DETERMINANTS OF POULTRY EGG FARMERS' PARTICIPATION IN LIVESTOCK INSURANCE IN RIVERS STATE, NIGERIA

Adeyinka Richard AROYEHUN[1]*

[1]*University of Port Harcourt, Faculty of Agriculture, Department of Agricultural Economics and Agribusiness Management, Port Harcourt, Nigeria*

Abstract: Poultry farming is exposed to several hazards caused by epidemic diseases, climate change and marketing among others which lead to losses of revenue. Yet, majority of poultry farmers do not neither shared nor transferred their hazards rightly. In the light of this, this study examined the determinants of poultry egg farmers' participation in livestock insurance in Rivers State, Nigeria. Primary data were obtained with the aid of questionnaire and interview schedules from 120 farmers drawn through multistage sampling procedure. Descriptive statistics and Probit regression model were used to analyze the data. Results shows the mean age of the poultry egg farmers to be 45.21 years, years spent in formal education mean of 14.87 years, mean household size of five (5), and stock size of 1721 birds were obtained. 60.8% were aware of livestock insurance and about 35% of the farmers insured their farms. Probit regression result shows that access to credit facilities, stock size and household size were statistically significant determining the poultry egg farmers' participation in livestock insurance scheme. Poor agricultural extension service delivery and delay in indemnity payment among others were constraints encountered in participating livestock insurance. The study recommends that extension agents in collaboration with the insurance company providers should educate poultry farmers on livestock insurance role in risk management. Also, insurance companies should endeavor to keep terms of contractual arrangements not to delay in indemnity payment to the farmers.

Keywords: Indemnity, Livestock insurance, Poultry farmers, Participation, Premium, Probit model

1. Introduction

Livestock is made up of 8.89% agricultural sector in 2015 (NBS, 2016). The Nigeria's livestock population consists of 16.3 million cattle; 40.8 million goats; 27 million sheep; 3.7 million pigs and 151 million poultry (Nasiru et al., 2012), Nigeria's livestock population projected to be about 53.6 million cattle; 207.8 million goats; 78.2 million sheep; 21.1 million pigs and 1.3 billion poultry by 2050 (Sasu, 2022). Going by the former figure, poultry alone constitutes about 63.2% of the total livestock population in Nigeria, signifying the dominance of poultry sector in the livestock industry; since majority can practice it easily. Poultry can be described as birds of economic value to man which provide meat and eggs. Poultry production plays a vital role in rural livelihoods and food security is enormous. The poultry farming enterprise provides employment opportunity for the teaming population, thereby serving as a source of income to the people. Also, it provides a good source of animal protein in meat and eggs which have a high nutritional value (Nasiru et al., 2012). Egg is an excellent source of iron, zinc and vitamin A, all of which are essential for health, growth and well-being of people; egg is a complete protein with excellent quality (Tijani et al.,

2006).

Poultry farming business are usually confronted with many risks and uncertainties; some are natural hazard like floods, drought, fire outbreak, diseases, pest attacks and theft among others. Since, the poultry egg farmers cannot foresee the possibility of occurrence of any of these hazards and cannot bear these risks and uncertainties alone, the farmer is faced with the choice of transferring or sharing the risks involved in poultry egg production. In a situation like this, insurance remains the only option to assist the farmers to go back to business. In general, insurance is a form of risk management used to hedge against a contingent loss. Therefore, poultry egg farmers underwrite livestock insurance in order to mitigate or assuage the bad effects of risks. Agricultural insurance is an economic constituent of farm management practices designed to lessen the adverse consequence of natural adversity on poultry egg farmers' incomes through the payment of indemnity (Ajieh, 2010). The National Agricultural Extension and Research Liaison Services (NAERLS) identified the following as the benefits of agricultural insurance to farmers: (i) it protects farmers against financial disaster after suffering any of the insured risks for which indemnity (compensation) is paid; (ii) it empowers the farmers to

obtain farm credit. Given that, insurance guarantees protection against crop and/or livestock failure, the insured farmer has greater confidence in obtaining loans; (iii) it facilitates better planning and project implementation since there is a high level assurance for continuity in business; (iv) it serves as an assurance to banks and other financial institutions who grant loan for agricultural purposes that loans given will be repaid; and (v) it build farmers confidence in using new technologies and making greater investments in agriculture according to NAERLS (1991) as cited in Akinrinola and Okunola (2014).

