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Research article

ANALYSIS OF THE CHALLENGES OF AGRICULTURAL INSURANCE ADOPTION FOR CLIMATE CHANGE ADAPTATION IN KUBAU LOCAL GOVERNMENT AREA, KADUNA STATE, NIGERIA

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ABSTRACT

Climate change continues to expose crop farmers in Nigeria to increasing production risks, threatening agricultural productivity and rural livelihoods. Although agricultural insurance is recognized as an important climate change adaptation strategy, its adoption among crop farmers remains low due to several financial, institutional and operational constraints. This study assessed the challenges affecting the adoption of agricultural insurance among crop farmers in Kubau Local Government Area, Kaduna State, Nigeria. Specifically, the study examined farmers' level of awareness of agricultural insurance and identified the major challenges affecting its adoption. A cross-sectional survey research design was adopted. The target population comprised 115, 648 registered crop farmers obtained from the 2025 crop farmer register maintained by the Kubau Local Government Department of Agriculture and Natural Resources Department. Data were collected from 384 registered crop farmers selected through a multistage sampling technique using a structured questionnaire. The collected data were analysed using frequencies, percentages, mean, standard deviation and Relative Importance Index (RII). The findings revealed a moderate level of awareness of agricultural insurance (grand mean = 3.02). The major challenges affecting adoption were delays in compensation and settlement of insurance claims (RII = 0.83), high insurance premiums (RII = 0.82), inadequate awareness and sensitization (RII = 0.81), low household income (RII = 0.81), and limited access to insurance providers (RII = 0.80). The study concludes that financial, institutional and operational barriers continue to constrain agricultural insurance adoption despite farmers' awareness. It recommends strengthening farmer sensitization, improving claims settlement, expanding rural insurance services, simplifying enrolment procedures and increasing premium subsidies to enhance agricultural insurance adoption.

KEYWORDS

Agricultural insurance;
Climate change adaptation;
Crop farmers; Awareness and
adoption.

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Introduction

Climate change has become one of the most significant environmental and development challenges confronting the global agricultural sector. Rising temperatures, changing rainfall patterns, prolonged droughts, floods, and the increasing frequency of extreme weather events continue to threaten agricultural productivity and food security, particularly in developing countries where farming is predominantly rain-fed (Ikpe, 2021). The dependence of millions of rural households on climate-sensitive agricultural systems has heightened concerns about the sustainability of food production, rural livelihoods, and economic development. According to the Intergovernmental Panel on Climate Change (IPCC, 2023), climate-related hazards are becoming more frequent and severe, thereby increasing production risks and reducing the resilience of farming communities. Consequently, governments, development agencies, and researchers have increasingly emphasized the adoption of climate change adaptation strategies capable of strengthening farmers' resilience and sustaining agricultural productivity (Food and Agriculture Organization [FAO], 2022).

Among the various adaptation measures, agricultural insurance has emerged as an important financial risk management instrument for reducing farmers' vulnerability to climate-induced shocks. Agricultural insurance is a contractual arrangement through which farmers transfer part of the financial risks associated with crop failure, livestock losses, or other agricultural hazards to an insurance provider in exchange for the payment of premiums (Mahul & Stutley, 2010). Unlike conventional disaster relief, agricultural insurance provides a structured mechanism for compensating insured farmers after verified losses, thereby facilitating quicker recovery and continuity of farming activities. It also enhances farmers' access to institutional credit because insured farmers are generally perceived as less risky by financial institutions. This encourages investment in improved agricultural technologies, quality inputs, and productivity-enhancing practices, thereby strengthening agricultural resilience and supporting sustainable agricultural development (Ahmed & Mkhitarian, 2022; World Bank, 2024).

Climate change adaptation refers to the process of adjusting natural or human systems in response to actual or anticipated climatic conditions and their effects in order to reduce adverse impacts or take advantage of beneficial opportunities (IPCC, 2023). In agriculture, adaptation encompasses measures such as the adoption of drought-tolerant crop varieties, irrigation, improved soil management, climate information services, and financial protection mechanisms such as agricultural insurance (FAO, 2022). The success of these adaptation measures depends not only on their technical effectiveness but also on farmers' willingness and capacity to adopt them. Consequently, understanding the factors influencing farmers' adaptation decisions has become increasingly important for developing policies that enhance agricultural resilience under changing climatic conditions (Bryan et al., 2011).

