Global Sustainability Research
https://doi.org/10.56556/gssr.v4i1.1080
ISSN: 2833-986X

RESEARCH ARTICLE

Determinants of Insurance Services Utilization and Their Impact on Income Shocks among poultry farmers

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Received: 21 November, 2024, Accepted: 11 March, 2025, Published: 20 March, 2025

Abstract
This research investigates the role of insurance services and their impact on income shocks among poultry farmers in Delta State, Nigeria. It uses a multistage sampling method to select 150 respondents surveyed through a questionnaire. The data gathered were analyzed using descriptive statistics and inferential statistics. The average age of the farmers was 46 years. The majority of the respondents were male, married, and well-educated. The average family size was seven people. On average, respondents possessed eight years of experience in farming. The average flock size was 887 birds. The binary logit analysis revealed that flock size, awareness of insurance, attitude towards insurance, premium payment, access to credit, and occupation greatly influenced the utilization of insurance services at a 5% level of significance. The insurance services used by the poultry farmers included extension services, veterinary services, general risk coverage, and training programs designed for farmers. The primary constraints faced by poultry farmers were inadequate awareness about insurance benefits, difficulties in implementing insurance policies, and delays in the payment of indemnity (compensation). Provision of premium subsidies (PPS), insurance coverage of equipment (ICOE), timely payment of indemnity (POI), encouragement of institutional lenders (EIL), and training programs for farmers (TOF) assist in absorbing income shocks among poultry farmers. The study recommends needing improved awareness and enhanced collaboration between farmers and insurance providers to increase the effectiveness of insurance in protecting farmers' incomes.

Keywords: Poultry Farmers; Utilization; Insurance Services; Output; Income Shock

Introduction

Poultry production plays a fundamental role in Nigeria's agricultural sector, significantly contributing to economic development, food security, and poverty reduction, particularly in rural areas where agriculture remains central to daily sustenance and income generation. As one of the highest-yielding sectors in the agricultural industry, poultry farming provides quick financial returns, contributing to food availability and diversification of livelihoods for many rural Nigerians (Omondi, 2022; Yeboah, 2022). The importance of poultry farming in Nigeria is underscored by its ability to address the nutritional needs of the population, specifically by increasing protein intake, and its capacity to generate income for families, contributing directly to poverty alleviation (Omonona et al., 2023). Additionally, poultry farming is an attractive business opportunity due to its low entry barrier compared to other

forms of livestock production, making it accessible to a wide range of farmers, especially those in rural communities (Offiah et al., 2024). The poultry industry in Nigeria is vast, encompassing small-scale, medium-scale, and large-scale enterprises, with a majority of poultry farmers operating on smallholder levels. Smallholder poultry farming is a crucial livelihood activity in many rural areas, where it serves as an important source of household income and nutritional security. Medium and large-scale commercial poultry farms, on the other hand, contribute significantly to employment generation, value chain development, and economic growth by supplying poultry products to both local and international markets (Udoye et al., 2024). The sector comprises layers, broilers, and indigenous poultry breeds, each with its unique production characteristics and market demands. Layer production provides a steady supply of eggs, which are a critical protein source, while broiler farming ensures the availability of poultry meat for consumption (Bist et al. 2024). Indigenous poultry farming, though often practiced at a subsistence level, is gaining recognition due to its adaptability to local environmental conditions and resilience to diseases (Yusuf et al., 2024). Despite its potential, poultry production is fraught with various challenges that threaten its sustainability and profitability. The sector is vulnerable to both environmental and socioeconomic risks that disrupt production cycles and undermine farmers' efforts. Natural hazards such as extreme weather conditions, floods, droughts, and disease outbreaks can severely affect poultry productivity, leading to substantial losses (Aliyu et al., 2023; Ojogbane & Gbigbi, 2022). Poultry diseases such as Newcastle disease, avian influenza, and coccidiosis are major concerns that require effective biosecurity measures, vaccination programs, and veterinary interventions (Adesola et al., 2024). Additionally, risks such as fire, theft, and other unforeseen events add layers of vulnerability, with many of these challenges beyond the control of individual farmers. These constraints can prevent farmers from reaching their production targets and destabilize the poultry industry (Gbigbi, 2020).

Economic constraints further exacerbate the challenges in poultry farming. Rising feed costs, which account for nearly 70% of production expenses, are a major hurdle for poultry farmers (Ogunleye et al., 2024). The high cost of maize and soybean, which are primary ingredients in poultry feed, often leads to increased production costs and reduced profit margins. Additionally, limited access to credit facilities hinders the ability of smallholder farmers to invest in improved production technologies, expand their businesses, or cushion against financial losses (Gbigbi & Isiorhovoja). The lack of adequate storage facilities and market access further limits profitability, forcing many farmers to sell their products at unfavorable prices during peak production periods (Mukaila, 2024). In response to these challenges, the Nigerian government has taken steps to mitigate risks through the Nigerian Agricultural Insurance Scheme (NAIS), which was established alongside the Nigerian Agricultural Insurance Corporation (NAIC) in 1987. This initiative provides a structured framework for insurance coverage that aims to protect farmers, including those in the poultry sector, from the financial repercussions of various disasters and uncertainties (Aliyu et al., 2023). The NAIS is part of a broader national disaster management strategy that aims to stabilize farmers' income, safeguard investments, and ensure continuity in agricultural production amidst unpredictable challenges (Udoh et al., 2024). These insurance schemes are crucial for enhancing the resilience of farmers against risks and providing them with the financial tools needed to sustain their operations in the face of adversity. Furthermore, recent updates to the NAIS have incorporated new technologies and improved outreach programs to increase its accessibility, especially to smallholder poultry farmers (Aremu & Amos 2024). Digital platforms and mobile-based insurance solutions have been introduced to simplify claim processes, improve transparency, and enhance farmer participation in agricultural insurance programs (Rudramuni, 2024). Beyond government initiatives, private sector participation in agricultural insurance has also grown, with financial institutions and microfinance organizations developing tailor-made insurance products to support poultry farmers (Ashoro et al., 2024). Collaborations between insurance companies, research institutions, and extension services have played a role in educating farmers on risk management strategies and the benefits of insurance coverage. The integration of climate-smart agricultural practices, improved biosecurity measures, and better disease surveillance

systems are also key in ensuring the long-term sustainability of poultry farming in Nigeria (Ngongolo & Mrimi, 2024).

Overall, poultry farming remains a cornerstone of Nigeria's agricultural sector, offering numerous opportunities for economic growth, job creation, and food security. However, persistent risks and constraints necessitate proactive measures to safeguard farmers against financial losses and production disruptions. Strengthening agricultural insurance schemes, improving access to credit, investing in disease control strategies, and enhancing market access are critical steps towards ensuring a resilient and sustainable poultry industry in Nigeria. The collaboration between government, private sector stakeholders, and international development agencies will be essential in addressing these challenges and maximizing the full potential of poultry farming as a viable agricultural enterprise. The findings from this research may provide valuable insights for policymakers aiming to refine agricultural insurance frameworks. Enhanced policy structures could assist in reducing income volatility, promoting greater investment in agricultural sectors, and finally enabling farmers to better manage income shocks and uncertainties. By customizing insurance services to meet the specific requirements of the agricultural community, particularly within vulnerable sectors such as poultry farming, policymakers can aid in the development of a more resilient and sustainable agricultural system in Nigeria. The primary objective was to evaluate the utilization of insurance services and income shocks among poultry farmers in Delta State. The explicit intentions were to identify the demographic features of poultry farmers; The degree of farmers' utilization of agricultural insurance services; The factors that influence farmers' decisions to use insurance services on their farms; The existing problems, including poor linkage between poultry producers and insurance service personnel, which hinder the effective utilization of insurance services and determine the influence of insurance services on income shocks. The Hypotheses were; Insurance services do not relate with income shocks of poultry farmers and Socioeconomic characteristics of poultry producers has no association with utilization of insurance services.

The structure and organization of the paper includes the following sections: Literature Review (comprising Conceptual Framework, Theoretical Framework, and Empirical Review), Methodology (including Study Area, Research Design, Population and Sampling, Data Collection Methods, and Analytical Techniques), Results and Discussion, and finally, Conclusion and Recommendations.

Literature Review

Agricultural insurance has become an essential tool for managing the fundamental risks faced by poultry farmers. By minimizing financial exposure to losses caused by natural and human-induced risks, insurance coverage enables farmers to maintain a more stable income, thereby enhancing both market stability and national food security. The role of agricultural insurance extends beyond individual risk management to broader economic benefits, as it encourages investment in improved production technologies and expansion of poultry enterprises. Research has shown that when farmers have access to well-structured insurance schemes, they are more likely to adopt advanced production methods, such as high-yield breeds, improved feeding strategies, and disease prevention techniques (Ologbon et al., 2021; Ajemunigbohun & Abdul-Azeez, 2023; Mfulwane, 2023). The security provided by insurance fosters long-term planning and financial stability, ensuring that poultry production remains resilient against external shocks, including climatic and economic fluctuations (Madaki et al., 2024). Insurance serves as a vital mechanism for mitigating income shocks experienced by poultry farmers, particularly in areas where agriculture is predominantly vulnerable to climate changes, market fluctuations, and disease outbreaks. The implementation of agricultural insurance programs spans globally and varies in effectiveness. In developed countries, such as the United States, Canada, and Australia, government-supported agricultural insurance schemes offer comprehensive coverage to farmers, ensuring that production-related risks do not

culminate in financial ruin (Ruan et al., 2024). These schemes typically involve subsidies that enable farmers to afford the necessary insurance premiums while still maintaining economic viability (Lan et al., 2024). For instance, government subsidies serve as financial incentives that significantly influence farmers' decisions to participate in such insurance programs, highlighting the importance of effective policy frameworks (Udoh et al., 2024). Conversely, in developing nations, poultry farmers frequently encounter obstacles that hinder access to sufficient risk protection, including low levels of insurance penetration, prohibitive costs, and suboptimal policy frameworks (Osorio et al., 2024). Research indicates that the challenges faced by smallholder farmers in countries like Tanzania and Vietnam primarily stem from the lack of awareness regarding available insurance options, high premiums, and bureaucratic hurdles associated with indemnity claims (Mushi et al., 2024; Goyal & Gulati, 2024). The limited implementation of crop insurance schemes in such regions fails to provide adequate protection against the diverse risks associated with poultry farming, such as disease outbreaks and sudden market changes, thereby undermining the financial stability of these farmers (Oben et al., 2024).

