

ASSESSMENT OF POULTRY FARMERS' WILLINGNESS TO PAY FOR AGRICULTURAL INSURANCE IN OSUN STATE, NIGERIA

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Abstract. Although poultry farming constitutes a significant component of the agricultural and household economy in the developing world, it is largely undertaken in an environment of risk and uncertainty, hence the need for poultry farmers to guard against risk by purchasing agricultural insurance. In order to analyse the willingness of poultry farmers in Osun State, Nigeria to purchase agricultural insurance cover, a multi-stage sampling technique was employed to select a total of 140 poultry farmers. Descriptive statistics were used to assess poultry farmers' awareness of agricultural insurance. To determine the willingness of poultry farmers to purchase agricultural insurance cover, the Contingent Valuation Method (CVM) was used, whereas a binary logistic regression model was employed to determine the factors that significantly influence poultry farmers' willingness to pay for agricultural insurance. The results of the study reveal that a considerable proportion of the surveyed respondents had not been aware of agricultural insurance prior to the time the survey was conducted. Although only 7.1% of the respondents indicated that their poultry farms are already insured, a substantial share of poultry farmers in the study area stated that they were willing to purchase agricultural insurance cover. Experience in poultry farming, the number of birds stocked, the primary occupation of the respondent and prior knowledge of agricultural insurance were the factors that exerted a significant influence on poultry farmers' willingness to pay for agricultural insurance cover. It can be concluded that, among other things, there is a need for a synergistic partnership between farmers, insurance companies and government. Primarily, the government needs to increase the present level of subsidy granted for livestock insurance cover so as to keep the price of premiums within a range that poultry farmers can afford.

Keywords: risk management, agricultural insurance, willingness to pay, contingent valuation method

INTRODUCTION

Poultry farming is a lucrative venture that accounts for a considerable portion of revenue in the agricultural sector of many developing countries (Omomule et al., 2020). It involves the raising and management

of domesticated birds such as chickens, turkeys, geese, ducks, and ostriches, among others, primarily for the consumption of meat or eggs. Generally, poultry are short-cycle animals with life spans of approximately one year in the farm (Fasanmi et al., 2018), and as a result they yield a short-term rate of return in terms of

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both cash and kind benefits (Igene, 1997). Poultry farming constitutes a significant component of the agricultural and household economy in the developing world (Gueye, 2002). Some 85% of rural households in sub-Saharan Africa keep chickens or other types of poultry (Gueye, 2000).

Poultry is the most dominant and commercialized livestock type in Nigerian agriculture (Olabisi et al., 2021), which makes it very important to the development of the country's economy. Adeyonu et al. (2016) reported that the poultry sub-sector comprises over 60% of the total livestock population in Nigeria. Available data indicates that the country produces above 550,000 mt of poultry meat and 700,000 mt of eggs per annum, contributing about 25% of the country's Agricultural GDP (FAO, 2010). Moreover, on account of rising incomes, continuous urbanization, population growth and changes in food consumption patterns, the poultry sub-sector in Nigeria has experienced rapid expansion in recent years. Furthermore, the Nigerian poultry sector is projected to experience more growth over the next 40 years (Olabisi et al., 2021). Poultry and its products meet food security needs, enhance livelihoods, and are particularly important in resource-poor settings in Nigeria. Notably, the meat and eggs derived from poultry are the most consumed forms of animal protein (Fasanmi et al., 2018) and have the potential to bridge the protein gap prevalent in Nigeria (Henke et al., 2015) due to their high nutritional value (Nasiru et al., 2012).

Just like other agricultural activities, poultry production is largely undertaken in an environment of risk and uncertainty, which can reduce the level of investment in the poultry sub-sector. Lawi and Polycarp (2022) assert that in its simplest sense, risk is the possibility that the real outcome of events may deviate from the result that was expected. By the same token, Obike et al. (2017) state that risk in agriculture refers to the possibility of harm, loss, damage, or uncertainty over whether agricultural output will produce the desired results. Banjoko et al. (2014) argue that risk is the likelihood of negative outcomes or anticipated losses as a result of the interplay between natural or man-made hazards and vulnerable conditions; given that its probability and outcome can be foreseen and measured in an empirical or quantitative manner, risk can be covered by insurance.

Although there are several sources of risk, pests and disease outbreaks are, arguably, the most pervasive risk factors in poultry production. Delgado et al.

(1999) allude to the fact that infectious and parasitic diseases affecting livestock in general and poultry in particular remain an important challenge to profitable livestock operations in many developing regions. Outbreaks of diseases such as Highly Pathogenic Avian Influenza (HPAI), Newcastle disease, Infectious bursal disease (IBD), Salmonellosis, Coccidiosis, Fowl cholera, and Fowl pox, amongst others, are of utmost concern because of their adverse impacts on public health, the poultry industry, and the economic wellbeing of affected nations. Mangen and Burrell (2003) point out that in the event of an animal disease outbreak, the food sector can suffer large or even catastrophic economic losses. Ojimelukwe et al. (2016) report that outbreaks of diseases such as HPAI not only devastate the poultry industry through their high mortality and morbidity, or through depopulation measures commonly introduced to control the outbreaks, but also result in a drop in demand for poultry and poultry products through negative market reactions. Fasanmi et al. (2018) note that a major uncontrolled outbreak of an infectious disease in the poultry industry would have far-reaching consequences for the national economy. The outbreak of HPAI H5N1 in Nigeria, which led to a decline in the demand for and consumption of poultry products as well as loss of jobs for poultry farmers (Obayelu, 2007), is a typical case in point.

