RISK ATTITUDE AND RISK MANAGEMENT STRATEGIES AMONG AGRIBUSINESS ENTREPRENEURS: CASE STUDY OF COCOA FARMERS IN ABIA STATE, NIGERIA

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Abstract

The study empirically analyzed the risk attitude and risk management strategies among cocoa farmers in Abia State, Nigeria. A Multistage sampling technique was used in the selection of sixty (60) cocoa farmers for the study. Descriptive statistics, Pearson Product Moment Correction and Ordinary Least Square Regression analyses were used to analyze the data. The results of the descriptive statistics showed that the respondents had a mean age of 42 years, majority (88.3%) of them are male, many (75%) of whom were married, with household size of about 6 persons, farm size of 5 hectares, farming experience of 17 years, and majority (98.3%) literate. The respondents had average farm income of ₦433,381, non-farm income of ₦64,337, extension contact of about 3 times, and cocoa output of 10 bags of 200kg. Majority (78.4%) of the respondents were also risk-takers. The most common risk management strategies used by the respondents were precautionary savings, intercropping and off-farm jobs. The major challenges faced by the respondents were: bad roads, pests and diseases, high cost of inputs and agrochemicals, and problem of middlemen. The results of the correlation analysis indicate a negative linear correlation between cocoa farmers' risk attitude and their risk management strategies in the study area. The results of the regression analysis showed that age, farm size, farm income, extension contact and credit were the significant determinants of cocoa farmers' output. The study therefore, calls for land reform policies to make more land available to cocoa farmers for increased output and income. Need to strengthen extension to enable farmer's access and process information on innovations that will enhance output of cocoa

Keywords: Risk attitude, risk management strategies, cocoa farmers.

Introduction

Cocoa (*Theobroma cacao* L.) is one of the cash crops produced in Nigeria. It is a perennial tree crop that depends on the quality of soil and nutrients for its yield (Samuel, 2017). It is grown mainly in fourteen States out of the thirty-six States in Nigeria (Adebayo, 2019). Abia State is one of the cocoa producing States in Nigeria. The other cocoa producing States are: Ondo, Cross River, Osun, Ekiti, Oyo, Edo, Ogun, Taraba, Delta, Akwa-Ibom, Adamawa, Kwara and Kogi. Cocoa production in Abia State is done in the rural areas by rural farming households with little or no education, limited access to extension agents, and low level of production technology. These have exposed the cocoa farmers to high level of production risk and its attendant problems of low output, resulting in low per capita income and consequent low standard of living (Samuel, 2017).

Risk is inherent in all business activities. Agribusiness activities are more prone to risk due to the peculiar nature of agriculture, which is dependent on climatic and environmental conditions. Some risks associated with crop production include: biological (insects, pests

and diseases), climatic (droughts, floods), price (volatility of input and output prices), and financial (credit unavailability and fluctuations in interest rate) (Shoaib *et al.*, 2019). Farmers exhibit different attitudes towards risk. Some are risk takers, and risk averse, while others are risk neutral. Although risk is inevitable in crop production, rural farmers tend to avoid taking risk which might endanger their livelihoods (Oparinde *et al.*, 2018). Farmers' attitude towards risk is essential for proper risk management in agriculture (Piotr and Anna, 2014). Risk management strategies are risk control mechanisms put in place before the occurrence of a risky event. Some risk management strategies that can be adopted by cocoa farmers to mitigate against risky event include; crop insurance, forward contracting, precautionary savings, spreading sales, crop diversification, off-farm job, pesticide application, use of improved seed varieties, and membership of cocoa farmers' cooperative. According to Olawuyi and Olawuyi (2015), farmers' choice of risk management strategies is determined by age, farm size, risk aversion, innovativeness and source of risk.

Though previous researchers (Oparinde *et al.*, 2018; Olawuyi and Olawuyi, 2015; Dadzie and Acquah, 2012; Ayinde *et al.*, 2008), have conducted research on risk attitude and management strategies among farmers, there is still dearth of literature on risk attitude and risk management strategies among cocoa farmers in Abia State, Nigeria. It is therefore imperative to empirically analyze the risk attitude and risk management strategies among cocoa farmers in Abia State, in order to fill the identified gap in literature.

