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Effect of agricultural insurance as a climate change adaptation strategy by arable crop farmers in Delta state, Nigeria

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Abstract

The study analyzed effect of agricultural insurance as a climate change adaptation strategy by arable crop farmers in Delta State. A multistage sampling technique was used to select 800 respondents. Data obtained through questionnaire were analyzed using descriptive statistics and probit regression model. Findings showed that the mean age was 48 years with 59.2% of the farmer's been female. The results show that 60% of the respondents had secondary education with mean farm size of 2.10ha. Only 39.2% are aware of agricultural insurance. The probit model results showed that age, educational, premium rate, farm size, accessibility to credit, gender, awareness and land tenure influenced farmer's decision to adopt agricultural insurance as a climate change adaptation strategy in Delta State. It is recommended that stakeholders' efforts should be directed towards policies and programmes that will enhance factors that increase farmers' adoption of agricultural insurance as a climate change adaptation strategy.

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Introduction

Arable farming is a type of crop production that produces a wide range of annual crops. This means that the crop life cycle, from germination to seed production, is complete within one year.

Depending on the type of use, there are a few different types of arable crops (Ines, 2017). These include: Grain crops; cultivated grasses and millets grown for their edible starch grains (wheat, maize, rice, barley, proso, millet), Pulse crops; edible seeds from the legume family, high in protein (lentil, beans, peas), Oil seed crops; grown for the oil extraction from the seeds (rapeseed, soybean, sunflower), Forage crops; crops used for animal feed, fresh or preserved (cowpea, clovers, timothy), Fiber crops; crops grown for fiber yield (cotton, jute, flax), Tuber crops; crops whose edible portion is a short thickened underground stem (potato, elephant yam), Tree crops such as oil palm that supply oil and plantain with edible portion.

Agriculture constitutes only about one-fifth of Africa's GDP and about half of the total value of its exports, yet more than two-thirds of the population lives in rural areas and more than 85% of people in these regions depended on agriculture for their livelihoods (World Bank Development Indicators, 2014). Improving the productivity, profitability, and sustainability of arable crop farming is therefore considered the main pathway out of poverty.

Climate change is a global phenomenon that poses significant challenges to agriculture, especially in developing countries like Nigeria, where agriculture plays a crucial role in the economy and livelihoods of millions of people. The agricultural sector in Nigeria is predominantly rain fed, making it highly susceptible to the impacts of climate change, such as erratic rainfall patterns, prolonged droughts, increased temperatures, and extreme weather events. These changes have resulted in reduced crop yields, increased production risks, and economic vulnerability for arable crop farmers who rely on rain fed agriculture (Skees *et al.,* 2015).

In recent years, climate change adaptation strategies have gained prominence as vital tools to mitigate the adverse effects of changing climatic conditions on agriculture. One such strategy is agricultural insurance, which has emerged as a promising mechanism to enhance the resilience of farmers and protect their livelihoods in the face of climate-related risks. Agricultural insurance offers financial support to farmers by compensating them for losses incurred due to adverse weather conditions, pests, and diseases, thus reducing the financial burden and providing a safety net.

Agricultural insurance is one of the modern risk management strategies available to make the agricultural system more resilient. It helps farmers to insure against the impacts of climate change on yield and income variability (Di Falco *et al.*, 2014; Skees *et al.*, 2015) and serves as collateral for banks in loan. Cash payments from an insurer improve farmers' ability to make the necessary investments to adapt or maintain their current production strategies; insurance can also facilitate adaptation when bundled with new technologies. Insurance can have a positive impact on the resilience of crop farmers, livestock keepers, food security and household consumption (Biglaria *et al.,* 2019).

Agricultural insurance reduces the risk of crop failure, as do other strategies such as reduced tillage, irrigation, new varieties, etc. Insurance encourages risk-averse farmers to adopt riskier adaptive innovations that promise higher yields and incomes. In this way, insurance can stimulate innovation and development, not just protection against crop failure (Hansen *et al.*, 2017). Some studies highlight the negative impacts of using agricultural insurance, such as over-reliance on insurance that may slow the adoption of other climate risk adaptations, moreover, subsidies may not be sustainable in the long run if the majority of farmers participate in an insurance programme with them (Budhathoki *et al.,* 2019). In addition, the price of premiums may increase as climate risk increases, while farmers become dependent on

insurance payouts without making efforts to adapt to the changing environment; thus, agricultural insurance itself may lead to moral hazard (Tadessa *et al.,* 2015; Budhathoki *et al.,* 2019).

