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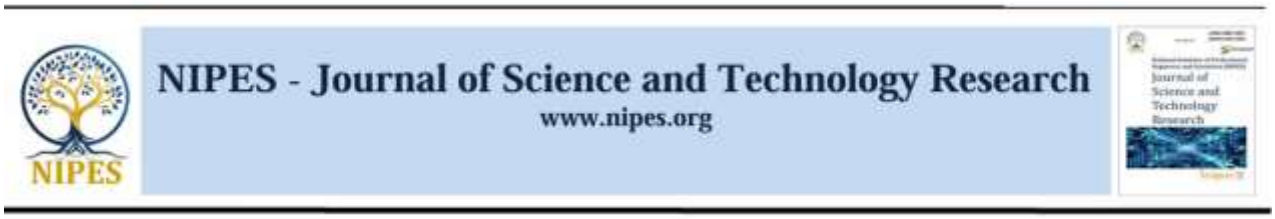

Determinants of Agricultural Insurance Participation Among Poultry Farmers in North-Central Nigeria: Implications for Risk Management

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Abstract*— The study assessed the determinants of poultry farmers participation in agricultural insurance in North-Central, Nigeria. A two-stage sampling procedure was used to select one hundred and five (105) respondents. Data were collected using a structured interview schedule and were analyzed using mean, percentage, and binary logistic regression models. Results show that the majority of the respondents were male (60%), married (72.5%), and the average age of the respondents was 39 years. The result further shows that the majority of the respondents (63.8%) of the respondents had a high level of participation in agricultural insurance, and the majority of them participated because the bank mandated them after they had secured a loan (55.2%), and also to prevent losses (50.5%). A great percentage of the respondents indicated rest of mind (93.3%) and access to credit facilities (46.7%) as the major benefit derived from participation. Sex (p=0.44) and number of years involved in agricultural insurance were key determinants of farmers' extent of participation in agricultural insurance. Therefore, extension agents should organize campaigns and training to educate farmers on its benefits beyond loan requirements. In addition, government agencies and insurance companies should introduce gender-sensitive policies and flexible payment plans to encourage sustained participation.

***Keywords*—Agricultural Insurance, Poultry Farmers, Risk Management, Participation**

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I. INTRODUCTION

The poultry industry plays a substantial role in the growth of developing countries by offering high-protein sources and providing job opportunities throughout the production process [1]. In Nigeria, poultry farming makes a significant contribution to the livestock sector, and the livestock industry is the primary source of animal protein, accounting for 10% of agricultural GDP [2, 3].

Nigeria's poultry farming is plagued by various risks such as a high rate of disease and pest infestation, an attribute related to climate change, excessive costs of veterinary services, the perishable nature of poultry products, limited financial support, and the involvement of inadequately trained and poorly skilled individuals in the industry [2,4]. According to [5], risk is defined as the likelihood of the occurrence of events that will negatively affect agricultural production and trade.in addition, some of the risks faced in poultry production are production risks, price and market risks, regulatory risks, technological risks, financial risks, and human resources risks. These risks faced by farmers are frequently interconnected [6]. Also, the impact of these risks affects both the welfare of the farmers and the food security of the Nation. Poultry birds are susceptible to disease outbreak; an outbreak can erase the whole farm. Climate change also poses a global pressing issue to the agricultural sector, thus necessitating the need to address these challenges [7,8]. Therefore, both the

government and farmers need to adopt strategies that will mitigate the effects of risks associated with agriculture [9].

Climate-smart agriculture has been developed to enhance agricultural resilience, reduce the impact of climate change and facilitate the achievement of sustainable development goals [10,11]. Agricultural insurance has been recognized as one of the climate risk adaptation strategies to help farmers insure against risks associated with climate change [12,13]. In addressing the risks associated with poultry farming, the Nigerian Agricultural Insurance Corporation implemented livestock insurance that covers the death or injury of animals as a result of disease, flood, lightning, storm, drought or heat stress and fire. [14]. In poultry, birds are exposed to sudden death caused by diseases. A study conducted by [15] revealed that a minority (11.9%) of poultry farmers insured their poultry farms.

Agricultural insurance plays a crucial role in the effective management of the various uncertainties such as extreme weather conditions, pests and diseases, and market uncertainties that characterize the agricultural sector [16]. Implementing sustainable animal husbandry practices can be facilitated by livestock insurance, and incorporating livestock insurance into agricultural policies is crucial for reducing the risk of losses and potential drops in output prices [9,17].

Since livestock insurance aims to cover the different agricultural risks associated with livestock production, it is not certain why poultry farmers participate in Agricultural insurance. Several studies have measured the awareness and willingness to pay for agricultural insurance among farmers [6,15,18]. However, there is little research on the extent of participation among poultry farmers, hence the need for this study. The study seeks to assess the reasons poultry farmers participate in Agricultural insurance, the extent of participation in Agricultural insurance and the constraints faced while participating in the North-Central region of Nigeria.