Methodology
Study Area
The study was carried out in Abia State, Nigeria. It is one of the thirty-six States of Nigeria located in the south-east part of the country. It was created in 1991, and bordered by the States of Enugu and Ebonyi to the North, AkwaIbom State to the East and South-East, Rivers State to the South and South-West, Imo and Anambra States to the West. It is made up of three Agricultural zones, three Senatorial zones and seventeen Local Government Areas, with Umuahia as the State Capital. The climatic condition of the state is suitable for agriculture. Rainy season starts in March and ends in October, while the dry season starts from November to February. Some of the major cash crops grown in the state are cocoa, oil palm, and rubber, while food crops like cassava, rice, yam, maize, and vegetables thrive in the state.

Sampling Technique
Multistage sampling technique was used in the selection of respondents for the study. In the first stage, 2 Agricultural Zones with predominance of cocoa farmers namely: Ohafia and Umuahia Agricultural Zones were purposively selected from the 3 Agricultural Zones in Abia State. In the second stage, 1 Local Government Area (LGA) known for cocoa production was purposively selected from each of the selected Agricultural Zones. In the third stage, 2 autonomous communities with high concentration of cocoa farmers were purposively selected from each of the selected LGAs. In the final stage, 15 cocoa producing households were randomly selected from each of the selected autonomous communities, giving a sample size of sixty (60) respondents.

Data Collection
Data for the study was sourced primarily using questionnaire and oral interviews to elicit information from the respondents.

Data Analysis
The data collected were analyzed using descriptive statistics (such as frequency, mean and percentage), and inferential statistics (such as Pearson Product Moment Correlation analysis and Ordinary Least Squares multiple regression analysis). Socio-economic profile of the respondents was examined with descriptive statistics; risk attitude of the respondents was determined using a 3 point likert scale rating technique. The farmers were asked to rate their attitude towards production risk, market risk, financial risk, biological risk, climatic risk and price risk. The rating was in the order: worried = 3, undecided = 2 and not worried = 1. The mean score was calculated thus: $3 + 2 + 1 = 6/3 = 2$. Using the interval of 0.05, the upper limit cut-off point was $2.00 + 0.05 = 2.05$, while the lower limit was $2.00 – 0.05 = 1.95$. Decision rule**:** Mean scores (MS) less than 1.95 (i.e. MS < 1.95) were regarded as low risk attitude/risk averse attitude; mean scores between 1.95 and 2.05 (i.e. $1.95 < MS < 2.05$) were regarded as medium risk attitude/risk indifferent attitude; mean scores greater than 2.05 (i.e. MS > 2.05) were regarded as high risk attitude/risk taking attitude. Also, a 4 point likert scale rating technique was used to ascertain the risk management strategies used by the respondents. The mean score was calculated thus: $4 + 3 + 2 + 1 = 10/4 = 2.5$. Decision rule**:** Mean score less than 2.5 were considered not relevant, while mean scores greater than or equal to 2**.**5 were considered relevant. Furthermore, a 5 point likert scale rating technique was used to identify the challenges faced by cocoa farmers in the study area. The mean score was calculated thus: $5 + 4 + 3 + 2 + 1 =$

15/5 = 3. Decision **rule:** Mean score less than 3 were considered not important, while mean scores greater than or equal to 3 were considered important. Pearson Product Moment correlation analysis was used to analyze the influence of cocoa farmers' risk attitude on their risk management strategies in the study area. Pearson product moment correlation analysis is specified thus:

$$r = \frac{n\,\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{\Sigma(X)^2 - (\Sigma X)^2 (\Sigma X)^2 \cdot N\,\Sigma(Y)^2 - (\Sigma Y)^2}} \quad \ldots\ldots\ldots\ldots(1)$$

Where,
r = correlation coefficient
n = number of observations
∑ = summation sign
X = cocoa farmers risk attitude (mean score)
Y = cocoa farmers risk management strategies (mean score)

Decision rule: The correlation coefficient lies between -1 and +1, with -1 indicating negative correlation; 0 indicating no correlation; and +1 indicating perfect correlation between variables (Osuala, 2010).