The utilization of insurance services is a crucial factor in mitigating income shocks among poultry farmers, particularly in the context of agricultural instability caused by climate variability, market dynamics, and disease outbreaks. Recent literature highlights the varied experiences and perceptions of poultry farmers regarding agricultural insurance, its impacts on operational decisions, and income stability. Studies demonstrate that access to agricultural insurance can significantly decrease the vulnerability of poultry farmers to income fluctuations caused by adverse events. For example, farmers with insurance are more likely to invest in higher-quality inputs and adopt modern farming techniques, which, in turn, may lead to increased productivity and stable income streams Mishra & Singh (2024). Moreover, insurance functions as a form of collateral that enhances farmers' credibility when seeking loans, thereby improving access to financial resources critical for sustainable farming practices (Vihi et al., 2024). This symbiotic relationship between insurance participation and financial accessibility is essential for fostering resilience in the poultry sector. Furthermore, the agricultural insurance landscape reflects broader economic vulnerabilities and the critical need for government intervention to support the agriculture sector. In settings where resources are scarce, governments play a pivotal role in implementing effective agricultural insurance policies that not only stabilize income but also bolster overall food security and rural development (Xie et al., 2024). The strategic integration of technology, as discussed in recent literature, can also enhance the effectiveness of insurance by facilitating better risk assessment and management practices, making it easier for farmers to engage with insurance products (Mushi et al., 2025). Research conducted by Kipkemoi and Ceyhan (2021), Nepali (2021), and Nwobodo et al. (2023) indicates that many farmers have a limited understanding of insurance processes. This lack of knowledge results in decreased participation, as farmers who do adopt insurance frequently fail to seek clarifications regarding policy terms, coverage specifics, and claims procedures, thereby diminishing the effectiveness of the insurance they receive. In Africa, the adoption of agricultural insurance remains notably low despite its significant potential to protect farmers against economic shocks. Studies indicate that insurance can stabilize farmers' incomes amidst unpredictable weather conditions, disease outbreaks, and volatile market prices, essential factors affecting agricultural productivity and sustainability in the region (Osorio et al., 2024; Qin et al., 2024). Countries such as Kenya, South Africa, and Ghana have pioneered index-based insurance programs designed to align with local agricultural risks, utilizing technological advances to enhance access and affordability for farmers (Qin et al., 2024). Nevertheless, many smallholder poultry farmers in sub-Saharan Africa remain marginalized from these vital services. Key barriers include insufficient financial literacy, skepticism towards insurance providers, and logistical issues surrounding premium payments and claims processing (Su et al., 2024). To tackle these challenges, comprehensive policy reforms and greater government intervention are necessary to design inclusive insurance models that effectively cater to the most vulnerable agricultural producers.

In Nigeria, poultry farming is a fundamental component of rural livelihoods and national food security; however, the sector is highly exposed to income shocks due to disease outbreaks, fluctuations in feed prices, theft, and environmental threats (Gyamerah & Owusu, 2024). Conversely, the adoption of insurance among poultry farmers in developing countries presents unique challenges. High premiums, limited awareness of available products, and inadequate infrastructure often hinder effective participation in these insurance schemes (Udoh et al., 2024; Ifabiyi et al., 2024). Research indicates that many farmers lack trust in insurance providers, stemming from past experiences with delayed claim payouts and unclear policy terms (Lan et al., 2024). This distrust further complicates farmers' willingness to engage with insurance products, which could otherwise safeguard their livelihoods against unpredictable agricultural risks (Ifabiyi et al., 2024). Furthermore, the effectiveness of insurance services is often mediated by government interventions and subsidy programs that aim to enhance the sustainability of agricultural practices (Lan et al., 2024; Osorio et al., 2024). For instance, when government-backed insurance products align with farmer education initiatives about risk management, the likelihood of insurance uptake increases significantly. Therefore, the role of institutional frameworks is critical in shaping farmers' perceptions and ultimately their willingness to utilize agricultural insurance (Mushi et al., 2024).

Misinterpretations concerning the extent and protection provided by insurance policies can result in misconceptions, which may lead to confusion, particularly during crises or when claims need to be submitted. This paper emphasizes the important role of agricultural insurance in protecting farmers from potential financial hardships resulting from unforeseen situations. Safeguarding poultry farmers from such risks is essential not only for their personal financial well-being but also for ensuring consistent food production to meet the dietary needs of the population. However, as noted by Alam et al. (2020), Akbarovich (2020), and Madaki et al. (2023). The establishment of the Nigerian Agricultural Insurance Corporation (NAIC) aimed to offer tailored insurance solutions for farmers, including those in poultry production (Muhammad & Inusa 2024). Despite this initiative, the uptake of agricultural insurance among Nigerian poultry farmers remains disappointingly low. Factors contributing to this trend include limited awareness of available options, perceived exorbitant premium costs, and convoluted claim processes (Lan et al., 2024). Studies suggest that despite several initiatives, the ongoing barriers to insurance adoption among poultry farmers continue to demand attention (Shkembi et al., 2024). Furthermore, research has highlighted that integrating mobile technology into agricultural insurance schemes could significantly enhance accessibility and participation rates among farmers (Samota et al., 2024). Mobile insurance services can facilitate streamlined premium payments, simplify the claims process, and foster improved communication between farmers and insurers, thereby enhancing trust in the insurance framework. The advantages of agricultural insurance extend beyond mere risk management; they also improve farmers' access to credit and essential financial resources. Financial institutions are more inclined to extend credit to insured farmers, as the associated risks for lenders decrease appreciably when coverage is in place (Raharjanti et al., 2024). This enhanced access allows poultry farmers to scale their operations, invest in upgraded infrastructure, and consequently boost productivity. Studies reveal that smallholder poultry farmers engaged in insurance programs are more likely to secure funding for various farm improvements, thus fostering increased profitability and economic growth within the sector (Khanal et al., 2024). This cycle positively influences rural economic development and job creation, as expanded poultry farming operations generate employment opportunities not just for farmhands but also for feed suppliers, veterinary service providers, and other agricultural stakeholders (Mishra & Singh, 2024).

Recent investigations point to the transformative potential of digital innovations and mobile-based insurance services in bolstering insurance adoption among poultry farmers (Johari et al., 2024). The launch of mobile insurance platforms and digital claim processes has enhanced accessibility, making it simpler for farmers to enroll in insurance schemes and submit claims without facing excessive bureaucratic hurdles. Moreover, mobile

technology facilitates real-time communication with insurers, thereby narrowing the information gap and fostering transparency in insurance dealings. Policymakers and relevant stakeholders in agriculture should harness these technological advancements to develop more inclusive insurance frameworks tailored to the specific needs of smallholder poultry farmers, ensuring their inclusion in the financial protection ecosystem (Kumar, 2024). Strengthening agricultural insurance policies will ultimately contribute to national economic stability and reaffirm poultry farming's significance in enhancing the broader agricultural landscape (Preethi & Sasane, 2024). This research is based on the following theories:

Risk Aversion and Utility Maximization Theory in Poultry Farming

Poultry farming is inherently fraught with considerable risks, including disease outbreaks, feed price volatility, and market fluctuations. Utility maximization theory posits that individuals strive to maximize their expected utility, leading risk-averse farmers to implement strategies that stabilize their income. Specifically, insurance acts as a risk-transfer mechanism, allowing these farmers to mitigate financial losses associated with adverse events. The degree of risk aversion, therefore, becomes a pivotal determinant in the decision to utilize insurance services. Research shows that farmers who display heightened risk aversion are more inclined to secure insurance coverage to guard against potential income shocks (Waithaka, 2024; Guan et al., 2024). Empirical studies substantiate this theoretical framework. A recent investigation of poultry farmers in Nigeria confirmed that risk perception significantly influenced insurance adoption. Farmers who regarded their operations as riskier were more likely to insure (Shah, 2024). This behavior aligns with the utility maximization concept, wherein risk-averse individuals prioritize securing their expected utility against possible adversities. Moreover, income variability resulting from unpredictable events can cause severe welfare losses for risk-averse farmers. Through purchasing insurance, these farmers can stabilize their incomes, safeguarding their consumption patterns and investment capabilities, which are crucial for maintaining productivity and resilience against future shocks (Waithaka, 2024; Guan et al., 2024). However, the decision to purchase insurance is also contingent upon the perceived effectiveness and reliability of the insurance products available. Farmers’ skepticism about insurers' credibility or fears regarding timely compensation can hinder insurance uptake, even among risk-averse individuals. Establishing trust between insurers and farmers is essential for increasing the adoption of insurance services (Bourova et al., 2024). In summary, the interplay of risk aversion and utility maximization theory intricately informs poultry farmers' decisions regarding insurance services, highlighting the importance of income stabilization while underscoring the need for trustworthy insurance products.

Information Asymmetry and Awareness

Information asymmetry arises when one party possesses superior information, hindering optimal decision-making. In the context of poultry farmers and insurance uptake, inadequate awareness of insurance products plays a critical role in limiting adoption rates. A study conducted in Southwest Nigeria revealed that while a significant majority (59.6%) of poultry farmers were aware of livestock insurance policies, only 11.9% actually insured their farms, illustrating the vast gap between awareness and utilization attributable to information asymmetry (Guan et al., 2024). Farmers may know about available insurance options but often lack comprehensive knowledge concerning their benefits, specifics of coverage, and the claims process, leading to hesitance in engaging with these products. Misconceptions and mistrust stemming from previous adverse experiences or anecdotal reports further aggravate this issue. Farmers who have encountered delays in claims or claim denials may develop skepticism toward insurance, thereby further distancing themselves from insurance services. This trust deficit is commonly

exacerbated by a lack of clear communication from insurers, reinforcing information asymmetry (Waithaka, 2024; Guan et al., 2024). Addressing these challenges demands targeted educational programs and effective communication strategies, where extension services and agricultural advisors can provide unbiased and comprehensive information about insurance products and assist farmers with the enrollment process. Technological advancements also present opportunities to bridge this information gap. For instance, mobile platforms and digital applications can expand access to insurance information and services, enhancing the overall adoption landscape (Osorio et al., 2024). In regions where mobile-based insurance initiatives have been launched, farmers can easily learn about, purchase, and claim insurance via their smartphones, simplifying the process and bolstering participation. Thus, combating information asymmetry through targeted education, transparent communication, and technological solutions is vital for improving insurance utilization among poultry farmers.

Financial Constraints and Liquidity Theory

Financial constraints significantly shape a poultry farmer's capacity to afford insurance premiums, even when the advantages of such coverage are clear. Liquidity preference theory suggests that individuals prioritize immediate financial needs, often resulting in farmers allocating their limited resources to more pressing operational expenses instead of insurance premiums. Recent research highlights that financial limitations remain a formidable barrier to insurance adoption. In a study of poultry farmers in South Bengal, for instance, low participation in livestock insurance was largely attributed to insufficient financial resources (Liu et al., 2024). Furthermore, the perceived opportunity cost of paying insurance premiums can deter farmers from acquiring coverage. The funds that could be allocated for insurance are often redirected towards necessary inputs like feed and labor, particularly given the small profit margins prevalent in poultry farming. These dynamics reveal that when farmers operate with limited financial flexibility, they are less inclined to invest in insurance (Guan et al., 2024). Addressing financial barriers can be facilitated through various strategies, including subsidizing insurance premiums as seen in government-backed agricultural insurance schemes globally (Amalia & Arifin, 2024). Additionally, microinsurance models designed for smallholder farmers can offer lower premiums and flexible payment structures, thereby making insurance more accessible. Moreover, integrating insurance with credit facilities can enhance affordability. For instance, bundling insurance with agricultural loans ensures that farmers can obtain coverage without having to make separate premium payments. Such strategies have demonstrated success in Nigeria through initiatives like the Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL) (Amalia & Arifin, 2024). Consequently, financial constraints stand as a major determinant of insurance utilization, underscoring the necessity for strategic interventions aimed at alleviating the economic burdens on poultry farmers.