Despite the benefits accrue to insured farms; Nigerian farmers are reluctant about taking an insurance policy. This can be traced to the less than satisfactory image of the insurance industry regarding loss compensations and this problem has created mixed feelings towards Agricultural insurance by prospective farmers and hence, the farmers become reluctant in participating in an insurance cover and also considering the very low incomes, the small sizes of holdings aimed at subsistence production, large scale ignorance and poverty and the adverse view of other people's experiences with activities of insurance companies in other sectors, peasant poultry egg farmers are generally reluctant to patronize the insurance market, let alone paying a small amount in the form of premiums in exchange for their farm risks (Olubiyo et al., 2009). Hence, poultry industry in Nigeria continually suffered a great deal of losses, which has affected both poultry egg farmers and consumers.

Despite the existence of insurance services rendered by Nigerian Agricultural Insurance Corporation (NAIC) and other private insurance firms in Nigeria, there has been a low level of participation of farmers buying insurance premium. In view of this, there is need to examine the determinants of poultry egg farmers participation in livestock insurance in Rivers State Nigeria.

The specific objectives of the study are to:

 a) Describe the socio-economic characteristics and management practices of the poultry egg farmers in the study area;
 b) Determine the factors affecting poultry egg farmers participation in livestock insurance in the study area;
 c) Identify the constraints in insuring poultry egg farms in the study area.

2. Material and Methods

The study was carried out in Rivers State Nigeria. The State lies between longitude 7°00'E and Latitude 5°70'N, and covers an area of 11,077km2. Rivers State shared boundary with Imo, Abia and Anambra States towards north side, Akwa/Ibom State to the east side, Bayelsa State to the west side, and Atlantic Ocean on the south side. The population of Rivers State was 5,198,716 according to the National Population Commission of 2006 (NBS, 2011). Livestock reared in the State include poultry, pig, goats and fish. The poultry bird reared includes laying bird for eggs, broilers, cockerels and turkeys.

Multistage sampling was used to select the poultry egg farmers for the study. In the first stage, simple random sampling was used to select six Local Government Areas (LGAs). Secondly, four communities in each of the six LGAs were randomly selected to give twenty-four. Thirdly, five poultry egg farmers were purposefully selected from each of the communities, making one hundred and twenty (120) poultry egg farmers that form the sample size for the study. Data were analyzed using descriptive statistics, and Probit Regression model. The above model is estimated using Probit Regression estimation procedure in Gun Regression, Econometrics and Time-series Library (GRETL).

2.1. Model Specification

Probit regression model was used to determine the factors affecting poultry egg farmers' participation in livestock insurance. The model was used by Dhanireddy (2010) and Adeyonu et al. (2016), the implicit of the model is expressed as:

$$y_i = \beta_0 + \sum_{i=1}^{N} \beta_i X_i + e_i \qquad (1)$$

Probability expression as;

$$P(Y = 1/X_1, X_2, \ldots X_n) = \varphi(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n) \qquad (2)$$

here, P= Probability of insured poultry egg farms, Y= 1 means yes and 0 otherwise, φ= Cumulative distribution function of the standard normal distribution, and β= Parameter estimates.

The explicit form model specified as:

$$y_i = \beta_0 + \sum_{i=1}^{10} \beta_i X_i + e_i \qquad (3)$$

where; Y= Probability of insured poultry egg farms (1 means yes and 0 otherwise), β_0= constant, β_1 to β_{10}= coefficients of the parameter estimates, X_1 to X_{10}= explanatory variables.

The a priori expectations of the explanatory variables are presented in Table 1.