Ordinary Least Squares multiple regression analysis was used to estimate the determinants of cocoa farmers output in the study area. The regression model is specified in the linear form thus:

$$Y = \beta 0 + \beta 1 X1 + \beta 2 X2 + \beta 3 X3 + \beta 4 X4 + \beta 5 X5 + \beta 6 X6 + \beta 7 X7 + \beta 8 X8 + \beta 9 X9 + \mu \quad \ldots\ldots\ldots\ldots(2)$$

Where,
Y = Output (kg of cocoa pods)
X1 = Age (years of respondents)
X2 = Marital Status (dummy, married = 1, single = 0)
X3 = Household Size (number)
X4 = Farm Size (hectare)
X5 = Farming Experience (years)
X6 = Level of Education (number of years spent schooling)
X7 = Farm Income (N)
X8 = Extension Contact (number of visits)
X9 = Credit (N)
β0 = Constant
β1 –β9 = Regression coefficients to be estimated
μ = Stochastic variable

Results and Discussion
Socio-economic characteristics of the respondents
The results of the descriptive statistics on socio-economic profile of the respondents are as presented in Table 1.

Table 1: Socioeconomic characteristics of cocoa farmers (n = 60)

Variables	Frequency	Percentage	Mean
Age			
1 – 40	23	46.7	42
41 and above	32	53.3	
Gender			
Male	53	88.3	
Female	7	11.7	
Marital status			
Single	15	25	
Married	45	75	
Household size			
1 – 6	42	70	6
7 and above	18	30	
Farm size			
1 – 5	41	68.3	5
6 and above	19	31.7	
Experience			
1 – 10	21	35	17
11 – 20	25	41.7	
21 and above	14	23.3	
Educational Level			
No formal	1	1.7	
Primary	14	23.3	
Secondary	29	48.3	
Tertiary	16	26.7	
Farm income			
Less than ₦200,000	20	33.3	433,381
₦200,000 - ₦400,000	12	20	
Above ₦400,000	28	46.7	

Non-farm income			
Less than ₦100,000	51	85	64,337
₦100,000 - ₦200,000	5	8.3	
Above ₦200,000	4	6.7	
Major occupation			
Farming	25	41.7	
Otherwise	35	58.3	
Cooperative membership			
Yes	23	38.3	
No	37	61.7	
Extension contact			
Nil	20	33.3	3
1 – 3	33	55	
4 and above	7	11.7	
Credit access			
Yes	16	26.7	
No	44	73.3	
Output			
1 – 10 bags	41	68.3	10
Above 10 bags	19	31.7	

Source: Field survey data, 2019

The results of socio-economic profile of the respondents as depicted in Table 1 showed that many (53.3%) respondents are above 40 years, with mean age of 42 years. This implies that cocoa farmers in the study area have an aging farming population. This finding is in line with that of Adeniyi and Ogunsola (2014), who observed that most cocoa farmers are getting old. The results also showed that majority (88.3%) of the respondents are males while the remaining 11.7% are females. This implies that cocoa production in the study area is a male-dominated activity. This finding is plausible given that cocoa is a cash crop, thus males go into the business in order to provide for their families as breadwinners. Majority (75%) of the respondents are married, with mean household size of 6 persons. This implies that cocoa farmers in the study area can rely on family labour for their activities, thereby reducing cost of labour. Most (68.3%) of the respondents have farm size of between 1 – 5 hectares of land, with mean farm size of 5 hectares. The large farm size is attributed to the topography of the cocoa producing area, which is prone to erosion. Hence, cocoa plantation serves as windbreak. This result is in consonance with that of Echebiri and Eririogu (2018), who posits that ownership of lands encourage farmers to adopt sustainable land management techniques and improve the soil fertility. Many (65%) of the respondents had farming experience of 11 years and above, with mean farming experience of 17 years. This implies that most of the respondents are experienced cocoa producers, capable of minimizing production losses by adopting the best risk management strategies in the study area. The results of the descriptive statistics equally indicated that majority (98.3%) of the respondents' attained different levels of formal education, while only 1.7% had no formal education. This means that majority of the respondents are enlightened and could take decision about good risk management strategies to utilize in the study area. As regards farm income, many (66.7%) of the respondents had farm income of ₦200,000 and above, while about 33.3% made less than ₦200,000. The mean farm income of the respondents was ₦433,381. This implies that cocoa production is a lucrative agribusiness. This finding is in line with *a priori* expectation given that cocoa is a cash crop, which can be processed into various value-added consumer products. Additionally, majority (85%) of the respondents had non-farm income of less than ₦100,000, with mean non-farm income of ₦64,337. This finding is in conformity with that of Adeniyi and Ogunsola (2014) who noted that most cocoa farmers had alternative sources of income aside from cocoa production. Furthermore, about 41.7% of the respondents indicated farming as their major occupation, while the remaining 58.3% had non-farm jobs as their main occupation. Also, many (61.7%) are non-members of cooperative societies, while about 38.3% are members. This implies that many cocoa farmers in the study area may not have access to market information and financial incentives available to members of cooperative societies. In terms of extension contact, 55% of the respondents were visited 1 – 3 times by extension officers, 11.7% 4 times and above, while about 33.3% had no extension contact in the last one year. The mean number of times the extent officers

