Full Length Research Paper

Uptake of Agricultural Insurance among Crop Farmers in Nigeria: Reviewing the Factors Influencing their Decisions to Adopt Agricultural Insurance

*Adeoti, Samuel Oluwafemi, Ajayi, Adedamola Mary and Agunbiade, Moses Omotayo

Department of Agricultural Economics, Obafemi Awolowo University (OAU), Ile-Ife, Osun State, Nigeria.

*Corresponding Author E-mail: samfemj2011@yahoo.com

ABSTRACT: Agriculture insurance is considered an effective tool for risk management as a means of promoting food security in Nigeria. The study examined the uptake of agricultural insurance among crop farmers in Nigeria. Primary data were collected from six states in the southern region of the country (i.e. Osun, Oyo, Enugu, Anambra, Akwa Ibom and the Delta States) and thirty crop farmers were randomly selected from each state to make a total of one hundred and eighty (180) respondents; these farmers were involved in root and tuber, cereals, legume production (i.e. cassava, yam, cocoyam, maize, beans, rice, etc.). Descriptive statistics were used to describe the socioeconomic and farm characteristics of the respondents. A Logit model was used to estimate the factors that influenced the adoption or uptake of insurance. The study showed that an increase in the years of experience of farmers which could stand as a proxy for the age of farmers has a negative relationship with the uptake of agricultural insurance by farmers: level of education has a positive effect on the likelihood of up taking an agricultural insurance product. Farm size, access to extension service, distance to insurance offices, and access to grants and aids from both governmental and non-governmental agencies were agreed to positively influence the uptake of agricultural insurance in the study area. The study recommended that there should be more awareness on agricultural insurance through different media and extension agents, bundling of insurance products with inputs, grants and aids will help to increase the uptake of insurance among farmers. Also, there is a need for insurance companies to create strategies and mediums of getting their insurance products to the farmers.

Keywords: Agricultural insurance, crop farmers, logit model

INTRODUCTION

Crop production is subject to many risks as they directly affect farmers´ production decisions and welfare. Farmers face many risks in their economic activity due to weather conditions, pests and diseases, price volatility and policies such as agricultural trade liberalization and restrictions on the use of crop protection products (World Bank, 2005). Important factors like weather, market developments and other events cannot be controlled by farmers but have a direct effect on the returns from farming (Baquet *et al.*, 1997).

The variations in productivity induced by nature cannot be fully accommodated by farmers (UNCTAD, 1994), therefore; the farmer has to manage risk in farming as part of the general management practice the farming business. In managing these risks, farmers over the years have adopted both ex-ante and ex-post risk management measures. Ex-ante risk management measures which are strategic actions taken in advance to minimize the occurrence of unfavourable events, these measures include crop rotation and diversification, inter-

cropping, use of high yielding seeds, drought, pest and disease tolerant varieties, tillage systems, irrigation system, agricultural extension service, pest management system, preparedness and adaptation to climate change and partial risk transfer system.   Ex-post risk management measures act as risk treatment tools used by farmers to cope with risk after an unfavourable event has occurred, this includes contractual inter-linking, development of non-cropping and nonfarm source incomes, social assistance programs, catastrophic or disaster assistance, informal financial arrangements, reallocation of labour and migration.

Some farmers have reduced food consumption and expenditure, borrowing and reliance on external help from cooperatives and family members to cope with the sudden shocks. These measures implemented by farmers are helpful, but they are limited when it comes to serious catastrophic situations and aggregate group risks such as drought, floods, pest and diseases outbreaks etc (UNCTAD, 1994). Therefore, there is a need to have a way of taking care of the ever-changing weather, diseases and pests as well as price fluctuations. Agriculture insurance is that tool that will ensure risks and uncertainties that the farmer could face in the producing or after production.

Agricultural insurance (in this case crop insurance) is a major management strategy that the farmers can use to overcome serious risk to a greater extent, it is regarded as an essential part of a well-rounded agricultural programme designed to protect farmers against the physical failure of crops due to uncontrollable and unavoidable natural hazards (Shahi and Umesh, 2012). Insurance being an effective tool for managing risks requires a signed agreement between two parties in which one party (the insured) agrees to pay a predetermined payment called the premium to the other party (the insurer). The insurer must agree to pay a claim or benefit to the insured upon the occurrence of a specified loss (Anderson and Brown, 2005). Insurance can also be defined as a financial mechanism that aims to reduce the uncertainty of loss by pooling a large number of uncertainties so that the burden of loss is distributed (Mahul and Stutley, 2010; Tsikirayi et al., 2012). When a specific risk is identified and quantified, a farmer can seek insurance cover for his farm against potentially devastating shocks. The insurance company assesses the nature of the risks and bases the premiums on the risks; the more likely the event is to happen, the higher the premium (Kahan, 2013). Generally, each policyholder pays a contribution to a fund in the form of a premium, commensurate with the risk he or she introduces. The insurer uses these funds to pay the losses (indemnities), suffered by any insured (Mahul and Stutley, 2010).

