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WILLINGNESS TO TAKE AGRICULTURAL INSURANCE BY COCOA FARMERS IN NIGERIA

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Abstract

This study examines willingness to take agricultural insurance by cocoa farmers in Nigeria. A three-stage sampling procedure was used to select 120 cocoa farm households and structured questionnaire was used to elicit data from the respondents. The data were analysed with descriptive statistics and probit regression model. Results showed that 77.5% of the farmers were aware of Agricultural Insurance but only 50% were willing to take it. The average willingness-to-pay (WTP) for Agricultural Insurance by the respondents was ₦11,087.5/ha (\$69.85/ha). The significant variables influencing willingness to take agricultural insurance by the farmers were age of household head, educational level, access to extension service and farm income. The study therefore recommends encouraging young well educated people to engage in cocoa farming, overhauling agricultural extension services as well as provision of insurance services to farmers at affordable rate.

Keywords: *Average willingness-to-pay, Cocoa, Insurance, Willingness-to-take, affordable rate.*

1. Introduction

The importance of cocoa (*Theobroma cacao*) to Nigeria's economy cannot be overemphasized. Since the introduction of the crop into Nigeria in about 1874 (Oyedele, 2007), it has grown to be a major export crop. Though Nigeria gets her foreign exchange earnings majorly from crude petroleum, yet cocoa remains the Nigeria's highest foreign exchange earner among all agricultural commodities, of which the country is the fifth largest exporter of in the world (Oseni, 2011). Besides, a significant population of Nigerian earns their living from cocoa cultivation, thereby providing direct or indirect employment opportunities.

In the 60s, Nigeria produced about 15% of world cocoa annually and was the second largest producer of the crop in the world (Utamakili and Abolagba, 1996). In the 70's cocoa output peaked at 308,000 tonnes (Adeyeye, n.d). In recent years, however,

cocoa output ranges between 185,000 and 215,000 tonnes (Oseni, 2011). Some of the reasons identified by previous studies for these variations in cocoa production include low yield, vagaries of nature, inclement weather conditions, disease incidence, pest attack, and natural hazards like flood, erosion, drought (Obatolu, Fashina and Olaiya, 2003; Oluyole and Sanusi, 2009; Villalobos, 1989; Wood, 1985; Wright, 1993).

Annual cocoa production is subjected to large variations due to risks and uncertainties completely beyond the farmer's control. Aderinola and Abdulkadri (2007) attribute the decline in its production to high risks and uncertainties often associated with agricultural production. This is as a result of the fact that cocoa, like other crops, requires extensive direct and continuous contact with the forces of nature. These risks and uncertainties are unforeseen and they are beyond the capacity of the farmers, hence, they can only be managed by the farmers. This makes cocoa farmers make considerable losses of investment and income as a result of the losses incurred from these risks and uncertainties. For this reason, Ajakaiye (2001) stated that small farmers in many developing countries of the world including Nigeria are trapped in the vicious cycle of poverty. This cycle is characterized by low productivity and low farm income which leave them with virtually no saving capital required in the transformation of their production technology, and this consequently amounts to the low status accorded to farmers in the society.

However, through agricultural insurance, cocoa farmers can be saved from these losses or damage to crops or the effects can be minimized. Agricultural insurance is defined in the Nigerian Agricultural Insurance Scheme Operation Guideline (1989) as the stabilization of income, employment, prices and supplies of agricultural products by means of regular and deliberate savings and accumulation of funds in small instalment by many farmers in favourable time periods, to defend the participants in bad time periods. Thus, agricultural insurance serves as a means of guiding against loss should the insured event occur. According to Ray (2001), crop insurance can cushion the shock of disastrous crop losses in bad year and help to ensure a considerable measure of security in farm income over the years. Agricultural insurance looks into how risks and uncertainties can be effectively managed to the advantage of the farmers in the present and also in the future. This can help in stabilizing agriculture and in turn the economy at large. Agricultural insurance is therefore a necessary part of the institutional infrastructure essential for the development of agriculture, which is mainly a high risk enterprise.