However, these negative effects are usually outweighed by the positive benefits (Cole and Xiong, 2017).

Because of its potential benefits, agricultural insurance has been recommended and promoted by intergovernmental organizations as one of the preferred climate change adaptation strategies (ARC, 2023; IPCC, 2018; IPCC, 2019; World Bank, 2014). Training and technical assistance have been provided to climate change stakeholders in developing countries, such as ministries of environment and agriculture, banks, insurance companies and brokers, farmer groups, and policymakers, to enable them to design local policies that create the institutional environment for well-functioning agricultural insurance markets (IWMI, 2021).

Nigeria has recognized the importance of climate change adaptation in its agricultural sector and has made efforts to promote the adoption of agricultural insurance as a risk management tool for arable crop farmers (Di Falco *et al.,* 2014). Various government initiatives and partnerships with insurance companies have been established to facilitate the dissemination of agricultural insurance products. Despite these efforts, the adoption rate remains relatively low, and there is limited empirical evidence on the effectiveness of agricultural insurance as a climate change adaptation strategy among arable crop farmers in Nigeria. The question therefore are: what are the socio-economic characteristics of arable crop farmers in Delta State, do you know any Agricultural insurance organization in Delta State, what factors influence the adoption of agricultural insurance as a climate change adaptation strategy, and what are the challenges to the adoption of agricultural insurance in Delta State.

The broad objective of this study is to examine the effect of agricultural insurance as a climate change adaptation strategy by arable crop farmers in Delta State.

The specific objectives are to:

1. Examine the socio-economic characteristics of arable crop farmers in Delta State.
2. Identify respondent's awareness of agricultural insurance organization in the study area.
3. Ascertain the factors influence the adoption of agricultural insurance as a climate change adaptation strategy.
4. Identify the challenges to the adoption of agricultural insurance in Delta State.

Hypothesis of the study

The hypothesis for the study is stated in a null form as follows:

H_{oi}: Socio-economic factors has no influence on adoption of agricultural insurance as a climate change adaptation strategy

Theoretical framework: The study was guided by the following theories.

Prospect theory

Prospect theory assumes that choice is about prospects and gains or losses, and does not tolerate uncertainty. In this regard, individuals are assumed to have thresholds or benchmarks for every expected gain or loss dubbed their risk appetite. Therefore the perception of gain which an individual envisages influences his/her choice of risk management strategy including the purchase of agricultural insurance. This theory which views individuals as risk referrers was also utilized in assessing cashew crop farmers' risk attitude and their insurance preference. The theory views cashew farmers as rationalizers who will first assess their wealth and eventually deviate from it in relation to the insurance premium they are supposed to pay (Kanemanann and Tversky, 1979 as cited in Mensah, 2006).

Expected utility theory

The expected utility theory posits that demand for insurance reflects individual risk aversion and that

demand for insurance is a choice between uncertain losses that occurs with a probability like paying a premium. However, the theory is silent about the impact of income on insurance decisions, making the random utility theory developed by Lancaster (1966 as cited in Mensah, 2006) which views individuals as rationalizers choosing from product options that maximize their utilities subject to their income constraints more appropriate theoretical framework for this study. This is discussed in detail with empirical review of factors influencing farmers' willingness to pay for agricultural insurance products.

Materials and methods

Study area and sampling technique

This study was conducted in Delta State, Nigeria. A multistage random sampling procedure was used for this study. Firstly, ten (10) local government areas were purposively chosen based on insurance usage. In the second stage, nine (9) communities were randomly selected from each of the LGAs giving a total of ninety (90) communities. The list of arable crop farmers was collected from the State Ministry of Agriculture and Natural Resources to form the sample frame. Thus, stage three involved a random selection of nine (9) arable crop farmers from each community and this gave a total of eight hundred and ten (810) respondents for the study.

