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ANALYSIS OF RISK MANAGEMENT PRACTICES AMONG CASSAVA FARMERS IN IDEATO SOUTH LOCAL GOVERNMENT AREA, IMO STATE, NIGERIA

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ABSTRACT

Risks are pervasive and inescapable in agriculture. There has been great concern about the problems posed by risk in agriculture. This apprehension stems from the harmful effects of risk on the output of farmers in Nigeria. This study examines risk management practices among cassava farmers in Ideato South Local Government Area (LGA) of Imo State, Nigeria. It specifically sought to identify the types of risks encountered, management practices adopted, and socio-demographic factors that influence cassava yields. The study used purposive and multistage sampling techniques to sample 90 cassava farmers from seven autonomous communities in Ideato South LGA. Data were collected using a structured questionnaire. Inferential and descriptive statistics such as multiple regression model, mean, percentage frequency counts were used in data analysis. Findings showed that poor yield due to bad weather conditions and inadequate transportation systems were the most intense risks faced by cassava farmers. The major farmers' risk management strategies in order of importance were mixed cropping, mixed farming, off-farm investment and Insurance. Insurance was least ranked mainly because the farmers lacked adequate information on the insurance benefits. Off-farm income and farming experience were the socio-demographic variables that positively influenced the output of cassava, implying that increase in these variables would increase the output of cassava. On the other hand, age as a variable was significant but had adverse effects on output. The findings show that risk cannot be eliminated in the agricultural production process because agricultural production has a high dependence on the vagaries of nature. The study recommends that farmers be encouraged to diversify their farming operations through a diversification process where the farmers produce several products rather than cassava, a single product. The use of improved cassava varieties should be encouraged. Additionally, farmers should increase their involvement in more income-generating activities to plummet the risk among cassava producers.

Key words: Risk, Management, Cassava, production, farmers, Ideato South LGA, regression model, Nigeria

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INTRODUCTION

Cassava (*Manihot spp*) is an annual crop in Nigeria. It is a starchy root tuber that is edible and can stay in the soil for more than one production year. The crop is a choice staple in most countries in Africa [1]. It is cultivated solely or with other crops and can be produced in any month of the year because it thrives in a warm, moist climate [2]. Besides, cassava is tagged a classic food security crop because it can produce high yields under poor, marginal, and unfavorable conditions where other food crops cannot grow properly. Its edible part is preserved in the soil pending when it is wanted. Implying that its tubers' can stay longer in the soil even when it is matured [3]. Humans consume nearly 90% of cassava produced in the West African region, with a small proportion used for feeding livestock in the semi-processed form. In many developed countries, cassava is processed into numerous secondary products of industrial marketable value. Conversely, in several developing countries like Nigeria, the manufacturing sector is still diffident to take it as one of its cost-effective raw materials or as an ingredient for producing several other food products [4]. Despite being able to grow in marginal soils where several crops cannot thrive, favorable climatic conditions and best soil properties and drainage are essential for its high produce and yield [1]. For instance, life-threatening weather conditions such as prolonged drought and an excessive amount of rainfall that leads to flooding may be harmful to cassava outputs and could reduce economic value in cassava production.

Agriculture requires careful management [5]. The general problems posed by risks in agricultural production have been of great concern among various actors in the industry. This concern is attributed to the harmful effects of risk on the output of farmers in Nigeria. Production decisions in agriculture are often where the atmosphere is risky, and outcomes are unknown. Decision-making must be accurate to boost production in the future. Farmers may be inexact about the climatic condition, the performance of crop and livestock, attack by pests and diseases, risk associated with business performance, government regulations and policies, and changes in technology [6, 7]. Output per hectare, prices of produce, cost of inputs, and amounts required are frequently unknown when making choices about the investment [8, 9]. In the past, there were records of climate variation, pest infestation, changes in prices of agricultural products and cost of farm inputs in the country, which would be used to predict household revenue [10].