Given that risks and uncertainties are a fundamental component of poultry production, risk management is crucial to the investment and financing decisions of poultry farmers, especially in developing countries and transition economies. In response to various risks and uncertainties, poultry farmers have adopted a multitude of informal, indigenous, household and community-level measures to limit risks within their production settings over the years, either through ex-ante or ex-post measures for smoothing income and/or consumption (Murdoch, 1995; Du et al., 2015). These measures include mixed cropping, livestock diversification, labour diversification, enterprise diversification, use of stress-tolerant animal species, engagement in non-farm sources of income, forward contracts, options markets and other financial arrangements which help to transfer, minimise or deal with hazards. Additionally, as a key component of socio-cultural strategies which distribute risks within the community, households enter into informal insurance contracts by creating bonds of friendship with their neighbours, relatives and market partners,

who reciprocate with help in difficult times (Stringer et al., 2020; Mgale and Yunxian, 2021).

However, while these conventional measures continue to be helpful, they are not sufficient in themselves to significantly reduce the risks inherent to poultry farming. The problem of residual risks, as well as the covariability of risks, still persists, which reduces the efficacy of traditional risk management measures. In certain cases, some of these traditional methods of risk management may further exacerbate the impact of risk (Adjei et al., 2016). According to Zeller and Sharma (2000), although informal insurance mechanisms may be somewhat effective for covering personal risks, they are mostly not efficient for protecting against weather and other covariant risks that usually affect almost everybody in the community who depends directly or indirectly on agriculture for their livelihood at the same time. In such a situation, insurance remains one of the viable options that can help poultry farmers to remain in business. Agricultural insurance policies are important for curtailing the various risks faced by farmers as well as providing protection against yield losses (Mishra and El-Osta, 2002; Zhou et al., 2018).

Farayola et al. (2013) view insurance as an economic device through which risk is transferred to the insurance company in exchange for a fee known as a premium and then distributed to the group of insured people or entities. It usually operates as a mechanism to transfer risk from an individual policyholder to a risk-sharing pool managed by the insurance provider (Biglari et al., 2019). Agricultural insurance is a special line of property insurance applied to agricultural firms. It is a financial tool used to transfer production risks associated with farming to a third party via payment of a premium that reflects the true long-term cost to the insurer assuming those risks (Epetimehin, 2010). According to Falola et al. (2013), "Agricultural insurance is defined in the Nigerian Agricultural Insurance Scheme (NAIS) operation guideline as the stabilization of income, employment, prices and supplies of agricultural products by means of regular and deliberate savings and accumulation of funds in small instalment by many farmers in favourable time periods, to defend the participants in bad time periods." Basically, agricultural insurance is designed to provide cover for financial losses incurred due to reductions in expected output brought about by the destruction or damage of crops and/or animals by different production risks.

Agricultural insurance policies protect the farmer against unforeseen circumstances by way of indemnification (Epetimehin, 2010; Nnadi et al., 2013). Where available and affordable, agricultural insurance (crop or livestock) can provide great benefits to farm households (World Bank, 2011). Insurance can cushion the shock of disastrous crop and livestock losses in a bad year and help to ensure a considerable measure of security in farm income over the years (Ray, 2001). Because insurance contributes to the transfer of excess risk to a third party, a reduction in risk through insurance can embolden farmers to invest in more profitable enterprises which they would not otherwise have considered. As such, agricultural insurance has the potential to raise the productivity of agriculture by helping farmers and herders to invest in more productive, but sometimes riskier, agricultural business opportunities (Nnadi et al., 2013). Thus, insurance is a viable tool that farmers can use to offset risks that are too large to manage on their own (World Bank, 2011). Evidentially, agricultural insurance serves as security for banks in terms of indemnification for financial losses suffered by farmers as a result of damage to their products by providing funds for servicing such loans (Epetimehin, 2010). Nnadi et al. (2013) indicate that agricultural insurance can facilitate access to credit, because it increases the creditworthiness of farmers and other agents in the agricultural sector, and invariably confers indirect benefits in terms of credit availability at other levels of the agribusiness marketing chain.

Thus, insurance is a key component of any comprehensive agricultural support and protection policy and can be an effective management tool to minimize the burden of disease as well as other risks factors. As a result, it can increase poultry productivity, especially for smallholder households in low income countries, by maximizing the economic and nutritional benefits farmers receive from the poultry they own. According to Alam et al. (2020), considering that agricultural insurance is one of the most widely quoted tools for risk management, it can play a key role in managing the risks involved in poultry farming, hence the need for poultry farmers to guard against risks through the purchase of agricultural insurance services, so as to provide coverage for the residual risks not covered by other risk reduction mechanisms. In this context, this study was carried out to assess the willingness of poultry farmers in Osun State, Nigeria to purchase agricultural insurance cover.