3. Results and Discussion

Result shows the maximum and minimum age of the poultry egg famers to be 65 years and 21 years respectively, with mean of 45.21 years Table 2. This implies that the farmers were strong enough to be engaged in poultry enterprise. This result agrees with Akintunde (2015), and Adeyonu et al., (2016) who obtained a mean of 45.5 years and 43.63 years respectively among poultry farmers' who participated in Insurance Scheme in Southwest and Oyo State Nigeria respectively. A mean of 14.87 years was obtained as the years spent to attain the level of education. This indicates that the poultry egg farmers were well educated in the study area; this could make the farmers to understand the benefit of insuring their poultry farms.

Table 1. The a priori expectations of the explanatory variables used in determine the factors affecting poultry egg farmers' participation in livestock insurance

Key	Variables	Description	Measurement	Expected sign
X_1	Age	Continuous	Years	-
X_2	Gender	Categorical	1 if male, 0 otherwise	+/-
X_3	Marital status	Categorical	1 if married, 0 otherwise	+/-
X_4	Household size	Continuous	Number	+/-
X_5	Farmer association	Categorical	1 if yes, 0 otherwise	+
X_6	Farming experience	Continuous	Years	+/-
X_7	Stock size	Continuous	Number	+
X_8	Extension contact	Categorical	1 if yes, 0 otherwise	+
X_9	Years of formal education	Continuous	Years	+
X_{10}	Access to credit	Categorical	1 if yes, 0 otherwise	+

Table 2. Socioeconomic characteristics and management practices of the poultry egg farmers in the study area

Variables	Mean	Std. Dev.	Min	Max
Age, years	45.21	10.38	21	65
Educational level	14.87	3.8	2	18
Household size	5	1.72	1	9
Farm distance to homestead (km)	5.14	5.94	0	29.00
Stock size (number)	1721.00	1284.68	250.00	8000.00
Amount pay on land rent/yr (₦)	175862.07	72457.73	50,000.00	350,000.00
Labour cost/month (₦)	31,880.73	32,626.31	10,000.00	260,000.00

This result is similar to that of Adeyonu et al., (2016) who obtained a mean of 13.46 years spent schooling among poultry farmers' who were willing to participate in National Agricultural Insurance Scheme in Oyo State, Nigeria.

A mean of five (5) persons was obtained as household size. This implies that the farmers have moderate household size. This result is similar to Akintunde (2015) who obtained a mean of five (5) persons among poultry farmers in Southwest Nigeria. 5.14km was obtained as the farm distance to the homestead of the farmers. This implies that the farmers were closed to the farms. The stock size shows that most poultry egg farmers are small-scale to medium scale with mean of 1721 birds. This result agrees with Oduwaiye et al., (2017) who recorded a mean of 1320 birds among poultry farmers in Kwara State Nigeria. Mean of ₦175,862.07 and ₦31,880.73 was obtained for amount spent on rent/lease of poultry land and labour cost respectively.

Table 3 shows that majority (60.8%) of the poultry egg farmers were aware of livestock insurance, while about 35% actually insured their poultry farms. This indicates that majority of the farmers do not insure their farms; this could be as a result that most of the farms were small-scale poultry farms. This result is similar to Akintunde (2015) who recorded 59.6% farmers that were aware of livestock insurance, while only 11.9% insured their farms among poultry farmers in Southwest Nigeria.

Table 4 shows the premium paid per annul on insuring poultry egg farm in the study area. About 42.9% pay between ₦51,000.00 – ₦100,000.00 per annul, while large scale farms pay above ₦210,000.00 were 7.1%. This

implies that poultry egg farmers pay premium per year according to the number of laying birds stocked.