Risk is an intrinsic feature of contemporary farm production. The agriculture sector is predisposed to risks and uncertainties, and cassava is not left out [11]. Also, financial lending institutions are afraid to grant loans to farmers due to a lack of collateral and poor repayment performance except a minute percentage of farmers the lending institutions term "creditworthy" [12]. Presently, the effects of climate change and population density have resulted in increased damage to land, forests, and other natural resources, leading to a rising scarcity of thickly populated pastoral areas. Low crop yields and loss of land to erosion have combined to attract rural-urban migration. Also, the agricultural production system is controlled by smallholder farmers. These farmers function mainly within the limits of their highly inadequate resources, limiting their capability to hire the most recommended risk management skills. As such, they are

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often with only the option of either leaving their farm operations at the mercy of natural risk factors or, at minimum, applying one way or other futile strategies based on homegrown knowledge. This factor reduces the capacity of smallholders to enhance food production for both national consumption and revenue generation, thereby affecting the food security projections of the whole population.

The issue of risk is complex because farm operations occur amidst an atmosphere of shrinking markets. Farmers lack the right support system, which could assist them in risk management.
Therefore, the study addressed the following objectives:

i. Identify the types of risks encountered by cassava farmers in Ideato South Local Government Area.
ii. Evaluate the risk management practices adopted by the farmers in the study area.
iii. Analyze the Socio-demographic factors influencing the output of cassava production in Ideato South Local Government Area.

LITERATURE REVIEW

Using a Mathematical Programming for Economic Analysis in Agriculture, Hazell and Norton stressed that the types of risks encountered by farmers depend on the type of agricultural method, weather, policy and the institutional atmosphere [5]. A study conducted by Salimonu and Falusi on sources of risk and management strategies among food Crop Farmers in Osun State, Nigeria, identified that between the years 2002 to 2003, 54.5%, 46.1%, and 33.9% of sampled households in Nigeria were affected by marketplace fiasco, price instability and pest and diseases, respectively [13].

Reports on Nigerian Floodplains by Umoh showed that flooding is the most significant prevailing risk factor while drought was 32.7% [14]. Usman *et a*l. [15] asserted that price risk due to fluctuations in price of agricultural produce, risk due to technological changes, production risk due to low yield and bad weather conditions, financial claims due to high debt ratio and human risk caused by death of spouse or children were the sources of risks affecting most farmers.

Lack of finance is one of the significant risk factors confronting agricultural production, as identified by Okereke [16]. Diversification of farm enterprise, hedging-in-futures, future options contracts, liquidity, leasing inputs, off-farm employment, were the risk management practices adopted by some farmers [17]. A study by Ogoke shows that farming experience is a significant determinant in risk reduction on output [18]. The findings of Effiong *et al.* and Ajieh [9,19] indicated that farming experience, marital status, primary occupation, off-farm income, proper management system, and farm size were the key determinants of risk reduction on output.

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METHODOLOGY

Study Area

Ideato South local government area is located within the Orlu agricultural zone of Imo state. It is located on longitude 5o 48′21.89" N and latitude of 7o 08′ 20.62" E. It has an area of 88km2 and had a population of 159,879 at the 2006 census [20]. There are 23 autonomous communities in Ideato South Local Government Area, some of which include *Dikenafai, Awalla, Umuchima, Umunna-Isiaku, Amanator, Umulewe, Nneat-Ogwu, Umuobom, Umuduruahurunwa, Umuezedike, Umuakam, Umuago, Umucheke*. The people of the area are known for their crafts, apprenticeship, and farming. They produce cash crops such as oil palm, raffia palm, groundnut, cotton, cocoa, rubber. The food crops grown in large quantities include cassava, cocoyam, breadfruits yam, maize, melon, and trifoliate yam. (Figure 1).

