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himaye

Determinants of agricultural insurance patronage among crop farmers in Delta north agricultural zone, Delta State, Nigeria

Nijerya Delta eyaleti, delta kuzey tarım bölgesindeki mahsul çiftçileri arasında tarım sigortası himayesinin belirleyicileri

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ABSTRACT

Objective: The objective of this paper was to identify the determinants of patronage of agricultural insurance in Delta north agricultural zone, Delta State Nigeria.

Material and Methods: A multistage sampling technique was used to select 120 respondents. Data were obtained through questionnaire administration. Descriptive statistics, logit model, and t-test were employed in the study.

Results: The findings showed that the mean age was 48 years with 59.2% of female farmers. About 60% of them had secondary education with a mean farm size of 2.10 ha. The mean farming experience was 11 years with 75% of the farmers not belonging to a cooperative society with a mean income of ₦80, 278.33. The major risks were pests, high temperature, variation in yield, flood and the least were a fire outbreak. Only 39.2% of the farmers are aware of agricultural insurance. The logit model showed that the age of farmers, educational level, premium rate, farm size, accessibility to credit, gender, awareness, and land tenure influenced farmers' decision to patronize agricultural insurance.

Conclusion: This study examines insurance patronage by highlighting the interaction between the socioeconomic factors of farmers and the decision to patronize insurance. As far as this study is concerned, the identified factors will significantly improve patronage and increase productivity.

ÖZ

Amaç: Bu makale, Delta Eyaleti Nijerya'daki Delta kuzey tarım bölgesinde tarım sigortasının himayesinin belirleyicilerini tanımlamayı amaçlamaktadır.

Gereç ve Yöntemler: Çok aşamalı örnekleme yöntemi 120 katılımcıyı seçmek için kullanılmıştır. Veriler anket yöntemiyle toplanmıştır. Bu çalışmada, tanımlayıcı istatistikler, logit modeli ve t-testi kullanılmıştır.

Araştırma Bulguları: Bulgular, kadın çiftçilerin %59,2'si ile ortalama yaşın 48 olduğunu gösterdi. Bunların yaklaşık %60'ı, ortaokul düzeyinde eğitime sahip ve ortalama çiftlik büyüklükleri 2.10 hektardı. Ortalama geliri ₦ 80, 278.33 olan bir kooperatif topluluğuna %75'i üye olmayan çiftçilerin, ortalama çiftçilik deneyimi 11 yıldır. Başlıca riskler haşere, yüksek sıcaklık, verimde değişiklik, sel ve en azı bir yangın çıkmasıydı. Üreticilerin yaşı, eğitim düzeyi, prim oranı, işletme büyüklüğü, kredi kullanım durumu, cinsiyet, farkındalık ve arazi mülkiyet şekli üreticilerin tarım sigortası yaptırma kararını etkilediği logit modelde saptanmıştır.

Sonuç: Bu çalışma, üreticilerin sosyoekonomik faktörleri ile sigortanın yaptırma kararı arasındaki etkileşimi vurgulayarak sigorta yaptırma kararını incelemektedir. Bu çalışmada belirtildiği gibi, tanımlanan faktörler yaptırma kararını önemli ölçüde iyileştirecek ve verimliliği artıracaktır.

INTRODUCTION

Several studies have shown that Nigerian food production rate in the aggregate has been growing at about 2.5% per annum in recent years whereas food demand has been growing at a rate of more than 3.5% per annum (Adeyonu et al., 2016). According to Adetunji et al. (2020) most food crops produced in the country come from the small-scale resource-poor farmers who depend largely on traditional farming systems for their agricultural inputs. These categories of farmers are bedeviled with natural hazards such as theft, flood disasters, diseases, farm destruction by pests, fire disaster, death, accident, inadequate credit; variation in price; marketing and distribution related risks, or any form of losses. This reduced the agricultural productivity over the years (Asamoah, 2019, Dhakal, 2019). For this reason, there is a need for a mechanism that can help reducing the risks and uncertainties by employing risk management tools such as insurance (Kumari et al., 2017; Nnadi et al., 2013; Warner et al., 2013).