In an attempt to assist farmers in managing risks, various insurance policies, programmes and projects were put in place by the Nigerian government. One of these programmes is the Nigerian Agricultural Insurance Scheme (NAIS) which was formerly launched in 1987. This was later followed by the incorporation of the Nigeria Agricultural Insurance Corporation (NAIC) in 1988 to implement the scheme. Besides, several private insurance companies that incorporate agricultural insurance in their policies have also emerged in Nigeria over the years. Nonetheless, the contribution of cocoa to Nigeria's total exports earnings in recent years has dropped considerably. In the 60s, the country produced about 15% of world cocoa annually and was the second largest producer of the crop in the world (Utamakili and Abolagba, 1996). As at today, the country has lost this feat to Cote'd' Ivoire, it even lags behind Ghana and Indonesia. This poses a question on whether the cocoa farmers in Nigeria are willing to take insurance for effective management of risks facing their operations or not. The goal of this present study, therefore, is to examine willingness to take insurance by cocoa farmers using Ondo State as a case study. The specific objectives are to

- describe the socioeconomic characteristics of the cocoa farmers;

- identify major risks encountered by the farmers;
- examine the extent of cocoa farmers' awareness of insurance taking;
- evaluate the average price that farmers are willing to take agricultural insurance; and
- examine factors affecting willingness to take insurance by cocoa farmers.

The study will provide planners, decision makers, and implementers with practical tools for implementing effective agricultural insurance programmes. It will also guide agricultural policy-makers, business leaders, members of the agricultural development community, researchers, and practitioners on methods and approaches that can be used to promote agricultural insurance in Nigeria and beyond.

2. Methodology

2.1 Study Area

The study was conducted in Ondo State, Nigeria. The state is located in the south-western part of the country and lies between longitude 4⁰31' and 6⁰00' east of the Greenwich Meridian and latitude 5⁰15' and 8⁰15' North of the Equator. It is bounded by Ekiti and Kogi State in the north; Edo State in the east; Ogun and Osun States in the west and the Atlantic Ocean in the south (SOSG Diary, 2010). The state has a population of 3,441,024 (NPC, 2006) and covers an area of 14,793sq.km at 120 kilometres north of the ocean. The state is made up of 18 Local Government Area (LGAs).

The tropical climate of the state is broadly of two seasons: rainy season (April-October) and dry season (November-March). Temperature throughout the year ranges between 21⁰C to 29⁰C and humidity is relatively high. The annual rainfall varies from 2,000mm in the southern areas to 1,150mm in the northern areas. The state enjoys luxuriant vegetation with high forest zone (rain forest) in the south and sub-savannah forest in the northern fringe.

Agriculture is the mainstay of the state and 65% of the state labour force is in agricultural sub-sector (Folayan, Oguntade and Ogundare, 2007). As regards cocoa production, Ondo State accounts for about 50% of Nigeria's annual cocoa production (Ajayi et al., 2012; Ajobo, 1980). Other cash crops produced in large scale in the state include palm produce and rubber. Food crops like maize, yam and cassava are also produced in large quantities. The state is also blessed with very rich forest resources where some of the most exotic timber in Nigeria abound.

2.2 Sampling Techniques

The target population of this study were cocoa farmers. A three-stage sampling technique was adopted for the study. First, six LGAs noted for cocoa production: Idanre, Ondo-West, Ile-Oluji/Oke-Igbo, Odigbo, Akure South and Owo were purposively chosen. This was based on the prior information obtained from the state Agricultural Development Project (ADP) Office that they were the major cocoa producing LGAs in the state. This was followed by random selection of four farm communities from each of the six LGAs. Third, five cocoa farmers were randomly selected from each community making a total of 120 respondents.

2.3 Data Collection

Both primary and secondary data were used for this study. Primary data were sourced from the cocoa farmers in the study area with the use of structured questionnaire. Data collected include: socio-economic profile of the farmers, level of awareness about the agricultural insurance, willingness to take insurance, amount that the farmers were willing to take the insurance, etc. Supporting secondary data were also obtained from the internet, published and grey literature.