Statement of the problem

Despite the recognized importance of agricultural insurance, its adoption remains relatively low across many developing countries, particularly in Sub-Saharan Africa. Agricultural insurance adoption refers to farmers' decision to enroll in and consistently participate in insurance schemes designed to protect agricultural investments against climatic and production-related risks (Greatrex et al., 2015). Adoption decisions are influenced by several socioeconomic, institutional, financial, and behavioral factors, including farmers' income, educational level, farm size, awareness of insurance services, affordability of premiums, trust in insurance providers, accessibility of insurance products, and efficiency of claims settlement (World Bank, 2024). Although Nigeria has introduced several public and private agricultural insurance initiatives to strengthen farmers' resilience, participation among smallholder farmers remains low because of operational, financial, and institutional constraints that continue to undermine confidence in insurance services (Ahmed & Mkhitryan, 2022).

Nigeria's agricultural sector is highly vulnerable to climate variability because agricultural production depends largely on seasonal rainfall and smallholder farming systems. In Kaduna State, increasing occurrences of irregular rainfall, prolonged dry spells, flooding, and other climate-related hazards have adversely affected crop production, household income, and food security (Nigerian Meteorological Agency, 2024). Although the Nigerian Agricultural Insurance Corporation (NAIC) and other stakeholders continue to promote agricultural insurance as part of national climate adaptation programmes, challenges such as inadequate awareness, delayed claims settlement, limited insurance coverage, weak extension services, and poor access to financial services continue to constrain adoption (National Bureau of Statistics, 2024; NAIC, 2023).

Kubau Local Government Area (LGA) of Kaduna State is predominantly agrarian, with farming serving as the primary livelihood for most households. Farmers rely mainly on rain-fed agriculture and are increasingly exposed to climate-related production risks. Despite the potential of agricultural insurance to enhance farmers' adaptive capacity, its utilization remains considerably below expectation (Onwunali et al., 2025). Furthermore, limited empirical studies have comprehensively examined the location-specific challenges affecting agricultural insurance adoption in Kubau LGA. Given the unique socioeconomic, institutional, and environmental characteristics of the area, there is a need for empirical evidence to inform policies and improve insurance delivery mechanisms. Therefore, this study seeks to examine the challenges of agricultural insurance adoption for climate change adaptation in Kubau Local Government Area of Kaduna State with a view to providing evidence-based recommendations for strengthening farmers' resilience and promoting sustainable agricultural development.

Research questions

1. What is the level of awareness of agricultural insurance among farmers in Kubau LGA, Kaduna State?
2. What are the challenges affecting the adoption of agricultural insurance among farmers in the study area?

Methodology

Study area

Location and Physical Characteristics of the Study Area

Kubau Local Government Area (LGA) is located in the northern part of Kaduna State within the Northern Guinea Savannah region of Nigeria. It lies between Latitudes 10°15'35" and 11°55'21" North and Longitudes 8°04'15" and 8°35'10" East (see Figure 1). The LGA shares boundaries with Ikara, Lere, Kauru, Zaria, and Sabon Gari LGAs (Onwunali et al., 2025).

The area is predominantly rural and agriculturally important. It is characterized by open savannah vegetation with drought-resistant tree species such as neem (*Azadirachta indica*), locust bean (*Parkia biglobosa*), and baobab (*Adansonia digitata*). The terrain is generally undulating, with elevations ranging from 600 to 750 metres above sea level, while seasonal streams and tributaries support farming activities during the rainy season (Onwunali et al., 2025).