visited the respondents in the last one year was 3 times. This implies that many of the respondents may have knowledge of innovative methods of cocoa production and cocoa black pod disease control disseminated by extension officers. The results also showed that majority (73.3%) had no access to credit, while about 26.7% had access to credit. This implies that majority of the cocoa farmers in the study area are credit risk averse, and may not want to incur debts due to the unpredictability of their output. Finally, many (68.3%) produced between 1 – 10 bags of 200kg of cocoa pods per harvest season, while 31.7% produced more than 10 bags. The mean output of the respondents per harvest season was 10 bags of 200kg of cocoa pods. This implies that the cocoa farmers in the study area are not producing optimally and need to adopt efficient methods of risk management strategies to minimize production losses.

Risk Attitude of Cocoa Farmers in the Study area
The distribution of cocoa farmers according to their risk attitude is as presented in Table 2. The results of the descriptive statistics on risk attitude of cocoa farmers in the study area as presented in Table 2, showed that majority (78.4%) of the respondents were risk-takers, with the mean score of risk taking attitude greater than 2.05. This implies that majority of the respondents have high risk attitude towards cocoa production. This finding though contrary to *a priori* expectations does not come as a surprise, because increase in cocoa production which is a major cash crop in the study area, will lead to improved living standard among the respondents. This result is in conformity with that of Yusuf *et al.,* (2015), who observed that farmers are risk-takers. Only 8.3% of the respondents were risk-indifferent, with the mean score of their risk taking attitude greater than 1.95 but less than 2.05. This implies that few of the respondents have medium risk attitude. About 13.3% of the respondents were risk-averse, with the mean score of their risk taking attitude less than 1.95.

Table 2: Risk attitude of cocoa farmers in the study area

Risk attitude	Frequency	Percentage
Risk-averse (MS<1.95)	8	13.3
Risk-indifferent (1.95<MS<2.05)	5	8.3
Risk-taker (MS>2.05)	47	78.4

Source: Field survey data, 2019
Note: MS stands for mean score of the respondents

Risk Management Strategies Used by Cocoa Farmers in the Study area
Sampled respondents utilized various risk management strategies. These were summarized and presented in Table 3.

Table 3: Risk management strategies utilized by cocoa farmers

Risk Management Strategies	Mean	Rank	Remarks
Crop insurance	1.7	10th	not relevant
Pesticide application	2.9	5th	relevant
Forward contracting	3.0	4th	relevant
Precautionary savings	3.5	1st	relevant
Intercropping	3.3	2nd	relevant
Use of improved Cocoa seedlings	3.5	1st	relevant
Off-farm jobs	3.1	3rd	relevant
Credit avoidance	2.2	9th	not relevant
Avoidance of new technology	2.3	8th	not relevant
Membership of cooperative	2.4	7th	not relevant
Adoption of new technology	2.8	6th	relevant

Source: Field survey data, 2019

The results of the descriptive statistics on the risk management strategies used by the respondents presented on Table 3 indicated that the relevant risk management strategies used by the respondents in ascending order of importance were: adoption of new technology, pesticide application, forward contracting, off-farm jobs, intercropping, use of improved cocoa seedlings and precautionary savings. Piotr and Anna

(2014), observed that off-farm jobs help to reduce financial risk in agricultural production. The other minor strategies used by the respondents include: membership of cooperative, avoidance of new technology, credit avoidance and crop insurance. Crop insurance was the least used risk management strategy in the study area because majority of the respondents were unaware of its relevance. This finding is in line with that of Oparinde *et al.,* (2018), who observed that insurance was the least used strategy for combating risk associated with cassava and maize production.