2.4 Data Analysis Techniques

2.4.1 Descriptive Analysis

Most of the results of the study are presented in tabular and descriptive forms. Descriptive tools like frequency distribution, percentages, averages and ranking techniques were used to analyse the socio-economic characteristics of the respondents and also to determine the average amount that the respondents were willing to take agricultural insurance from NAIC. Adopting Yapa and Ariyawardana (2003),

$$\text{Average WTP} = \frac{\text{Sum of bidding amounts}}{\text{Total number of respondents who were willing to pay}} \quad (1)$$

2.4.2 Probit Analysis

The Probit regression model was used to examine factors influencing the cocoa farmers' willingness to take insurance. Following Raje, Dhobe and Deshpande (2002), the Probit model was used to assess the effects of the independent variables on the probability of the respondents' willingness to take agricultural insurance. The empirical model measuring the probability that a farmers was willing to take insurance was expressed as

$$P_i = F(WTI_i) = \frac{1}{1 + e^{-WTI_i}} = \frac{1}{1 + e^{X_i + \varepsilon_i}} \quad (2)$$

Where $i = 1, 2, 3, \dots, n$

Where P_i is a probability function, which is the farmers yes/no response to the willingness to take agricultural insurance. WTI_i is the willingness to take insurance. X_i is a vector of observed characteristics of an individual. They include socio-economic and attitudinal attributes of the respondents.

For this study, equation (2) is expressed implicitly as

$$WTI = F(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, \varepsilon_i) \quad (3)$$

Where

WTI = Willingness of the respondents to take agricultural insurance (1 if yes, 0 if otherwise)

X_1 = Age of household head (years)

X_2 = Farm size (hectares)

X_3 = Household size

X_4 = Level of education of household head

X_5 = Access to extension services

X_6 = Opinion on insurance policy (mild = 1, strict = 0)

X_7 = Farm income (₦)

X_8 = Farming experience of household head (years)

$\beta_1, \beta_2, \dots, \beta_8$ are parameters corresponding to estimated variables' coefficients. ϵ_i is the error term and consists of unobservable random variables.

3. Results and Discussion

3.1 Socio-economic Characteristics of the Respondents

Socio-economic characteristics are important human attributes that help to enhance the efficiency of farmers to adopt practices that can improve their production. Indeed, they help to shape the entrepreneurial abilities of farmers in rational decision making, especially those relating to agricultural enterprise system (Haruna, Garba, Nasiru & Sani, 2010; Shu'aib, 2009). Based on this rationale, the relevant socio-economic characteristics of the respondents were investigated in order to ascertain their relevance to the ability of the farmers to take agricultural insurance.

Table 1 shows the socio-economic characteristics of the respondents. Majority (94.17%) of the farmers were male while just 5.83% were female. This may be because cocoa production, like any other crop production activity, is energy consuming and men are more capable of doing vigorous activities than women.

About 66.66% of the farmers were within the range of 55 years and above. Also, the mean age of the farmers was 56 years. This implies that most of the farmers were relatively old. About 74.2% of the respondents were married while just 5.83% were single. This suggests that cocoa farming is a means of catering for the family in the study area.

In the traditional agricultural production, family labour plays a significant role in farm labour supply. The average farmer first exhausts all sources of labour in his family before hiring labour in order to reduce the cost of production (Muhammad-Lawal, Omotesho & Falola, 2009). The average household size of the respondents was about 14 persons. This suggests the possibility of much availability of family labour for cocoa farming activities to the farmers. About 96.67% of the farmers had formal education. Distribution of the respondents according to their farming experience shows that all the farmers had been in cocoa production for at least 10 years, with majority of them having farming experience of 21–30 years. Also, the mean farming experience of the farmers was 25.58 years. This implies that cocoa production is an age-long venture in the study area.

The farm income of the respondents ranged between ₦52,000 and ₦1,300,000 (1 US Dollar = ₦158.73). The mean annual farm income of the respondents was ₦230,700. Dividing this by 12 (the number of months in a year) gives ₦19,225, which is greater than ₦18,000 (the official Minimum Wage in Nigeria). This suggests that the cocoa farmers were more financially buoyant than their counterparts in Nigerian civil service.

Willingness to Take Agricultural Insurance by Cocoa Farmers...

Majority (80.83%) of the farmers had access to extension services. The modal farm size of the respondents ranged from 1 to 10 hectares. The mean farm size was about 7.86 hectares, implying that the farmers were medium scale farmers.