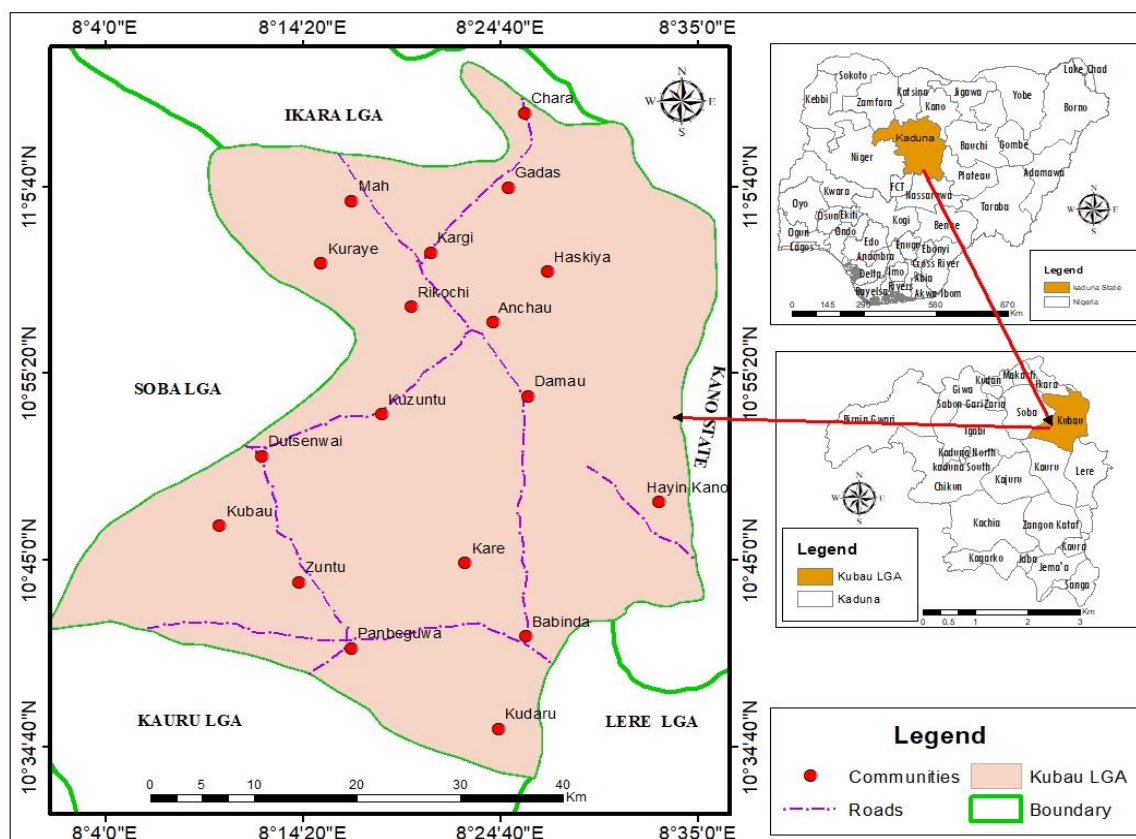


Figure 1: The Study Area

Source: Adapted and Modified from Administrative Map of Kaduna State (2026)

The area experiences a tropical continental climate characterized by distinct wet and dry seasons controlled largely by the movement of the Inter Tropical Convergence Zone (ITCZ). The rainy season usually begins in April and ends in October, while the dry season extends from November to March under the influence of the northeast trade winds. Average annual rainfall ranges between 900 mm and 1,200 mm, whereas mean annual temperatures vary between 24°C and 32°C (Echebima & Obafemi, 2023). The soils are predominantly ferruginous tropical soils that support the cultivation of crops such as maize, millet, sorghum, tomatoes, peppers, onions and vegetables. However, increasing climate variability, irregular rainfall, prolonged dry spells and occasional flooding have continued to expose farmers to significant production risks, resulting in declining agricultural productivity and income instability (Ikpe et al., 2023). These climate related challenges have increased the need for adaptation measures that can improve farmers' resilience, including the adoption of agricultural insurance as a financial risk management strategy.

According to the National Population Commission (2006), Kubau LGA had a population of 282,045 people, with recent projections indicating continued population growth due to expanding rural settlements and increasing economic activities. The inhabitants are predominantly Hausa and Fulani, whose major occupations include crop farming, livestock rearing, petty trading and agro processing. Agriculture remains the dominant economic activity, with most farmers practicing small scale rainfed agriculture that is highly susceptible to climatic uncertainties (Ikpe et al., 2023). Despite the efforts of government agencies and development partners to promote climate smart agricultural practices, including improved farming technologies and extension services, the adoption of agricultural insurance among farmers remains relatively low. This makes Kubau LGA an appropriate setting for examining the challenges affecting agricultural insurance adoption as a climate change adaptation strategy among farming households.

Sample Size and Sampling Technique

The target population for this study comprised registered crop farmers in Kubau Local Government Area (LGA), Kaduna State. Official records obtained from the Kubau Local Government Agriculture and Natural Resources Department indicated that there were 115, 648 eligible registered crop farmers across the seven selected wards used for the study (Table 1). Since the target population was known, the sample size was determined using the Krejcie and Morgan (1970) formula for finite populations. The formula is widely used to obtain statistically reliable sample sizes for known populations at a 95% confidence level and a 5% margin of error. The Krejcie and Morgan (1970) formula is expressed as:

$$S = \frac{X^2 NP(1-P)}{d^2(N-1) + X^2 P(1-P)} \dots\dots\dots \text{Eq. 1}$$

Where:

S = Required sample size

X^2 = Chi-square value for one degree of freedom at the 95% confidence level (3.841)

N = Population size (115,648)

P = Population proportion (0.50)

d = Degree of accuracy expressed as a proportion (0.05)

Substituting the values into the formula:

$$S = \frac{3.841 \times 115,648 \times 0.50(1 - 0.50)}{0.05^2(115,648 - 1) + 3.841 \times 0.50(1 - 0.50)}$$

$$S = \frac{111,053.16}{290.08}$$

$$S = 382.83 \approx 383$$

Following the recommendation of Krejcie and Morgan (1970) for large finite populations and to improve the representativeness of the study, the sample size was rounded up to 384 respondents. This sample size was considered adequate for generating statistically reliable findings regarding the challenges of agricultural insurance adoption for climate change adaptation among crop farmers in the study area.