Insurance can be described as a financial mechanism that aims minimizing losses uncertainty by pooling a large number of uncertainties to distribute the loss burden (Akintunde 2015; Masara et al., 2017). Agricultural insurance has become important due to the industry's vulnerability to several risks and uncertainties (Dercon et al., 2014; Hazell & Varangis, 2020). When a loss occurs, the insurer pays the policyholder a certain amount of money known as a premium to secure his life and property. The only shock absorber to guarantee food security is an effective agricultural insurance scheme (Cole & Xiong, 2017; Masara et al., 2017). In an attempt to support farmers in handling risks, various insurance policies, programs and projects were implemented by the Nigerian government. This is based on the premise if natural risks in agriculture like drought, flood, pests, and diseases occur and the losses of the farmer are reduced to a certain level.

Moreover, agricultural insurance explores the efficient management of risks and uncertainty for the benefit of farmers today and in the future. This will help stabilizing agriculture and the economy as a whole. According to Idris (2018), agricultural insurance would cushion the shock of disastrous crop losses in some years to ensure a considerable measure of security in farm income over the years. However, according to Rola & Aragon (2013) farmers have less access to risk management options needed to cope with natural disasters and unexpected events. An estimation of the willingness of crop farmers to take insurance was put to the fore considering the prominence of crop production to the Nation's economy and the inherent risks involved. Conversely, farmers are not willing to participate in insurance policies due to the unsatisfactory image of the insurance industry regarding low compensations. This created a confusion among the insurance users. Other factors hampering the willingness of crop farmers to have a insurance coverage can be attributed to low income, small farm holdings, poverty and burden of payment of premiums (Aidoo et al., 2014).

Similarly, Delavallade et al. (2015), stated that the principal purpose of insurance policy is to function as a security for fatalities. But high premium payments created an obstacle for the farmers not to have an insurance. On the other hand, in developed countries, governmental subsidize premiums makes to have an insurance coverage more attractive (Nwosu et al., 2012). However, in some western countries, such as the US and the UK, Insurance coverage can be found to be high, as indicated by Idris (2018).

Agricultural insurance policies and agricultural development discussed in several studies (Okwoche et al., 2012; Nwosu et al., 2012; Nmadu et al., 2012; Sargazi et al., 2013; Lyu & Barre, 2017). Danso-Abbeam et al. (2014) identified that the age, education, capital of the farmer, risk-taking and the previous record for facing risk, land value, crop rotation and land diversity are the factors that influence insurance patronage in Iran. Ellis (2016) also concluded that marital status, educational level, and awareness of crop insurance affect patronage in the study conducted in Ghana. Jin et al. (2016) found that having insurance was strongly correlated with farm size, education and income with patronage. The previous studies on agricultural insurance were mostly carried out outside Delta State Nigeria. Hence, a study was conducted in the Delta State and the objectives of this study were as follows.

- i. Identify the socioeconomic attributes of the farmers
- ii. Identify major risks encountered by the respondents
- iii. Ascertain the awareness level of insurance
- iv. Determine the factors impelling agricultural insurance patronage
- v. Identify constraints militating against farmers insurance patronage
- vi. Ascertain the foredeals of insurance patronage

Hypothesis

Ho1: There is no difference between the income of farmers before and after patronizing agricultural insurance.

MATERIALS and METHODS

This research was conducted with approval from the Ethical Committee of the Department of Agricultural Economics and Extension, Delta State University Asaba Campus (number AEE/2020/008).

Delta North Agricultural zone has a population of 1,236,840 (NPC, 2006). The vegetation varies from mangrove swamps to evergreen forests. The zone is richly endowed with fertile agricultural land suitable for 'the growth of various tropical crops and good feeders for domestic animals. Major crops grown by the inhabitants include oil palm, yam, pepper, maize, cassava, melon groundnut, and vegetables.

