, 2018

**Table 2. Farming/institutional characteristics of farmers in Kogi state**

<b>Farming/institutional variables</b>	<b>Percentage</b>	<b>Mean</b>
<b>Farm size (hectares)</b>		
1 – 5	30.3	6.6±3.5
5.1 – 10	37.0	
10.1 – 15	32.7	
<b>Farming experience (years)</b>		
1 – 15	34.3	23.5±14.3
16 – 30	42.7	
31 – 45	6.3	
46 – 60	7.7	
<b>Access to extension services</b>		
Yes	76.3	
No	23.7	
<b>Access to credit facilities</b>		
Yes	57.0	
No	43.0	
<b>Land status ownership</b>		
Inheritance	90.0	
Lease	4.0	
Purchase	5.0	
Gift	1.0	
<b>F. Membership of farming assoc.</b>		
Yes	36.3	
No	63.7	

Source: Field Survey, 2018

The distribution according to household size shows a mean household size of 6 members with a standard deviation of 2.2. By implication, most farmers in the state have more household members which could be available as family labour for farming activities. Large household size could influence the rate of adoption of agricultural innovation like the agricultural insurance scheme. This finding is similar to an earlier study by Ibitoye [11] when they reported an average family size of 7 members among farmers in Kogi State.

Findings of the study show that the majority (97.3%) of the respondents had one form of formal education or the other. This indeed is a great fit, as educated farmers are expected to understand the importance of agricultural innovation such as agricultural insurance, with a positive influence on its adoption.

Findings on secondary occupation show that, only 24% of the respondents are full-time farmers. In addition to farming, 35.7% are civil servants, 23.3% are traders, while 11.7% and 5.3% of the respondents are food processors and artisans, respectively. Engagement in secondary occupation could negatively affect agricultural production in terms of time or priority given to farming enterprise. On the hand,

secondary occupation could serve as extra source of income and help farmers to have steady income especially during the off or lean season. This agrees with Ibitoye [12] who reported civil service and trading as the major secondary occupation among smallholder farmers.

#### **4.2 Farming/ Institutional Characteristics**

The result presented in Table 2 shows that most (37%) of the farmers had a farm size between 5.1 – 10 hectares. The mean hectare of farm land recorded in the state was 6.6 hectares with a standard deviation of 3.5. The result did not come as a surprise as it was observed that, in addition to arable crop production, the majority of farmers in the state were also into tree crop production or plantation agriculture which requires large expanse of farm land. Furthermore, the farm size recorded in the state is above the minimum hectare required for agricultural insurance. The minimum farm size for insurance cover according to Okwoche, et al. [13] was 0.4 hectare (about one acre) with respect to crop production.

The mean farming experience recorded among farmers in the state as presented in Table 2 was about 24 years with a standard deviation of 14.3.

By implication, farmers in the area had the required level of farming experience for a profitable enterprise as increased farming experience implies increased skills and knowledge in farming techniques with its multiplier effect on higher output. Farming experience could also increase the adoption of agricultural innovation like the agricultural insurance scheme. Increased years of farming could expose farmers to various sources of risk and their likelihood to accept the insurance scheme as a mitigating tool.

The findings recorded an impressive extension service delivery in the state as the majority (76.3%) of the respondents claimed they had access to extension services in the last farming season. The extension contact provides the information that farmers obtain on their production activities as well as the importance of innovations through counseling and demonstrations by extension agents on a regular basis. It is believed that respondents who are not frequently visited by extension agents have lower possibilities of adoption than those frequently visited [14].

More than half (57%) of the respondents had access to credit facilities in the form of loan from financial institutions. Farmers in the state can have access to credit, especially from formal sources when they are under the NAIS. By implication, the majority of farmers indirectly participate in the insurance programme. Expectedly, credit access could increase scale of production with effect on level of yield and welfare of the rural farmers.

Table 2 shows that farm holding in the state was dominated by inheritance (90%). Other forms of land ownership were purchase (5%), lease (4%) and gift (1%). An earlier investigation by Ibitoye [7] found that 72% of farmers in the state inherited their land thereby having absolute control of such land. The World Bank [15] also discovered that the majority of farmers in Nigeria got their farm land through inheritance.