A multistage sampling technique was employed to select respondents for the study. In the first stage, seven wards namely Anchau, Damau, Haskiya, Kubau, Mah, Pambegua and Zuntu were purposively selected because they constitute the major crop-producing areas within Kubau LGA. These wards are characterized by extensive cultivation of maize, sorghum, millet, groundnut, soybean, cowpea and other staple crops that are highly susceptible to climate variability. The purposive selection ensured that respondents possessed adequate knowledge and practical experience regarding climate-related production risks and agricultural insurance.

Official records obtained from the Kubau Local Government Agriculture and Natural Resources Department provided the number of eligible registered crop farmers in each of the selected wards. These records served as the sampling frame for proportionate allocation of the study sample. The sample allocated to each ward was determined using Bowley's (1964) proportionate allocation formula:

$$n_h = \frac{N_h}{N} \times n \dots\dots\dots \text{Eq. 2}$$

Where:

n_h = Sample size allocated to ward h

N_h = Number of eligible registered crop farmers in ward h

N = Total number of eligible registered crop farmers in the selected wards (115,648)

n = Total sample size (384)

Using this procedure, the 384 copies of the questionnaire were proportionately distributed among the seven selected wards as presented in Table 1.

Table 1: Eligible Registered Crop Farmers and Proportionate Sample Size of Selected Wards

Ward	Eligible Registered Crop Farmers	Proportionate Sample Size
Anchau	19,231	64
Damau	15,342	51
Haskiya	18,121	60
Kubau	24,324	81
Mah	19,290	64
Pambegua	11,211	37
Zuntu	8,129	27
Total	115,648	384

Source: Kubau Local Government Agriculture and Natural Resources Department (2025).

In the second stage, simple random sampling was employed to select individual respondents from the register of eligible crop farmers in each selected ward. This ensured that every registered crop farmer had an equal probability of being selected for the study. Eligibility was restricted to farmers who had engaged in crop production for at least three consecutive farming seasons, as such respondents were considered capable of providing informed responses on climate variability, agricultural production risks, awareness of agricultural insurance and the challenges affecting its adoption.

The purposive selection of the seven wards introduces the possibility of selection bias because only wards with relatively high concentrations of crop farming activities were included in the study. Consequently, crop farmers residing in wards with comparatively lower agricultural production or different socioeconomic and farming characteristics were excluded from the sampling frame. This may result in the views and experiences of respondents being more reflective of farmers in the major crop-producing areas than those in the entire Local Government Area. Therefore, the findings should be generalized primarily to registered crop farmers in the selected wards and interpreted with caution when extending them to all crop farmers in Kubau LGA. Nevertheless, the subsequent application of simple random sampling in selecting respondents from the register of eligible crop farmers within each selected ward minimized respondent-level selection bias by ensuring that every eligible registered farmer had an equal chance of being selected. This combination of purposive and probability sampling enhanced the internal validity of the study while maintaining the relevance of the findings to the major agricultural communities under investigation.

Instrument for Data Collection

Data for the study were collected using a structured questionnaire titled Agricultural Insurance Adoption for Climate Change Adaptation Questionnaire (AIACCAQ). The questionnaire was developed by the researcher based on the objectives of the study and relevant literature on agricultural insurance and climate change adaptation. The instrument was administered to registered crop farmers in the selected wards to obtain information on their socio-demographic characteristics, level of awareness of agricultural insurance and the challenges affecting its adoption.

The questionnaire was structured to measure the key variables of the study in line with its objectives. The instrument comprised three sections. Section A elicited information on the socio-demographic characteristics of respondents, including age, gender, marital status, educational attainment, farming experience, farm size and annual farm income. Section B measured respondents' level of awareness of agricultural insurance using statements that assessed their knowledge of agricultural insurance, awareness of available insurance providers, understanding of insurance benefits, premium payment requirements, claims procedures, eligibility conditions and the role of agricultural insurance in mitigating climate-related agricultural production risks. Section C measured the challenges affecting agricultural insurance adoption through statements relating to insurance premium affordability, delays in claims settlement, access to insurance providers, awareness and sensitization programmes, government support, agricultural extension services, enrolment procedures, household income, trust in insurance providers, documentation requirements and other institutional constraints limiting farmers' participation in agricultural insurance schemes.

Responses to Sections B and C were measured using a five-point Likert scale of Strongly Disagree (1), Disagree (2), Undecided (3), Agree (4) and Strongly Agree (5). Individual item scores for each construct were summed and divided by the total number of items to obtain a composite mean score for each respondent. Subsequently, the grand mean for each construct was computed by averaging the composite scores across all respondents. To facilitate interpretation, awareness levels were classified using predetermined decision intervals, where mean scores of 1.00–2.49 indicated low awareness, 2.50–3.49 indicated moderate awareness, and 3.50–5.00 indicated high awareness.