The study specifically seeks to (1) gauge the knowledge of poultry farmers' in the study area regarding agricultural insurance, (2) estimate the willingness of poultry farmers in the study area to pay for agricultural insurance, and (3) determine the factors that significantly influence the willingness of poultry farmers in the study area to pay for agricultural insurance.

MATERIALS AND METHOD

Study area

The study was conducted in Osun State, South West Nigeria. With a land area of 8,882.55 square kilometres and a population of 3,423,535, Osun State is bordered to the west by Oyo state, to the east by Ondo and Ekiti States, to the north by Kwara State and to the south by Ogun State (Sanusi et al., 2016). The annual temperature ranges from 21.1°C to 31.1°C, whilst annual rainfall varies from 1,100 millimetres in the southern part of the State to 800 millimetres in the northern part. Typically, the rainy season starts in late March and ends in October, whereas the dry season stretches from November to early March (Sanusi et al., 2016).

The ecological features of Osun State provide suitable conditions for the cultivation of various crops and cropping patterns. Moreover, agriculture is the main occupation of the inhabitants of the State. In the forest region, which has much higher rainfall and relative humidity, tree crops such as cocoa, kola, citrus and oil palm are grown, as are arable crops such as maize, yam, rice, cassava, tomato and pepper. On the other hand, the savannah region mainly features arable crops, with tree crops grown in patches (Sanusi et al., 2016). In addition, poultry, pigs, sheep and goats are the animals most commonly reared in the region.

Sampling technique and sample size

To analyse the willingness of poultry farmers in Osun State to purchase agricultural insurance cover, a questionnaire was developed and used as an interview guide in a survey which was conducted between February and June of 2021. Hence, primary data was gathered for the purpose of statistical analysis. Osun state was selected for this study because of the prevalence of poultry farmers in the State. Furthermore, Osun State is within the main hub of poultry production in Nigeria (Salman et al., 2010). However, due to time and resource constraints, the study was limited to Ejigbo,

Ife, Illesha, and Iwo LGAs out of the 30 LGAs that comprise Osun State.

A multi-stage sampling technique was employed to select the individual respondents. The first stage involved the purposive selection of Ejigbo, Ife, Illesha, and Iwo LGAs. These four LGAs were purposively selected based on accessibility and the available funds. In the second stage, a random sampling technique was employed to select the individual poultry farmers from the respective LGAs. A total of 140 poultry farmers (35 from each LGA) were sampled in the survey. However, upon screening for completeness only 113 questionnaires were tenable for statistical analysis.

Analytical techniques

Poultry farmers' awareness of agricultural insurance

To assess poultry farmers' awareness of agricultural insurance, a simple question about respondents' prior knowledge of the main agricultural insurance mechanisms in Nigeria, which include the Nigerian Agricultural Insurance Scheme (NAIS), the Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL) and the Nigerian Agricultural Insurance Corporation (NAIC), was posed to the respondents. The responses obtained were descriptively presented using frequencies and percentages.

Poultry farmers' willingness to pay for agricultural insurance

To determine the willingness of poultry farmers to purchase agricultural insurance cover, a contingent valuation (CV) survey was developed. The Contingent Valuation Method (CVM) is a stated preference valuation technique that uses a survey to ask individuals to assign a hypothetical value to public non-market goods or to marketed goods that are not available in major retail outlets. CVM has been employed in various agriculture-related studies to elicit farmers' willingness to pay for a service, product or technology (Okoffo et al., 2016; Lawi et al., 2016; 2017).

Among the different methodological alternatives for carrying out CV surveys, the dichotomous double-bounded contingent valuation method was used to elicit respondents' willingness to pay a given amount. Depending on the response of the consumer to the presented price premium, further questions based on varying price premiums were asked in order to delineate willingness to pay more finely. A twenty percent premium

for an indemnity value of ₦100,000 for every 100 birds was used as the starting bid, with follow-up bids of 10 percent and 50 percent as the lower and upper bounds, respectively. If the respondents agreed to pay the initial bid (20 percent), the price of the chosen alternative was raised (higher bid); if not, the price of the forgone alternative was discounted (lower bid). That is, depending on the respondents' answer to the first bid question, the amount of the second bid was increased (premium bid) or decreased (discounted bid).

Accordingly, the responses to the double-bounded CV questions generated four possible discrete outcomes: (1) the poultry farmer was not willing to pay for agricultural insurance even at the discounted price (“no”, “no” to both bids); (2) the poultry farmer was not willing to pay for agricultural insurance at the initial price, but was willing to buy at the discounted price (“no”, “yes”); (3) the poultry farmer was willing to pay for agricultural insurance at the initial price but not the increased, premium price (“yes”, “no”); or (4) the poultry farmer was willing to pay for agricultural insurance at both the initial price and at the premium price (“yes”, “yes”).

Determinants of poultry farmers' willingness to pay for agricultural insurance

To determine the factors that significantly influence poultry farmers' willingness to pay for agricultural insurance, a multivariate binary logistic regression model was employed. This model is favoured for its asymptotic

characteristics and mathematical simplicity. It is also able to address possible distortions in the mean willingness to pay estimates arising from “zero willingness to pay” responses. In the logistic regression, the dependent variable was dichotomous and was coded as one for poultry farmers who are willing to pay for agricultural insurance and zero otherwise. Hence, willingness to pay for agricultural insurance was modelled as a function of independent and predetermined continuous and dummy variables, including the socio-economic characteristics of poultry farmers. Generally, the logistic function estimates the probability of occurrence of the event ($p\{x\}$), on the basis of the values of the independent variables included in the model (x).