A multistage random sampling procedure was used for this study. Firstly, three local government areas were selected. The selected LGAs were Ndokwa East, Anoicha North and Oshimili South. In the second stage, four communities were randomly selected from each of the LGAs giving a total of 12 communities. The list of farmers was collected from the State Ministry of agriculture to form the sample frame. Then from the list, random numbers were assigned for each farmer thus 10 farmers were randomly chosen from each community and this means that a total of 120 respondents participated in the study. Primary data were used by a structured questionnaire. The constraints confronted by farmers in patronizing insurance were ranked from most critical to the least for the farmers to express their opinion. The risks faced and awareness level of the farmers on agricultural insurance were rated by frequency count. The mean income of farmers realized before and after participating in the insurance scheme was achieved with t-test. Logit regression model was utilized for the determinants of insurance patronage. For this study, the outcome of the farming which is income was considered irrespective of mixed farms that produce more than one crop. Differentiation of crop farms concerning insured and uninsured would be a gap for further studies.

Data Specification

Logit regression model on contributing factors of insurance patronage

The binary logistic regression method was used to model the factors affecting insurance patronage. This was because the decision to participate in insurance arrangement is a dichotomous outcome that can be modelled by a logit model (Gbigbi, 2017). The dependent variable is the interest to patronize insurance. Patronage of insurance was dichotomous taking the value of 1 if a farmer is interested in patronizing insurance and 0, when a farmer is not interested in patronizing insurance.

In this study, the probability that a farmer patronize insurance is Prob (Y=1) and Prob (Y=0) when there is no decision of insurance patronage. The choice of the farmers on insurance patronage was built as a binary-choice model which supposed that farmers were confronted between two alternatives and the choice was contingent upon a set of independent variables that were composed of categorical and ordinal variables.

The conceptual model for the linear function of (X) variables is as given below:

$$Z = \beta_0 + \sum_i^n \beta_i X_i + U_i \quad (1)$$

Given that $P_i = \frac{e^Z}{1+e^Z}$ (Gbigbi 2017) where e is the base of the natural logarithm and P_i is the probability that the i^{th} farmer decides to patronize insurance, $1-P_i$ is the probability that the farmer had no interest in patronage insurance. The odds of the farmer's decision to patronize insurance ($Y=1$) and the odds of no patronage ($Y=0$) are expressed as the ratio of the probability of the decision to patronize insurance to no interest to patronize insurance.

This is expressed as:
$$odds = \frac{P_i}{1-P_i} \quad (\text{Gbigbi 2017}) \quad (2)$$

The explicit form of the model is specified as:

$$L = \left(\frac{P_i}{1-P_i} \right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_n X_n + e \quad (3)$$

Where:

Where, L_i = logit model

P = the probability of the outcome

Z_i = odds ratio of farmer's decision to patronize insurance

Y_i = the dichotomous dependent variable expressed as follows: $Y_i = 1$, when a farmer is interested in patronizing insurance, and $Y_i = 0$, when a farmer is not interested in patronizing insurance;

β_0 = intercept

β_i = the regression coefficient that explains the probability of farmers' interest in patronizing agricultural insurance;

X_1 - X_{10} = determinants of insurance patronage

e = stochastic error term.

X_1 = age of farmer (years)

X_2 = educational level (categorical: 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 (₦)

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

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

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

RESULTS and DISCUSSION

The results of socioeconomic features of respondents are tabulated in Table 1.

Table 1. Socioeconomic characteristics of respondents

Tablo 1. Katılımcıların sosyoekonomik özellikleri

Variables	Frequency	Percentage	Mean
Age (years)			
<40	14	11.7	
40-49	58	48.3	48 years
50-59	38	31.7	
>59	10	8.3	
Gender			
Male	39	32.5	
Female	81	67.5	
Education			
No formal education	12	10.0	
Primary education	28	23.3	
Secondary education	72	60.0	
Tertiary education	8	6.7	
Farm size (ha)			
<1	6	5.0	
1-2	72	60.0	2.10
>2	42	35.0	
Household size			
1-4 persons	57	47.5	
5-8	61	50.8	5 persons
9-12	2	1.7	
Farming experience			
1-5 years	7	5.8	
6-10	35	29.2	11 years
>10	78	65.0	
Member of cooperative			
Member	30	25.0	
Non-member	90	75.0	
Marital status			
Married	86	71.7	
Single	27	22.5	
Divorced	5	4.2	
Widow/er	2	1.7	
Income level (₦)			
<100,000	92	76.7	
100,000-150,000	12	10.0	₦ 80,278.33
150,001-200,000	10	8.3	
>200,000	6	5.0	