II. METHODOLOGY

The study was carried out in the North-Central zone, which is one of the six geo-political zones in Nigeria. North-Central comprises six states (Benue, Kogi, Kwara, Nasarawa, Niger and Plateau) and the Federal Capital Territory (FCT), Abuja. Each State has the following latitudes and longitudes: Benue (7.33690 N, 8.74040 E), Kogi (7.73370 N, 6.69060 E), Kwara (8.96690 N, 4.38740 E), Nasarawa (8.49980 N, 8.19970 E) Niger (9.93090 N, 5.59830 E) Plateau (9.21820 N, 9.51790 E) and FCT (9.05630 N, 7.49850 E). The population of the study comprises poultry farmers in the North-Central who have already purchased the insurance.

The sample size was chosen using a two-stage sampling procedure. The initial stage involves the random selection of three States – Abuja, Nasarawa and Niger. The next stage involves a snowballing technique to select 40, 35, and 30 contact farmers respectively.

The Data were analyzed using descriptive statistics (Frequency, Mean and Percentage) and inferential statistics (Binary Logit Regression). The reasons and benefits of participation were captured using simple statements with the Yes (1) and No (0) responses. The extent of participation was measured using net assets (input) insured divided by assets that potentially could have been insured. A mean score was generated which was used to categorize the extent of participation into high and low. The constraint was measured using a 3-point Likert scale; major constraint (3), minor constraint (2) and not a constraint (1), an aggregate mean score was used to rank the constraints. The factors that determined the participation of farmers in agricultural insurance were analyzed using Binary Logit Regression analysis. The Model specification for the regression is stated as shown in equation 1:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + U \quad (1)$$

Where:

Y: Level of participation (High = 1; Low = 0)

β_1 β_{10} = Regression coefficient

X_1 = Sex (Male = 1, Female = 0)

X_2 = Age (Years)

X_3 = Household size (number of people living under the same roof and eating from the same pot)

X_4 = Marital status (Married = 1, Single = 0)

X5 = Farming Experience (Years)

X6 = Annual Income (Naira)

X7 = Years of Participation (Years)

U = Error term

α = Intercept

TABLE 1: THE A PRIORI EXPECTATIONS OF THE EXPLANATORY VARIABLES USED IN DETERMINING THE FACTORS AFFECTING POULTRY FARMERS' PARTICIPATION IN LIVESTOCK INSURANCE

Key	Variables	Description	Measurement	Expected Sign
X_1	Sex	Categorical	1 if male, 0 otherwise	+ / -
X_2	Age	Continuous	Years	-
X_3	Household size	Continuous	Number	+ / -
X_4	Marital status	Categorical	1 if married, 0 other	+ / -
X_5	Farming experience	Continuous	Years	+ / -
X_6	Income	Continuous	Naira	+
X_7	Years of participation	Continuous	Years	+

III. RESULTS AND DISCUSSION

Socio-economic Characteristics of the Sampled Poultry Farmers

The results of the socio-economic characteristics of the respondents are presented in Fig 1,& 2.

Result in Fig. 1 shows the age distribution of the respondents which revealed that 42.86% of the farmers were between 31 and 40 years. About 30.57% were within 41 and 50 years. This suggests that the majority of the poultry farmers are within their prime and productive age and are more willing to participate in insurance. This is in line with the findings of [19] that middle-aged farmers participate more in agricultural insurance than younger farmers because of a lack of financial resources to invest in insurance. The gender distribution indicates the majority (60%) of the farmers are male while 42% are females. The prevalence of male dominance in poultry farming could be attributed to its labour-intensive nature inherent uncertainties and risks that are typically managed only by men in most situations. This is consistent with the research conducted by [20]. The results furthers shows that the majority of the farmers engaged in poultry farming are married (70.5%), possibly because of the need to meet family responsibilities and maintain stability. A study by [19] found similar demographics in Nigeria. Concerning the years of experience, the result showed that the mean years of poultry farming is 7 years. This could have influenced them to undertake some risks. This also shows that poultry farming is a new venture in the study area and holds potential for continuity if efficient and effective techniques are introduced to the farmers. This conclusion is in consonant with the study conducted by [21] that years of experience can impact the farmer's decision to participate in agricultural insurance.