Table 3. Awareness and participation of poultry egg farmers in livestock/poultry insurance

Variables	n	%
Awareness of livestock insurance		
Yes	73	60.8
No	47	39.2
Insured poultry farm		
Yes	42	35.0
No	78	65.0
Total	120	100.0

Table 4. Premiums pay per annual on poultry farms

Amount (₦)	n	%
50,000 and below	6	14.3
50,001 – 100,000	18	42.9
100,001 – 150,000	9	21.4
150,001 – 200,000	6	14.3
200,001 and above	3	7.1
Total	42	100.0

Table 5 shows the Probit regression results of determinants factors affecting poultry egg farmers' participation in livestock insurance in the study area. A McFadden R-squared value ranging from 0.2 to 0.4 indicates very good model fit. Hence, a McFadden R-squared of 0.351 was obtained, which indicates that the regression model is a good fit of the data. The Log likelihood value was significant which also, validated the fitness of the model with likelihood ratio Chi-square (10)

of 27.4047 which is statistically significant at 1% level (0.0022). Error is normally distributed test statistic Chi-square (2) of 2.1588 with p-value of 0.3398 was obtained; this shows that the test for normality of residual (Null hypothesis) error is normally distributed since the p-value is greater than the level of significant, with 91.7% cases correctly predicted in the model as well as 0.301 mean of independent variables captured in the model. This indicates that, overall, the regression model statistically significantly predicts the outcome variables. This implies that poultry egg farmers who transferred or shared their risks and uncertainties hazards with livestock insurance company is beneficial in getting indemnity in the study area. Almost all the variables included in the model satisfied the a priori expectation as presented in Table 5, however, access to credit facilities, stock size and household size were statistically significant variables as related to the determinants of poultry egg farmers' participation in livestock insurance scheme in the study area.

Table 5 shows that access to credit with coefficient of 1.0706 was statistically significant at 0.011% directly related with the probability of the poultry decision to share losses with livestock insurance. This implies that poultry egg farmers that have access to credit facility are more prone to participate in sharing their losses with livestock insurance companies than other farmers who do not have access to credit. This was observed from the response of the poultry egg farmers that insured their farms that accessing loans from banks and insurance companies is better simplified and expedited when the farmers have insurance certificate, hence, such farmers assented to livestock insurance scheme so as to increase in intensity to loans accessibility. This finding agrees with Dhanireddy (2010) and Adeyonu et al. (2016) who noted in their studied that access to credit facilities facilitate the decision of farmers to participate in the insurance

scheme were directly positively related. However, it contradicted the report of Akintunde (2015) who showed no significant relationship.

Another important and strong determinant of poultry farmers' decision to participate in livestock insurance is poultry egg farmers' stock size. This stock size is positively correlated and statistically significant at 0.0 levels with poultry egg farmers' participation in the livestock insurance scheme. This implication of this is that poultry egg farmers who invested more or have high stock size in have a higher probability of insuring their poultry egg farms than other poultry farmers with lower stock size. This is logical and reasonable for the reason that, the poultry egg farmers that has invested huge financial resource will tend to insure the poultry farm to avert a condition whereby the entire investment both material and finance will go down the drain in case of any tragedy which is common with the poultry production business. Furthermore, generally the large scale poultry farmers do have access to credit facilities and the poultry farmers have to insure their poultry farms as one of the criteria of obtaining the loans from banks and other formal financial institutions. The finding agrees with report of Akintunde (2015) and Adeyonu et al. (2016) who reported that the level of stock size invested by the poultry farmers' is directly correlated with the farmers' decision to participate in the livestock insurance scheme. Lastly, household size coefficient of −0.2630 was obtained which is negatively connected with the probability that the poultry egg farmers will participate in livestock insurance scheme at 0.05 level of significant. This indicates that poultry egg farmers who have less household size or the other are more likely not to participate in livestock insurance scheme in comparison with other poultry farmers who have large household size.