Method of Data Analysis

Data collected from the field were coded, cleaned and analyzed using the Statistical Package for the Social Sciences (SPSS) version 27. Descriptive statistical technique was employed in accordance with the objectives of the study. Descriptive statistics were used to summarize the characteristics of the respondents and provide answers to the research questions.

The first research question, which sought to determine the level of awareness of agricultural insurance among farmers in the study area, was analyzed using frequencies, percentages, mean, and standard deviation. The mean score was computed to determine the average level of awareness of the respondents, while the standard deviation measured the extent of variation in their responses. The mean score was calculated using the expression:

$$\bar{X} = \frac{\sum X}{N} \dots\dots\dots \text{Eq. 3}$$

Where:

$\bar{X}$ = Mean score

$\sum X$ = Sum of all observations

N = Total number of respondents

The second research question, which examined the challenges affecting the adoption of agricultural insurance among farmers, was analyzed using the Relative Importance Index (RII) and ranking. The Relative Importance Index was employed to determine the relative significance of each identified challenge and to rank them according to their severity as perceived by the respondents. The Relative Importance Index was computed using the following formula:

$$RII = \frac{\sum W}{A \times N} \dots\dots\dots \text{Eq. 4}$$

Where:

RII = Relative Importance Index

$\sum W$ = Sum of the weights assigned to each factor by the respondents

A = Highest weight on the Likert scale (5)

N = Total number of respondents

The calculated RII values range from 0 to 1, with higher values indicating greater importance of the identified challenge. The challenges were subsequently ranked from the highest to the lowest RII values to facilitate interpretation.

Results and discussion

Socio-demographic/Economic Characteristics

Table 2 presents the socio-demographic and economic characteristics of the respondents. The gender distribution indicates that males constituted the majority of the respondents, accounting for 78.3%, while females represented 21.7%. This suggests that crop farming in the study area is largely dominated by men, although women also contribute significantly to agricultural production and household livelihoods. The age distribution further reveals that respondents between 41 and 50 years formed the largest age group at 31.4%, followed by those aged 31 to 40 years with 26.3%. Respondents aged 51 to 60 years accounted for 17.4%, those between 18 and 30 years represented 17.2%, while only 7.8% were above 60 years. This distribution indicates that the majority of the farmers are within the economically active age bracket, implying that they possess the physical capacity and experience required to engage in agricultural production and respond to climate related adaptation initiatives such as agricultural insurance.

The marital status of the respondents, as presented in Table 2, shows that 76.7% were married, while 13.1% were single, 6.2% were widowed, and 4.0% were divorced. The predominance of married respondents suggests that most farmers have household responsibilities that may influence their production decisions and encourage the adoption of strategies capable of protecting family income against agricultural losses. In terms of educational attainment, respondents with secondary education constituted the largest proportion at 32.4%, followed by those with tertiary education at 24.9%. Respondents without formal education accounted for 22.8%, while those with primary education represented 19.8%. This pattern indicates that a substantial proportion of the respondents possess some level of formal education, which is expected to enhance their ability to access, understand and utilize information relating to agricultural innovations, climate change adaptation practices and agricultural insurance programmes.

Table 2: Socio-Demographic/Economic Characteristics of the Respondents

Variable	Category	Frequency	Percentage
Gender	Male	292	78.3
	Female	81	21.7
	Total	373	100
Age (Years)	18–30	64	17.2
	31–40	98	26.3
	41–50	117	31.4
	51–60	65	17.4
	Above 60	29	7.8
	Total	373	100
Marital Status	Single	49	13.1
	Married	286	76.7
	Divorced	15	4.0
	Widowed	23	6.2
	Total	373	100
Educational Attainment	No Formal Education	85	22.8
	Primary Education	74	19.8
	Secondary Education	121	32.4
	Tertiary Education	93	24.9
	Total	373	100

Variable	Category	Frequency	Percentage
Farm Size (Hectares)	Less than 2	136	36.5
	2–5	153	41.0
	6–10	61	16.4
	Above 10	23	6.2
	Total	373	100
Farming Experience (Years)	Less than 5	42	11.3
	5–10	91	24.4
	11–20	145	38.9
	Above 20	95	25.5
	Total	373	100.0
Annual Farm Income (₦)	Less than 500,000	118	31.6
	500,000–999,999	129	34.6
	1,000,000–1,999,999	82	22.0
	2,000,000 and above	44	11.8
	Total	373	100