Source: Field survey (2020)

Age: The result revealed that 58 respondents representing 48.3% were within 40-49 years age, 31.7% fell within 50-59 years age. It was also found that 11.7% were in the age bracket of fewer than 40 years while 8.3% of respondents were aged over 59 years who were the least. The average age was 48 years old. This indicated that the majority of the farmers were mature enough to appreciate the

importance of insurance. The decision to adopt a novel policy such as an insurance policy can be affected by age distribution (Muroiwa et al., 2018).

Gender: Table 1 indicates that 32.5% of the farmers were male and 67.5% were female. The findings suggest gender imbalance in crop production which signifies that more women than men participate in patronizing agricultural insurance for arable crop farming. Most of the previous studies showed that females are more likely to become members of insurance schemes since in most cases they are more exposed to the consequence of health shocks (Jehu-Appiah, 2011).

Education: The result infers that 60.0% of respondents graduated from secondary school while 23.3% had primary school education, 6.7% of them were holders of degrees or their equivalent while 10% has no formal education. This shows that a high proportion of the farmers are reasonably educated and they can be enlightened on insurance and risk management effectively. Education is a core factor that influences agricultural insurance patronage decisions. This finding agrees with Balma Issaka et al. (2015) that knowledge is a vital policy measure for stimulating insurance patronage in various development and natural resource management initiatives.

Marital status: About 71.7% of the respondents were married, 22.5% were single, 4.2% divorced and only 1.7% widow/widower. In other words, the majority of the farmers are married. This suggests that crop farming is a means of catering to the family. This aligns with Gbigbi (2017) who reported that married women easily get access to financial services such as credit, grants and insurance than unmarried ones since they are considered to be more responsible.

Household size: Household size between 5 and 8 persons formed the majority (50.8%) of the respondents. About 47.5% of the household has 1-4 persons. The average household size was 5 persons signifying that the size was fairly large enough to influence the patronage of insurance for new technology adoption. This is why most farmers depend on family labor as a cheap and reliable source of labor for their farm activities. This would reduce the cost of labor to a large extent.

Income level: Quite a large percentage of the farmers (76.7%) earned less than ₦100,000 from crop farming. A total of 10% of respondents earned between ₦100,001-₦150,000 annually, 8.3% earned ₦150,001-200,000 annually while 5.0% of respondents earned greater than N 200,000 annually. The mean annual income was ₦80,278.33k that makes the monthly income to be ₦6,689.86. This monthly income is much lower income than the official minimum wage in Nigeria which is ₦18,000. This suggests that they were financially poorer than their counterparts in the Nigerian civil service.

The experience in Farming: The farmers' farming experience reveals that majority (65%) of respondents have farming experience of greater than 10 years. This was followed by 29.2% with 6 and 10 years while the least 5.8% of farmers had 1-5 years' experience. Furthermore, the mean experience was 11 years suggesting that the farmers are well experienced in crop production. This implies that crop farming is an age-long venture. The more experienced the farmer is, the more efficient he/she would be in the farm business since the acquired experience over the years would be brought to bear on their activities. Similarly, the experience of the farmers would enable them to develop and acquire strategies for efficient use of inputs and guard against risks and uncertainties.

Farm size: Table 1 indicates that 5% of the respondents hold less than 1.0 ha of land while 60% have between 1.0 and 2.0 ha of land and 35.0% hold above 2 ha of land. This infers that the bulk of the respondents are small scale farmers with an average of 2.10 hectares of land. The respondent farmers who have larger lands are willing to patronize more than the small and poor farmers because they face various risks. Furthermore, larger farms need larger investments to produce more and they tend to discover methods to reduce the magnitudes of crop failure. For this reason, there is a likelihood of patronage of agricultural insurance (Enjolras et al., 2012). Farm size plays an important role in the success of farm production as it is a reflection of the availability of capital, access to credit and managerial ability.