Influence of cocoa farmers' risk attitude on their risk management strategies in the study area
The influence of cocoa farmers' risk attitude on their risk management strategies was analyzed using correlation analysis. The results were presented in Table 4.

Table 4: Pearson product moment correlation analysis for the relationship between risk attitude and risk management strategies of the respondents

	Risk attitude
Risk attitude	1
Significance (2 tailed)	
No of observations	60
Risk Management Strategies	-0.254*
Significance (2 tailed)	0.050
No of observations	60

Source: Field survey data, 2019.
Note: * implies significant at 0.10 probability level

The result of the Pearson product moment correlation analysis on influence of cocoa farmers' risk attitude on their risk management strategies showed a negative linear correlation between cocoa farmers' risk attitude and their risk management strategies in the study area. This implies that the risk attitude of cocoa farmers in the study area had negative influence on the risk management strategies used by them. That further says that the higher the risk attitude of the cocoa farmers, the lower the risk management strategies used by them. This finding is in consonance with *a priori* expectation given that cocoa farmers with high risk attitude (i.e. risk takers) may employ fewer risk management strategies compared to their risk indifferent or risk averse counterparts in order to minimize production cost. Piotr and Anna (2014) observed that higher risk aversion increases the chances of implementation of most of the considered risk management strategies among farmers.

Socioeconomic Determinants of Cocoa Farmers Output in the study area
The results of the regression analysis on the socio-economic determinants of cocoa farmers' output were summarized and presented in Table 5.

The results indicate that age, farm size, farm income, extension contact and credit were the significant socio-economic determinants of cocoa farmers output in the study area. The coefficient of age was positive and significant at 5% level of probability. This implies that *ceteris paribus* increase in age of the respondents will bring about a corresponding increase in the output of the respondents. This result is in line with *a priori* expectation, given that increase in age which is a continuous variable implies increase in knowledge and experience on cocoa production. The coefficient of farm size was equally positive and significant at 10% level of

probability. This implies that increase in farm size will bring a corresponding increase in the output of the respondents. This finding is in consonance with *a priori* expectation, as increase in farm land will lead to increase in the number of cocoa seedlings planted and cocoa pods harvested. This finding is in tandem with that of Adeniyi and Ogunsola (2014), who observed that farm size, had positive impact on cocoa yield. The coefficient of farm income was positive and highly significant at 1% level of probability. This indicates that increase in farm income will bring about a corresponding increase in the output of the respondents. This result is in conformity with the *a priori* expectation, because increase in farm income entails availability of funds to purchase improved seedlings and agrochemicals to control cocoa pests and diseases. The coefficient of extension contact was positive and significant at 10% level of probability. This shows that increase in respondents' extension contact will bring about a corresponding increase in the output of the respondents. This finding is in agreement with the *a priori* expectation, as extension officers will transfer information on innovative production techniques to cocoa farmers for increased output. Finally, the coefficient of credit was also positive and significant at 10% level of probability. This implies that increase in credit will lead to a corresponding increase in output. This result is in line with *a priori* expectation, given that credit will enable the farmers to purchase the necessary inputs for enhanced output. The R^2 value of 0.495 implies that 49.5 percent of the variations in the dependent variable were explained by the independent variables included in the model. The F-ratio of 5.446 significant at 1% level of probability shows the goodness of fit of the overall model.

Challenges Faced by Cocoa Farmers in the Study Area

Sampled respondents encountered several challenges in cocoa production. These challenges have been summarized and presented in Table 6.

