EVALUATING THE EFFECT OF FARMERS' PARTICIPATION IN AGRICULTURAL INSURANCE SCHEME ON THE PERFORMANCE OF FARMERS' AGRIC BUSINESS IN DELTA STATE, NIGERIA

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Abstract

The study evaluated the effects of farmers' participation in agricultural insurance scheme and farmers' agric business performance among insured farmers' multipurpose cooperative societies in Delta State of Nigeria. Multistage sampling technique was used to select 398 insured farmers who are members of multipurpose cooperative societies that cut across 18 LGAs of Delta State. Evidence from the study revealed that, the majority of the respondents (insured members of farmers' multipurpose cooperative societies) agreed that, NAIC made all their agric insurance products accessible to the farmers who are willing to take up the insurance covers. Evidence from the study also revealed that, farmers socioeconomic characteristics are

major determinant factor for their participation in NAIC insurance scheme. Also, there is a great difference (x= #554,324.35) between farmers' average income before and after their participation in the NAIC insurance scheme. In order to strengthen the effects of farmers' participation in agricultural insurance scheme the following recommendations are therefore made; the NAIC should design more insurance products (policies) that will cover all aspect of agriculture. The NAIC and the cooperative societies should collaborate and organize capacity building programmes in form of adult education, seminar, workshop, etc. this will improve the literacy level of the farmers as well as enhancing their participation. The NAIC should also make the amount of premium paid by the farmers to be more affordable and attractive. Finally, the NAIC should ensure prompt and timely payment of compensation (indemnity).

Keywords: Framers participation; Agricultural Insurance Scheme; Agribusiness performance

INTRODUCTION

Agricultural business is categorize as one of the investment faced with uncertainties as the farmers are faced with a variety of risks which range from flooding; bad weather conditions, pest outbreak, disease outbreak, inadequate farm input supply credit; pricing; marketing and distribution related risks. 2012 was a particularly challenging year for farmers in Nigeria as security challenges had a consequential effects on farmers output. This was compounded by the flood that occurred largely during the third quarter of 2012 affected at least 25 out of the 36 States in Nigeria (National Bureau of Statistics [NBS] 2013. Retrieved on 25th of January 2014). As a result of these risks many farmers express fear and their inability to meet overhead costs, family needs and debt repayment, and these fears influence their attitude to risk. Agricultural insurance has been identified as a viable instrument for risk management and observed to be one of the ways by which farmers express their risk aversion (Ajetomobi & Binuomote, 2006). defined agricultural insurance in a broad sense 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 (Akinsoroton; 2007). Similarly, Ogomua, (2002), stated that the primary motive of any agricultural insurance policy is to serve as a security for losses resulting from natural disasters, as well as bank collateral for access to agricultural loan by farmers.

In Nigeria, agricultural insurance was introduced by the government in 1987 with the Nigerian Agricultural Insurance Corporation (NAIC) as the executing agency. The scheme was established to address issues of risks facing farmers as a result of incidences of natural hazards such as drought, flood, pests and diseases. Also, to make agricultural investments more secured so that financial institutions will be willing to put in more funds in the agricultural sector thereby stabilizing investments in the sector (NAIC, 2010).

Profitability in agribusiness along the value chain is threatened, from cultivation to harvesting to storage to processing up to marketing by such factors as under pricing or as a result of low quality of produce resulting from pest and disease attack. The threat of losing investment to natural disaster such as erosion, drought and other environmental problems is a great challenge confronting farmers. Burglary, fire and loss in transit also constitute a large percentage of the risks and uncertainties in agriculture. These factors discourage farmers from investing more in agriculture as their resources are relatively too small to withstand the risk involve in farming. The implication is grave for the economy of a developing country like Nigeria which owes a large percentage of its Gross Domestic Product to the agricultural sector. The government has made several efforts to improve agriculture yet shortage in food supply and food insecurity still persist, due largely to the both natural and man-made disasters. The Nigeria Agricultural Insurance Cooperation (NAIC) is among measures put in place by the Federal Government of Nigeria to reduce and avert the risk among farmers, and the Corporation is located in different zones across the country. It is therefore necessary to transfer some of the risk to insurance. Reduction in risk and uncertainty can be achieved through involvement of farmers in the agricultural insurance scheme which was introduced to minimize the adverse effects of natural hazards on agricultural production and the security of credit through indemnity on sustained losses. Therefore, the study became necessary and urgent to evaluate the benefit of participating in NAIC insurance scheme among farmers in Delta state. There is also a dearth of empirical studies on the importance of agricultural insurance and the challenges faced by participants in Nigeria especially in the study area which this study seeks to address. All these necessitated the study.