Table 1: Socio-economic Profile of the Respondents (N = 120)

Variable	Category	Frequency	Percentage
Age of household head	35 – 44	14	11.67
	45 – 54	26	21.67
	55 – 64	40	33.33
	≥65	40	33.33
	Mean	56.83	
Sex of household head	Male	7	5.83
	Female	113	94.17
Marital Status of household head	Single	7	5.83
	Married	89	74.17
	Widowed	21	17.50
	Divorced	3	2.50
Household Size	1 – 5	26	21.67
	6 – 10	92	76.67
	≥11	2	1.67
	Mean	13.75	
Educational level of household head	No formal	4	3.33
	Primary	27	22.50
	Secondary	83	69.17
	Tertiary	6	5.00
Farm income (₦ '000)	50.0 – 100.0	10	8.33
	100.1 – 150.0	12	10.00
	150.1 – 200.0	34	28.33
	200.1 – 250.0	37	30.83
	≥250.1	27	22.50
	Mean	230.7	
Farming experience (years)	10 – 20	48	40
	21 – 30	51	42.5
	31 – 40	19	15.83
	≥40	2	1.67
	Mean	25.58	
Farm size (hectares)	1 – 10	113	94.17
	11 – 20	4	3.33
	≥20	3	2.5
	Mean	7.86	
Access to extension agricultural services	Yes	97	80.83
	No	23	19.17

Source: Field Survey, 2013

3.2 Risks Faced by the Farmers

The risks faced by the respondents are presented in Table 2. About 76.7% of the farmers were faced with pest attack, 79.2% were faced with disease risk, 77.5% with excess rainfall, 73.3% too high temperature, 70% with variation in yield, 3.3% were

faced with flood, 6.7% encountered fire outbreak, drought (69.2%) and 78.3% were faced with poor access to inputs. Thus, the major risks faced by the farmers are pest attack, disease, access to input, excess rainfall, too high temperature, drought, and variation in yield. These results also show that fire outbreak and flood are less encountered by the farmers.

Table 2: The Major Risks Faced by the Respondents

Risks	Category	Number of Respondents	Percentage
Pests	Yes	92	76.7
	No	28	23.3
Diseases	Yes	95	79.2
	No	25	20.8
Excess rain	Yes	93	77.5
	No	27	22.5
Too high temperature	Yes	88	73.3
	No	32	26.7
Variation in yield	Yes	84	70.0
	No	36	30.0
Flood	Yes	4	3.3
	No	116	96.7
Fire outbreak	Yes	8	6.7
	No	112	93.3
Drought	Yes	83	69.2
	No	37	30.8
Poor access to inputs	Yes	94	78.3
	No	26	21.7

Source: Field Survey, 2013

It is worthy of note that most of the risks faced by the farmers were production risks. This is in consonance with Salimonu and Falusi (2009) who classified price fluctuation, drought, pest and diseases attack and erratic rainfall as the most important risks faced by farmers. Tru and Cheong (2009) also posited that in general, price and production risks were perceived as the most important risks faced by farmers.

3.3 Awareness of Agricultural Insurance by the Farmers

The Table 3 shows level of awareness of agricultural insurance by the respondents and their willingness to take the service. About 15.8% of the farmers were strongly aware of agricultural insurance, 34.2% were partially aware, 27.5% were fairly aware while 22.5% were not aware at all. Overall, this means that 77.5% of the farmers were aware of agricultural insurance. However, despite a larger percentage of the farmers were aware of agricultural insurance, only 50% of them were willing to take it.

Table 3: Distribution of Respondents According to their Awareness and Willingness to Take NAIC Insurance (N = 120)

Item	Number of Respondents	Percentage
Level of awareness about NAIC		
Strongly aware	19	15.8
Partially aware	41	34.2
Fairly aware	33	27.5
Not aware	27	22.5
Willingness to take insurance		
Willing	60	50.0
Not willing	60	50.0

Source: Field Survey, 2013

3.4 Evaluation of Average Willingness-to-Pay for Agricultural Insurance Services

Table 4 shows the amount that the respondents were willing to take agricultural insurance. The results show that 88.3% of the willing respondents were willing to pay ₦5000 – ₦10000 per hectare as insurance premium. Overall, the average WTT by the respondents was ₦11087.5/ha (\$69.85). However, just 11.7% of the interested farmers were willing to pay above ₦10,000 (\$63.0) per hectare per annum.