Behavioral Economics and Perception of Risk

Behavioral economics provides critical insights into how poultry farmers approach decisions regarding insurance services, challenging the assumption of rational decision-making found in classical economic models. One pertinent concept is prospect theory, which posits that individuals perceive potential losses with greater weight than equivalent gains. In the sphere of insurance, farmers may undervalue the advantages of insurance due to a focus on the guaranteed costs of premiums instead of the uncertain prospects of receiving payouts, thus exhibiting loss aversion that deters them from purchasing coverage (Shah, 2024; Liu et al., 2024). Another behavioral aspect influencing these decisions is present bias, where immediate financial needs often take precedence over future uncertainties. Particularly in the context of poultry farming, which is characterized by seasonality and periodic cash flow constraints, farmers might prioritize investments in immediate needs (e.g., feed or equipment) over

insurance, which only provides benefits in adverse situations (Amalia & Arifin, 2024). Empirical evidence corroborates these behavioral insights. A study in Uganda revealed that, despite offering subsidized insurance rates, participation remained low due to low perceived risk and mistrust toward insurance providers (Cha et al., 2024). To counteract these behavioral biases, tailored interventions such as behavioral nudges can be employed. This includes reframing insurance as an investment rather than a mere expense and utilizing default enrollment mechanisms to increase participation in insurance programs (Amalia & Arifin, 2024). Additionally, providing flexible payment structures and leveraging digital tools for reminders about policy renewals can further encourage uptake.

Institutional Trust and Policy Environment

The significance of institutional trust and government policy in influencing insurance adoption among poultry farmers is substantial. Trust in insurers, financial institutions, and regulatory bodies is a crucial determinant of whether farmers perceive insurance as a reliable safety net. Negative past experiences, including delays in claim payouts and convoluted documentation processes, contribute to a lack of trust, thereby deterring farmers from engaging with formal insurance providers (Waithaka, 2024; Muraya et al., 2024). To foster greater trust and facilitate insurance adoption, government interventions can play a pivotal role. Strengthening regulatory oversight, ensuring transparency in insurance policies, and collaborating with private insurers to provide subsidized agricultural insurance are effective strategies to expand coverage and enhance farmer confidence in these offerings (Osorio et al., 2024; Amalia & Arifin, 2024). Additionally, conditioning discounts on insurance premiums for farmers who adopt best management practices can further incentivize uptake.

Methodology

The research was carried out in the Delta North Agricultural Zone of Delta State, Nigeria, which is a region predominantly dedicated to the cultivation of arable crops and poultry farming, along with some participation in plantation agriculture. A multistage sampling method was used to select respondents for this research. In the initial stage, 50% of the Local Government Areas (LGAs) within the agricultural zone were chosen, leading to the inclusion of five LGAs. In the subsequent stage, three farming communities were randomly selected from each chosen LGA, resulting in a total of 15 agrarian villages. In the third stage, a random selection of 12 respondents was made from each community, producing an initial sample size of 180 producers. Data was gathered using a structured questionnaire as the main tool. To guarantee accurate data collection, trained enumerators who were skilled in both English and the respondents' local language administered the questionnaires. However, 30 questionnaires were discarded due to incomplete information, leading to a final sample size of 150 respondents for analysis.

Analytical techniques

Data collected were evaluated using descriptive and inferential statistics. Descriptive statistics was used to achieve specific objectives (i), (iii), and (iv). Descriptive statistics typically involve summarizing and describing the main features of a dataset. In your case, it seems like you used a Likert-type scale with three categories (highly utilized = 3, moderately utilized = 2, not utilized = 0) and calculated means for these categories to describe certain aspects of your data. A logit model to achieve objective (ii). A logit model is often used in logistic regression to analyze

binary or categorical outcomes. It's used when you want to predict the probability of an event occurring based on certain predictor variables. Objective (v) was realized using a multiple regression model. Multiple regression is used to analyze the relationship between a dependent variable and multiple independent variables. It helps you understand how different variables may be related to each other.

Model specification of logit model;

The logit model was chosen since the dependent variable is a dummy. It is stated as;

Ln CS/(I –Si) = Bo + B1EDU + B2AOI + B3PP + B4EXP + B5ATIT + B6ATC +B7SEX + mi

Where;
Si = Farmers utilization of insurance services
1 – Si = Not utilizing insurance services.
Bo = constant
B1 (1,2,3,4,5, 6, 7) = coefficients
X1 (1,2,3,4,5,6,7) = explanatory variables and
mi = stochastic error term.
The factors influencing insurance services utilization is specified as;
X1 = level of education (years)
X2= Awareness of insurance (Yes = 2, No = 1)
X3 = Premium payment (Yes = 2, No = 1)
X4 = Years spent in farming
X5 = Attitude toward insurance taking (Positive = 1, Negative = 0)
X6 = Accessibility to credit (Yes = 1, No = 0).
X7 = Occupation (full-time=1, Part-time=0)
Model specification of Regression model on the influence of insurance services and income shock among poultry farmers
The model is explicitly specified as shown:
Y = f(PPS+ ES + VS + ICOE + GRC + CIS + POI+ EIL + TOF + μ)
Where: Y = ability to absorb income shocks (N)
X1= PPS(highly utilized =3, moderately utilized=2 and not utilized =0)
X2 = ES (highly utilized =3, moderately utilized=2 and not utilized =0)
X3 = VS (highly utilized =3, moderately utilized=2 and not utilized =0)
X4 = ICOE (highly utilized =3, moderately utilized=2 and not utilized =0)
X5 = GRC (highly utilized =3, moderately utilized=2 and not utilized =0)
X6 = CIS(highly utilized =3, moderately utilized=2 and not utilized =0)
X7 = POI(highly utilized =3, moderately utilized=2 and not utilized =0)
X8 = EIL (highly utilized =3, moderately utilized=2 and not utilized =0)
X9 = TOF(highly utilized =3, moderately utilized=2 and not utilized =0)
μ = Error term

Results and discussions

Socioeconomic characteristics of respondents

The socioeconomic characteristics of the respondents are presented in Table 1**.**

Gender distribution

The results of the examination indicate an important gender imbalance within the poultry sector, with 72% of participants being male and merely 28% female as seen in Table 1. This demographic breakdown emphasizes the fact that the poultry industry is primarily male-dominated. This pattern is not a unique phenomenon, as earlier investigations conducted by Nwachukwu et al (2021) and Aminu & Hermanns (2021) have also recognized a similar predominance of male poultry farmers. Gaining insight into the factors contributing to this gender disparity is essential for understanding the dynamics within the poultry farming industry. One potential reason for the detected gender imbalance in poultry farming is the challenging nature of the occupation. Poultry farming encompasses various physically intensive tasks, including but not limited to feeding, cleaning, and ensuring the well-being of the birds. The strict and labour-intensive characteristics of these tasks may deter female involvement in the industry. Societal views and conventional gender roles may also shape the workforce composition in poultry farming, with the perception that such physically strenuous work is more appropriate for men. In addition, cultural and economic elements may contribute to perpetuating the gender divide in poultry farming. Societal norms and expectations regarding women's responsibilities in agriculture and animal husbandry may affect vocational choices, pushing women away from poultry farming. Limited access to resources, such as financing and land, which are often essential for initiating and maintaining a poultry enterprise, may disproportionately impact women, further exacerbating their underrepresentation in this field. Tackling the gender disparity in poultry farming is critical not only for ensuring fairness but also for the practical sustainability and development of the industry. Acknowledging the potential roles of women in poultry farming and adopting strategies to promote gender inclusivity could result in a more varied and strong poultry sector. Policymakers, industry stakeholders, and advocacy organizations can collaborate to cultivate an environment that promotes and assists the active engagement of women in poultry farming by addressing the socio-economic and cultural impediments that may restrict their participation.

Age of Respondent

The demographic profile of poultry ranchers is essential for comprehending the dynamics of the poultry farming industry. The information that most (80%) poultry ranchers are aged between 37 and 56 years, with an average age of 46, has major implications for the current and future environment of the industry. This demographic trend indicates a concentration of relatively young individuals in their productive years who are involved in poultry farming. A primary implication of having a majority of poultry ranchers in this age group is the potential for increased resilience and adaptability within the industry.

Individuals in this age range typically possess a combination of energy, enthusiasm, and experience, which are important qualities for effectively managing the challenges encountered in poultry farming. Their youthfulness may lead to a proactive stance in welcoming new technologies, implementing innovative farming strategies, and adjusting to changing market trends. This is advantageous for the overall sustainability and competitiveness of the poultry farming sector. Comparisons made with a study conducted by Popoola & Obi-Egbedi (2020) that reported

a similar age distribution among farmers lend credence to the current findings. The consistency across studies implies that the age profile of poultry ranchers may demonstrate stability over time. This stability can be beneficial for policymakers, researchers, and industry stakeholders in developing targeted interventions, policies, and support systems that cater to the unique needs and characteristics of this demographic group. Besides, the age distribution prompts inquiries about succession planning within poultry farming enterprises. As these farmers age, it becomes critical to consider the effective transfer of knowledge, skills, and operations to the next generation. It is essential for the industry to cultivate an environment that encourages and assists the entry of younger individuals into poultry farming, ensuring a smooth transition and ongoing growth of the sector.

Marital status

The result reveal that 76% of the participants in the study were married, while 10% were single, another 10% were widowed, and 2% were divorced, offering important insights into the demographic makeup of poultry farmers within the surveyed group. This observation is consistent with the research conducted by Onyemekihian et al (2023) and Michael et al (2022), who asserted that a important proportion of poultry farmers are indeed married individuals. One possible explanation for this trend is that married individuals might be regarded as more responsible and driven to participate in poultry farming. The relationship between marital status and involvement in poultry farming can be complex. Marriage typically brings additional responsibilities, such as providing for a family and ensuring financial stability. Engaging in poultry farming can be seen as a strategic approach for these individuals to enhance their economic well-being and improve their overall quality of life. The sense of responsibility linked to marriage may also extend to the dedication required in poultry farming. Operating a poultry farm necessitates commitment, consistent effort, and a long-term vision. Married individuals, motivated by family obligations, may perceive poultry farming as a feasible and sustainable source of income, thus accounting for the notable proportion in this demographic. That being apart, the cultural and societal expectations placed on married individuals to secure a reliable source of income for their families could are a motivating factor. Poultry farming, with its potential for profitability and economic sustainability, may be particularly attractive to married individuals striving to meet these expectations.

Educational status

The data indicates that a substantial portion (56%) of poultry ranchers possess post-primary education, with 38% attaining tertiary education and merely 6% having completed only primary education. This information provides valuable insights into the educational qualifications of those involved in poultry farming. This distribution implies that a majority of poultry ranchers have attained a higher level of education, which could considerably influence the overall management and success of their poultry enterprises. A noteworthy aspect of this finding is the potential positive impact of education on poultry ranchers' ability to access and understand information pertinent to effective risk management. Higher levels of education are often linked with improved analytical and decision-making capabilities, alongside an enhanced ability to comprehend and adapt to variable challenges. In poultry farming, where various risks, such as disease outbreaks, market variations, and environmental factors, can affect operations, having a well-educated workforce could lead to more knowledgeable and strategic decision-making. The consistency of this result with prior research, such as the study conducted by Sani et al (2023), further emphasizes the significance of education within agribusiness. They put additional emphasis on the benefits of education in agriculture and related domains, illustrating how it can enhance the efficiency, productivity, and overall sustainability of agricultural practices. The correlation identified in the present study emphasizes the persistence

of this trend, emphasizing the lasting importance of education considering poultry ranching. Moreover, the findings may imply that individuals with post-primary and tertiary education are more inclined to engage in poultry farming as a business effort rather than as a means of subsistence. This could have wider implications for the poultry sector, indicating a shift towards a more professionalized and commercially-driven model of poultry farming. The potential integration of advanced technologies, data-driven decision-making, and best practices in poultry management may be more attainable for individuals with higher educational qualifications.