The empirical model for the determinants of poultry farmers' willingness to pay for agricultural insurance was specified as;

$$\begin{aligned} \text{WTP} = & \beta_0 + \beta_1 \text{AGE} + \beta_2 \text{GENDER} + \beta_3 \text{MSTAT} + \\ & \beta_4 \text{EDU} + \beta_5 \text{HHINCOM} + \beta_6 \text{PSCALE} + \\ & \beta_7 \text{HHSIZE} + \beta_8 \text{POCCUP} + \beta_9 \text{EXPERIENCE} + \\ & \beta_{10} \text{EXTENSION} + \beta_{11} \text{CREDIT} + \beta_{12} \text{KNOW} + \varepsilon_i \end{aligned}$$

where WTP, the dependent variable, represents the willingness to pay for agricultural insurance and it takes a value of 1 if the respondent is willing to pay and 0 otherwise. $\beta_0, \beta_1, \beta_{12}$ represents the vector of parameters of the function to be estimated and ε_i is the error term. The independent variables are presented and defined in Table 1.

Table 1. Variable description and their a priori expectations

Variable	Measurement	A priori expectation
1	2	3
AGE	Age of the respondent measured in years	+/-
GENDER	Gender of the respondent measured as a dichotomous variable. Male = 1 and female = 0	+/-
MSTAT	Marital status of the respondent. Measured as a dichotomous variable. Married = 1, otherwise = 0	+/-
EDU	Highest level of education of the respondent. Measured as a binary variable. Primary school education and above = 1, otherwise = 0	+/-
HHINCOME	Average monthly income of the household head as a proxy for monthly household income. It was captured as the reported monthly income of the household head from all income sources	+
PSCALE	Number of birds owned by the poultry farmer as at the time of the survey. The actual number of birds stocked at the beginning of the production period was used	+
HHSIZE	Household size of the respondent. Captured as a count variable representing the number of individuals in the household	-

Table 1 – cont.

1	2	3
POCCUP	Primary occupation of the household head. A value of 1 is assigned if the respondent identify poultry farming as his or her primary occupation and zero otherwise	+
EXPERIENCE	Signifies experience in poultry farming. Measured by the number of years the respondent has been involved in poultry farming	+
EXTENSION	Access to formal extension services. Measured as a dichotomous variable, taking the value of 1 if the respondent had any form of extension contact in the last two production seasons and zero if otherwise	+/-
CREDIT	Signifies access to credit. Captured as a binary variable, it assumes the value of 1 if the poultry farmer obtain any formal credit in the last two production season and zero otherwise	+/-
KNOW	Indicates respondents' prior knowledge of agricultural insurance. It takes the value of 1 if the respondent indicate that he/she knew of agricultural insurance prior to the time of this survey and zero otherwise	+

Source: own elaboration.

RESULTS AND DISCUSSION

Socio-economic characteristics of the respondents

Table 2 indicates that 70.8% of the sampled respondents were male, while 29.2% were female. As such, poultry farming in the study area was a male-dominated enterprise. The majority of the respondents (39.8%) were in the age range 31–40. In addition, 31.0% and 25.7% of the respondents were in the age ranges 46–60 and 18–30, respectively. The average age of 40.62 years, in addition to the age distribution of the respondents, means that most of the respondents fell within an economically active and productive age group. This implies that they were able to fulfil the labour requirements inherent in poultry farming. Furthermore, only a slight fraction (3.5%) of the respondents had no form of formal education. In contrast, 56.6%, 21.2%, 12.4% and 6.2% of the respondents had acquired tertiary education, secondary school education, primary school education and postgraduate education, respectively. Thus, most of the sampled respondents had at least a rudimentary level of educational attainment. The implication of this is that most of them could process and understand information relevant to their poultry enterprises. Therefore, they could be more readily disposed and keen to accept and implement new technologies that could help them manage risk in their poultry enterprises.

Furthermore, Table 2 shows that, with a mean household size of 4.62, above 65% of the respondents were

Table 2. Socio-economic characteristics of respondents ($n = 113$)

Variables	Frequency	Percentage
1	2	3
Gender (categorical)		
Male	80	70.8
Female	33	29.2
Age (years)		
18-30	29	25.7
31-45	45	39.8
46-60	35	31.0
>60	04	03.5
Mean	40.62	
Standard deviation	11.73	
Marital status (categorical)		
Single	33	29.2
Married	74	65.5
Divorced	1	00.9
Widowed	5	04.4
Level of education (categorical)		
None	04	03.5
Basic	14	12.4
Secondary	24	21.2
Tertiary	64	56.6
Postgraduate	07	06.2

Table 2 – cont.