Data collection and analysis

Data for this study was obtained from primary source with the use of structured questionnaire. Data was also gathered with the help of enumerators for data collection. The data for this study was analyzed using both descriptive and inferential statistics. Objectives (i), (ii) and (v) were actualized with descriptive statistics such as frequency, percentage, chart, line graphs, mean and standard deviation. Objective (iii) and (iv) was achieved with probit regression model.

Model specification

Probit regression model for determinants of patronage of agricultural insurance

Probit models were used to identify those factors that influence the adoption of agricultural insurance as a climate change adaptation strategy, and effect of Agricultural insurance as a climate change adaptation strategy on arable crop farming. This regression model has been the most frequently used model in determining such factors (Ellis, 2016). The probit model is suitable for dichotomous dependent variables that take a value of one or zero (Mfungwe, 2012). The general probit model can be expressed as in Eq. 1.

The explicit form of the binary probit model is specified as:

$$Pr(Y = 1/X) = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_nX_n + e \quad (1)$$

Where:

Yi = the dichotomous dependent variable expressed as follows: Yi = 1, when a farmer is interested in adopting agricultural insurance, and Yi = 0, when a farmer is not interested in adopting agricultural insurance;

β_0 = intercept

βi= the regression coefficient that explains the probability of arable crop farmers' interest in adopting agricultural insurance;

X_1-X_{11}= determinants of agricultural insurance adoption strategy

e = stochastic error term.

X_1= age of farmer (years)

X_2 = educational level (categorical variable: 1 if no formal education, 2 if primary education, 3 if secondary education, 4 if tertiary)

X_3 = premium rate (high= 1, 0 otherwise)

X_4 =gender (male=1, 0 otherwise)

X_5 = farm size (hectare)

X_6 = farming experience (years)

X_7 = income (N)

X_8 = accessibility to credit (amount of loan farmer accessed N)

X_9 = awareness of agricultural insurance (awareness =1, 0= otherwise)

X_{10}= land ownership (dummy: 1 if owner; 0 = otherwise)

X_{11}= cooperative membership (dummy: membership of cooperative = 1, 0= otherwise)

Results and discussion

Socioeconomic characteristics of respondent's age

The result reveals that 58 respondents representing 48.3% were within 40-49 age brackets, 31.7% fell within 50-59 years age bracket. The result unveiled that 11.7% were in the age bracket of less than 40 years while 8.3% of respondents were aged over 59 years who were the least. The mean age was 48 years. This showed that majority of the farmers were mature enough and could relate well with arable crop farming because the decision of the farmer to adopt a new policy can be affected by age distribution.

Gender

The results shown in Table 1 indicate that 40.8% of the respondents were male and 71 respondents representing 59.2% were female. The findings show that there is gender imbalance in arable crop farming. This signifies that more women than men participate in adopting agricultural insurance for arable crop farming as a climate change adaptation strategy. This has been in line with most of the studies in literature. Most studies show that female individuals and households headed by females are more likely to become members of insurance schemes, since women are in most cases are exposed to the consequence of health shocks (Jehn-appiah, 2011; Owusu *et al.*, 2012).

Education

Education is one of the factors influencing agricultural insurance patronage decisions. Several studies have shown that improving education and disseminating knowledge is an important policy measure for stimulating insurance patronage in various development and natural resource management initiatives (Hassan and Nhemachena, 2008; Anley *et al.*, 2007). The result showed that majority of the respondents (60.0%) had secondary education, 23.3% had primary school education in which 6.7% of them were tertiary degree holders while 10% has no formal education. This shows that majority of the farmers are quite educated and thus can relate to issues regarding insurance and risk management as a climate change adaptation strategy.