Farming experience

The result as presented in Table 1 indicates that a majority (64%) of participants possess 6-10 years of farming experience, with an average duration of 8 years, which represents an important observation that has implications for the comprehension and enhancement of poultry farming practices. The existence of 6-10 years of farming experience among respondents is remarkable. This range signifies a substantial degree of dedication and commitment to the field of poultry farming. The fact that a considerable majority falls within this range indicates a veteran group of individuals who have dedicated an important portion of their time and effort to refining their skills in poultry farming. This accumulation of experience is likely to encourage a deeper comprehension of the complexities associated with poultry farming, including breeding, nutrition, disease management, and overall farm management. The average duration of 8 years of farming experience further stresses the solid foundation of knowledge and expertise that the respondents contribute. Engagement in poultry farming for eight years signifies a considerable timeframe in which individuals encounter various challenges, successes, and opportunities for learning. This type of practical experience is invaluable, as it equips farmers with a refined understanding of the sector, enabling them to make well-knowledgeable decisions and apply effective strategies.
Gbigbi (2021) has previously emphasized the importance of experience in farming, which corroborates the current findings. Their emphasis on the importance of experience aligns with the acknowledgment that practical knowledge gained over years of farming is a critical component for achieving success and sustainability in agricultural pursuits. The details of poultry farming, such as disease prevention, optimal feeding practices, and efficient production methods, often require a level of skill that can solely be attained through years of hands-on experience. The implications of this finding extend beyond individual farms to the wider poultry farming sector. A group of farmers possessing 6-10 years of experience, on average, can enhance the collective knowledge base of the industry. This shared expertise may promote collaboration and information exchange, leading to continuous enhancement in farming practices, increased productivity, and the development of innovative approaches to common challenges. Besides, the findings carry significance for policy and support programs within the agricultural sector. Acknowledging the importance of experience in poultry farming should motivate policymakers and stakeholders to devise programs that nurture and assist the ongoing professional growth of farmers. This could encompass training programs, mentorship opportunities, and knowledge-sharing platforms that promote the transfer of experience from seasoned farmers to those who are newer to the industry.

Family size

The findings indicate that the majority of respondents (52%) had family sizes ranging from six to ten individuals, yielding a mean family size of seven individuals as seen in Table 1. This observation offers valuable insights into the demographics of poultry ranchers and their households. This result suggests a prevailing trend among poultry ranchers towards larger family units, which can have major implications for their farming activities. The recorded mean family size of seven individuals is noteworthy, as it corresponds with the research conducted by Gbigbi and

Ikechukwuka (2020), who documented a similar mean household size in their investigation. The consistency of findings across various studies enhances the credibility and applicability of the results. It indicates that the trend of larger household sizes among poultry ranchers is not an isolated occurrence but rather a wider trend that may be influenced by several socio-economic and cultural factors. One possible rationale for the larger family sizes among poultry ranchers could be the necessity for sufficient family labour to support the demanding nature of farming activities, especially in the poultry sector. Poultry farming frequently requires considerable manual labour for tasks such as feeding, cleaning, and maintaining the facilities. Larger family sizes may provide poultry ranchers with a readily available and cost-efficient source of labour, thereby contributing to the efficiency and sustainability of their operations. Besides, the finding holds implications for comprehending the social dynamics within poultry farming communities. Larger families may cultivate a sense of community and shared responsibility, thereby creating a supportive network for poultry ranchers. This social cohesion could enhance knowledge exchange, resource sharing, and mutual assistance, further bolstering the resilience of the poultry farming community. Nonetheless, it is essential to identify possible challenges related to larger family sizes, such as heightened financial pressure on households and the importance of effective management of family dynamics within the farming operation. Achieving a balance between the benefits of having a larger family for farm labour and the challenges it may pose is essential for the long-term sustainability of poultry farming enterprises.

Farm size

The findings of the research demonstrate that 76% of poultry producers operate at a modest scale, with a poultry flock size ranging from 250 to 1,149 birds, and an average flock size of 887 birds (Table 1). These results provide major insights into the current characteristics of the poultry farming sector. The dominance of small-scale chicken farming suggests that a considerable portion of the poultry industry comprises relatively smaller enterprises. This inference aligns with the study by Ogba et al (2020) concerning the challenges experienced by small poultry farms in Abia State. This has ramifications for various facets of the industry, encompassing production efficiency, market dynamics, and the socio-economic context of chicken farming. Understanding the presence of small-scale operations is critical for policymakers, agricultural organizations, and researchers aiming to devise focused interventions and support systems for this group of farmers. A major consequence of the small-scale nature of the majority of chicken farms is the potential effect on production efficiency. Smaller flock sizes may indicatively reveal limited resources and infrastructure, which could affect economies of scale. Farmers functioning at this scale may encounter obstacles in integrating state-of-the-art technologies, executing efficient management practices, and negotiating beneficial terms with suppliers. Tackling these obstacles could improve the overall productivity and sustainability of small-scale chicken farming enterprises. Besides, the average flock size of 887 birds is a benchmark for discerning the standard scale of small chicken farms. Examining the elements that contribute to this average, such as regional differences, resource availability, and market demands, can provide insightful perspectives. For example, certain regions may exhibit a greater occurrence of small-scale farming due to geographical limitations or cultural practices, while others may feature larger operations propelled by market requirements. Similarly, the study's outcomes may simplify the economic and social ramifications for farmers engaged at this scale. Small-scale farmers might face distinctive challenges related to income generation, livelihood sustainability, and market access. Investigating the socio-economic aspects of small-scale chicken farming can assist in identifying focused strategies to enhance the well-being of these farmers, such as offering financial assistance, enhancing market connections, and supporting training initiatives. Besides, the research findings provoke considerations about the broader environment of the poultry industry, including its role in food security and rural development. Understanding the distribution of farm sizes is critical for creating policies that

encourage comprehensive growth, guaranteeing that both small and large-scale farmers contribute to overall industry resilience and sustainability.

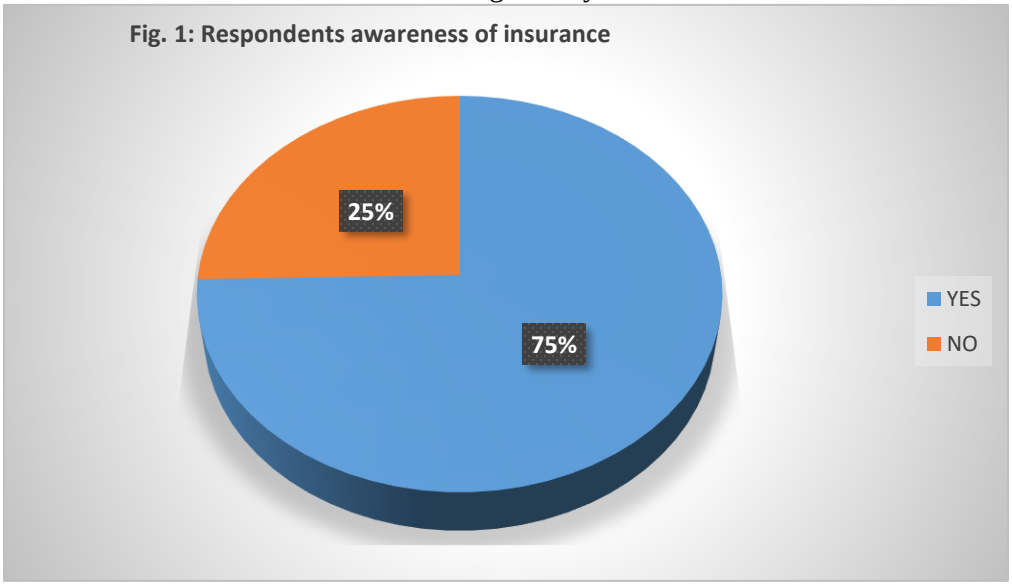
Table 1: Demographic attributes of chicken farmers (N= 150)

Characteristic	Frequency	Percentage	Mean/mode
Gender			
Male	108	72	Male
Female	42	28	
Age(years)			
27-36	18	12	46 years
37-46	60	40	
47-56	60	40	
57-66	12	8	
Marital Status			
Married	114	76	Married
Single	15	10	
Widow/widower	15	10	
Divorced	6	4	
Educational level			
Primary	9	6	Secondary
Secondary	84	56	
Tertiary	57	38	
Farming Experience (years)			
1-5	33	22	
6-10	96	64	
11-15	18	12	8 years
16-20	3	2	
Household size			
1-5	51	34	7 persons
6-10	78	52	
11-15	21	14	
Flock size			
250-549	27	18	
550-849	57	38	887 birds
850-1149	30	20	
1150-1448	12	8	
1450-1749	18	12	
1750-2049	6	4	

Farmers awareness of agricultural insurance

The information depicted in Figure 1 illustrates the levels of awareness among breeders concerning the availability of insurance. The findings indicate that a major majority, comprising 75% of the surveyed breeders, were aware of existing insurance options. This awareness is an essential element of risk management within the agricultural sector, especially for breeders who encounter various uncertainties and challenges in their operations. It is major that one-quarter of the breeders, as shown by the remaining 25% in Figure 1, were uninformed about the availability of insurance. This observation emphasizes a possible gap in communication or outreach efforts pertaining to agricultural insurance. Gaining insight into the reasons for this lack of awareness could be critical in formulating strategies to close the knowledge gap and ensure that a greater number of breeders can take advantage of risk mitigation measures. The study is consistent with the work of Ojogbane and Gbigbi (2022) which lends additional credibility and context to the current findings. According to Ojogbane and Gbigbi (2022), a considerable percentage of poultry farmers in Kogi State were aware of the Nigerian Agricultural Insurance Scheme (NAIS). The alignment between the two studies implies that awareness levels have remained constant over time, and breeders in the region continue to be knowledgeable about the availability of agricultural insurance options. The importance of this awareness becomes even more apparent when evaluating the function of insurance in risk management within the agricultural sector. Agriculture is intrinsically vulnerable to various risks, including weather-related events, diseases, and market fluctuations. Insurance offers a financial safety net for breeders, providing protection against unexpected losses and enabling the continuity of agricultural activities. The implications of these findings transcend mere recognition of insurance availability. They open pathways for further research and interventions aimed at understanding the factors influencing awareness levels, addressing potential obstacles, and improving outreach programs. Policymakers, agricultural extension services, and insurance providers can work together to create targeted initiatives that not only increase awareness but also educate breeders on the benefits and complexities of agricultural insurance.