Member of cooperative: The finding indicates that 75.0% of the farmers are not a member of a cooperative while the rest were members of a cooperative society. This could hinder them from the numerous benefits that accrue from insurance schemes being a member of a cooperative society. To get financial and other assistance from the government in Türkiye to boost sheep and goat production the farmers were advised to form breeders association (Koşum et al., 2019)

Major risks facing insurance patronage

The risks confronting the respondents are presented in Table 2. About 93.3% of the respondents faced pest attacks, 82.4% faced with high temperature, 79.8% with variation in yield, 77.3% faced with flood, 69.7% faced with excessive rainfall, 60.5% faced with disease risk, 52.1% faced with drought and 47.1% faced with access to modern inputs. Fire is the least of risks occurring to respondents which was represented by 46.2 %. Thus, the major risks faced by the farmers are pest attacks, high temperature, variation in yield, flood, excess rainfall, disease and drought. According to Ofuoku & Ewrierhurhoma (2018) that conflict decrease levels of crop production and food security in Delta State. These results also show that access to modern inputs and fire outbreak are less encountered by the farmers. A high proportion of the risks were production risks. This result supports the findings of Zhang et al. (2013) who classified price fluctuation, drought, pest, and diseases attack and erratic rainfall as the most important risks challenging the farmers. Field (2012) and Wang et al. (2012) also reported that in recent years, there has been an increased frequency of global natural disasters caused by extreme weather events such as droughts, floods, and frosts.

Table 2. Major risks faced by farmers

Tablo 2. Çiftçilerin karşılaştığı başlıca riskler

Risks	Frequency	Percentage
Pest	111	93.3
Disease	72	60.5
Drought	62	52.1
Flood	92	77.3
Variation in yield	95	79.8
High temperature	98	82.4
Fire outbreak	55	46.2
Excess rain	83	69.7
Access to inputs	56	47.1

Source: Field survey (2020) Multiple responses

Awareness of Insurance Policy

Respondents were asked whether they are aware of insurance (Table 3). The findings of the survey showed that 39.2% of farmers reacted positively and reported that they had an idea about insurance while the 60.8% of farmers responded that they knew nothing about insurance.

Table 3. Level of awareness of agricultural insurance

Tablo 3. Tarım sigortası farkındalık düzeyi

Awareness	Frequency	Percentage
Yes	47	39.2
No	73	60.8

Source: Field survey (2020)

Determinants of agricultural insurance patronage

The results of the binary logistic model were estimated using Stata statistical package (Version 14) and the results are presented in Table 4. In this model, log likelihood ratio was obtained -47.621 and the chi-square statistic for the goodness of fit of the model is 70.28, significant at 1% level. The pseudo R² value of the model is 0.425. Thus, the overall model is a significant and good fit. The explanatory variables used in the model are collectively explaining the decision of the respondents to patronize insurance in the study area.

Table 4. Factors influencing insurance patronage

Tablo 4. Sigorta patronajını etkileyen faktörler

Variables	Coeff.	Std. Err	Z	p> z	dy/dx
Age	-.0597619	.0236814	-2.52	0.012	-.0139021
Education	1.474371	.492218	3.00	0.003	.3429744
Premium rate	-2.430482	.9644609	-2.52	0.012	-.5307827
Gender	1.225031	.568098	2.16	0.031	.2919788
Farm size	.4287264	.1854696	2.31	0.021	.0997322
Farming experience	.1326847	.0932501	1.42	0.155	.0308657
Income	4.30e-06	4.80e-06	0.90	0.370	1.00e-06
Access to credit	1.292881	.6486873	1.99	0.046	.2983153
Awareness	4.420282	1.052198	4.20	0.000	.6749677
Land tenure	1.230345	.5755628	2.14	0.033	.2741321
Constant	-1.470456	1.78979	-0.82	0.411	
Log likelihood	-47.621476				
LR Chi 2 (10)	70.28				
Prob>Chi 2	0.0000				
Pseudo R2	0.4246				