Source: Field Survey, 2026

The economic characteristics presented in Table 2 reveal that 41% of the respondents cultivated between 2 and 5 hectares of farmland, while 36.5% cultivated less than 2 hectares. Farmers cultivating between 6 and 10 hectares accounted for 16.4%, whereas only 6.2% cultivated more than 10 hectares. This finding demonstrates that farming in the study area is predominantly characterized by small and medium scale agricultural holdings, making farmers more susceptible to climate induced production risks. Regarding farming experience, the largest proportion of respondents, representing 38.9%, had between 11 and 20 years of farming experience, followed by those with more than 20 years at 25.5%. Those with 5 to 10 years of farming experience accounted for 24.4%, while only 11.3% had less than 5 years of experience. This suggests that most respondents have accumulated considerable farming knowledge that could influence their perception of climate risks and the need for agricultural insurance. The annual farm income distribution further shows that 34.6% earned between ₦500,000 and ₦999,999 annually, while 31.6% earned less than ₦500,000. In addition, 22.0% earned between ₦1,000,000 and ₦1,999,999, whereas only 11.8% earned ₦2,000,000 and above. The predominance of relatively low- and moderate-income levels reflects the limited financial capacity of many farming households, which may affect their ability to pay insurance premiums despite recognizing the importance of agricultural insurance as a climate change adaptation strategy.

Farmers' Level of Awareness of Agricultural Insurance

Table 3 presents the level of awareness of agricultural insurance among farmers in the study area. The findings reveal that respondents demonstrated relatively higher awareness of the existence of agricultural insurance schemes in Nigeria, with a mean score of 3.37 and a standard deviation of 1.37. This is further reflected by the fact that 60.1% of the respondents either agreed or strongly agreed that they were aware of the existence of agricultural insurance schemes, compared with 31.1% who disagreed or strongly disagreed. Similarly, respondents showed a moderate understanding of the purpose of agricultural insurance in protecting farmers against production losses, as indicated by a mean score of 3.25 and a standard deviation of 1.40, while 55.8% agreed or strongly agreed with the statement. Awareness that agricultural insurance can serve as a climate change adaptation strategy was comparatively lower, with a mean score of 3.09 and a standard deviation of 1.46.

Table 3: Level of Awareness of Agricultural Insurance among Farmers in the Study Area

SN	Awareness Statements	SD	D	I	A	SA	Mean	STD
A	I am aware of the existence of agricultural insurance schemes in Nigeria.	49 (13.1%)	67 (18.0%)	33 (8.8%)	145 (38.9%)	79 (21.2%)	3.37	1.37
B	I understand the purpose of agricultural insurance in protecting farmers against production losses.	58 (15.5%)	71 (19.0%)	36 (9.7%)	136 (36.5%)	72 (19.3%)	3.25	1.40
C	I know that agricultural insurance can serve as a climate change adaptation strategy.	72 (19.3%)	76 (20.4%)	35 (9.4%)	126 (33.8%)	64 (17.2%)	3.09	1.46
D	I am aware of the types of agricultural insurance available to farmers.	88 (23.6%)	84 (22.5%)	31 (8.3%)	112 (30.0%)	58 (15.5%)	2.91	1.49
E	I know where agricultural insurance services can be obtained.	94 (25.2%)	87 (23.3%)	28 (7.5%)	107 (28.7%)	57 (15.3%)	2.85	1.50
F	I have received information about agricultural insurance from extension agents.	106 (28.4%)	93 (24.9%)	27 (7.2%)	95 (25.5%)	52 (13.9%)	2.72	1.51
G	I have heard about the Nigerian Agricultural Insurance	69	74	34	132	64	3.13	1.43

SN	Awareness Statements	SD	D	I	A	SA	Mean	STD
	Corporation and its services.	(18.5%)	(19.8%)	(9.1%)	(35.4%)	(17.2%)		
	I know the procedures required to enroll in an agricultural insurance scheme.	96 (25.7%)	91 (24.4%)	26 (7.0%)	105 (28.2%)	55 (14.7%)	2.82	1.50
	I understand the benefits of agricultural insurance for improving farmers' resilience to climate change.	63 (16.9%)	69 (18.5%)	34 (9.1%)	140 (37.5%)	67 (18.0%)	3.21	1.40
	I am adequately informed about agricultural insurance programmes available in my community.	91 (24.4%)	89 (23.9%)	27 (7.2%)	112 (30.0%)	54 (14.5%)	2.86	1.49

Source: Field Survey, 2026

Although 51% of the respondents acknowledged this role, a considerable proportion of 39.7% expressed disagreement, suggesting that many farmers are yet to fully appreciate the relevance of agricultural insurance beyond financial compensation. These findings indicate that while general awareness of agricultural insurance exists, knowledge of its broader role in climate change adaptation remains moderate. This finding is consistent with the study of Ahmed and Mkhitarian (2022), who reported that awareness of agricultural insurance among farmers is often limited to its compensatory function, with relatively fewer farmers recognizing its contribution to climate resilience and sustainable agricultural production.