Research Questions

- What are the conditions for participating in NAIC insurance services?
- Are there any differences between farmer's income before and after their participation in NAIC insurance services?
- Do these insurance products of NAIC have any significant effects on the performance of farmers businesses?

Hypotheses of the Study (Null)

- Insured farmers' socioeconomic characteristics are not significant conditions for their participation in insurance services of NAIC.
- There is no significant difference between insured farmers' income before and after their participation in NAIC insurance services.
- NAIC insurance products have not significantly affected insured farmers' agric business performance

THE NIGERIAN AGRICULTURAL INSURANCE SCHEME

Olubiyo, Hill and Webster (2009) agreed that the Federal Government of Nigeria introduced an agricultural insurance scheme in 1987. The broad aim of the scheme was to widen farmers' access to farm inputs, especially credit, and to encourage farmers to adopt modern farming practices. This aim was predicated on the belief that if the risks associated with the adoption of modern farming practices could be reduced, farmers could be encouraged to produce high value enterprises that had previously been abandoned and regarded as too risky to produce. The potential changes in farm practices would increase the quantity and quality of agricultural produce supplied to the market and subsequently improves the welfare of the people. The insurance scheme was operated as a commercial enterprise by The Nigerian Agricultural Insurance Company (NAIC) and offered a multi-peril insurance policy to cover any crop enterprise. The insurance is compulsory for farmers taking institutional credit for their farm business. It is expected that by linking the insurance with credit it will encourage more inflow of funds to the farm sector and safeguard repayment to the banks. As an additional incentive to farmers' patronage, the government provides a 50 per cent subsidy of the premium payable by farmers. However, before a farmer could be indemnified for any insured hazards he/she would prove that he/she followed the guidelines on production practices published by NAIC. Owing to the diverse geographical, cultural and ecological spread and for administrative convenience, the country was divided into five operational zones.

This study is focused on Minna zone that is referred to as the middle belt of the country. The zone produces various types of agricultural products that are peculiar to the extreme climatic conditions of the northern and southern part of the country. As a result of this geographical advantage, the zone has been named the food basket of the country. Therefore it has always been a focus of attention when natural disasters strike in the country. Agriculture in this region is mainly rain-fed, with limited irrigation facilities being restricted to government-controlled agro-service projects and some dry season vegetable gardens. In addition, the

average farm holding is small scale and majority of the farming population are illiterate with little access to the formal credit market.

EMPIRICAL STUDIES

In a study conducted by Nwosu, Oguoma; Lanichi, Chendo, Ukeha, Onyeayecha and Ibeanwuchi (2012) on the output performance of food crop farmers under the Nigeria Agricultural Insurance Scheme in Imo State. The researchers sampled 145 food crop farmers and used Z-test to analyse the data. Their result indicated that agricultural insurance has a positive impact on farmer's output and performance.

Similarly, Falola, Eyitayo and Agboola (2013) conducted study on the willingness of the cocoa farmers to take agricultural insurance policies in Ondo State. Where 120 cocoa farmers were sampled and they used probit regression model to analyse the data. As such, their result showed that farmer's age; educational qualification; extension services and farm income are major variables influencing the willingness of farmers to take agricultural insurance policies.

More so, in a recent study conducted in Nigerian federal capital Territory by Oyinbo, Abdulmalik and Sani (2013) on the determinants of crop farmers participation in Agricultural insurance scheme. 1,200 farmers were sampled and logit regression was used to determine the factors that influence farmers participation. Therefore, the result revealed that education, farm size, accessibility to credit were significant factors that determine farmers participation in insurance scheme.