Agricultural insurance is not that different from other types of insurance, except that it is specific to agriculture; by providing cover against financial losses, it helps farmers to cope with income shocks and to manage them efficiently (Nnadi et al., 2013). Furthermore, agricultural insurance lowers the effects of the risks faced by farmers by compensating them for losses, thus allowing them to invest more in agriculture to gain increased income (Nahvi et al., 2014).

Agricultural insurance is one method by which farmers can stabilize farm income and investment and guard against the disastrous effect of losses due to natural hazards or low market prices. Agriculture insurance not only stabilizes the farm income but also helps the farmers to initiate production activity after a bad agriculture year. In other words, it cushions the shock of agriculture losses by providing farmers with a minimum amount of protection as it forms an important component of safety-net programs and leverage to access credit. The size of insurance market can be viewed not only as an indicator of development but also as an indicator of the social and cultural relationship of any society (Besley and Brigham, 2005; Nyabochwa, 2015; Masara and Dube, 2017).

Nigerian Agricultural Insurance Corporation is, therefore, a wholly-owned Federal Government of Nigeria insurance company set up specifically to provide Agricultural risks insurance cover to protect the Nigeria Farmer from the effects of natural hazards by introducing measures which shall insure an indemnity sufficient to keep the farmer in business. A major aspect of agricultural insurance is the Crop insurance, which can be purchased by farmers to protect their farms against losses caused either by natural disasters (drought, floods and hail) or a potential loss of revenue due to the decline in market prices for agricultural commodities (Insurance Fact Book, 2017). Crop insurance can be classified into two major groups, indemnity-based and index-based insurance.

Indemnity-based insurance

Indemnity-based insurance comprises multi-peril crop insurance, which is made up of peril and yield insurance. This type of insurance focuses on the actual loss incurred by a farmer and ensures that claim repayments are paid in relation to the loss. It involves careful inspection of the damage to ensure corresponding indemnity calculation. The insurance cover depends on a specific classification, which can cover only a single peril or multi-perils. Single peril insurance provides cover against a named peril, whilst multi-peril crop insurance covers all perils affecting production, excluding specific perils not indicated in the insurance contract (Roberts and Dick, 1991). Usually, the sum insured is based on either the expected crop revenue or production costs (Tsikirayi et al., 2012). However, indemnity-based insurance is associated with adverse selection and moral hazard, high administration and transaction cost problems (Binswanger-Mkhize, 2012; Jones et al., 2009).

Index-based insurance

Index-based insurance uses triggers to determine actual crop loss. A trigger is an index threshold which can be either above or below a specified trigger, usually an amount of rainfall, which determines when payment can be made. Triggers can be made by either using data on rainfall amounts or crop yield data (Cole *et al.*, 2012). Payments from claims are not made based on individual farm losses but from deviations from the index such as rain, soil moisture and humidity. Area yield insurance is an example of the type of insurance that measures crop yield as an index in a particular geographical region. Indirect index insurance uses external indices such as satellite, vegetation and weather derivatives. Payments are made when crop yields fall below a certain predetermined trigger. Weather index-based insurance is designed for specific, unpredictable events such as drought or floods, the data of which is usually recorded in weather stations. Payments are made when the index (rainfall amount) is below or above a predetermined threshold which can lead to crop loss (Roberts and Dick, 1991).

Investment in agriculture remains an unprofitable venture if it faces risks that are beyond the control of farmers most especially risks associated with adverse weather conditions, pest and diseases among others which could lead to a loss in production and farm income, this further affects the country's food security. Hence, the importance of uptake of agricultural insurance among farmers to minimize losses and enhance food security in the country cannot be overemphasized. It has been reported that awareness of agricultural insurance, socio-economic factors, stakeholder's influence and government policies influences the use of agricultural insurance.