1	2	3
Scale of production (ratio)		
<100	31	27.4
100–300	35	31.0
301–500	15	13.3
>500	32	28.3
Mean	613.40	
Standard deviation	782.64	
Household size (ratio)		
1–3	32	28.3
4–6	66	58.4
7–9	11	09.7
>9	04	03.5
Mean	04.62	
Standard deviation	02.24	
Occupation (Categorical)		
Primary	44	38.9
Secondary	69	61.1
Experience (Years)		
1–4	44	38.9
5–8	23	20.4
9–12	19	16.8
13–16	13	11.5
>16	14	12.4
Mean	08.30	
Standard deviation	06.75	
Monthly income (₦)		
<50,000	33	29.2
50,001–100,000	51	45.1
100,001–150,000	21	18.6
>150,000	08	07.1
Access to extension services (categorical)		
Yes	28	24.8
No	85	75.2
Access to credit (categorical)		
Yes	19	16.8
No	94	83.2

Source: survey result, 2022.

married. The remaining 29.2%, 4.4% and 0.9% were single, widowed and divorced, respectively. Married respondents are more likely to have a larger household size than those in other categories. Considering that the labour in most small-scale farming enterprises is supplied by household members, household size is of great importance. Therefore, the larger the household size, the higher the likelihood of generating more man-days for routine farm management practices. In addition, the average household size, as well as the fact that the majority of the respondents were married, indicates that poultry farming could be a viable source of income that enables households to meet their physiological needs and other obligations. However, most (61.1%) of the respondents indicated that poultry farming was not their major source of income. Perhaps, it was rather a viable means of income diversification.

Table 2 further shows that just about 39% of the respondents had been actively involved in poultry farming for a time span ranging from one (1) to four (4) years. Also, 20.4%, 16.8%, 11.5%, and 12.4% of the respondents had been engaged in poultry farming for a time duration of 5–8 years, 9–12 years, 13–16 years, and >16 years, respectively. The distribution of the respondents' experience in poultry farming, as well as their mean experience of 8.30 years, shows that most of the respondents had been actively involved in poultry farming for an extended period of time. As expected, many of them eked out a living for themselves and their households from this venture. In a sense, experience is associated with better adoption of innovations, as well as more knowledge and information about risk management practices. The monthly income from their poultry enterprise, as well as from other sources, for most (45.1%) of the respondents ranged between ₦50,001 and ₦100,000, whereas more than 29% of the respondents indicated earning <₦50,000 in a month, and 18.6% revealed that they earned between ₦100,001 and ₦150,000. A meagre 7.1% of the respondents earned more than ₦150,000 in a typical month.

Table 2 also illustrates that 52.2% of the respondents were members of either an FBO (Farmer-based organisation), a cooperative society or another form of social organisation. Participation in cooperative societies enables small-scale farmers to pool their resources, jointly market their products, and by so doing gain economies of scale, thereby overcoming the high transaction costs associated with their small farm sizes. Cooperative membership also

offers members access to agricultural inputs and modern technologies at affordable rates. Further, only 24.8% of the respondents indicated that they had had any sort of contact with extension agents in the past three production cycles. As unpalatable as this finding is, it is quite typical of extension service provision in Nigeria. Even more disturbing is the situation regarding poultry farmers' access to credit facilities. Only around 17% of the respondents indicated that they had been able to access any form of credit from formal lending institutions in the past three production cycles. This can be attributed, among other things, to the reluctance of formal lending agencies to offer loans or credit facilities to farmers.

Poultry farmers' awareness of agricultural insurance

The study respondents were considered aware if they had prior knowledge of the main agricultural insurance mechanisms in Nigeria, which include NAIC, NAIS and NIRSAL. Fig. 1 illustrates that overall about 41% of the respondents claimed to have had prior knowledge of agricultural insurance, whereas the remaining 58.4% had not heard of any of the three main agricultural insurance mechanisms in Nigeria (NAIC, NAIS and NIRSAL) before the survey was conducted. This implies that although the level of knowledge of agricultural insurance amongst the sampled respondents was not very low, it was less than average. This result is not completely surprising, considering that among the three types of financial services – savings, credit and insurance – the largest gap between demand and access exists for insurance (Zeller and Sharma, 2000). The low level of extension contact (24.8%) in the study area may have

been a contributing factor to the low level of awareness amongst the farmers about agricultural insurance.

Previous studies carried out in other parts of Nigeria have also reported a low level of awareness about agricultural insurance amongst poultry farmers. In a study that analysed the determinants of poultry farmers' adoption of agricultural insurance in Abeokuta, Nigeria, Babalola (2014) found that only 46% of farmers were aware of agricultural insurance policies. Similarly, in Oyo State, Nigeria, Adeyonu et al. (2016) found that only about 29% of the respondents were aware of the National Agricultural Insurance Scheme. However, higher levels of farmer awareness of agricultural insurance have been reported in some other parts of Nigeria (Farayola et al., 2013; Akintunde, 2015).