Table 1. Socioeconomic characteristics of respondents

Variables	f	%	Mean
Age (years)			
<40	94	11.7	
40-49	386	48.3	48 years
50-59	254	31.7	
>59	66	8.3	
Gender			
Male	326	40.8	
Female	474	59.2	
Education			
No formal education	80	10.0	
Primary education	186	23.3	
Secondary education	480	60.0	
Tertiary education	54	6.7	
Farm size (ha)			
<1	40	5.0	
1-2	480	60.0	2.10
>2	280	35.0	
Household size			
1-4 persons	380	47.5	
5-8	406	50.8	5 persons
9-12	14	1.7	
Farming experience			
1-5 years	46	5.8	
6-10	234	29.2	11 years
>10	520	65.0	
Member of cooperative			
Member	200	25.0	
Non-member	600	75.0	
Marital status			
Married	574	71.7	
Single	180	22.5	
Divorced	34	4.2	
Widower	14	1.7	
Income level (₦)			
<300,000	614	76.7	
300,000-350,000	80	10.0	₦ 320,556.66
350,001-400,000	66	8.3	
>400,000	40	5.0	
Land owner			
Bought	180	22.5	
Inherited	106	13.3	
Family land	220	27.5	
Lease	294	36.7	
Premium rate			
High	486	60.8	
Low	314	39.2	

Frequency=f, Percentage=%, Source: Field survey (2023)

Marital status

The result shows that 71.7% of them are married, 22.5% are single, 4.2% divorced and only 1.7% widow/er. It means that most of the respondents in the study area are married. This suggests that arable crop farming is a means of catering for the family in the study area.

Household size

Household size between 5 and 8 formed the majority (50.8%) of the total number of the respondents. It was observed that 47.5% of the respondents have household size of 1-4 persons. The average household size was 5 persons signifying that the size was fairly large enough to influence the patronage of agricultural insurance for new technology adoption.

Income level

Quite a large number of the respondents (76.7%) earned less than N300,000 from their arable crop farming. About 10% of respondents earned between N300,001-N350,000 annually, 8.3% earned N350,001-400,000 annually while 5.0% of respondents earned greater than N 400,000 annually. The mean income was N 320,556.66k. Wealth is believed to reflect past achievements of households and their ability to bear risks. Dividing this by 12 (the number of months in a years) gives N6,689.86, which is less than N18,000 (the official Minimum Wage in Nigeria). This suggests that the arable crop farmers were less financially better than their counterparts in Nigerian civil service.

Farming experience

The farming experience of the farmers' reveals that majority (65%) of respondents are having farming experience of greater than 10 years. This was followed by 29.2% having farming experience of 6 and 10 years while the least 5.8% of them had 1-5 years. Furthermore, the mean farming experience of the farmers is 11 years. This implies that arable crop farming is an age-long venture in the study area.

Farm size

Table 1 indicates that 5% of the respondents hold less than 1.0ha of farm land while 60% have between 1.0 and 2.0 ha of land and 35.0% hold above 2 ha of land. Farmers who have larger farms are also willing to patronize more than the small and poor farmers. Because they face various risk. For this reason, they are more likely to adopt agricultural insurance as a climate change adaptation strategy (Enjolras *et al.*, 2012). Furthermore, larger farms need larger investments to produce higher yield and they tend to discover methods to decrease the magnitudes of crop failure. This implies that majority of the respondents are small scale farmers with average of 2.10 hectare of land.

Member of cooperative

Table 1 also reported that 75.0% of the respondents did not belong to a cooperative society while only 25.0% belong to cooperative society.

Land ownership

The results presented in Table 1 shows that 36.5% acquired land through leasehold, family land 27.5%, 13.3% are through inheritance while 22.5% of the farmers bought the land used for the production of arable crops.

Table 2. Level of awareness of agricultural insurance

Awareness	Frequency	Percentage
Yes	314	39.2
No	486	60.8

Source: Field survey (2023)

Awareness agricultural insurance adoption by the farmers

Respondents were asked whether they have heard of agricultural insurance (Table 2). The results of the survey show that 39.2% of farmers have reacted positively and reported that they had an idea about agricultural insurance scheme. On the other hand, 60.8% of farmers responded that they knew nothing about agricultural insurance.

Determinants of agricultural insurance patronage

The parameters of the Probit regression model were estimated and the results are presented in Table 3. The Chi-square statistic of 96.19 ($p < 0.01$) obtained shows that the model gave a good fit for the analysis.