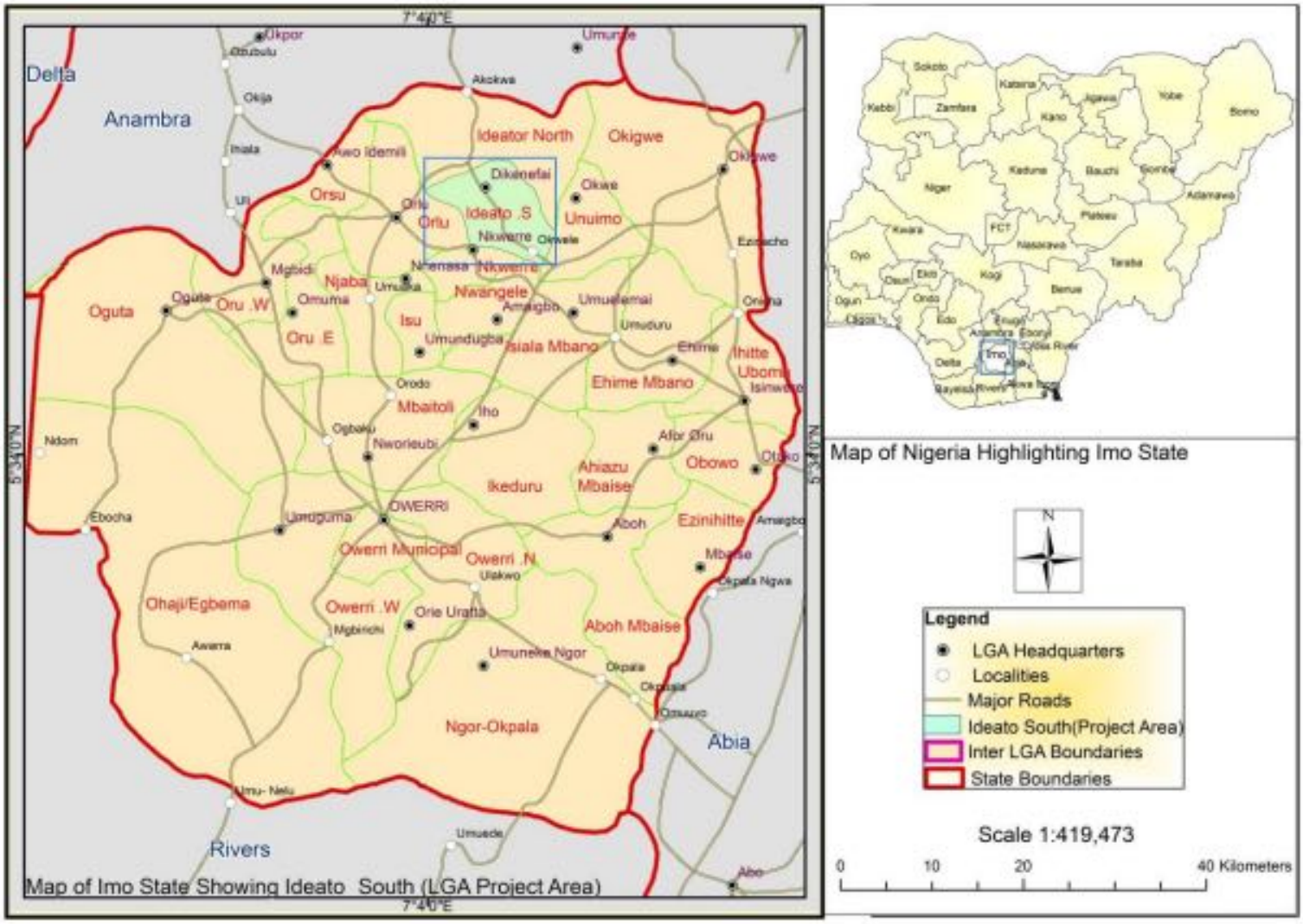

Figure 1: Map of Imo State showing Ideato South Local Government Area

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Population Size
The study population comprised all the registered cassava farmers in Ideato South Local Government Area in Orlu agricultural zone, totaling to one hundred and fifty (150) farmers. They were predominantly subsistence farmers with small farm sizes averaging less than 2 hectares.

Sampling Procedures
For this study, respondents were selected through a multi-stage sampling procedure. In the first stage, seven communities were purposively selected. These were communities with a larger number of cassava producers who were registered as cassava farmers in the Ministry of Agriculture in the LGA. In the second stage, 60% of the registered cassava farmers were randomly selected. Registered farmers were purposively used because they adhered to record keeping. This selection was in proportion to the number of registered farmers in each of the communities (Table 1), giving a total of ninety farmers as the sample size.

Method of Data Collection
A structured questionnaire was administered to individual respondents to obtain relevant information from the registered cassava farmers in the study area. The questionnaire was written in readable English language since most of the farmers were literate and it was designed to elicit accurate information from the respondents.