The result in Table 2 indicates that 36.3% of the farmers were members of an association. Farmers' association enables them to solve their agricultural problems among other things. Membership of associations has been found to enhance the interaction and cross-fertilization of ideas among farmers [14]. Farmers who do not belong to associations are expected to have lower probabilities of adoption and a lower level of use of agricultural insurance scheme.

### 4.3 Services Provided by NAIS

The services provided by the Nigeria Agricultural Insurance Scheme, an auspex of the Nigerian Agricultural Insurance Corporation is presented in Table 3.

Agricultural insurance is a major tool for farmers and other stakeholders to use in managing risk. Generally, insurance protects against production-related risks (pests, diseases, farming practices) and market & policy related risks (drought, flood, prices). As part of its mandate, the NAIS provides subsidized crops and livestock. The result in Table 3 indicates that the majority (94.7%) of the respondents were under the subsidized crop policy. This finding is not surprising, as most of the farmers are crop farmers who obtained loan from commercial and agricultural banks to expand their crop farm.

The subsidized crop policy refers to crop insurance cover of food crops of which 50% of the premium is paid by the farmers with the remaining 50% paid by the federal and state government of the location where the farm resides, in a ratio of 3:1, respectively. Perils under cover are loss or damage resulting from fire, lightning, explosion, aircraft damage, windstorm, flood and drought. Crops under this cover include; maize, rice, cassava, yam, millet, sorghum, Irish potato, soya beans, cowpeas, fluted pumpkin, melon, groundnut, vegetable, sesame, wheat, and sweet potato.

The result further shows that 44.3% of the insured farmers were under the subsidized livestock insurance policy. This policy refers to insurance cover of livestock of which 50% of the premium is paid by the farmers with the remaining 50% paid by the federal and state government of the location where the farm resides, in a ratio of 3:1, respectively. Perils under cover are; death of animals/birds/fishes due to disease, accident, fire, lightning, storm and flood. The livestock include; cattle, poultry, turkey, pigs, sheep, ram, goats, fishery, ducks, grasscutters, bee keeping, rabbitery, and snailery.

The NAIS also provide commercial crops and livestock services. However, the study reported that, only 1.7% of the insured farmers interviewed were under the commercial crops insurance policy, while none of the respondents was under the commercial livestock insurance policy. Under the NAIS, commercial crops refer to non food crops which are of economic value.

Such crops are normally grown on a mono crop large scale. In this case, the farmer pays 100% premium with no subsidy from the government. Examples of crops under this category include; cotton, pineapple, citrus, rubber, plantain, palm tree, cocoa, sugarcane, tobacco, sugar, cashew, coffee, jatropha, banana/plantain, date palm, kolanut, mango, guava, avocado, ginger, gum arabic, and pawpaw. On the other hand, commercial livestock refers to non food animals of economic value. There is no government subsidy on this category of livestock insurance. Examples of such animals include; dogs, horses, zoo animals, ostrich, donkey, camel, and cat.

The multi-peril cover policy with 17.7% of the respondents is designed for produce storage, post harvest preservation, processing, trading, and agricultural or produce marketing. These include agricultural produce in store, in-transit, trading, and provision in store, processing and

packaging, fishing net, boat with outboard engine and accessories.

#### 4.4 Frequency of Use and Sources of Information of Agricultural Insurance

The distribution of insured farmers according to the frequency of use of agricultural insurance scheme is presented in Table 4.

**Frequency of use:** Investigation into the use of agricultural insurance scheme in the state showed that 92.7% of the insured farmers used the scheme occasionally. This finding agrees with Tologbonse et al. [16] who found in a study on farmers' response to agricultural insurance in Kogi State, Nigeria that out of 51.7% of farmers that were aware of agricultural insurance, none of them took agricultural insurance policy. They concluded that farmers' awareness of agricultural insurance was not a major determining factor for participation.