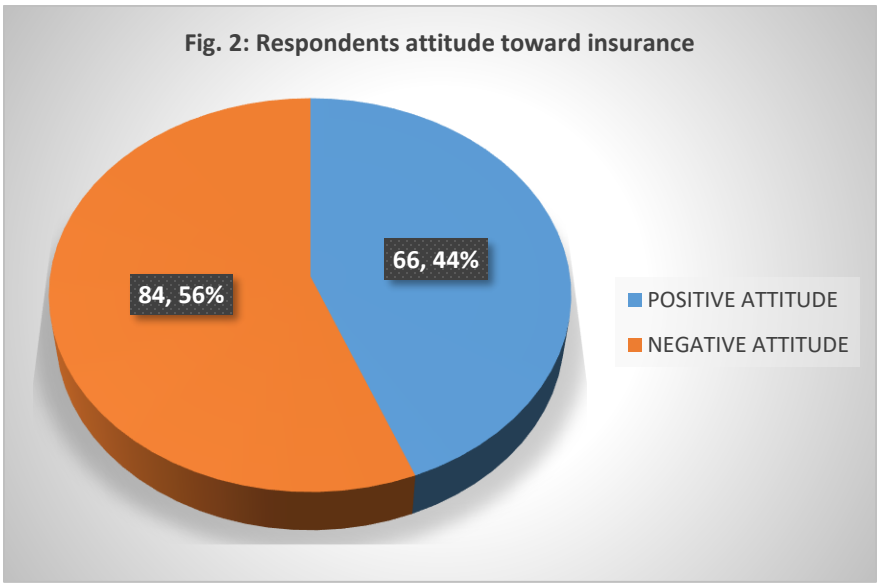
Figure 1: Level of Awareness of Insurance Among Poultry Farmers



Farmers attitude towards insurance

The findings reveal that a major percentage of poultry ranchers, specifically 56%, display a lack of concern or indifferent attitude towards obtaining insurance, whereas only 44% exhibit a favorable attitude towards insurance coverage (Fig.2). This indicates that a considerable number of poultry ranchers may not recognize the value or significance of securing insurance for their businesses. Moreover, a study conducted by Alabi et al (2023) also indicates that this pessimistic perspective regarding insurance uptake is not exclusive to poultry ranchers but could reflect a widespread sentiment among farmers, including those engaged in crop production. This similarity in attitudes across various agricultural sectors may suggest broader challenges or perceptions related to insurance within the agricultural community. It is essential to acknowledge that these findings could have major ramifications for the insurance sector and policymakers who seek to enhance insurance uptake among farmers and poultry ranchers. Comprehending the reasons underlying this negative disposition and addressing them could be essential in promoting greater insurance enrolment within these industries.

Figure 2. Attitude toward Insurance



Determinants of utilization of insurance services

The determinants of insurance service utilization among poultry farmers are presented in Table 2.

Flock Size

The results, presented in Table 2 indicate that Flock size exhibits a positive correlation with insurance utilization, evidenced by a coefficient of 0.0037 and a Z-value of 2.47, attaining statistical significance at the 5% level ($p = 0.614$). The marginal effect (dy/dx) of 0.0001, while minimal, suggests that as flock size increases, the likelihood of using insurance services also experiences a slight uptick. This observation is consistent with the perspective that farmers overseeing larger operations are more inclined to view insurance as beneficial due to their heightened exposure to risk, given that they have more to lose in terms of potential losses. This positive association between flock size and insurance adoption reinforces the notion that larger-scale farmers may exhibit a greater inclination

to safeguard their assets, as any loss could result in considerable financial difficulties. The finding corroborates the conclusions reached by Olutumise et al (2023) regarding poultry farmers in Ondo State. A major interpretation of this finding is grounded in the economic rationale for insurance utilization. Typically, larger flock sizes indicate more substantial investments in poultry farming endeavors. As farmers allocate increased resources, both financial and human, to the growth of their flocks, the potential risks linked with poultry farming become increasingly evident. These risks may include epidemics, environmental calamities, or variations in market conditions that could result in important financial consequences.

Awareness of Insurance

Awareness of insurance demonstrates a notable negative correlation with insurance utilization, exhibiting a coefficient of -2.9037, a Z-value of -2.42, and a probability of 0.016, important at the 5% level. The marginal effect of -0.4614 indicates that insufficient awareness regarding insurance substantially diminishes the likelihood of insurance adoption. This result emphasizes the essential role that awareness plays in shaping insurance uptake. Agricultural producers who lack sufficient information about insurance options, advantages, and processes are less likely to engage, probably due to uncertainty or misconceptions regarding the value of insurance. This finding indicates that focused awareness campaigns could be essential in enhancing insurance utilization rates among farmers. The result corroborates the study by Ojogbane and Gbigbi (2022), which argues for a positive correlation between awareness status and the likelihood of willingness to pay for insurance, further reinforcing the significance of awareness in decision-making. This alignment with technology adoption illustrates a broader trend wherein knowledgeable decision-making is connected to awareness, not only within the scope of insurance but across multiple sectors. Furthermore, the negative correlation between awareness and insurance utilization emphasizes a potential obstacle that policymakers must address. This may reflect challenges such as inadequate access to information, ineffective communication channels, or even misunderstandings about the advantages of agricultural insurance. Identifying these obstacles is essential for creating targeted interventions aimed at enhancing awareness and, as a result, increasing insurance utilization rates among farmers.

Attitude Toward Insurance

The perspective on insurance is another important factor that affects insurance usage, with a positive coefficient of 3.6538, a Z-value of 2.93, and a probability of 0.003, which is major at the 1% level. The marginal effect of 0.3172 indicates that a more positive view of insurance considerably enhances the likelihood of adoption. This finding suggests that individuals perception and belief in the effectiveness and reliability of insurance play a important role in motivating farmers to acquire insurance. A positive attitude may arise from perceived benefits or confidence in insurance providers, emphasizing the necessity of cultivating positive views through consistent service delivery and customer education. Recognizing these psychological factors can assist policymakers, insurers, and agricultural extension services in designing interventions to positively impact farmers' views. Farmers face numerous risks, which can include uncertainties related to weather and fluctuations in the market. An optimistic perspective regarding insurance may indicate that a farmer acknowledges the importance of managing risks and comprehends the role of insurance in mitigating the impact of unforeseen occurrences. Ajemunigbohun et al (2020) study supports the current findings of this investigation. This finding reinforces the notion that promoting risk awareness and education regarding insurance benefits can be a strategic method for encouraging adoption among farmers. The positive relationship indicates that establishing trust in the insurance industry is essential for increasing adoption. Farmers with positive attitudes may view insurance providers as dependable

partners in protecting their agricultural investments. Therefore, efforts to enhance transparency, simplify insurance processes, and provide clear information about the benefits can contribute to establishing trust and, in turn, nurturing positive attitudes.

Premium

The cost of premiums has a notable adverse effect on the utilization of insurance, with a coefficient of -2.6684, a Z-value of -2.27, and a probability of 0.023, which is major at the 5% level as depicted in Table 2. The marginal effect of -0.4357 suggests that enhanced premiums dissuade farmers from acquiring insurance. This finding is consistent with economic theory, as high costs diminish the perceived affordability and cost-effectiveness of insurance for farmers. Farmers, especially those with limited resources, may consider insurance premiums to be a financial strain, opting to manage risks independently. This result emphasizes the necessity of designing affordable insurance products that cater to the financial capabilities of smallholder farmers, since exorbitant premiums may prevent their participation. Bear in mind that the negative correlation identified in this study emphasizes the critical significance of affordability in influencing farmers' insurance-related decisions. The discovery corroborates the idea that enhanced premium costs can are an obstacle, restricting the accessibility of insurance for farmers. This indicates that a considerable segment of the agricultural population may be left outside the protective scope of insurance due to financial limitations created by premium costs. As a result, this could leave farmers more exposed to heightened risks and vulnerabilities, especially when confronted with unpredictable events such as adverse weather, crop failures, or other insurable hazards. This finding concurs with Gbigbi and Ndubuokwu (2022). The differing result in relation to other research emphasizes the contextual aspects of insurance utilization behaviors. The importance of affordable premium structures, as demonstrated in the study by Ojogbane and Gbigbi (2022); Hossain et al. (2022), cannot be underestimated. The fact that nearly all the farmers in that study expressed a willingness to pay any premium for insurance utilization emphasizes the critical impact of the affordability factor on farmers' perspectives regarding insurance. This finding carries major policy implications. It is essential for policymakers and insurance providers to carefully manage the equilibrium between ensuring the financial sustainability of insurance programs and guaranteeing that they are accessible and appealing to the target audience. This requires a reassessment of premium structures and the development of creative approaches to enhance affordability, possibly through subsidies, risk-pooling strategies, or alternative financial instruments that mitigate the fiscal strain on farmers.

Access to Credit

As shown in Table 2, Access to credit has a positive and major impact on insurance utilization, with a coefficient of 2.1299, a Z-value of 2.01, and a probability of 0.044, which is major at the 5% level. The marginal effect of 0.2828 indicates that farmers with access to credit are more inclined to adopt insurance services. Access to credit may enhance a farmer's ability to pay for insurance premiums, thereby promoting participation. Besides, some credit providers may stipulate insurance coverage as a prerequisite for loan approval, directly linking credit access with insurance utilization. This finding indicates that improving farmers' access to credit could simultaneously bolster their capacity to afford and adopt insurance. This result emphasizes the essential role that credit accessibility plays in influencing farmers' choices to obtain insurance coverage and actively engage with insurance services. The finding corresponds smoothly with the insights presented by Gbigbi and Ndubuokwu (2022) study, emphasizing the facilitative role of financial resources in managing risks through insurance. This alignment further strengthens the reliability and consistency of the observed relationship, adding further credibility to the research

findings. One major implication of this positive relationship is the potential for access to credit to are a catalyst for enhancing farmers' resilience to various risks. Access to credit has improved for farmers, which enhances their capacity to manage the uncertainties fundamental in agricultural activities. This increased financial flexibility allows them to actively seek insurance coverage, thereby creating a stronger safety net against unforeseen occurrences such as crop failures, natural disasters, or fluctuations in the market.

Occupation

The occupation variable, exhibiting a positive coefficient of 3.1793, a Z-value of 2.46, and a probability of 0.014 (which is important at the 5% level), indicates a strong positive effect on insurance utilization. The marginal effect of 0.6186 implies that the character of a farmer's primary occupation plays an important role in their propensity to adopt insurance. Farmers who are more commercially oriented or whose income predominantly hinges on farming may experience a heightened necessity to protect their livelihood through insurance. This positive correlation suggests that initiatives aimed at promoting insurance services could be particularly effective if they focus on full-time farmers who are more financially reliant on agricultural productivity. The financial implications associated with poultry farming are considerable. Full-time poultry farmers allocate substantial resources to acquire and maintain poultry infrastructure, procure high-quality breeds, and oversee daily operations. In contrast to part-time farmers, who may have diversified income streams, full-time poultry farmers substantially depend on the success of their poultry operations for sustenance. The fundamental financial risks related to poultry farming, stemming from variables such as disease outbreaks, market fluctuations, or adverse weather conditions, call for a comprehensive risk management approach. In this scenario, insurance becomes an essential instrument for alleviating financial losses due to unpredictable events. Besides, the reliance on poultry farming as the sole or primary income source heightens sensitivity to economic changes. Any disruption in poultry production or income can result in an immediate and direct effect on the financial stability of full-time poultry farmers. Acknowledging this vulnerability, these farmers are more inclined to pursue insurance coverage as a strategy for establishing a safety net against unforeseen circumstances. The desire to safeguard one’s livelihood is a strong motivator for actively engaging with insurance services. The correlation implies that full-time poultry farmers may possess a more important understanding of the risks related to their profession. This increased awareness might arise from their daily involvement and practical experience in managing various facets of poultry farming. Consequently, they are more likely to evaluate potential risks and take proactive steps to mitigate them, including seeking insurance services.