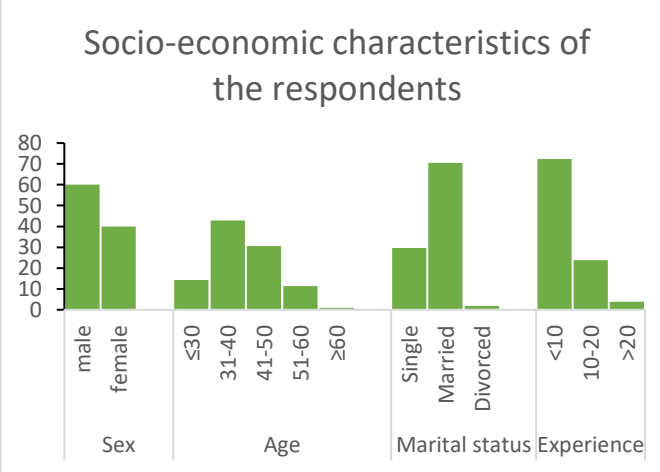

Fig. 1: socio-economic characteristics of the respondents

The result in Fig. 2 revealed that the average household size in the study area is 3. Having a small household size can free up additional funds which could be invested in insurance in the hope of building a safe net in case of unforeseen circumstances. The result further shows that the average annual income is N2,195,714.286 and this suggests that middle-income farmers find agricultural insurance accessible. This is in line with the research finding by [22] that farmers' income affects participation in agricultural insurance. The result further shows that the average years of participation in agricultural insurance is 3 years. This implies that farmers are more likely to remain involved with the insurance programme if they had positive experiences with it during periods of unforeseen losses, thus fostering trust and understanding. A study by [12] revealed that previous experiences with insurance influence participation.

Fig 2: Socio-economic characteristics

Reasons of Participation: Results in Fig. 3 shows that the majority (55.2%) of the poultry farmers participated in insurance because the bank mandated them after they had secured a loan, 50.5% of the respondents participated to prevent losses while 38.1% participated due to the losses they encountered during perils. The implication is that farmers who have access to loans are more likely to participate in insurance. This is in line with the findings by [21], and [23] that access to credit is a determinant to the adoption of insurance among Nigerian farmers. Also, experiences with loss tend to drive farmers toward participation. The findings by [24] supports this conclusion.

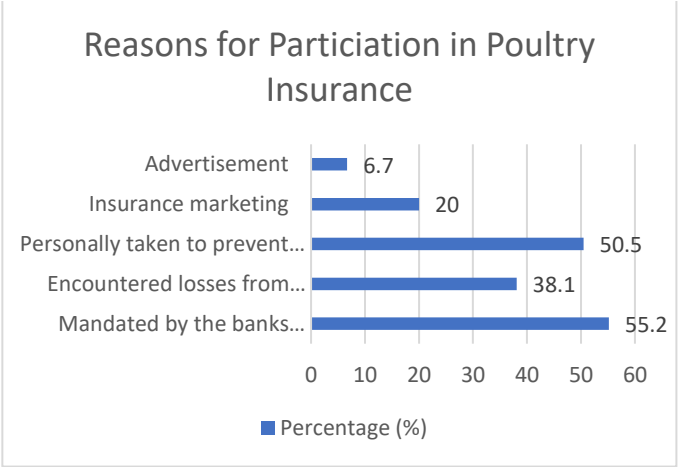

Fig 3: Distribution according to reasons for participation

The Extent of Participation: Fig. 4 indicates that the majority (63.8%) of the respondents engage in insurance at a high level while 36.2% engage at a low level. This could be as a result of the binding constraints imposed by the financial institution or the previous devastating losses encountered. This is consistent with

[24] who reported that farmers engage in insurance when it is linked to loans.

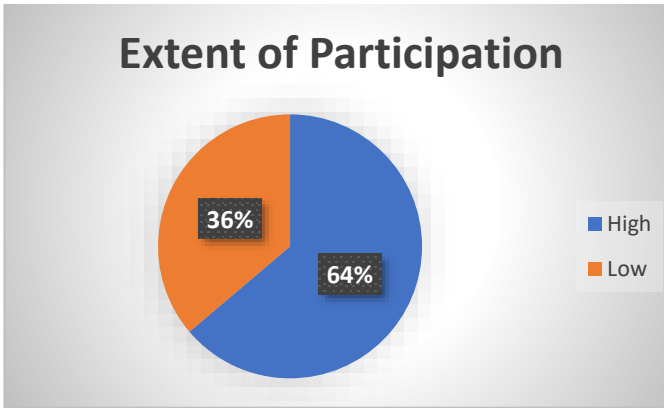

Fig. 4: Distribution according to extent of participation in Insurance

Benefits derived from Participation: The results in Fig 5 reveals that 93.3% of the respondents noted "rest of mind" as the major benefit, 46.7% picked access to credit facilities while 42.9% noted an increase in farm size. The finding agrees with [25] who reported sense of security as the important benefit offered by agricultural insurance. However, access to credit facilities continues to have a major advantage for insurance in Nigeria.