The findings further indicate that awareness becomes weaker when respondents were asked about specific operational aspects of agricultural insurance. Awareness of the types of agricultural insurance available recorded a mean score of 2.91 with a standard deviation of 1.49, while only 45.5% agreed or strongly agreed that they were familiar with the available insurance products, compared with 46.1% who disagreed or strongly disagreed. Knowledge of where agricultural insurance services could be obtained was even lower, with a mean score of 2.85 and a standard deviation of 1.50, as only 44% expressed awareness compared with 48.5% who indicated otherwise. The lowest level of awareness was observed regarding information received from agricultural extension agents, which recorded a mean score of 2.72 and a standard deviation of 1.51. More than half of the respondents, representing 53.3%, disagreed or strongly disagreed that they had received information on agricultural insurance through extension services, while only 39.4% affirmed receiving such information. The relatively high standard deviation values across these variables suggest considerable variation in respondents' experiences and access to agricultural insurance information. These findings corroborate the observations of Greatrex et al. (2015), who noted that inadequate extension services and weak dissemination of insurance information remain major barriers to farmers' awareness and participation in agricultural insurance programmes across developing countries.

Table 3 also shows that awareness of institutional arrangements and practical procedures for agricultural insurance remains relatively low among farmers. Awareness of the Nigerian Agricultural Insurance Corporation and its services recorded a mean score of 3.13 with a standard deviation of 1.43, while 52.6% of the respondents agreed or strongly agreed that they had heard about the institution. In contrast, knowledge of the procedures required to enroll in agricultural insurance schemes recorded a lower mean score of 2.82 and a standard deviation of 1.50, with only 42.9% indicating familiarity with the enrollment process compared with 50.1% who disagreed or strongly disagreed. Likewise, respondents' understanding of the benefits of agricultural insurance for improving resilience to climate change recorded a moderate mean score of 3.21 and a standard deviation of 1.40, whereas being adequately informed about agricultural insurance programmes available within their communities recorded a lower mean score of 2.86 with a standard deviation of 1.49. Overall, the grand pattern of responses suggests that although farmers possess some general awareness of agricultural insurance, detailed knowledge relating to programme availability, institutional support, and enrollment procedures remains inadequate. This finding differs from the report of the World Bank (2024), which observed relatively higher awareness levels in areas where insurance promotion was supported by sustained extension campaigns and digital agricultural advisory services.

Challenges Affecting Agricultural Insurance Adoption among Farmers

Table 4 presents the major challenges affecting the adoption of agricultural insurance among farmers in the study area. The findings indicate that delay in compensation and settlement of insurance claims emerged as the most critical challenge, recording the highest RII value of 0.83. This finding is supported by the response pattern, where 85.2% of the respondents agreed or strongly agreed that delays in claims settlement discourage participation, while only 9.6% expressed disagreement. High insurance premium also constituted a major challenge with an RII value of 0.82, as 84.2% of the respondents agreed or strongly agreed that premium costs discourage them from subscribing to agricultural insurance schemes. Similarly, inadequate awareness and sensitization recorded an RII value of 0.81, with 82.6% of the respondents affirming that limited awareness constrains participation. These findings demonstrate that financial barriers and institutional inefficiencies remain important factors limiting agricultural insurance adoption. The results are consistent with the findings of Greatrex et al. (2015), who reported that high premium costs, inadequate awareness, and inefficient claims settlement

procedures significantly reduce farmers' willingness to participate in agricultural insurance programmes across developing countries.

The findings further reveal that limited access to insurance providers in rural communities and poor government support for agricultural insurance programmes both recorded RII values of 0.80, indicating that they are significant barriers to adoption. In each case, about 80.7% of the respondents agreed or strongly agreed that these constraints negatively influence their participation, whereas only 13.7% and 14.5%, respectively, disagreed with the statements. Lack of trust in insurance providers also emerged as a notable challenge with an RII value of 0.79, as 78.3% of the respondent's expressed agreement that distrust discourages enrollment. Furthermore, complicated registration and enrollment procedures, together with limited access to reliable agricultural extension services, each recorded an RII value of 0.78. More than three quarters of the respondents agreed that these factors hinder agricultural insurance adoption, reflecting the practical difficulties many rural farmers encounter in accessing insurance services. These findings agree with the observations of Kaunda & Chowa (2023), who found that institutional weaknesses, limited extension contact, and low confidence in insurance providers substantially reduce farmers' participation in agricultural insurance schemes in Zambia.