**Table 3. Services provided by NAIS**

Services	Category	Number of engaged respondents
Subsidized livestock	Agricultural insurance	133(44.3)
Commercial crops	Agricultural insurance	05 (1.7)
Commercial livestock	Agricultural insurance	0
Multiple cover	Agricultural insurance	53 (17.7)
Subsidized crops	Agricultural insurance	284 (94.7)
Motor liability	General insurance	0
Fire and special peril	General insurance	0
General accident	General insurance	0
Engineering and bonds	General insurance	0
Special risks	General insurance	0

Source: NAIC and Field Survey, 2018

**Table 4. Frequency of use and sources of information of agricultural insurance**

Items	Frequency	Percentage (n = 300)
<b>Frequency of use of agricultural insurance</b>		
Occasionally (1 – 4 times)	278	92.7
Frequently (more than 4 times)	22	7.3
Total	300	100
<b>Sources of information on agricultural insurance*</b>		
Extension agents	122	40.7
Friends and relatives	112	37.3
Radio/television	88	29.3
Print media	62	20.7
Village meetings	56	18.7
E-media	44	14.7
Commercial banks	298	99.3
Cooperative societies	276	92.0
NAIC agricultural show	62	20.7

Source: Field survey, 2018 \* = multiple responses

**Table 5. Result of t-test on improvement made in income level of insured farmers**

Variables	Mean income (N)	z-cal.
Mean income before ( $X_1$ )	244 510.25	1.019
Mean income after ( $X_2$ )	290 220.90	

Source: Computed from field survey, 2018

**Sources of information:** Further investigation into the source of information on agricultural insurance scheme shows commercial banks (99.3%) as the leading source of information. This high percentage could be associated with the fact that most of the insured farmers transact and obtained loan from commercial institutions. By implication, participation in agricultural insurance among farmers in the state could be said to be indirect and not necessarily on demand by farmers. There is need for concerted efforts to encourage voluntary participation of farmers in agricultural insurance services to mitigate the vagaries of risks and uncertainties in farming activities. Cooperative societies (92.0%) ranked second among the source of information. This is followed by extension agents.

**Improvement made on the income of insured farmers after the scheme:** The improvement or otherwise made on income as a result of the scheme was determined using the z – test statistic model as presented in Table 4. The data obtained were fitted into the model in order to determine the impact of the scheme on farmers' income.

The z – test analysis on the impact of the scheme gave a z – calculated value of 1.019. At 5% level of significance, z- tabulated value at 30 degrees of freedom is 1.697. It can be inferred that the marginal increase in the income of insured farmers is not statistically significant. Although there is an increase in the average farm income after insurance, the increase is not statistically significant. This is based on the ground that the t – calculated (1.019) is less than the t – tabulated (1.697). The insurance scheme has not brought about the desired increase in farmers' income. This may be attributed to the fact that; insurance scheme is meant to serve as cover in case of loss and not necessarily for increase in productivity or income. This is in agreement with Shaibu et al. [8] and Okwoche et al. [13] who reported that insurance scheme did not bring about the desired change in peasant farmers' output/income. However, the result is in contrast to studies by Nwosu et al. [17] and Arene and Tee [18] 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.

## 5. CONCLUSION AND RECOMMENDATIONS

The study evaluated the performance of the NAIS in Kogi State, Nigeria. It can be concluded from the study that, NAIS provides services such as subsidized crops and livestock, commercial crops and livestock policy and multi-peril agricultural insurance policy for farmers in the state. Furthermore, most of the insured farmers in the state occasionally used the insurance scheme with commercial banks and cooperative societies ranking as the major sources of information on agricultural insurance. On improvement made, it was revealed that, the agricultural insurance scheme did not have any significant impact on farmers' income. However, there was an increase in the farm income of insured farmers after their participation in the scheme. In order to increase the frequency of use of agricultural insurance, the operators of the scheme should take advantage of existing ICT device to advertise their services. Furthermore, the state government should make it mandatory for farmers to produce agricultural insurance certificate as a condition for benefitting from government subsidies and incentives; this will encourage the level of usage of agricultural insurance scheme among farmers in the state.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.



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