Age of the respondents

Age of the respondent is significant at 5% and negatively influences the tendency of taking agricultural insurance by farmers as a climate change adaptation strategy. This means that the older a

farmer is, the lower his likelihood to participate in agricultural insurance scheme. This could be largely due to less receptivity of older farmers to innovation unlike young educated farmers who have high receptivity to innovations. This result is consistent with similar studies by Aidoo *et al.* (2014), Falola *et al.* (2013), Uematsu and Mishra (2011) and Piyasiri and Ariyawardana (2011); Mishra and Godwin (2006) and Piyasiri and Ariyawardana (2002). This findings contradicted Jehu-Appiah (2011) that the greater an individual's age, the more likely his/her insurance enrolment. Dercon *et al.* (2014) found in Ethiopia that households with younger household heads who hold official positions are more likely to purchase crop insurance.

Education

The coefficient of educational level of the farmers was found to be positive and significant at 1% and this conforms to the a priori expectation that the higher the educational level of farmers, the higher their participation in agricultural insurance scheme as a climate change adaptation strategy. This result is strongly in agreement Olubiyo *et al.* (2009); Masoumi and khodadadi (2013); Falola, Banjoko and Ukpebor, 2012. This is contrary to Raju and Chand (2008) findings that level of education did not show any significant influence on insurance uptake in India. Literacy has a positive relationship with the willingness of farmers to adopt agricultural insurance scheme (Aidoo *et al.*, 2014; Arshad *et al.*, 2015; Koloma, 2015; Lin *et al.*, 2015). More educated farmers are likely to appreciate crop insurance issues better than their less educated counterparts. Therefore, education may facilitate the diffusion of new technology and as such has a positive relation with innovation adoption and the payment of accompanying charges.

Table 3. Factors influencing insurance patronage

Variables	Co-eff.	Std. Err	Z	p>/z/
Age	-0.0346844	0.0138491	-2.50**	0.012
Education	0.868579	0.2836191	3.06**	0.002
premium rate	-1.441377	0.549524	-2.62**	0.009
Gender	-0.7155524	0.333245	-2.15**	0.032
Farm size	0.2542676	0.1091518	2.33**	0.020
Farming experience	-0.070333	0.0535173	-1.31	0.189
Income	2.06e-06	2.65e-06	0.78	0.438
Access to credit	0.745768	0.1751136	4.26***	0.000
Awareness	2.600797	0.5949656	4.37***	0.000
Land ownership	-0.7312929	0.3369231	-2.17**	0.030
Cooperative membership	-0.0860943	0.320772	-0.27	0.788
Constant	-0.8509641	1.061951	-0.80	0.423
Log likelihood	-47.208827			
LR Chi^2 (11)	96.19			
Prob>Chi^2	0.000			
Pseudo R^2	0.6561			

Source: Field survey (2023)

Premium rates

The coefficient of premium rate of the farmers was found to be negative and significant at 5% and this conforms to the a priori expectation that the higher the premium rate of farmers, the decrease in their interest for agricultural insurance. Higher premium rates result in substantially lower levels of participation in agricultural insurance programs (Smith and Watts, 2009). Similarly, Arshad *et al.* (2015) reported that the increase in premium rate decreases the levels of participation in agricultural insurance programs by 0.03. Several authors including Bierer and Eling (2012) report that high premium is a major impediment to micro insurance uptake.

Gender

The coefficient of gender was found to be negative and significant at 5% level. This result reveals that female farmers were more willing to take agricultural

insurance in the study area with a marginal effect of 0.72% compared to their female counterparts. This is in agreement with Wan (2014) findings that there is a significant relationship between gender and breeding sow insurance uptake in China.

Farm size

The coefficient of farm size indicates a positive and significant relationship with willing to pay crop insurance. This implies that increase in farm size have a positive probability that an arable crop farmer will purchase an insurance policy cover. In other words, farmers who have larger farm size are more likely to use an insurance policy. This result is consistent with the study by Fallah *et al.* (2012), Gininda *et al.* (2014), Farayola *et al.* (2013) and Zanini *et al.* (2001).