In the same vein, Akinsorotan (2007) evaluated the activities of Agricultural insurance scheme (1996 – 2001) in Edo state and Delta state of Nigeria. The findings from his study revealed that farmers from Delta State benefited (79%) more from the insurance scheme than those from Edo State (21%). This, was attributed mainly to the fact that Delta State ecological zones is more prone to national disaster and better awareness created than Edo State.

Furthermore, Nnadi, Nnadi; Chikaire, Umunnakwe and Ihenacho (2013), analysed rural cassava farmers' participation in the Nigeria Agricultural Insurance Scheme in Imo State while 90 cassava farmers were sampled, Z-test and logit regression model of 0.05 level of significance. Thus, their result revealed that, there is variation in farmers' socio-economic factor which is determinant factors to their participation in the scheme.

Finally, empirical evidence on the assessment of the levels of awareness and the use of Agricultural Insurance Scheme among rural farmers in Kogi State of Nigeria, conducted by Ibitoye (2013). Where he sampled total of 240 respondents with sigma scoring model. His result revealed that (sigma score 5.04) level of awareness showed a high level of awareness of agricultural insurance scheme among the rural farmers in the State.

METHODOLOGY

The study was carried out in Delta State. The state has a population of 4,098,291 (NPC, 2005) and covers a landmass of about 18,050 Km^2 of which more than 60% is land. It lies approximately between Longitude 5°00 and 6°.45' East and Latitude 5°00 and 6°.30' North (Wikipedia, 2014).

The 398 respondents were drawn from general membership of cooperative societies and staff of NAIC in the study area. Multistage sampling technique was used to select 398 insured farmers who are members of multipurpose cooperative societies that cut across 18 LGAs of Delta State.

Cronbach Alpha at 5% level of significance was used to detect the strength of each item in the research tool and the possibility of removing unnecessary item in the tool.

Table 1 Reliability Testing

		N	**%**
Cases	Valid	398	0.0
	Excluded[a]	0	.0
	Total	398	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.901	.857	17

The Alpha value of 0.901 shows adequate internal consistency of the research tool as the value is greater than 0.60.

T test statistics model analysis was used to determine relationships between variables, while regression was used to make predictions from observed variables. Hypothesis one (H_{01}) was analyzed using regression model. The independent variables are the socio-economic factors while the dependent variable is the farmers' participation (accessibility) in the NAIC products. The regression was used to determine the influence of independent variables on the dependent variable. As such, the empirical model for this is stated as-

$Y_1 = a + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 + b_6 x_6 + b_7 x_7 + b_8 x_8 + ei$

ANALYSIS AND FINDINGS

Accessibility of NAIC Insurance Products

Table 2 Distribution of Responses Based On the Insurance Products
That Are Accessible To Insured Farmers

S/N	NAIC Insurance Products	Mean	Decision
i	Single-risk insurance	3.71	Accessible
ii	Combined (peril) insurance	4.02	Accessible
iii	Yield insurance	3.44	Accessible
iv	Price insurance	3.97	Accessible
v	Revenue insurance	3.08	Accessible
vi	Whole-farm insurance	4.46	Accessible
vii	Income insurance	3.85	Accessible
viii	Index insurance	3.13	Accessible
	Grand Mean	**3.44**	**Accessible**

The responses were analyzed with the scale analysis of 5 points with weighted mean of 3.0. The above result shows that the majority of the respondents have access to most of the NAIC products which include; Single-risk insurance (3.71); Combined (peril) insurance (4.02); Yield insurance (3.44), Whole-farm insurance (4.46). Meanwhile, the grand mean indicated that the NAIC products are accessible to the insured farmers.