Source: Field survey (2020)

Age: Age was significant at 5% probability level (Is this what you meant?) and negatively influences the propensity of taking insurance by farmers. The negative coefficient suggests a negative influence of age on the farmers' patronage decision. The finding implies that the probability of insurance patronage decreases by a marginal effect of 1.39% for older farmers all other factors held constant. Older farmers, perhaps because of investing several years in farming without any assistance, may not want to jeopardize their activities by trying out insurance services that are not affordable. Hence, the patronage for insurance is higher among young farmers as compared to the old ones. In other words, the likelihood of patronage decreases with an increase in the age of the farmers. This underscores the fact that older farmers are risk-averse and more conservative than the younger ones who are more innovative and receptive to new ideas. In other words, the likelihood of farmers' willingness to patronage insurance decreases as the farmers become elderly. This result aligns with similar studies by Aidoo et al. (2014). These findings contradicted with the study conducted by Jehu-Appiah (2011). He found that that the greater an individual's age, the more likely his/her insurance enrolment.

Education: The education of farmers was positively significant at 5% probability level. The farmers with higher educational prefer an insurance coverage. Keeping the other variables constant, one-year increase in the level of education of the would cause the probability of patronage in insurance by the marginal effect of 34.3%. This finding is strongly agreed with the study by Arshad et al., 2015; Koloma, 2015; Lin et al., 2015. The reason could be that the more educated, farmers are likely to appreciate crop insurance issues better than less-educated ones. Therefore, education may facilitate the diffusion of modern technology and as such has a direct relationship with innovation adoption and the payment of accompanying charges. According to Achoja & Ukwama (2020) education enhances the adoption of technologies for goat production in Nigeria.

Premium rate: The variable premium rate had inversely related with patronage about 5% and this agreed with the a priori expectation that 1% increase in premium rate will trigger 53.1% decrease in marginal effect of insurance patronage. The finding portrays a true farmers' situation giving that they would have a high probability of insurance patronage if the cost of obtaining such is low and affordable. The cost being within the reach of the farmer would stimulate interest for purchasing insurance policy; and little would however be demanded if the rate is above the purchasing power of the farmer. That means a higher premium rate paid, will decrease their interest for insurance patronage. Higher premium rates result in substantially lower levels of participation in insurance programs (Smith & Watts, 2009). Several authors such as Bieber & Eling (2012) reported that high premium is a major impediment to micro insurance uptake.

Gender: The gender of respondents was positive and statistically significant at 5% probability level with a marginal effect of 29.2%. The male had a higher probability of insurance patronage compared to female farmers. This is probably because in a typical rural setting, male farmers are usually the decision-makers among the family members in terms of access to resources and partaking in agricultural projects. Female farmers often need the permission of their husbands to partake in insurance programs and this situation constrains their patronage level. This supports Wan (2014) findings that there is a relationship between gender and breeding sow insurance uptake in China.

Farm size: The variable farm size indicates a positive relationship with insurance patronage at a probability level of 5%. Being positive is indicative of an influence in favour of the farmers' likelihood to purchase an insurance policy in the study area. If the land size increase by one hectare, the probability to participate in insurance increase by the factor of 9.97, when other variables kept constant. Thus, a unit addition of hectares of land owned by farmers would prompt farmers to purchase an insurance policy to enable easy adoption of production technologies. This suggests that an increase in farm size has a positive likelihood that an arable crop farmer will purchase insurance policy coverage. In other words, farmers that cultivate larger farm lands are most likely to use insurance. This result agrees with the study by Fallah et al. (2012) and Gininda et al. (2014).

Access to credit: The variable access to credit was positively significant with patronage at a probability level of 1%. This implies that farmers that had access to credit are more likely to patronize insurance than those farmers who do not have credit accessibility. The marginal effect in favour of patronizing insurance increased by 29.8% for farmers who had received credit. The result revealed that the availability of credit is a necessary condition for increased patronage of insurance. The reason being that credit is associated with the use of improved inputs. This was evident from the reaction of most of the farmers that when insurance policies are in place, they facilitate access to banks' loans and so subscribe to the scheme to enhance credit availability more freely. This concurs with the submission of Farrin & Miranda (2015); Saqib et al. (2016). They all submitted that accessibility to loan and decision to patronize insurance policy was positively correlated. Credit availability becomes vital to the result of Achoja & Ukwama (2020) that goat mortality negatively affects productivity.