Figure 2 shows that 41.7% of the respondents revealed that the mass media was the source via which they had acquired knowledge of agricultural insurance. Thus, the mass media appears to have been the predominant source of awareness for the respondents who indicated that they had prior knowledge of agricultural insurance. Similarly, family and friends also proved to be a significant source of information for the respondents, accounting for 31.3% of knowledge sources. Other means by which respondents had acquired knowledge of agricultural insurance were banks (10.4%), extension agents (6.3%) and others (10.3). Others included schools, cooperatives and research. It is notable that government offices have emerged as the main source of

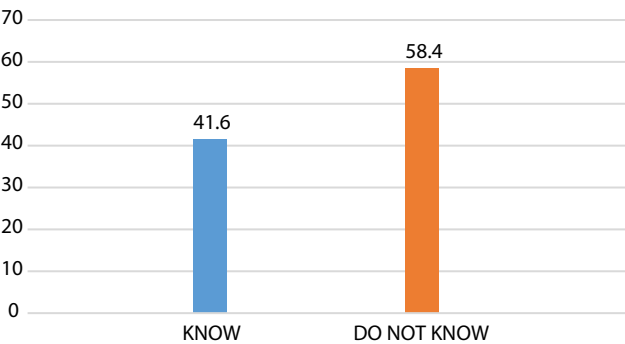


Fig. 1. Respondents' awareness of agricultural insurance
Source: survey result, 2022.

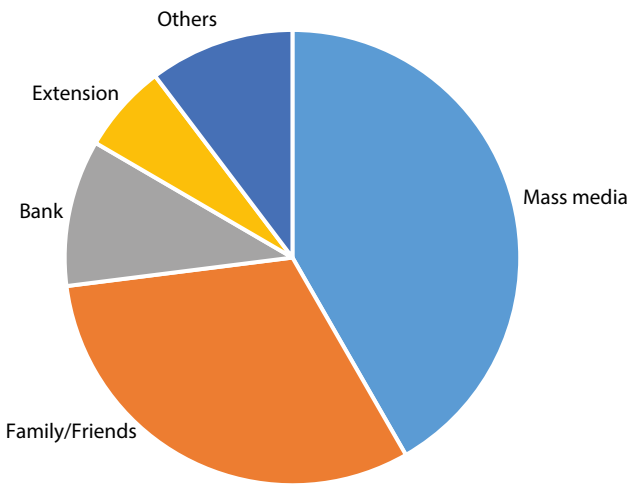


Fig. 2. Source of knowledge
Source: survey result, 2022.

information on livestock insurance in other related studies (Kumar et al., 2011; Devkota et al., 2021).

Poultry farmers' willingness to pay for agricultural insurance

Eight out of the 113 respondents, corresponding to 7.1%, indicated that their poultry farms were already insured by NAIC. The low level of awareness of agricultural insurance in the study area (41%) was likely one factor precluding poultry farmers from purchasing poultry insurance cover. Other factors that may be responsible for the low uptake of agricultural insurance according to other similar studies include farmers' negative perceptions concerning the operations of insurance companies (Akintunde, 2015; Li and Wang, 2022) and the high cost of insurance premiums (Akintunde, 2015; Devkota et al., 2021). It is important to note that farmer's decision to purchase poultry insurance cover may vary across regions due to differences in farmers' attitudes towards risk, differences in the level of risk inherent in the enterprise and differences in farmers' socioeconomic characteristics (Adjei et al., 2016).

Similarly low levels of adoption of livestock insurance by poultry farmers in other parts of Nigeria have previously been reported. In Kogi State, Tologbonse et al. (1995) found that out of the farmers that comprised the study sample, none had taken out an agricultural insurance policy. Similarly, Akintunde (2015) reported that only 11.9% of the poultry farmers in South West Nigeria had insured their poultry farms. On the contrary, a higher uptake of agricultural insurance by poultry farmers has been documented in other parts of Nigeria. Ajieh (2010), in his work "Poultry farmers' response to agricultural insurance in Delta State, Nigeria", discovered that 37% of respondents had insured their poultry farms. In a study which analysed the determinants of participation in Agricultural Insurance Scheme in Kwara State, Farayola et al. (2013) discovered that 32.7% of respondents had participated in the insurance scheme. In his study of the factors that influence adoption of agricultural insurance in Abeokuta, Babalola (2014) discovered that 44% of poultry farmers had adopted poultry insurance.

As a whole, 52.4% (55) of the remaining respondents who were not covered by NAIC were not willing to purchase agricultural insurance cover for their poultry. The remaining 47.6% (50) of the respondents indicated their willingness to pay for agricultural insurance

at varying premiums. Some 42% of the respondents who were willing to purchase agricultural insurance were willing to offer at most a 10% premium. In addition, 46% of the respondents were willing to purchase agricultural insurance at a 20% premium. Finally, just 12% were willing to purchase agricultural insurance if only the upper bid of 50% was available. This result suggests that a considerable number of poultry farmers in the study area are willing to purchase insurance cover for their poultry farms – a finding which has implications for policymakers, advisers, developers and sellers of risk management strategies. Specifically, the stated willingness to pay indicates that it may be worthwhile to develop more comprehensive poultry insurance packages.

Table 3. Poultry farmers' willingness to pay for agricultural insurance

Bid	Percentage (Frequency)
Not willing to pay	52.4 (55)
Willing to pay 10%	42 (21)
Willing to pay 20%	46 (23)
Willing to pay 50%	12 (6)

Source: survey result, 2022.

Factors that influence poultry farmers' willingness to pay for agricultural insurance

The results of the estimated parameters are presented in Table 4. The signs on almost all the variables make intuitive sense and are mostly in tandem with a priori expectations. The likelihood that a poultry farmer will pay for agricultural insurance increases with age, educational status, household size, poultry farming being the primary occupation, extension contact, credit access and prior awareness of agricultural insurance. On the other hand, the likelihood that a poultry farmer will pay for agricultural insurance decreases with experience, income and the number of birds stocked. Furthermore, willingness to pay for agricultural insurance also declines if the household head is a male, the household head is married or the household head is a member of a farmer-based organisation. The discussion of the results is limited to those variables that were significant at the 10%, 5% and 1% levels.