Table 4: Challenges Affecting the Adoption of Agricultural Insurance among Farmers

SN	Challenges	SD	D	I	A	SA	RII
A	High insurance premium discourages farmers from subscribing to agricultural insurance.	18 (4.8%)	24 (6.4%)	17 (4.6%)	151 (40.5%)	163 (43.7%)	0.82
B	Delay in compensation and settlement of insurance claims discourages participation.	15 (4.0%)	21 (5.6%)	19 (5.1%)	146 (39.1%)	172 (46.1%)	0.83
C	Inadequate awareness and sensitization on agricultural insurance limits farmers' participation.	20 (5.4%)	27 (7.2%)	18 (4.8%)	156 (41.8%)	152 (40.8%)	0.81
D	Limited access to insurance providers in rural communities reduces adoption.	22 (5.9%)	29 (7.8%)	21 (5.6%)	149 (39.9%)	152 (40.8%)	0.80
E	Lack of trust in insurance providers discourages farmers from enrolling.	24 (6.4%)	35 (9.4%)	22 (5.9%)	145 (38.9%)	147 (39.4%)	0.79
F	Complicated registration and enrollment procedures discourage participation.	28 (7.5%)	37 (9.9%)	24 (6.4%)	146 (39.1%)	138 (37.0%)	0.78
G	Lack of access to reliable agricultural extension services limits awareness of insurance programmes.	25 (6.7%)	42 (11.3%)	21 (5.6%)	149 (39.9%)	136 (36.5%)	0.78
H	Religious and cultural beliefs discourage some farmers from participating in agricultural insurance schemes.	49 (13.1%)	58 (15.5%)	32 (8.6%)	132 (35.4%)	102 (27.3%)	0.70
I	Low household income makes it difficult for farmers to pay insurance premiums.	19 (5.1%)	29 (7.8%)	18 (4.8%)	149 (39.9%)	158 (42.4%)	0.81
J	Poor government support for agricultural insurance programmes reduces farmers' participation.	23 (6.2%)	31 (8.3%)	20 (5.4%)	147 (39.4%)	152 (40.8%)	0.80

Source: Field Survey, 2026

Religious and cultural beliefs recorded the lowest RII value of 0.70 among the identified challenges, although it still represents a significant constraint within the study area. The results show that 62.7% of the respondents agreed or strongly agreed that religious and cultural beliefs influence farmers' decisions regarding agricultural insurance, while 28.6% disagreed with the statement. Although this challenge was less pronounced than the financial and institutional barriers, it nevertheless reflects the influence of local beliefs and social norms on farmers' decision making. Low household income also emerged as a major challenge, recording an RII value of 0.81, with 82.3% of the respondents agreeing that limited financial resources make it difficult to pay insurance premiums. The overall pattern of responses indicates that challenges affecting agricultural insurance adoption in the study area are largely associated with affordability, weak institutional support, inadequate information dissemination, and operational inefficiencies rather than farmers' unwillingness to participate. This finding is in agreement with the report of the World Bank (2024), which observed that financial limitations, inadequate service delivery, and weak institutional capacity continue to constrain agricultural insurance uptake among smallholder farmers in many developing countries, although the influence of religious and cultural factors tends to vary across communities and geographical settings.

Conclusion

The study concludes that crop farmers in Kubau LGA possess a moderate level of awareness of agricultural insurance as a climate change adaptation strategy. However, this level of awareness has not translated into widespread utilization due to several persistent constraints affecting farmers' access to and participation in agricultural insurance schemes. The major challenges identified include high insurance premiums, delays in claims settlement, inadequate sensitization programmes, limited access to insurance providers, insufficient government support, low household income, weak agricultural extension services and complex enrolment procedures. These challenges continue to hinder the effective adoption of agricultural insurance among crop farmers despite their awareness of its potential benefits. Therefore, enhancing farmers' access to affordable agricultural insurance requires coordinated efforts to strengthen institutional support, improve awareness

campaigns, simplify enrolment processes, expand extension services, and implement farmer-friendly insurance policies capable of improving resilience to climate-related agricultural risks in the study area.

Recommendations

The Nigerian Agricultural Insurance Corporation, in collaboration with the Federal Ministry of Agriculture and Food Security, Kaduna State Ministry of Agriculture, and agricultural extension agencies, should strengthen awareness campaigns on agricultural insurance through regular farmer education and community outreach programmes. The Nigerian Agricultural Insurance Corporation and insurance providers should ensure prompt settlement of claims, simplify enrollment procedures and improve transparency to enhance farmers' confidence. The Federal and Kaduna State Governments should increase premium subsidies and expand insurance service delivery to rural communities to improve affordability and accessibility, while farmers' cooperative societies should support information dissemination and encourage members to participate in agricultural insurance schemes as a viable climate change adaptation strategy.

Ethical Statement

Participation in this study was The authors declare that the data were used solely for scholarly and planning purposes and that no respondent was exposed to deliberate harm or coercion.

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