Table 2: Factors influencing utilization of insurance services

Variables	Coefficient	Std error	Z	Probability	dy/dx
Education	-0.34502	0.9298	-0.37	0.711	-0.0553
Farming experience	-0.2320	0.193	-1.20	0.230	-0.0372
Flock size	0.0037	0.0015	2.47	0.614**	0.0001
Awareness of insurance	-2.9037	1.2019	-2.42	0.016**	-0.4614
Attitude towards insurance	3.6538	1.2483	2.93	0.003**	0.3172
Premium	-2.6684	1.1755	-2.27	0.023**	-0.4357
Access to credit	2.1299	1.0589	2.01	0.044**	0.2828
Occupation	3.1793	1.2937	2.46	0.014**	0.6186
Constant	1.8231	3.194	0.57	0.568	

** =significant at 5%

Level of use of insurance services

The level of use of insurance services among poultry farmers was analyzed based on key indicators, as presented in Table 3**.**

Extension Services (ES)

With a score of 2.30, extension services are the most commonly used among poultry farmers as shown in Table 3. This high degree of involvement indicates that farmers recognize the importance of these services in providing technical assistance, information on best practices, and guidance on farm management. Extension services are likely critical in helping poultry farmers to improve their production processes and tackle challenges such as disease management, feed efficiency, and productivity enhancement. The frequent use of Extension Services may also reflect their accessibility and importance to farmers' daily activities. Extension agents play an essential role in connecting the knowledge gap between research findings and field applications, which is particularly essential in rural areas with limited information access. Increasing the range and frequency of extension services could further boost farmers' productivity and resilience against common risks. The utilization of Extension Services has been highlighted as critical to the functionality of agricultural sectors, particularly among poultry farmers. As shown in the work by Shkembi et al. (2024) extension services are pivotal for enhancing sustainability and providing both practical and academic knowledge to farmers, thus bridging the gap between research and actual farming practices. Additionally, Mishra and Singh (2024) note that tailored training and the efficient delivery of agriculture-related knowledge contribute significantly to farmers' adoption of modern techniques in livestock management. The consistent emphasis in these studies on enhancing accessibility and responsiveness of extension services suggests a strong correlation between their utilization and farmers' productivity levels.

Veterinary Services (VS)

With a score of 2.16, veterinary services are also commonly accessed, showing poultry farmers' recognition of the significance of animal health and disease management. The availability of veterinary services allows farmers to receive prompt medical care for their flocks, which is essential in preventing losses from illnesses, improving flock productivity, and maintaining overall poultry health. However, challenges such as the expense and accessibility of these services may persist in limiting their overall effectiveness. There is also a chance that some farmers rely on informal veterinary support due to insufficient formal veterinary coverage in rural areas. Enhancing access to veterinary services and possibly reducing their costs could improve health outcomes for poultry flocks and promote sustainable farming practices. Veterinary services are recognized for their importance in managing animal health among poultry farmers. As reported by Tsay & Paulson (2024), the provision of veterinary care directly impacts flock health and productivity. The report emphasizes the necessity of these services in preventing disease outbreaks, which, if ignored, could lead to substantial economic losses (Shkembi et al., 2024). Furthermore, Mishra and Singh (2024) state that while veterinary services are crucial, their accessibility remains a challenge, and improving these services could yield more robust livestock practices.

Training of Farmers (TOF)

According to Table 3, Training of farmers received a score of 2.22, suggesting that poultry farmers actively engage in training programs. Training sessions offer essential knowledge in areas such as farm management, disease

prevention, and the adoption of innovative farming techniques, which can directly boost productivity. The high engagement rate indicates that farmers are aware of the advantages of training and may consider it a worthwhile investment to enhance their farm operations. Nevertheless, the accessibility of training and the relevance of the curriculum could be improved to make sure that farmers are sufficiently equipped to handle emerging industry challenges. Besides, consistent and updated training programs could address the changing environment of poultry farming and enhance farmers' ability to adapt to new risks and opportunities. Training programs represent an essential area of focus for poultry farmers, as outlined in the studies by Khanal et al. (2024) which illustrate that participation in training significantly enhances the farmers' knowledge and capability in adopting modern farming practices. Furthermore, Koprivica et al. (2024) discuss the role of training in overcoming barriers to the adoption of insurance and risk management strategies, highlighting that informed farmers are more likely to utilize available insurance products effectively. The ongoing need for updated and targeted training regimens is corroborated by Oben et al. (2024) who stress that adapting curricula to meet current agricultural challenges can strengthen farmers' responses to risks.

General Risk Coverage (GRC)

General risk coverage has a score of 2.02, reflecting moderate utilization by poultry farmers. This service likely offers a form of fundamental protection that addresses common risks in poultry farming, such as disease outbreaks and severe weather. Farmers' adoption of this coverage may arise from a need to safeguard their investments against unforeseen events. However, the moderate score suggests that some farmers may perceive insurance coverage as either insufficient or costly. Expanding general risk coverage to encompass a broader range of risks and making it more affordable could encourage more farmers to take advantage of this service, thereby enhancing the poultry sector's resilience to unexpected events. General Risk Coverage shows moderate utilization among farmers, reflecting a necessary protective measure against common agricultural vulnerabilities. The analysis by Philippi & Schiller (2024) suggests that expanding risk coverage could better align with farmers' needs and lead to increased uptake. Moreover, Mishra & Singh (2024) highlight that understanding the scope of risks covered by insurance programs can support farmers in securing their investments.

Provision of Premium Subsidy (PPS)

With a score of 1.80, the provision of premium subsidy is not widely used by poultry farmers as indicated in Table 3**.** This finding indicates that premium subsidies, which could make insurance more accessible, are not reaching farmers effectively or that the available subsidy is insufficient to offset costs. Cost is often a major barrier to insurance adoption among small-scale farmers, and this underutilization could indicate that the subsidies provided are inadequate to make a meaningful impact. Addressing this issue may involve raising subsidy levels, simplifying the application process for subsidies, and guaranteeing that farmers are well-knowledgeable about the financial support available to them. The underutilization of premium subsidies is a noteworthy concern, as indicated in studies by Cha et al. (2024) which emphasize that without adequate subsidies, farmers may remain hesitant to adopt insurance coverage. The findings by Koprivica et al. (2024) affirm that significant premium subsidies are crucial for increasing the uptake of insurance products among rural populations, suggesting a direct correlation between subsidy levels and farmer participation rates. Furthermore, Ma et al. (2024) indicate that governments must ensure that subsidies are sufficient to lower entry barriers for farmers into the insurance market.

Insurance Coverage of Equipment (ICOE)

Scoring 1.82, insurance coverage of equipment is another service that is not widely used. This low score suggests that poultry farmers may not perceive equipment insurance as essential, or they might view the premiums as too high compared to the perceived risk or replacement cost of their equipment. Alternatively, some farmers may be unaware of this coverage option. Given that equipment represents a substantial investment in poultry farming, promoting the advantages of insuring equipment could help protect farmers' assets and maintain operational continuity in the event of equipment damage or failure. The low utilization rate for insurance coverage of equipment appears linked to perceptions of cost versus risk, as explored by Tsay & Paulson, (2024) who found that farmers prioritize covering more immediate risks over equipment. The research by Cha et al. (2024) supports this by suggesting that raising awareness about the benefits and necessity of equipment insurance can change farmers' attitudes.

Coinsurance Service (CIS)

Coinsurance Service achieved a score of 1.88, indicating minimal utilization among poultry farmers. Coinsurance, which involves the sharing of risk between the insurer and the insured, can be a financially efficient method for farmers to mitigate their financial exposure. However, the low score suggests that poultry farmers may either not understand the concept of coinsurance or lack confidence in its benefits. Educating farmers on how coinsurance works and its potential to reduce individual risk burdens could help increase uptake. Besides, redesigning coinsurance policies to better align with farmers' financial capacities and risk tolerances might improve its appeal. The minimal uptake of coinsurance services indicates a gap in understanding among farmers regarding how these services can mitigate financial exposure. Research by Khanal et al. (2024) emphasizes an educational approach to better inform farmers about coinsurance and its mechanics. Additionally, Ojogbane & Gbigbi (2022). underline that clearer policy designs that consider farmers' financial capabilities could enhance the attractiveness of coinsurance.

Payment of Indemnity (POI)

Payment of Indemnity, which has a score of 1.82, indicates low utilization. This observation may suggest that poultry farmers are either unaware of their eligibility for indemnity payments or perceive the claims process as tedious and uninviting. Indemnity payments are designed to provide compensation to farmers for losses and can play an essential role in assisting them to recover from adverse situations. By simplifying and simplifying the claims process while enhancing awareness regarding the operation of indemnity payments, it is possible to encourage a greater number of farmers to use this service as a safety net for losses. Indemnity payments show low engagement levels, and this may be attributed to the complexity involved in the claims process as stated in studies by Philippi and Schiller (Philippi & Schiller, 2024). Misunderstandings regarding eligibility and the claims process can deter farmers, as noted by Mishra and Singh, who argue for educational initiatives to simplify these operations (Mishra & Singh, 2024). Furthermore, improved communication about the potential benefits of indemnity payments could encourage farmer participation.

Encouraging Institutional Lenders to Lend More to Agriculture (EIL)

With a score of 1.80, the initiative focused on encouraging institutional lenders to lend more to agriculture is currently underutilized. This may reflect various challenges such as limited access to financial institutions, high interest rates, or stringent lending terms that deter poultry farmers from seeking credit. Enhancing poultry farmers' access to affordable credit and easing collateral requirements could assist greater borrowing, enabling farmers to invest in their operations and potentially enhance productivity. Furthermore, encouraging stronger collaborations between insurance providers and financial institutions could render borrowing more attractive by combining loans with insurance coverage, thereby affording farmers additional protection against financial risks. The initiative to encourage institutional lenders reflects a broader economic support structure necessary for farmer growth. As evidenced by Li et al. (2024) the facilitation of easier access to credit can significantly boost agricultural expansion. Studies suggest that reducing barriers such as high interest rates can encourage more farmers to seek loans that could enhance productivity (Peirong, 2024).