The uptake of insurance services in the agricultural sector is generally low as compared to other sectors of the economy like manufacturing, mining and services sectors across the world, and Nigeria is no exception. Farmers view insurance as an unnecessary expense rather than an investment to curtail upcoming risks, especially farmers with smallholding capacity (Nyabochwa, 2015).

Therefore, knowing the level of insurance uptake and understanding the factors influencing the uptake of agricultural insurance among Nigerian farmers is very important and this will help farmers, policymakers and other stakeholders to know the way forward on improving the uptake of agricultural insurance for better agricultural risk management.

The study addressed the following objectives with regards to the use of crop insurance as a means of promoting food security: (i) to identify the level of uptake of agricultural insurance in the study area, (ii) examine the factors that influence the use of agricultural insurance among the farmers.

METHODOLOGY

The study area is Nigeria and data were collected from six states in the southern region of the country (i.e. Osun, Oyo, Enugu, Anambra, Akwaibom and Delta States). Thirty crop farmers were randomly selected from each state to make a total of one hundred and eighty respondents; these farmers were involved in root and tuber, cereals, legume production (i.e. cassava, yam, cocoyam, maize, beans, rice etc.). Experienced enumerators were used to administer the well-structured pretested questionnaires to the farmers in the randomly selected states in southern part of Nigeria.

Descriptive statistics was used to describe the socioeconomic and farm characteristics of the respondents while binary logit model would be used to estimate the factors that influenced uptake of agricultural insurance because the dependent variable evokes a yes or no answer (Gujarati, 1998) hence its choice for this study.

Following Gujarati (1998), the logit model is specified as follows:

$$Ln (Pi / (1-Pi)) = \beta 0 + \beta 1X1 + …..+\beta 13X13 + ei$$

Where: Pi = likelihood of farmer accepting agricultural insurance
1-Pi = likelihood of not accepting agricultural insurance
$\beta 0$ = Intercept
(1, 2, 3…) = Regression coefficients
Xi (1, 2, 3…13) = Independent variables and
Ei = error term.

The agricultural insurance uptake model was specified as follows:

Insurance Uuptake = $\beta 0 + \beta 1$FARMEXPERIENCE + $\beta 2$EDUCATION + $\beta 3$FARMSIZE + $\beta 4$EXTENSIONCONTACT + $\beta 5$ACCESSTOGRANT + $\beta 6$DISTANCETOINSURANCEOFFICE + *ei*

Where $\beta 0 – \beta 6$ are parameters to be estimated or independent variable and *ei* is an error term.

Some socioeconomic and farm characteristics were grouped/binned for presentation purpose in the table below while variables like farming experience, education level in years, farm size and distance to the insurance office where continues variables in the analysis.

RESULTS AND DISCUSSION

Socio-economic characteristics of crop farmers

Table 1 shows that 25% of the respondents had been farmers for a period between 11-15 years and closely followed by 23.3% of them who had been farmers for a period between 6-10 years. Majority (41.1%) had secondary education; 29.4% reached the primary level

Table 1: Socio-economic characteristics of respondents

Socio-economic data	Frequency	Percent
Farming experience (Years)		
≤5	27	15.0
6-10	42	23.3
11-15	45	25.0
16-20	26	14.5
21-25	15	8.3
26-30	14	7.8
>30	11	6.1
Level of education		
No formal	8	4.5
Primary	53	29.4
Secondary	74	41.1
Tertiary	45	25
Farm size (ha)		
<2	141	78.3
≥2	39	21.7
Access to extension services		
Yes	64	35.6
No	116	64.4
Access to grants/aids		
Yes	28	15.6
No	152	84.4
Distance to insurance outlet		
Close (≤10km)	4	2.2
Far (>10km)	176	97.8
Insurance uptake		
Yes	31	17.2
No	149	82.8
Total	180	100

The estimate of factors influencing the uptake of agricultural insurance

The result of binary logit regression is presented in (Table 2).

Table 2: Binary Logit regression estimates of factors influencing uptake of agricultural insurance.