Insured Farmers Socioeconomic Characteristics That Serves As Determinant or Conditions for Participation in NAIC Insurance Services

Table 3 Distribution of Responses on the Factors That Determines Respondents
Participation in NAIC Insurance Services

S/N	Farmers socioeconomic factors	Mean	Decision
i	Literacy level (educational Qualification)	2.87	Disagree
ii	Cooperative membership	4.67	Agree
iii	Farming experience	2.58	Disagree
iv	Farm size	3.42	Agree
v	Types of crops planted	3.09	Agree
vi	Annual farm income	2.95	Disagree
vii	Operating an account with BOA or MFIs	3.72	Agree
viii	amount of premium paid	4.32	Agree
	Grand mean	**3.452**	**Agree**

Evidence from the descriptive statistics table 3 revealed that most of the farmers' socioeconomic factors (coop. membership, farm size, types of crop, operating account, as well as premium paid) serve as determinant factor to their participation in NAIC insurance services. Meanwhile, the majority of the respondents disagree that educational qualification; farming experience; and annual farm income are not necessarily serve as determinant/ condition for their involvement in NAIC insurance scheme. As such, the grand mean (x) = 3.452 indicated that the farmers socioeconomic factors are determinant factor to their participation in NAIC services.

Test of Hypothesis one (H_{o1})

H_{o1}: Insured farmers' socioeconomic characteristics are not significant conditions for their participation in insurance services of NAIC.

H_{A1}: Insured farmers' socioeconomic characteristics are significant conditions for their participation in insurance services of NAIC.

The above hypothesis one was analyzed using regression model. The independent variables are the socio-economic factors while the dependent variable is the farmers' participation (accessibility) in the NAIC products. The regression was used to determine the influence of independent variables on the dependent variable.

The socio-economic factors are Literacy level (educational Qualification) (1), Cooperative membership (2), Farming experience (3), Farm size (4), Types of crops planted (5), Annual farm income (6), Operating an account with BOA or MFIs (7) and amount of premium paid (8). Therefore, the model is stated as follows:

Regression Analysis: y versus x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8

The regression equation is:

y = 0.151 + 0.103 x1 + 0.0122 x2 + 0.107 x3 + 0.346 x4 + 0.0000 x5 + 0.022 x6 + 0.714 x7 + 0.959 x8

Table 4 Regression Output

Predictor	Coef	SE Coef	T	P
Constant	0.151	0.09925	0.32	0.324 (significant)
X1	0.103	0.05118	10.13	0.534 (insignificant)
x2	0.0122	0.001681	16.24	0.031 (significant)
x3	0.107	0.04590	2.21	0.028 (significant)
x4	0.346	0.005195	6.66	0.000 (significant)

Table 4...

x5	-0.00000	0.06287	-0.00	0.000 (significant)
x6	0.022	0.000001	2.09	0.037 (significant)
x7	-0.714	0.004769	-2.40	0.017 (significant)
x8	0.959	0.05345	0.11	0.012 (significant)

R-Sq = 78.3%   R-Sq (adj) = 74.6%

Table 5 Analysis of Variance

Source	DF	SS	MS	F value	P value
Regression	8	24.1904	3.0238	254.10	0.000
Residual Error	390	4.6393	0.0119		
Total	398	28.8297			

The model is significant as the P-value of the model is less than 0.05. With R- Square of 0.783 which implies that the independent variables (socioeconomic factors) considered contributed up to 78% of the variation in the variable dependent variable (accessibility). That is, farmers' accessibility to NAIC insurance products was explained (influenced) by 78% of their socioeconomic characteristics. Meanwhile, among the farmers socioeconomic factors considered, X_1 (educational level of the farmers) is the only insignificant variables in the model. In conclusion, since the model P value (0.000) is less than 0.05 at 5% level of significance, as such there is enough evidence to reject the null hypothesis and accept the alternate, meaning that, insured farmers' socioeconomic characteristics are significant conditions for their participation in insurance services of NAIC.

Therefore, the hypothesis one testing further affirmed the result of descriptive statistics table 2 on the influence of farmer socioeconomic profile on their involvement in NAIC programme.