Limitations confronting utilization of insurance services

This reveals that every participant (100%) did not have enough knowledge about the benefits of agricultural insurance as presented in Table 4**.** This lack of understanding could prevent them from using insurance services. A complete consensus among participants (100%) regarding this matter indicates that the implementation of insurance policies in the agricultural sector is challenging and may be discouraging. For instance, Muraya et al. (2024) indicate gaps in farmers' knowledge regarding Weather Index Insurance (WII) but do not report a specific 100% unawareness, suggesting that awareness levels can vary and are contextual. All participants (100%) experienced delays in receiving indemnity payments, which can be frustrating and create financial strain. Moreover, challenges related to indemnity payments, with significant delays reported by farmers, align with Udoh et al.'s (2024) findings that mention a notable percentage of respondents encountering delays, which can dissuade farmers from pursuing insurance options due to frustrations.

Table 3: Level of insurance services utilization

Services	Mean	Standard deviation	Utilization
PPS	1.80	0.70	Low
ES	2.30	0.71	High
VS	2.16	0.77	High
ICOE	1.82	0.77	Low
GRC	2.02	0.77	High
CIS	1.88	0.77	Low
POI	1.82	0.75	Low
EIL	1.80	0.76	Low
TOF	2.22	0.79	High

Note: A mean score ≥ 2.00 indicates high utilization**,** while a mean score < 2.00 indicates low utilization. Standard deviations indicate variations in responses among poultry farmers regarding the extent of insurance service utilization

This aligns with the issues of cash flow and distrust toward the insurance system. Another shared concern suggests that the compensation received through insurance policies is inadequate to cover the losses experienced by participants (100%), which undermines the purpose of insurance. The consensus regarding insufficient compensation from insurance policies is reflected in the findings of Charamba (2024), who discusses the inadequacy of compensation schemes and their funding, highlighting farmers' dissatisfaction. This supports the claim regarding inadequacy of compensation but does not suggest that all participants indicated this uniformly.
A considerable number of participants (68%) found that the procedures for securing insurance coverage were protracted, which may dissuade them from seeking insurance as seen in Table 4**.** An important number (66%) of participants voiced worries that insurance claims might not be fulfilled when necessary. This skepticism regarding the insurance system can discourage farmers from using insurance services. Participants' concerns regarding prolonged procedures (68%) and difficulties in accessing insurance representatives (56%) do align with broader trends. However, the reference by Kanchai et al. (2024) does not pertain to the hurdles in accessing insurance representatives. More than half of the participants (54%) were not aware of the insurance options available, emphasizing needing enhanced communication and education about agricultural insurance. Over half (56%) of the participants indicated difficulty in reaching insurance representatives. This can pose a logistical challenge for farmers who may need help or information about their policies. A notable proportion of participants (52%) encountered financial limitations due to their low income as poultry farmers, making it difficult to pay for insurance premiums. Lastly, the financial constraints reported by participants resonate with observations by Koprivica, et al (2024) who states that low financial capacity restricts rural populations' ability to afford insurance premiums. Only 48% of participants viewed the payment of premiums as a barrier to their use of insurance services. This indicates that while some participants experience issues related to premium payments, it is not the most important concern among them.

Research hypothesis

Demographic characteristics of respondents and utilization of insurance services

The results detailed in Table 5 illustrate the connection between various socioeconomic characteristics and using insurance services among the respondents, as analyzed through the Chi-square test. The Chi-square value (X^2-value), degrees of freedom (Df), and asymptotic significance (p-value) for each variable assist in evaluating whether there exists a statistically major correlation between the characteristics and using insurance services.

Sex: The result from the Chi-square test regarding sex reveals an extremely low X^2-value of 0.001 alongside a p-value of 0.979. This enhanced p-value, greatly exceeding the standard cutoff of 0.05, indicates that there is no meaningful association between sex and the adoption of insurance services. This outcome suggests that both men and women in the study sample exhibit similar chances of using insurance services. As insurance uptake is frequently associated with financial or risk-related aspects rather than solely gender, this finding indicates that gender-neutral policies and outreach strategies may be suitable for encouraging insurance enrollment among both male and female participants. While the present study found no significant association between sex and insurance usage, other research indicates that gender can play a role in agricultural insurance uptake. For instance, a study on crop insurance among smallholder maize farmers noted that insurance appeared to be more biased against women among subscribers (Bai et al. 2024). However, specific studies on poultry farmers found that sex was a significant factor influencing participation in agricultural insurance.

Table 4: Limitations confronting utilizing insurance services

Limitations	Frequency	Percentage
Insufficient knowledge on the benefits of insurance	150	100
Fears that claims may not be paid	99	66
Lack of information about availability of agricultural insurance	81	54
Difficulty in implementing insurance policy	150	100
Low income of poultry farmers	78	52
Delay of payment of indemnity	150	100
Compensation does not cover losses	150	100
Unable to have access to insurance personnel	84	56
Procedures of taking up insurance cover is too long	102	68
Payment of premium	72	48

Note: The percentages indicate the proportion of poultry farmers who identified each limitation as a challenge in utilizing insurance services. Some limitations were reported by all respondents (100%), emphasizing their critical impact on insurance uptake.

Age: The Chi-square value for age is recorded at 30.469, with 26 degrees of freedom, and an asymptotic significance level of 0.249. While the Chi-square statistic is relatively substantial, the associated p-value of 0.249 surpasses the 0.05 significance threshold, signifying no statistically major link between age and insurance services. This indicates that age may not play a critical role in the decision to use insurance services among the study participants. Although age generally influences financial choices, including the adoption of insurance, due to correlations with income stability and risk acceptance, this analysis shows that insurance usage remains consistent across various age groups, implying that insurance needs and behaviors are more evenly distributed across different age segments in this instance. The present study found no significant link between age and insurance services. However, other research suggests that age can influence insurance adoption. For example, a study on poultry farmers indicated that age was a significant factor affecting participation in agricultural insurance (Udoh et al 2024) Another study highlighted that age, along with education level and access to extension services, influenced the adoption of insurance as a climate risk management strategy (Baba et al 2024).

Marital Status: The Chi-square result shows an X^2-value of 2.942 and 3 degrees of freedom, with a p-value for marital status being 0.401. This value emphasizes the absence of a statistically major relationship between marital status and insurance service utilization. Regardless of whether respondents are single, married, divorced, or widowed, their likelihood of engaging with insurance services remains largely unchanged. This finding implies that marital status may not greatly influence insurance usage, despite the possibility that married individuals sometimes feel a heightened necessity for financial protection. The lack of a major correlation might suggest that family-related considerations do not primarily drive insurance decisions within this sample, and therefore, promoting insurance as a measure of family security may not considerably alter utilization patterns. The present study found no significant relationship between marital status and insurance usage. However, a study on crop insurance among smallholder farmers found that marital status was correlated with the decision to use crop insurance (Aina et al 2024). This suggests that marital status might influence insurance uptake in specific contexts.

Education: The Chi-square value related to education stands at 1.996, accompanied by a p-value of 0.369, which indicates no major correlation between education level and insurance usage. It is commonly believed that educational attainment influences individuals' choices regarding the adoption of insurance services, with higher

education levels potentially enhancing awareness of financial products and their advantages. Nevertheless, the absence of a statistically major correlation in this instance indicates that educational background might not heavily affect whether respondents opt to use insurance services. This could point to the possibility that information and access to insurance are affordably available to individuals across different educational levels, or that mere knowledge is not enough to encourage insurance adoption without supporting factors like affordability or accessibility. While the present study found no major correlation between education level and insurance usage, other research indicates that education significantly influences agricultural insurance adoption. For example, studies have shown that farmers with higher educational levels are more likely to understand and participate in agricultural insurance (Ugwuja et al 2024). Educated farmers are better equipped to appreciate the benefits of crop insurance.

Farming Experience: The Chi-square analysis for farming experience yields $X^2 = 10.896$ with 13 degrees of freedom, and a p-value of 0.620, indicating no statistically major relationship between farming experience and using insurance services. This result suggests that respondents, regardless of their farming experience whether they are novices or seasoned farmers do not show major differences in their patterns of insurance usage. One might expect that more experienced farmers would seek out insurance for protection against risks they have faced over time, but this finding implies that, within this sample, experience does not lead to increased insurance uptake. This outcome may emphasize needing customized outreach that emphasizes the specific advantages of insurance for farmers across all experience levels. The present study found no significant relationship between farming experience and insurance usage. However, other studies suggest that farming experience can influence insurance adoption. For instance, a study in Benin found that farming experience was a determinant of participation in agricultural insurance schemes (Zoundji et al. 2024).

Table 5: Chi-square test on socioeconomic characteristics and utilization of insurance services

Variables	X^2 – value	Df	Asymp. Sig. (2 sided)
Sex	0.001	1	0.979
Age	30.469	26	0.249
Marital status	2.942	3	0.401
Education	1.996	2	0.369
Farming experience	10.896	13	0.620
Household size	9.811	12	0.633

Note: The results indicate that none of the socioeconomic characteristics tested (sex, age, marital status, education, farming experience, and household size) have a statistically significant relationship with the utilization of insurance services, as all p-values (Asymp. Sig.) are greater than 0.05**.**

Household Size: Concerning household size, the Chi-square test results in an $X^2 = 9.811$, with 12 degrees of freedom and a p-value of 0.633, indicating no substantial association with insurance service utilization. Household size typically influences financial decision-making, as larger families may seek additional protection for their dependents; however, the lack of a major correlation in this case suggests that respondents' decisions regarding insurance usage are not swayed by the number of individuals in their household. This might imply that insurance companies could focus on emphasizing individual-centered benefits in their outreach, since household size does not become a critical factor affecting the decision to use insurance services. The present study found no substantial

association between household size and insurance service utilization. While household size typically influences financial decision-making, specific studies on agricultural insurance often emphasize other socioeconomic factors like income and employment status. However, household size positively influences insurance decisions through its impact on financial needs and risk management strategies (Obalola et al 2024).

Influence of insurance services on income shocks

The findings in Table 6 demonstrate the effect of different insurance services on income shocks experienced by poultry farmers. Regarding model performance, the R^2 value of 65.16% indicates that the model accounts for a notable portion of the variation in income shocks, with the independent variables explaining more than 65% of the differences. This indicates that the elements included in the model play a essential role in elucidating income shocks among poultry farmers. The F-ratio of 12.23 further reinforces the overall relevance of the model, showing that the combined effect of the independent variables on income shocks is statistically major and not a result of random fluctuations. The provision of subsidies (PPS) demonstrates a major negative association with income shocks, exhibiting a coefficient of -17.913 and a t-ratio of -2.68, indicating that subsidies effectively help to lessen income shocks among poultry farmers. Subsidies can provide financial assistance during crises, enabling farmers to manage unexpected losses or costs. They help minimize expenses for farmers, allowing them to allocate a greater proportion of their income toward savings or risk mitigation activities. When subsidies are in use, farmers may experience greater financial flexibility and a reduced need for credit during periods of income volatility. Therefore, PPS may bolster their resilience to income shocks by offering a financial cushion. This finding emphasizes the significance of government or organizational subsidies as essential mechanisms for alleviating the effects of economic uncertainty or unexpected events, particularly within the unstable agricultural sector. The statistically major negative impact indicates that poultry farmers receiving subsidies are better positioned to absorb income shocks, which may arise from factors such as market price changes, disease outbreaks, or natural disasters. A study on the impact of subsidy removal on smallholder livestock farmers in Nigeria highlights that the removal of subsidies led to increased costs and reduced productivity among these farmers (Mohammed 2024). This supports the notion that subsidies can mitigate income shocks by reducing operational costs.