Table 6: Challenges faced by cocoa farmers in the study area (n = 60)

Challenges	Mean	Rank	Remarks
High interest on loan	2.6	8th	not important
Bad roads	4.8	1st	important
Inadequate collateral	2.5	9th	not important
Lack of storage facilities	2.7	7th	not important
Inadequate finance	3.7	4th	important
High cost of input and agrochemicals	3.8	3rd	important
Cocoa pests and diseases	3.9	2nd	important
Lack of organized cocoa market	3.4	5th	important
High cost of transportation	3.3	6th	important
Far distance to market	2.7	7th	not important
Problem of middlemen	3.8	3rd	important
Limited access to formal credit	2.5	9th	not important

Source: Field survey data, 2019

The results of the descriptive statistics on the challenges faced by cocoa farmers in the study area showed that the major challenges encountered by the respondents in the study area in descending order of importance were: bad roads, cocoa pests and diseases, high cost of input and agrochemicals, problem of middlemen, inadequate finance, lack of organized cocoa market and high cost of transportation with mean scores greater than 3.0. Samuel (2017) identified pest and diseases and marketing as some of the problems militating against cocoa production in Nigeria.

Conclusion

The findings of this study have shown that most agribusiness entrepreneurs involved in cocoa production in the study area had risk taking attitude. The major forms of risk management strategies utilized by the respondents were: precautionary savings, use of improved cocoa seedlings, intercropping and off-farm jobs. The study therefore recommends that the government should reconstruct the dilapidated roads in the study area to checkmate the activities of middlemen, subsidize farm inputs and agrochemicals, to make it affordable to cocoa farmers and help them to tackle the problem of cocoa pests and diseases. Extension officers should increase the number of times they visit cocoa farmers per year and credit made accessible to cocoa farmers to enable them access production information and purchase the needed production inputs, in order to boost their output. Land reform policies will enable farmers access more land for increased output.

References

Adebayo, G. A. (2019). The role of access to credit in cocoa production in Nigeria.M.Sc. Thesis submitted to Business Economics Chair Group, Wageningen University and Research, Netherlands.

Adeniyi, O. R. and Ogunsola, G. O. (2014). Cocoa production and related social-economic and climate factors: A case study of Ayedire Local Government Area of Osun State, Nigeria. *Agricultural Science*, 2(4):1 – 13.

Ayinde, O. E., Omotesho, O. A. and Adewumi, M. O. (2008). Risk attitudes and management strategies of small-scale crop producers in Kwara State, Nigeria: A ranking approach. *African Journal of Business Management*, 2(12):217- 221.

Dadzie, S. K. N. and Acquah, H. D. (2012). Attitude toward risk and coping responses: The case of food crop farmers at AgonaDuakwa in Agona East District of Ghana. *International Journal of Agriculture and Forestry*, 2(2):29 – 37.

Echebiri, R. N. and Eririogu, I. H. (2018). Sustainable Land Management Practices and income Diversification Among Rural Cassava-based and yam-based smallholder farmers in Imo State. *The Nigerian Agricultural Journal*, 49(1):91-100.

Olawuyi, S. and Olawuyi, T. (2015). Risk management strategies adoption of farming households in Kwara State of Nigeria: A pragmatic approach. Proceedings of 18th International Academic Conference, London, United Kingdom.

Oparinde, O. L., Amos, T. T., Aturamu, A. O. and Daramola, G. A. (2018). Attitudes Towards risk and risk combating strategies among maize and cassava farmers in Southwest, Nigeria. *Journal of Economics, Management and Trade,* 21(7):1 – 12.

Osuala, A.E. (2010). *Econometrics: Theory and Problems*, Toniprints services, Nigeria. Pp 4-12.

Piotr, S. and Anna, K. (2014). Farmers' risk perception, risk aversion and strategies to cope with production risk: an empirical study from Poland. Studies in Agricultural Economics, 3(116):140 – 147.

Samuel, A. O. (2017). Problems and prospects of cocoa production in Nigeria Economy: A Review. *International Journal of Social Sciences*, 11(2):32-43.

Shaoib, A., Li G., Adnan, N., Amar, R., Razz, U., Muhammad, F., Muhammad, A. and Muhammad, H. R. (2019). Maize production under risk: The simultaneous adoption of off-farm income diversification and agricultural credit to manage risk. *Journal of Integrative Agriculture*, 18(2):460 – 470.

Yusuf, S.A., Ashagidigbi, W.M. and Bwala, D.P. (2015). Poverty and risk attitude of farmers in North-Central Nigeria. *Journal of Environmental and Agricultural Sciences*, 3:1-7.