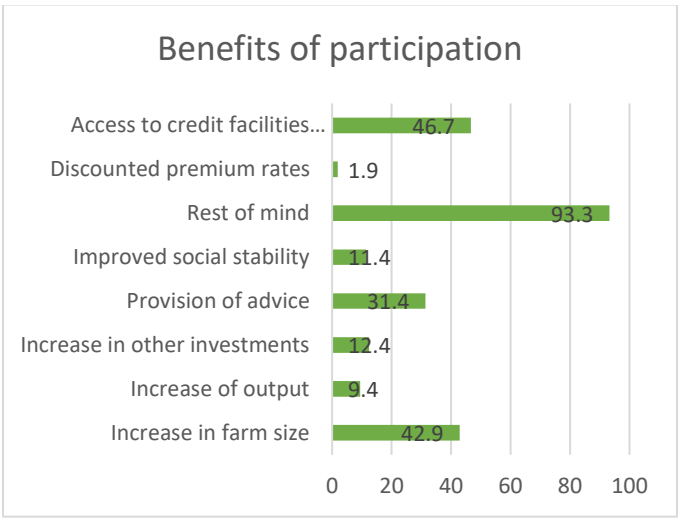

Fig. 5: Distribution according to benefits derived from participation

Constraints to Participation in Agricultural Insurance: The results in Table 2 indicate that rigorous claims process ranked first (M = 3.528), followed by poor customer service (M = 2.754), expensive premiums (2.716), and long duration before payment is made (M = 2.358), were the key constraints poultry farmers faced to participate in Agricultural insurance. This is consistent with the findings by [21] who reported that the rigorous process in claiming indemnity is a key constraint to farmers' participation. A study conducted by [26] also shows that a lack of adequate information limits the participation of farmers in agricultural insurance.

TABLE 2: CONSTRAINTS FACED BY POULTRY FARMERS TO PARTICIPATE IN AGRICULTURAL INSURANCE

Constraints	Mean	Rank
Rigorous claims process	3.528	1st
Poor customer service such as inadequate information on agricultural insurance policy	2.754	2nd
Expensive premiums	2.716	3rd
Long duration before payment is made	2.358	4th
Unpaid claims	1.981	5th
Lack of money to renew premium	1.830	6th

Factors affecting poultry Farmers' participation in Agricultural Insurance

The results in Table 3 showed that Age (p = 0.536), Household size (p = 0.974), Marital status (p = 0.125), Farming experience (p = 0.130), and annual income (p = 0.570) were not statistically significant. The factors that had a significant influence on poultry farmers' participation in Agricultural insurance were sex and years of participation. The results show that being male increases the likelihood of participating in agricultural insurance. However, by being male (versus being female), the odds of participating increased by 38.7%. This means that males are approximately 38.7% as likely as females to participate in Agricultural insurance. In other words, females are significantly more likely to participate.

Also, longer participation increases the likelihood of being involved in agricultural insurance. This means for a unit increase in years of participation, the odds increase by 45.6%, and this indicates a strong and positive influence. In other words, experience in years of participation drives continued participation. This finding is in line with [12] who reported that previous experience with insurance influences participation.

TABLE 3: FACTORS AFFECTING POULTRY FARMERS' PARTICIPATION IN AGRICULTURAL INSURANCE

	B	S. E.	Wald	df	Sig.	Exp (B)
Sex	.951	.471	4.071	1	.044*	.3.87
Age	-.034	.056	.382	1	.536	.966
Household size	-.006	.190	.001	1	.974	.994
Marital status	.775	.506	2.348	1	.125	2.172
Farming experience	-.078	.052	2.296	1	.130	.925
Income	.000	.000	.323	1	.570	1.000
Years of participation	.375	.149	6.308	1	.012*	1.456
Constant	-.589	.910	.419	1	.517	.555

IV. CONCLUSION AND RECOMMENDATION

The study concludes that the primary reason for participation in agricultural insurance was the mandate from financial institutions, and fear of experiencing losses. The extent of participation was relatively high, with most farmers actively engaging in insurance, which is likely due to financial obligations tied to loans and past experiences of farm losses. In terms of benefits, the most significant benefit reported was peace of mind, followed by access to credit facilities and farm expansion opportunities, reinforcing the importance of insurance in providing financial security and business continuity. The complex and time-consuming claims process discourages participation. Insurance companies should streamline claims processing, reduce bureaucratic bottlenecks, subsidized premium rates or flexible payment plans, and improve efficiency to enhance farmers' trust and confidence. Finally, policymakers should design gender-sensitive agricultural insurance programs to encourage more female farmers to participate.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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