Conversely, the extension services (ES) variable, with a coefficient of 1.091 and a t-ratio of 0.14, indicates a positive relationship with income shocks, although this effect lacks statistical significance. Extension services can greatly educate farmers about optimum practices, strategies for managing risk, and effective resource utilization. The knowledge obtained from these services can lower the chances of losses and enhance productivity, indirectly bolstering farmers' capacity to endure income shocks. Farmers who have access to and use these services may achieve more consistent production results and improved income stability. Although extension services aim to equip farmers with critical insights on best practices, crop management, and disease prevention, the absence of statistical significance implies that these services, while beneficial in enhancing long-term farm productivity, do not exert a strong immediate effect on alleviating income shocks. It is plausible that the influence of extension services is more prospective, concentrating on boosting farm productivity and sustainability rather than offering immediate financial support during crises.

Veterinary services (VS), which show a coefficient of -10.456 and a t-ratio of -1.22, also indicate a negative correlation with income shocks, but this effect is not statistically major. Access to veterinary services has the potential to substantially diminish the risk of poultry loss due to disease, one of the most major threats in poultry farming. Regular veterinary attention encourages healthier stock, thereby reducing possible income loss. Thus, a high reliance on veterinary services enhances a farmer's ability to withstand livestock-related income shocks. Nevertheless, the lack of statistical significance for this variable emphasizes that, while veterinary services may

contribute to farm steadiness by promoting healthy livestock, they do not exert a decisive enough impact on alleviating financial shocks in the short term. This may result from variability in the quality and accessibility of veterinary services or the fact that the financial implications of veterinary care may not be major enough to offset more considerable income shocks caused by external factors like market instability or climate-related issues.

Insurance coverage for equipment (ICOE) shows a major negative connection with income shocks, registering a coefficient of -17.183 and a t-ratio of -2.38. This finding emphasizes that insurance coverage for essential farming equipment, such as incubators, feed systems, and heating units, is essential for reducing income shocks. Breakdown of equipment can greatly disrupt poultry production; however, insurance coverage provides a safety net by reimbursing farmers for repair or replacement expenses. This enables poultry farmer to maintain operations without facing financial devastation. The statistical significance of this variable emphasizes the critical importance of insuring farming equipment, as it helps to mitigate the financial exposure of farmers to unforeseen equipment failures, thus enhancing their resilience against income shocks.

The general risk coverage (GRC) variable, with a coefficient of -2.583 and a t-ratio of -0.41, demonstrates a negative relationship with income shocks, yet the effect is not statistically major. General risk coverage is designed to protect farmers from a variety of risks, including extreme weather, fluctuating market prices, and other unpredictable factors. When farmers possess comprehensive coverage, they are more insulated from risks that could potentially disrupt income, contributing to a stronger buffer against income shocks. Thus, the utilization of GRC plays a role in ensuring steady income, even amidst unpredictable farming challenges. However, the low statistical significance indicates that this form of broad risk coverage may not be effective enough to greatly lessen income shocks among poultry farmers. This may result from general risk coverage being too generalized or not specifically customized to address the key risks encountered by poultry farmers, such as disease outbreaks or sudden market fluctuations. Consequently, although general risk coverage may provide some protection, its effectiveness in mitigating income shocks seems limited.

Likewise, the coinsurance service (CIS) variable, with a coefficient of 0.882 and a t-ratio of 0.13, indicates a positive relationship with income shocks, though the effect is again not statistically major. Coinsurance involves sharing the cost of insurance between the farmer and the insurer, making insurance more affordable while still offering substantial coverage for risks. Farmers using coinsurance services may be more capable of managing costs and accessing insurance, thereby increasing their protection against shocks without incurring the full cost of premiums. The shared financial burden aids in maintaining resilience without stretching resources too thin, but the low t-ratio suggests that the influence of coinsurance on income shocks is negligible. This outcome may imply that while coinsurance can lessen the financial burden on farmers to some degree, it fails to deliver adequate coverage to effectively mitigate the larger income shocks that poultry farmers frequently face. The slight positive coefficient indicates a minimal potential for coinsurance to aid income stability, but its limited effectiveness suggests that alternative financial protection strategies, such as indemnity payments or subsidies, are likely more impactful.

Payment of indemnity (POI), with a coefficient of -20.289 and a t-ratio of -2.81, emerges as one of the most major predictors of reduced income shocks among poultry farmers. Indemnity payments, which reimburse farmers for losses incurred due to covered risks such as natural disasters or disease outbreaks, are essential in assisting farmers with recovering from income shocks. A high utilization of indemnity services directly contributes to the absorption of income shocks by providing funds exactly when income is at risk. The negative coefficient and high t-ratio signify that indemnity payments are very effective in diminishing income shocks. By compensating for lost income and covering unexpected costs, indemnity payments equip poultry farmers with the financial stability necessary to maintain operations during challenging times. This finding emphasizes the necessity of establishing effective indemnity mechanisms as a important approach for enhancing farmers' resilience to income shocks while promoting long-term agricultural sustainability. Studies indicate that despite the benefits, many small-scale farmers

have low demand for agricultural insurance products due to barriers such as high premiums and lack of awareness. This suggests that while indemnity payments can mitigate income shocks, their effectiveness might be limited if farmers do not utilize insurance products (Attipoe, & Adams 2024).

Encouraging institutional lenders (EIL), with a coefficient of -13.428 and a t-ratio of -2.36, also exhibits a substantial negative relationship with income shocks as seen in Table 6**.** Access to formal credit from financial institutions provides poultry farmers the opportunity to secure loans that they can use for investments, recovery, or smoothing income fluctuations. Institutional loans grant farmers essential liquidity during financial distress, enabling them to address cash flow issues, purchase inputs, or recover from unforeseen losses. The statistical relevance of this variable emphasizes needing assisting access to credit for farmers, especially in moments of financial instability. Promoting institutional lenders to offer affordable and accessible credit options is an essential policy intervention for alleviating income shocks and enhancing financial resilience within the agricultural sector. A study on poultry farmers in Nigeria found that only about 17% of respondents had accessed credit from formal lending institutions, highlighting significant barriers to accessing institutional credit. This suggests that despite the potential benefits, encouraging institutional lenders might not always lead to increased access for all farmers (Lawi, et al. 2024)

Table 6: Influence of insurance services on income shocks

Services	Coef.	Std. error	t-ratio
Payment of Subsidy (PPS)	-17.913	6.677	-2.68**
Extension Services (ES)	1.091	7.700	0.14
Veterinary Services (VS)	-10.456	8.540	-1.22
Insurance Coverage of Equipment (ICOE)	-17.183	7.234	-2.38**
General Risk Coverage (GRC)	-2.583	6.364	-0.41
Coinsurance Service (CIS)	0.882	6.914	0.13
Payment of indemnity (POI)	-20.289	7.227	-2.81**
Encouraging Institutional Lenders (EIL)	-13.428	5.700	-2.36**
Training of Farmers (TOF)	-18.343	6.155	-2.98**
Constant	3.930	44.260	0.09
R^2	65.16		
F-Ratio	12.23		

** = Significant at a 5% level of significance

The training of farmers (TOF), with a coefficient of -18.343 and a t-ratio of -2.98, displays a highly major negative effect on income shocks. Training programs provide farmers with the knowledge and skills to more effectively manage their operations, enhance productivity, and adapt to changing conditions. By improving farm management practices, disease prevention, and risk management strategies, training can greatly minimize income volatility. The substantial statistical significance of this variable indicates that educational and capacity-building initiatives are notably effective in assisting farmers in dealing with income shocks. Training enhances farmers' ability to make well-knowledgeable decisions, improve operational efficiency, and navigate financial challenges, thus decreasing their exposure to income fluctuations. This outcome emphasizes the value of farmer education and training as a crucial strategy for promoting resilience and ensuring sustainable agricultural practices. Despite the benefits of training, some studies indicate that small-scale farmers often face barriers in adopting new technologies and

practices. This suggests that while training can be effective, its impact might be limited if farmers do not fully integrate the knowledge into their operations (Sanusi & Dries 2024).

Conclusion

This research emphasizes the significance of insurance services in the poultry farming industry and proposes methods to improve their use and effectiveness in safeguarding farmers against income fluctuations. It concludes that financial assistance is accessible to help farmers reduce their insurance premium expenses. However, many farmers seem to be missing out on this financial aid, which may be attributed to a lack of knowledge or comprehension regarding the subsidy program. Farmers should obtain insurance coverage for their equipment, considering the high costs associated with agricultural machinery. If they are not making use of this service, it may signal the need for enhanced communication and outreach from insurance companies. Coinsurance represents a collaborative financial agreement between the insurer and the insured. If farmers are not taking advantage of coinsurance options, it could stem from a lack of full understanding about how it operates or the benefits it can provide. The receipt of indemnity payments typically refers to the compensation that farmers receive when they experience a covered loss. If farmers are not getting their indemnity payments as anticipated, it could result from administrative problems or delays. Optimizing the process is critical to ensuring that farmers receive their compensation without unnecessary delays. Encouraging institutional lenders to offer more loans to the agricultural sector is also essential for farmers to invest in their businesses and obtain the necessary resources. To enhance the adoption and impact of agricultural insurance, programs such as providing premium subsidies, broadening insurance coverage to encompass equipment, and motivating institutional lenders should be implemented. Training and outreach initiatives can help farmers grasp the advantages of coinsurance and how it can mitigate their financial risks. Cultivating relationships between farmers and lenders is essential, along with offering incentives or guarantees to attract financial institutions to agricultural lending. Establishing effective partnerships between poultry farmers and insurance agencies, including ongoing communication, workshops, and collaborations between farmers' groups and insurance companies, can help tailor insurance products to meet farmers' specific needs. Successful mobilization efforts should include awareness campaigns, training sessions, and outreach programs to educate farmers about the advantages of insurance coverage, the available subsidies, and how to access these services. Addressing issues such as enhancing knowledge sharing, optimizing processes, ensuring timely compensation, and tackling affordability concerns can significantly boost the impact and uptake of agricultural insurance. Simplifying and expediting the procedures for obtaining insurance coverage will help reduce the obstacles faced by farmers. Additionally, ensuring the prompt payment of indemnity and that compensation sufficiently addresses losses will help build farmers' confidence in insurance services.

Declaration

Acknowledgment: The authors sincerely appreciate the invaluable contributions of the anonymous reviewers whose insightful comments and constructive feedback helped enhance the quality, clarity, and rigor of this work, making it suitable for publication. We are grateful for their time and expertise in refining the manuscript.

Funding: Funding for this study is from the authors' own source(self-finance)

Conflict of interest: The authors declare that there is no conflict of interest associated with this research.

Ethics approval/declaration: N/A

Consent to participate: N/A.

Consent for publication: N/A

Data availability: Data available on request. Access would be based on a thorough scrutiny.

Authors contribution: Theophilus Miebi Gbigbi conceptualized the research, designed the methodology, and contributed to data analysis and interpretation. Christiana Ojirhevwe, also played part in the conceptualization of the study. contributed to literature review, participated in the instrument design and conducted the data collection. Both authors reviewed, edited, and approved the final version of the manuscript

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