Factors	Coefficients	p-values
Constant	-0.103	0.750
Farming experience	-0.322	0.096*
Years of education	0.312	0.010***
Farm size	0.114	0.003***
Access to extension service	0.031	0.154
Access to grant and aids	0.225	0.048**
Distance to an insurance office	0.154	0.220
Chi-square	94.5	
Log likehood	-31.12	

***, ** and * represent 1%, 5% and 10% significant levels.

Years of experience of the farmers in crop production had a negative relationship with the uptake of agricultural insurance by farmers indicating that as the farmers grow to spend additional years in farming, the likelihood of uptaking agricultural insurance policy is reduced. This submission agreed with other studies on adoption like Mahammed and Ortmann, (2005) and Akinola, (2014) who showed that experience negatively influence the uptake of agricultural insurance. These authors argued that older and more experienced farmers are less willing to purchase insurance because they might have acquired enough knowledge through time to deal with production risks without insurance. Old age was also viewed to increase risk aversion and a decreased interest in long-term investment in farming technologies. Other studies on adoption on agric insurance like Masara and Dube (2017), Ng'ombe *et al.* (2014), Sadati *et al.* (2010) and Tsikirayi *et al.* (2012) have shown different results, explanation for this result may be a repeated production shock experienced by the household, which may prompt it to devise a 'safe' mechanism of taking insurance.The result also showed that an increase in the years of education has a positive effect on the likelihood of uptaking an agricultural insurance product all things being equal. This submission disagreed with the submission of Vandeveer (2001) that farmers with more education were less likely to buy insurance. Esho *et al.* (2004) used education (completing secondary school) as a proxy for risk aversion following the argument by Outreville (cited by Esho *et al.*, 2004) that improving cognition enables a better assessment of risk and hence an increased demand for insurance. Bullock *et al.* (1994) found that education was negatively related to a farmer's willingness to take the risk.

From this result, Farm size is agreed to be positively influencing the uptake of agricultural insurance in the study area. In this case, the level of the investment of

and 25% had Tertiary Education. The findings thus revealed that most of the respondents were well educated and this agrees with the study of Torkamani, (2002) that level of education could influence the adoption of insurance. Also, 78.3% of the respondents had farm sizes of less than 2 hectares while 21.7 % had a farm size of 2 hectares and above. The study further revealed that 64.4% of the respondents had access to extension services, 15.6% had access to grants/aids for their enterprise and 97.8% of the respondents indicated that the distance of insurance outlets to their location is far, this can affect the farmer's decision to uptake agricultural insurance. Tsikirayi *et al.* (2012) revealed that the location of most insurers makes it difficult for farmers to access insurance service providers or vice versa. This has an overall effect of reducing the uptake of farming insurance policies. The study finally found that 82.8% of the respondents had not insured their crops while 17.2% had insured. The findings are in line with that of Nyabochwa, (2015), Smith and Banquet (1996) and Tsikirayi *et al.* (2012) who found that level of education, years of farming experience, size of land, and distance to insurance outlets among others are important factors affecting the participation of farmers in an insurance scheme.

farmers on their farms may be an important factor that farmers consider before obtaining and insurance cover, farmers that can cultivate a large expanse of land will be able to purchase insurance cover for his farm investment. This is contrary to the outcome of the research of Ntukamazina *et al. (*2017).

Access to extension service has a positive relationship with agricultural insurance uptake but not statistically significant at an acceptable level, the more awareness and new information on agricultural insurance through extension agents, the more the likelihood of farmers to pick up agricultural insurance products (Nyaaba *et al.,* 2019). Access to grants and aids from both governmental and non-governmental agencies shows a positive relationship with the likelihood of farmer's uptaking agricultural insurance. This shows that if farmers have access to aids and grants that have insurance as criteria of approval or grants/aids that are insurance imbedded, the level of uptake of insurance will likely increase.

With regards to distance to insurance offices, it is believed that the closer the insurance outlet is to farmer's location the more likelihood of farmers picking up the insurance products. There is a need for insurance companies to create strategies and mediums of getting their insurance products to the farmers. The chi square statistics of 94.56 obtained shows that the model gives a good fit for the analysis and the log of likelihood for the fitted model is -31.12 significant at 10%.

Conclusion

Agricultural insurance is an effective tool for risk management in agriculture employed by farmers to supplement any loss or damage incurred in their farming business. Findings from this study established that factors that positively influence the uptake of agriculture insurance by smallholder farmers are education, farm size, access to extension service as well as the distance to an insurance office. The study therefore, recommends that there should be more awareness on agricultural insurance through different media and extension agents, bundling of insurance products with inputs, grants and aids can be of help while insurance desks should be close to farmers. There is need for insurance companies to create strategies and mediums of getting their insurance products to the farmers and organizations selling the insurance policies to farmers should reduce the procedures and also compensate farmers immediately in cases of loss. This will help in building the confidence of the farmers in purchasing the policies thus promoting agriculture insurance.

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