Awareness: The variable awareness had a direct relationship with the willingness to patronize agricultural insurance at 1% probability level. The result reveals that the marginal effect on the probability of farmers patronizing agricultural insurance was 67.5%, implying that for every unit increase in the awareness among the farmers, the likelihood of taking agricultural insurance increases by 67.5% which is supported by the findings of Ellis (2016) that, awareness level increases the chance of patronage. This is not surprising because awareness implies having some knowledge about insurance and its benefits. The finding also supports Danso-Abbeam et al. (2014) findings that awareness status and probability of a decision to adopt new technology are positively related.

Land Tenure: Land tenure was positively related to the likelihood of farmers being interested in insurance at a probability level of 1%. This means that a unit increase in land tenure will lead to an increase in insurance patronage. The marginal effect showed that the farmers who inherited or bought land are 67.5% likely to patronize insurance policies. This implies that the more the land is inherited or bought, the higher is the significant involvement. This may be because 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. Thus, farmers patronize insurance when they feel they have land tenure security. This outcome agrees with Agidew & Singh (2019) findings that landowners are significantly more willing to patronize insurance than those farmers without enough land in Nigeria. This result contradicts with the findings by Aidoo et al. (2014). Aidoo et al. (2014) found that the farmers who own lands are not as willing to adopt crop insurance compared to tenants and sharecroppers. Such farmers can diversify into other crops and enterprises since they have easy access to land.

Constraints Encountered in Insurance Patronage

The constraints confronted by farmers in patronizing insurance are ranked from most critical to the least as presented in Table 5. The finding indicates that inadequate knowledge of insurance took the lead with a share of 89.9%. This was followed by high premium payment (84.9%), delay in the valuation of losses (79.0%), administrative bottlenecks arising from unnecessary bureaucracy accounted (74.8%) and delay in claim payment (74.8%). Due to the unnecessary bureaucratic practices involved, these restrictions declined the interest of farmers to have an insurance. Most farmers found untimely and insufficient compensation payment by insurance firms during casualties. This scenario affects their orientation toward agricultural insurance because they appear to assume that insurance firms are only involved in collecting premiums and inadequate compensation payment when due. The lack of confidence in the institution accounted for 69.7% while rigorous procedure in claim reimbursement, fear of the unknown and lack of accessibility to personnel accounted for 63.9%, 61.3% and 61.3% respectively. The least constraint was the distance to the insurance office from the locality (47.1%). It is interesting to note that if these constraints are looked into, other impediments may cease to exist or reduce to a minimum.

Table 5. Constraints against farmers patronage of agricultural insurance

Tablo 5. Çiftçilerin tarım sigortası patronajına karşı kısıtlamalar

Constraints	Frequency	Percentage
Inadequate knowledge of agricultural insurance	107	89.9
Lack of confidence in the institution	83	69.7
High premium payment	101	84.9
Fear of the unknown	73	61.3
Logistics in the schemes	69	58.0
Bureaucratic processes	89	74.8
Delay in claim payment	89	74.8
Delay in valuation of losses	94	79.0
Difficult process in entitlement reimbursement	76	63.9
Inaccessibility to insurance personnel	73	61.3
Distance to insurance office from locality	56	47.1

Source: Field survey (2020) *Multiple responses*

Benefits of Insurance Patronage

The findings on benefits derived are presented in (Table 6. The majority (89.2%) of the crop farmers established that insurance patronage enables them to secure their investment. This was followed by the indemnity in case of an accident which was accounted for 85.8% of them, an increase in farm

income (82.5%) and stress-free access to credit was agreed by 80.8%. Furthermore, only 45.0% of respondents agreed to get farm inputs was not difficult and technical assistance by insurance extension agents (34.1%) respectively.