Table 4: Respondents' Distribution of Prices Willing to take Agricultural Insurance

Amount (₦/ha) per annum	Willing Respondents (N = 60)					Unwilling Respondents (N=60)
	Number of Respondents	%	Min. (₦)	Max. (₦)	Mean (₦)	
≤ 5000	45	75	2500	4000	2000	
5001-10000	8	13.33	6000	8500	7050	
10001 - 20000	6	8.33	10000	18000	15300	
≥20000	1	3.33	20000	20000	20000	
Average WTT	₦11087.5 (1 US Dollar = ₦158.73)					

Source: Field Survey, 2013

3.5 Determinants of Farmers' Willingness to Take Agricultural Insurance

The parameters of the Probit regression model were estimated using Stata statistical package (Version 11) and the results are presented in Table 5. The Chi-square statistic of 104.46 (p < 0.1) obtained shows that the model gave a good fit for the analysis. The result shows that age of household head, educational level, access to extension services and farm income are the significant factors influencing willingness to take insurance by the farmers.

Age of the household head is significant at 1% and negatively influences the tendency of taking agricultural insurance by farmers. 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 Mishra and Godwin (2006) and Piyasiri and Ariyawardana (2002).

Table 5: Probit Regression on Factors Influencing Willingness to Take Agricultural Insurance by the Respondents

Variable	Coefficient	Standard error	t-value	P-value
Age of household head	-0.0810391	0.0192104	-4.22***	0.000
Farm size	0.0266474	0.0326783	0.82	0.415
Household size	-0.0499346	0.0970791	0.51	0.607
Educational level of household head	1.382801	0.3765144	3.67***	0.000
Access to Extension Services	0.9857264	0.4014188	2.46**	0.014
Opinion on insurance policy	0.3666865	0.4221356	0.87	0.385
Farm income	-0.00000737	0.00000408	-1.80*	0.071
Farming experience of household head	0.0053007	0.29805	0.18	0.859
Constant	2.204747	1.203735	1.83	0.067
Chi-square	104.46			

Note: *, **, *** - Variable is significant at 1%, 5%, 10% respectively.

Source: Field Survey, 2013

The coefficient of educational level of household head is positive and significant at 1%. This implies that the higher the educational level of the household head, the more likely he would take agricultural insurance. This conforms to *a priori* expectation. Well educated farmers accept innovations that would help them in farm management more readily than their less educated counterparts (Falola, Banjoko & Ukpebor, 2012).

Access to agricultural extension services by the farmers is significant at 5% and positively affects farmers' willingness to take agricultural insurance. This also is in accord with prior expectation, as access to extension services can provide farmers with crucial information on modern methods of managing risks, such as taking insurance.

One would expect farmers with high farm income to take insurance more readily than their low income colleagues. However, the result of this study gave a reverse trend. This could result from the fact that those who earn high income from their farm operations are likely to adopt other methods of risk management even at high cost, which their low income counterparts may not be able to afford. This may explain the negative significance of farm income in relation to ability of the farmers to take agricultural insurance.

4. Conclusion and Recommendations

This study examined willingness-to-take agricultural insurance by cocoa farmers in Nigeria. It stemmed from the need to manage the risks militating against cocoa production in the country. It can be inferred from the study that most of the farmers are aware of agricultural insurance, though the level differs. Also, a good number of the farmers are willing to have insurance cover in order to manage agricultural risks effectively. On the average, the farmers were willing to take insurance if the premium is not greater than ₦11,087.5 per hectare (1 US Dollar = ₦158.73). Moreover, the study has revealed that age of household head, educational level, access to extension services and farm income are the significant factors that influence willingness to take insurance by the farmers.

Based on the findings of this study, therefore, it is recommended that young and well educated people should be encouraged to actively participate in cocoa production, as this will improve their willingness-to-take insurance. There is also the need for extension agents and other agricultural development stakeholders to overhaul their services in sensitizing and training cocoa farmers on the importance of agricultural insurance policy. Also, agricultural insurance corporations should provide insurance to farmers at affordable rates as to encourage them to obtain it.

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