Table 4. Determinants of poultry farmers' willingness to pay for agricultural insurance

Variable	Coefficient	Std. error	Z value	Marginal effect
Sex	−0.2046069	0.5145325	−0.40	−0.051089
Age	0.0387333	0.031699	1.22	0.0096715
Education	0.7918232	0.6909468	1.15	0.1903726
Marital status	−0.0320921	0.5949704	−0.05	−0.0080141
Household size	0.1807993	0.1356898	1.33	0.0451444
Experience	−0.119691	0.0548845	−2.18**	−0.0298861
Membership of FBO	−0.0075523	0.5680713	−0.01	−0.0018858
Primary occupation	0.8813643	0.534797	1.65*	0.2166569
Income	−0.6521644	0.5511621	−1.18	−0.1614532
Scale	−0.0007741	0.0003826	−2.02**	−0.0001933
Extension contact	0.0469701	0.6786567	0.07	0.0117281
Credit access	0.6980887	0.8107931	0.86	0.1713313
Knowledge	0.8506092	0.5409439	1.57*	0.2094264
Constant	−1.631959	1.482537	−1.10	
Model fitness				
No of obs	= 105			
LR chi ² (13)	= 24.97			
Prob> chi ²	= 0.0233			
Pseudo R ²	= 0.1718			

Source: survey result, 2022.

Experience in poultry farming

Experience in poultry farming was found to be negatively related to willingness to pay for agricultural insurance, and significant at 5%. This implies that the likelihood that poultry farmers will purchase agricultural insurance cover declines as they accumulate more experience in poultry farming. The result of this study regarding the impact of experience on the uptake of agricultural insurance seems counterintuitive. This is because ordinarily it is expected that as the years of experience of the poultry farmer increase, he/she is more likely to have experienced loss and, as such, more likely to take out livestock insurance in order to hedge against future losses. Be that as it may, this inverse relationship may be because experience predisposes farmers to ample knowledge of pest and disease management and, as such, experienced farmers may have a number of risk management options at their disposal. The respondents' average age of experience of 8.30 years implies

that most of the poultry farmers in the study area have adequate mastery of poultry farming, having passed through more than eight production cycles.

Therefore, as poultry farmers accumulate more experience, they may assume better control and management of their poultry venture and, as a result, may not be particularly interested in insurance as a risk reduction mechanism. A related study has shown that poultry farmers in the study area employ a number of alternative risk management/prevention options that include timely administration of drugs, frequent pen cleaning, maintaining routine hygiene practices, finding a reliable source of animals, proper water and feed management, the use of disease resistant species, proper labour planning and the engagement of a veterinarian (Lawi and Polycarp, 2022). Carrer et al. (2019) posited that when faced with alternative risk management strategies, a rational farmer will choose a risk management strategy when the expected utility of adopting that strategy is higher than that

of adopting another strategy. However, it is important to note that it would be disastrous if farmers became too confident in their years of experience and as a result become complacent about risk management, particularly bearing in mind that a single outbreak of poultry disease can result in mass casualties, with mortality rates as high as 100% (World Bank, 2009).

The result of this study regarding the relationship between experience and the adoption of agricultural insurance is in agreement with the findings of other studies. Babalola (2014) found that the adoption of agricultural insurance among poultry farmers in Abeokuta, Nigeria decreased as the years of experience in poultry rearing increased. In their analysis of perception and determinants of dairy cattle insurance in Nepal, Subedi and Kattel (2021) reported that farming experience has a negative relationship with farmers' adoption of live-stock insurance. Conversely, a number of other studies have reported that experience increases the tendency for farmers to adopt agricultural insurance (Danso-Abbeam et al., 2014; Akintunde, 2015; Adeyonu et al., 2016).

Farm size (number of birds stocked)

Table 4 further reveals that farm size, measured by the number of birds stocked, was negatively associated with poultry farmers' willingness to pay for insurance cover in Osun State, Nigeria. This relationship is significant at 5%. This result seems counterintuitive and quite contrary to the findings of most other studies with related themes. Given that as the number of birds stocked increases, the level of investment and commitment in the poultry business increases, it is expected that farmers with a higher level of investment will be more willing to pay for poultry insurance. However, that was not the case in this study. Although this finding may seem counterintuitive, it makes more sense when analysed alongside the result for experience. Considering that the scale of production usually increases along with the level of experience, this result possibly indicates that as poultry farmers acquire more experience and purchase a higher number of birds, they tend to employ other measures to mitigate the risks inherent in poultry farming and, as a result, feel less inclined to invest in formal insurance mechanisms. Moreover, it is a common perception among poultry farmers that the most common endemic diseases can be mitigated more effectively by improved herd management, biosecurity and medication rather than by purchasing an insurance policy which entails

transaction costs (Niemi and Heikkilä, 2011). Another plausible explanation for this finding is that most large-scale poultry farmers have easier access to credit facilities than small-scale poultry farmers and, as a result, can afford to opt for other risk management strategies.