Level of Insured Farmers Income before and after Participating In NAIC Insurance Services

Table 6 Comparison between Insured Farmers Income Before

and After Participation In Insurance Services

	Farm Income per Annum in Naira					
	Before Participation	**Freq.**	**%**	**After Participation**	**Freq.**	**%**
i	Below 100,000	92	23.1	Below 100,000	24	6.03
ii	100,001 – 200,000	109	27.4	100,001 – 200,000	47	11.80

iii	200,001 – 500, 000	129	32.4	200,001 – 500, 000	92	23.12	Table 6...
iv	500,001 – 1,000,000	50	12.5	500,001 – 1,000,000	106	26.63	
v	1,000,001 – 2,000,000	16	4.02	1,000,001 – 2,000,000	88	22.11	
vi	2,000,001 – 5,000,000	2	0.50	2,000,001 – 5,000,000	36	9.04	
vii	5,000,001 – 10,000,000	-	-	5,000,001 – 10,000,000	5	1.25	
viii	Above 10,000,000	-	-	Above 10,000,000	-	-	
	Average (x) 308,581.06			**Average (x) 862,905.41**			

*Average mean(x) difference between insured farmers' farm income before
and after their participation in NAIC services is **#554,324.35**

The descriptive result table 3 above shows clear evidence that the annual income of insured farmers increase significantly after their participation in the NAIC insurance services. This was reflected from the table as the majority of the farmers earned below 500,000 annually before participating in NAIC programmes while most of them earned above 500,000 after they have accessed NAIC products. Therefore, the implication is that the NAIC products have significantly contributed the revenue of the farmers who participates in their programmes.

Test of Hypothesis two (H$_{o2}$)

H$_{o2}$: There is no significant difference between insured farmers' income before and after their participation in NAIC insurance services.

H$_{A2}$: There is significant difference between insured farmers' income before and after their participation in NAIC insurance services.

This is an example of comparative analysis which involves two variables (groups); before and after. In this case, percentage increase and weighted mean (average) of the descriptive statistics table 3 was used to convert the qualitative data to quantitative data and paired T- test was used to test for significant difference between the groups (before and after).

The primary aim of this is not only to investigate if there exist significant difference between the groups (before and after), but also if the income after participation is significantly greater that it was before farmers participation in NAIC services.

Paired T-Test and CI: Before Participation, After participation

Table 7 Paired T for Before Participation - After participation

	N	Mean	St Dev	SE Mean
Before Participation	8	3.226	1.148	0.406
After participation	8	**3.835**	1.025	0.362
Difference	8	-0.609	2.113	0.747

95% CI for mean difference: (-2.376, 1.158)

T-Test of mean difference = 0 (vs. not = 0):

T-Value = -0.81; P-Value = 0.0427

Decision: The P-value of the test is 0.0427 which is less than 0.05. There exists enough evidence to reject the null hypothesis and conclude that there is significant difference between insured farmers' income before and after their participation in NAIC insurance services. This further strengthens the result of descriptive statistics table 3.

Effects of NAIC Insurance Scheme

Table 8 Distribution of Responses on the Effects of Accessed NAIC Products
on the Insured Farmers Agric Business

S/N	Effects Indicators	Mean	Decision
i	Security of investment	4.38	Agree
ii	Boost self confidence	3.82	Agree
iii	Easy access to credit	3.98	Agree
iv	Technical assistance by Insurance extension agent	4.43	Agree
v	Indemnity in case of accident	3. 44	Agree
vi	Education and training	3.36	Agree
vii	Record keeping technique	2.71	Disagree
viii	Increase in farm income	4.02	Agree
ix	Improvement in general living condition	3.47	Agree
x	Easy access to fertilizers	4.48	Agree
	Grand Mean	**3.626**	**Agree**

The above table 4 results was deduced from 5 points scale analysis with weighted mean of 3.0, which implied that any variable that is greater or equal the threshold (3.0) was considered to be the effects of NAIC services on the business performances of the respondents, while the variable that is less than the threshold (3.0) was considered not effective. Therefore, most

(grand mean (x) = 3.626) of the insured farmers agreed that the NAIC insurance scheme, some of these effects include; Security of investment (4.38); Boost self confidence (3.82); Easy access to credit (3.98); Technical assistance by Insurance extension agent (4.43); Easy access to fertilizers (4.48); as well as Increase in farm income (4.02); and Improvement in general living condition (3.47).