Table 6. Benefits of agricultural insurance patronage

Table 6. *Tarım sigortası patronajının faydaları*

Benefits	Frequency	Percentage
Security of investment	107	89.2
Easy access to credit	97	80.8
Technical assistance by insurance extension agents	41	34.2
Indemnity in case of accident	103	85.8
Increase in farm income	99	82.5
Easy access to farm inputs	54	45.0

Source: Field survey (2020) *Multiple responses*

T-test of income before and after insurance patronage

Table 7 presents the finding of the null hypothesis that no difference exists between the income of farmers before and after patronizing agricultural insurance. The outcome of the t-statistics indicates that there is a significant difference ($P < 0.05$) between the income of respondents before and after patronizing insurance services. This was confirmed by a mean income of ₦57,644.17 and ₦72,264.92 before and after patronage. This suggests that the mean income after patronizing agricultural insurance services is greater than that of before patronage. The difference in income is indicative of the fact that there has been an improvement in the farming operations of the arable crop farmers. Hence, ever since the farmers got affiliated with insurance programs there had been an improvement in their entrepreneurial skills including financial advisory services. Therefore, the null hypothesis was rejected and the alternate hypothesis which states that there is a significant income differential between before and after insurance patronage was accepted. This finding showed that their investment is secured.

Decision: The P-value of the test is 0.000 which is less than 0.05. There exists enough evidence to reject the null hypothesis and conclude that farmers' income before and after patronizing agricultural insurance services were different.

Table 7. Paired T for Before and After insurance patronage

Table 7. *Sigorta patronajı Öncesi ve Sonrası için Eşleştirilmiş*

	N	Mean	Std Dev	Std. Mean
Before Patronage	120	57644.17	18801.73	1716.36
After Patronage	120	72264.92	25505.65	2328.34
Difference	120	-14620.75	31978.51	2919.22

Source: Field survey (2020) 95% CI t-value = -5.008; p-value = 0.000

CONCLUSION

Agricultural insurance patronage and constraints among crop farmers were the main thrust of this study. Information on agricultural insurance has not been popularly disseminated to encourage patronage by the farmers. The findings reveal that majority (60.8%) of the farmers are not aware of insurance. By implication, therefore, government policies aimed at enhancing and sustaining food production without effective insurance policy awareness may not meet with enormous success. Therefore, farmers' awareness of agricultural insurance should be intensified by the government and other stakeholders to encourage

patronage through enlightenment campaigns with information communication technologies. Farmers realized better income after purchasing insurance policies. Agricultural insurance is known to be one of the risk management options used by farmers to supplement any loss or damage incurred in their farming business. Monthly premium charges by the insurance firms discourage patronage by the farmers. To create a conducive platform premium rates paid by the farmers should be subsidized by the government for effective productivity. The finding has shown that credit availability tends to enhance insurance patronage by the farmers since its absence would be detrimental to agricultural productivity. Hence, credit should be made easily accessible to the farmers by financial institutions. Insurance patronage interest by farmers is dependent on many factors such as age, educational level, premium rate, farm size, access to credit, gender, awareness and land tenure. The major constraints in patronizing agricultural insurance were inadequate knowledge, high premium, delays in the assessment of losses, delay in claim payment, administrative bureaucracy and lack of confidence in the institution. Policy to address the identified problems would propel patronage of insurance by the farmers. It is suggested that Indemnity should be paid to the farmers as soon as possible by the insurance firms to build a positive attitude on the farmers toward patronage. The unnecessary processes in insurance enrolment were a key factor that discourages participation. It is the expectation of this study that bureaucratic bottlenecks should be reduced to the barest minimum to encourage farmers for patronage of insurance to achieve the goals of food sufficiency. Most farmers are discouraged by the attitude of the insurer during assessment and settlement of losses because the firms do not respond as fast as possible. Thus, the actual damage could not be estimated at the time of damage on time. . To increase the willingness of the farmers delay in the valuation of losses by insurance firms should be curtailed to encourage insurance patronage by the farmers.

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