Table 5. Probit regression results of determinants factors affecting poultry egg farmers' participation in livestock insurance in the study area

Variables	Coefficient	Std. Error	z	P-value
Constant	−1.1502	1.1504	−0.9998	0.3174
Age (X_1)	−0.0027	0.0273	−0.0976	0.9222
Gender (X_2)	−0.0308	0.4177	−0.0738	0.9411
Marital Status (X_3)	0.1555	0.5194	0.2994	0.7646
Household size (X_4)	−0.2630	0.1115	−2.3590	0.0183**
Farmer association (X_5)	0.3495	0.4883	0.7158	0.4741
Farming experience (X_6)	0.0422	0.0393	1.0730	0.2834
Stock size (X_7)	0.0003	0.0001	2.1000	0.0357**
Extension contact (X_8)	0.4755	0.5247	0.9062	0.3648
Years of formal education (X_9)	−0.0446	0.0358	−1.2470	0.2123
Access to credit (X_{10})	1.0706	0.4118	2.6000	0.0093***
Mean dependent var	0.1000	S.D. dependent var		0.3013
McFadden R-squared	0.3513	Adjusted R-squared		0.0693
Log-likelihood	−25.3076	Akaike criterion		72.6152
Schwarz criterion	103.2776	Hannan-Quinn		85.0673

Table 6. Constraints of poultry egg farmers in insuring the poultry farms in the study area

Constraints Variables	SA		A		D		SD		DK		Mean	Rank
	F	%	F	%	F	%	F	%	F	%		
Poor agricultural extension service delivery	35	29.2	19	15.8	29	24.2	31	25.8	6	5	2.6	1st
Illiteracy of the poultry farmer	36	30	36	30	23	19.2	23	19.2	2	1.7	2.3	2nd
Inadequate government policies to empower poultry farmers	46	38.3	52	43.3	8	6.7	3	2.5	11	9.2	2.0	3rd
Delay in indemnity payment	37	30.8	63	52.5	8	6.7	7	5.8	5	4.2	2.0	3rd
Land ownership problem	59	49.2	41	34.2	16	13.3	1	0.8	3	2.5	1.7	4th
High cost of poultry farmland	72	60	37	30.8	7	5.8	2	1.7	2	1.7	1.5	5th

SA= Strongly Agreed, A= agreed, D= disagreed, SD= strongly disagreed, DK= don't know, F= frequency, %= Percentage.

Table 6 shows the constraints encountered by the poultry egg farmers in participating in livestock insurance. Poor agricultural extension service delivery with mean of 2.6 ranks first. This implies that the poultry farmers in the study area do not have adequate access to extension agents. Illiteracy of the poultry farmers with mean of 2.3 ranked second, inadequate government policies to empower poultry farmers and delay in indemnity payment ranked third with mean of 2.0. This result is similar to the finding of Ajieh (2010) among poultry farmers' response to agricultural insurance in delta State Nigeria.

4. Conclusion

This study concludes that the poultry egg farmers were in their productive age, with more years in formal education, and majority of the farmers were aware of livestock insurance. Access to credit, stock size and household size were statistically significant determining the poultry egg farmers' participation in livestock insurance scheme. Poor agricultural extension service delivery, illiterate education of the poultry farmers and inadequate government policies to empower poultry farmers were constraints encountered in participating livestock insurance in the study area.

The study therefore, recommends that:

Extension agents in collaboration with the insurance company providers should create awareness and educate the livestock insurance company role in risk management should be incorporated in their package for outreach to poultry farmers especially.

Government should make livestock insurance more affordable to poultry egg farmers by increasing the present level of subsidy granted for agricultural insurance cover.

Insurance companies should endeavour to keep terms of contractual arrangements so as to delay in indemnity payment to the farmers allays the fears of the poultry egg farmers.

A special loan scheme for poultry farmers should be established by government to enable the farmers cope with the financial requirement involved in taking an agricultural insurance cover.

Author Contributions

The percentage of the author contributions is presented below. The author reviewed and approved the final version of the manuscript.

	A.R.A.
C	100
D	100
S	100
DCP	100
DAI	100
L	100
W	100
CR	100
SR	100
PM	100
FA	100

C=Concept, D= design, S= supervision, DCP= data collection and/or processing, DAI= data analysis and/or interpretation, L= literature search, W= writing, CR= critical review, SR= submission and revision, PM= project management, FA= funding acquisition.

Conflict of Interest

The author declared that there is no conflict of interest.

Ethical Consideration

Permissions were obtained from the University of Port Harcourt Ethics committee (protocol code: 2022/23 and date: February 23, 2022).

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