Test of Hypothesis three (H_{o3})

$H_{o3:}$ NAIC insurance products have not significantly affected insured farmers' agric business performance

$H_{A3:}$ NAIC insurance products have significantly affected insured farmers' agric business performance

Decision rule: the null hypothesis is accepted if there exists enough evidence that the first group is significantly less than the second group, otherwise, the alternative hypothesis is accepted. Therefore, test of significant difference was conducted using paired-t test at 5% level of significant

T-Test and CI: Affected, Not Affected

Table 9 T for Affected vs. not Affected

	N	Mean	St Dev	SE Mean
Affected	8	252.6	39.5	14
Not Affected	8	145.4	39.5	14

Difference = mu (Affected) - mu (Not Affected)

Estimate for difference: 107.3

95% CI for difference: (64.9, 149.6)

T-Test of difference = 0 (vs. not =): T-Value = 5.44

P-Value = 0.000 Degree of Freedom = 14

The P-value of the test is less than 0.05 which indicates significant difference between the variables of interest. The P-value (0.00) less than 0.05 which shows the existence of enough evidence to reject the null hypothesis and conclude that NAIC insurance products have significantly affected insured farmers' agric business performance.

Challenges Constrain the Usage of NAIC Insurance Scheme by Farmers

Table 10 Distribution of Responses on the Constraints That Hinder Farmers Accessibility to
NAIC Insurance Products

S/N	Challenges	Mean	Decision
i	High level Illiteracy among farmers	4.49	Agree
ii	Low publicity about NAIC insurance programme	3.15	Agree
iii	Lack of trust and confidence in insurance services	4.51	Agree
iv	Inadequate and poor mode of compensation payment after farmers loss	4.38	Agree
v	Distance of insurance offices from locality	4.44	Agree
vi	Limited insurance products option accessible to farmers	3.60	Agree
vii	Unfavorable government policies	3.42	Agree
viii	Cultural belief and traditional ways of farming	3.71	Agree
ix	Lack of fund and commitment to pay insurance premium	4.16	Agree
x	Inadequate NAIC field officers and extension services	3.18	Agree
	Grand Mean	**3.8023**	**Agree**

Results of table 5, shows that the farmers are being faced with many challenges (grand mean(x) = 3.8023) which hindered their involvement in NAIC insurance scheme. Some of these problems range from, High level Illiteracy among farmers (4.49); Lack of trust and confidence in insurance services (4.51); Inadequate and poor mode of compensation payment after farmers loss (4.38); Distance of insurance offices from locality (4.44); as well as Lack of fund and commitment to pay insurance premium (4.16). Therefore, with all these challenges confronting farmers in accessing NAIC services it will be difficult for them to participate and benefit from the scheme.

CONCLUSION AND POLICY IMPLICATIONS

In order to strengthen the effects of farmers' participation in agricultural insurance scheme the following recommendations are therefore made;

The NAIC should design more insurance products (policies) that will cover all aspect of agriculture. Agriculture does not limit only to crop and livestock, it entails various activities therefore, it is necessary to provide for all aspect of agriculture, this encourages more farmers to participate in insurance scheme which will in turn boost their farm productivity and food security.

The NAIC and the cooperative societies should collaborate and organize capacity building programmes in form of adult education, seminar, workshop, etc. this will improve the literacy level of the farmers as well as enhancing their participation.

As a matter of urgency, the NAIC should embark on publicity and awareness campaign programmes. This will enable the farmers know more about the NAIC services and the benefits of participating in it. This will equally change their orientation about insurance in Nigeria.

The NAIC should also make the amount of premium paid by the farmers to be more affordable and attractive. This will encourage new and existing farmers' continuous participation of farmers in insurance scheme.

Finally, the NAIC should ensure prompt and timely payment of compensation (indemnity). By so doing it boost the confidence and trust among the farmers who does not have faith in Nigerian insurance sector.

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