A few other studies have reported a negative interaction between farm size and the adoption of agricultural insurance policies. The study of Farayola et al. (2013) which analysed the factors that influence participation in agricultural insurance schemes showed that the higher the number of birds stocked, the lower the likelihood that small-scale commercial poultry farmers in Kwara State, Nigeria will take part in an agricultural insurance scheme. Similarly, Nimoh et al. (2011) reported a negative influence of farm size on the uptake of agricultural insurance by cocoa farmers in Sekyere West Municipality of Ghana. As stated above, most other studies on related themes document that the adoption of agricultural insurance is impacted positively by farm size (Danso-Abbeam et al., 2014; Akintunde, 2015; Adeyonu et al., 2016; Subedi and Kattel, 2021).

Major occupation

Table 4 demonstrates that the primary occupation of the respondent has a significant ($p = 0.05$), positive influence on his/her willingness to pay for agricultural insurance. This result suggests that those respondents who identify poultry farming as their primary occupation are more predisposed to adopt agricultural insurance as a risk mitigation mechanism than those who engage in poultry farming as a secondary activity. A plausible explanation for this finding is that given the level of risks and uncertainty involved in poultry production, those who are involved in it as a primary occupation and as a result obtain all or most of their income from it are willing to employ every available method to secure their investment, hence their willingness to pay for agricultural insurance.

Awareness

Prior awareness of agricultural insurance was also found to exhibit a significant ($p = 0.10$), positive relationship with poultry farmers' willingness to purchase insurance cover. This finding underscores the significance of knowledge in the decision-making process of consumers, whether in terms of stated or revealed preferences. In a general sense, prior knowledge of agricultural insurance will enable farmers' to obtain vital information pertaining to poultry insurance, which will help them to

understand the importance of purchasing insurance cover and, in turn, facilitate the uptake of poultry insurance policies, implying that farmers' awareness of agricultural insurance is a major determining factor for participation.

This finding is in agreement with those of other studies that have shown a positive association between awareness and farmers' uptake of agricultural insurance. In his study of the determinants of poultry farmers' adoption of agricultural insurance in Abeokuta, Nigeria, Babalola (2014) discovered that the probability of poultry farmers taking out insurance increases in tandem with an increase in their awareness of agricultural insurance. Likewise, Adeyonu et al. (2016) found that the awareness status of poultry farmers in Oyo State, Nigeria, was positively related to their decision to partake in the National Agricultural Insurance Scheme (NAIS). Correspondingly, a lack of knowledge regarding the advantages of insurance was reported as the main reason for not purchasing cattle insurance cover in Nepal (Subedi and Kattel, 2021). A couple of other empirical studies have also found that the likelihood of taking out agricultural insurance cover increases with an increase in farmers' prior awareness of insurance (Aina and Omonona, 2012; Devkota et al., 2021).

CONCLUSION

The study employed a multi-stage sampling technique to obtain data from a total of 140 poultry farmers, which was used to analyse the willingness of poultry farmers in Osun State, Nigeria to purchase agricultural insurance cover. Poultry farming in the study area was a male-dominated enterprise, with majority of the respondents having at least a rudimentary level of educational attainment, and falling within an economically active and productive age group. A vast majority of the participants were married, with an average household size of five persons. Most of the respondents had been actively involved in poultry farming for a period of time spanning almost a decade. However, poultry farming was not the major source of income for most of the respondents. Over half of them indicated that they were members of either a farmer-based organisation, a cooperative society or another form of social organisation. Furthermore, less than a quarter of the respondents indicated that they had had any sort of contact with extension agents in the past three production cycles. Strikingly, a huge majority indicated that they had not been not able to access any

form of credit from formal lending institutions in the past three production cycles.

A considerable proportion of the surveyed respondents had been aware of agricultural insurance prior to the time the survey was conducted, with the media serving as the knowledge base for a large share of the respondents who had such prior knowledge. The stated preference for the three "willingness to pay" categories revealed that a substantial share of poultry farmers in the study area were willing to purchase agricultural insurance cover. This indicates the existence of potential interest in agricultural insurance from farmers and the possibility of designing and implementing appropriate poultry insurance programmes. Experience in poultry farming, the number of birds stocked at the beginning of the production period, the primary occupation of the respondent and prior knowledge of agricultural insurance were the factors that exerted a significant influence on poultry farmers' willingness to pay for agricultural insurance cover.

RECOMMENDATIONS

Given the low level of awareness concerning agricultural insurance in the study area, dissemination of knowledge among poultry farmers about the benefits of insurance, through a combined effort of broadcast media, insurance corporations, farmer-based groups, community-based organizations, and research institutes, is key to bolster insurance adoption in the study area. There is a need for a synergistic partnership between farmers, insurance companies and government. Primarily, the government needs to increase the present level of subsidy granted for livestock insurance cover so as to keep the premium price within a range that poultry farmers can afford. In this way, farmers' stated willingness to pay for agricultural insurance will most likely be transformed into effective demand. Also, public-private partnerships with insurance companies will assist in the marketing and design of suitable insurance products. Specifically, the government could act as a reinsurer against losses in poultry farming, while private organisations could provide financial and operational assistance to the local agricultural insurance market.

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