Access to credit

The coefficient of accessibility to credit by the farmers was found to be positive and significant at 5% implying that farmers that have access to credit are more likely to participate in the programme than their members who do not have access to credit which was evident in the response of most farmers that access to loans from banks is better facilitated when they have insurance cover and therefore, they subscribe to insurance scheme so as to increase their accessibility to loans. This concurs with the submission of (Olubiyo *et al.*, 2009; Oyinbo *et al.*, 2012; Farayola *et al.*, 2013). They all submitted that access to credit and decision to participate in the scheme were positively correlated.

Awareness

The coefficient of Awareness was significant at 1% having a positive influence on the willingness to take agricultural insurance. The result reveals that the marginal effect on probability of farmers taking agricultural insurance with respect to awareness is 2.600797, implying that for every unit increase in the awareness among the farmers, the likelihood of taking agricultural insurance increases by 2.600797 in line with the findings of Babalola (2014) that as the level of awareness of the farmers about insurance increase, the probability of patronage also increases. This is not surprising because awareness implies having some knowledge of the scheme and its economic importance. The results also support Danso-Abbeam *et al.* (2014) findings that awareness status and probability of decision to adopt new technology are positively related.

Land ownership

Land ownership was significant at 5% significance level and inversely related to the probability of farmers being interested in agricultural insurance. This may be due to the fact that farmers who own lands do not have to pay anything to anybody in times of crop failure but rather manage the little at their disposal. Aidoo *et al.* (2014) found farmers who own lands are less willing to adopt crop insurance compared to tenants and sharecroppers. Such farmers have the capacity to diversify into other crops and enterprises since they have easy access to land. This outcome also supports Black and Dorfman (2000). This result is contradictory with Akter and Brouwer (2007) findings that Landowners are significantly more willing to buy crop insurance scheme than landless farmers in Bangladesh.

Constraints encountered by farmers in their adoption of agricultural insurance as a climate change adaptation strategy

The result of analysis of constraints encountered by farmers in adopting agricultural insurance in the study area ranked from most critical to the least as presented in Table 4 showed that inadequate knowledge of agricultural insurance took the lead indicated by 89.9%. This was followed by high premium payment (84.9%), delay in assessment of losses (79.0%), administrative bottlenecks which stems from excessive bureaucracy accounted (74.8%) and this constraint has the tendency of making the farmers withdraw from insurance scheme because of the excessive bureaucratic processes in the operation of insurance. delay in claim payment (74.8%). The payment of indemnity by insurance companies was indicated to be untimely and inadequate by most of the farmers and this affected their perception of agricultural insurance scheme as they tend to

believe that insurance companies are only interested in collecting premium and not paying indemnity when due. The other constraints encountered by the farmers patronizing agricultural insurance include; Lack of confidence in the institution accounted for 69.7% while rigorous procedure in claim settlement, fear of the unknown and inaccessibility to insurance personnel accounted for 63.9%, 61.3% and 61.3% respectively. The least constraint was distance to insurance office from locality (47.1%). It is interesting to note that if these constraints are looked into, other impediments may cease to exist or reduce to minimum in the study area.

Table 4. Constraints against farmer's patronage of agricultural insurance

Constraints	Frequency	Percentage
Inadequate knowledge of agricultural insurance	719	89.9
Lack of confidence in the institution	558	69.7
High premium payment	679	84.9
Fear of the unknown	490	61.3
Logistics in the schemes	464	58.0
Administrative bureaucracy	598	74.8
Delay in claim payment	598	74.8
Delay in assessment of losses	632	79.0
Rigorous procedure in claim settlement	511	63.9
Inaccessibility to insurance personnel	490	61.3
Distance to insurance office from locality	377	47.1

Source: Field survey (2023) multiple responses recorded

Conclusion

Agricultural insurance has not been popularly adopted by the farmers in the study area. By implication therefore, government policies aimed at enhancing and sustaining food production without effective agricultural insurance may not meet with huge success. Agricultural crop insurance is known to be one of the risk management options employed by farmers to supplement any loss or damage incur in their farming business. It is an effective tool for risk management in agriculture and its interest by farmers is dependent on many factors.

This study concludes that age of farmers, educational level, premium rate, farm size, accessibility to credit, gender, awareness and landownership experienced in the farm in previous year determine farmers' decision to adopt agricultural insurance as a climate change adaptation strategy. The findings of this study showed that majority of the respondents (60.8%) were not aware of agricultural insurance. It is observed that the major challenges faced by farmers in the course of patronizing agricultural insurance were inadequate knowledge, high premium, and delay in assessment of losses, delay in claim payment, administrative bureaucracy and lack of confidence in the institution.

Recommendations

Based on the findings, the following recommendations were made:

1. It is recommended that to ensure continuity of farmer's participation in agricultural insurance and also participation by farmers who are yet to participate, there is the need for proper sensitization of farmers on the importance of insurance policy by government, non- governmental agro services providers and insurance corporation.
2. And also the insurance corporation should ensure prompt delivery of their services to farmers and ensure effective and efficient mode of assessment and payments as at when due.
3. Farmers should be sensitized on the benefits of being insured as the scheme stabilizes farmers' income with more investment decision.
4. Premium rates paid by the farmers should be subsidized.
5. The major constraints identified affecting agricultural insurance adoption should be adequately addressed as soon as possible.
6. Technical assistance from insurance extension agents should be provided.
7. Government should assist farmers to easily access farm inputs.

References

ARC. 2023. African Risk Capacity Strategic Framework. Retrieved from https://www.arc.int/arc-strategic-framework.

Biglaria T, Maleksaeidi H, Eskandari F, Jalali M. 2019. Livestock insurance as a mechanism for household resilience of livestock herders to climate change: Evidence from Iran. Land Use Policy **87**, 104043.

Budhathoki NK, Lassa JA, Pun S, Zander KK. 2019. Farmers' interest and willingness to pay for index-based crop insurance in the lowlands of Nepal. Land Use Policy **85**, 1–10.

Chantarat S, Mude AG, Barrett CB, Turvey CG. 2017. Welfare impacts of index insurance in the presence of a poverty trap. World Development **94**(1), 119–138.

Cole SA, Xiong W. 2017. Agricultural insurance and economic development. Annual Review of Economics **9**(1), 235–262.

Daron JD, Stainforth DA. 2014. Assessing pricing assumptions for weather index insurance in a changing climate. Climate Risk Management **1**(1), 76–91.

Di Falco S, Bozzola M, Adinolfi F, Capitanio F. 2014. Crop insurance as a strategy for adapting to climate change. Journal of Agricultural Economics **65**(2), 485–504.

Fisher E, Hellin J, Greatrex H, Jensen N. 2018. Index insurance and climate risk management: Addressing social equity. Development Policy Review **37**(1), 581–602.

Freudenreich H, Mubhoff O. 2018. Insurance for technology adoption: An experimental evaluation of schemes and subsidies with maize farmers in Mexico. Journal of Agricultural Economics **69**(1), 96–120.

Hansen JW, Araba D, Hellin J, Goslinga R. 2017. A roadmap for evidence-based insurance development for Nigeria's farmers. CCAFS Working Paper no. 218. Wageningen, Netherlands: CGIAR Research Program on Climate Change, Agriculture and Food Security.

IPCC. 2018. Summary for policymakers. In: Global warming of 1.5°C. World Meteorological Organization, Geneva, Switzerland, 32.

IPCC. 2019. Climate change and land: An IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems. Intergovernmental Panel on Climate Change. Retrieved from www.ipcc.ch, 511.

Tadesse MA, Shiferaw BA, Erenstein O. 2015. Weather index insurance for managing drought risk in smallholder agriculture: Lessons and policy implications for sub-Saharan Africa. Agricultural and Food Economics **3**(26), 2–21.

World Bank. 2014. Reducing the vulnerability of Azerbaijan's agricultural systems to climate change: Impact assessment and adaptation options. Published by World Bank, Washington, D.C., 94. Retrieved from http://doi.org/10.1596/978-1-4648-0184-6.

Zhu W, Porth L, Tan KS. 2018. A credibility-based yield forecasting model for crop reinsurance pricing and weather risk management. Agricultural Finance Review **79**(1), 2–26.