Data Analysis
Descriptive and inferential statistics such as: frequency counts, mean, tables, percentages, and multiple regression analysis were employed.

Model specification
Y = Output of cassava in Naira per kg
X_1 = Sex of farmer (1 for male, 0 for female)
X_2 = Age in years
X_3 = Educational level (Years of schooling)
X_4 = Farm size in hectares
X_5 = Off-farm income in naira
X_6 = Farming experience in years
X_7 = Marital status (1 for married, 0 for otherwise)
X_8 = Household size (Number of persons)

RESULTS AND DISCUSSION

Socio-demographic Profile of the Respondents
The socio-demographic characteristics of the respondents indicated that there were more female (56.3%) cassava farmers than the male (43.3%) (Table 2). The proportion was so because the men were more focused on yam farming and other businesses, leaving the cassava production and processing mainly to the women. The mean age of the respondents was fifty-five years, implying that most of them were above their middle age, revealing that most of the youth were involved in non-farming activities outside the farm. In terms of educational background, most of the respondents were

literate. Only 5.56% of the total respondents did not have primary education. Thus most of the farmers could read and write and were well informed on issues surrounding their farms. The majority (78.89%) of the respondents were married. Marriage and a large family could help to provide family labor which reduces the cost of hired labor. Information on household size revealed that most (64.4%) farmers had household sizes ranging between 6-10 persons. The mean income of the farmers was ₦49, 388.89 Naira which is equivalent to 150 US Dollars, revealing that cassava farmers in the study area were small scale holders with an average farm size of 0.59 hectares. In developing countries such as Nigeria, small-scale farmers form more than 50% of the farming population producing food for the growing population and thus bridge the food security problem. The findings also revealed that most farmers had a mean farming experience of 30.6 years with a mean output of 950kg per farmer per season.

Types of Risks Encountered by Farmers

Table 3 shows the prevalent types of risks to all the respondents in the study area, which were poor yields due to environmental hazards (18.99%) followed by price fluctuation and poor transportation at 9.60% each, while the least risk was farmers' sickness at 5.08 %. Results are in consonance with the report of Okereke [16], who opined that farmers' yields are poor due to the vagaries of weather. The volatility in climatic conditions in the study area poses a huge risk to cassava production.

Risk Management Practices

The result revealed that three practices were the most prevalent in risk management by the respondents (Table 4). These were mixed cropping at 16.70%, followed by mixed farming at 16.15%, then off-farm investment at 16.14%. Insurance was the least method adopted by the respondents at 0.74%. Farmers had a poor response to insurance due to lack of information on the positive outcome of the insurance process and other perceived notions such as cost of insurance premium and the possible fear of failure of compensatory payment in the event of disasters.

Other risk management practices used were application of improved crop/agronomic technologies, that is, fertilizer application (13.54%), appropriate weeding (13.73%), and planting of improved cassava varieties (12. 25%). It was also observed that all the farmers adopted more than one type of risk management practice. Mixed cropping was practiced in the area as a guard against crop failure, which is in line with work conducted by Effiong *et al.* [9].

Socio-demographic Factors Influencing the output of Cassava

The variables that determined the socio-demographic factors influencing the output of Cassava are presented in table 5. Four functional forms of a linear double log, semi-log, and exponential log were assessed, and the lead equation of the regression for this study was linear form. Linear regression resulted in the best fits in terms of coefficient of determination (R^2), the statistical significance of the regression, and expected signs of the regression coefficient. Regression was significant at 1% level, and the value of the coefficient of multiple determinations R^2, which measures the overall goodness of fit of the entire regression, was 0.885. It revealed that the independent variable accounted for about 89% of the total variation of the dependent variable. Therefore, the

variables included in the model were significant determinants of factors influencing output of cassava production. The F ratio was 77.886 and significant at a 1% level, implying that the combined effects of the entire included variables in the model were significant.

Age of the farmer was significant at 1% level and indirectly related to increasing output of cassava, implying that with age, the farmer's ability to manage production reduces as productivity declines. The regression coefficient was -277.84. Meaning there is an inverse relationship between age and output. Off-farm income was significant at a 99% confidence level with a regression coefficient of 2.917, and it was positively related to an increase in output. Therefore, there is a direct relationship between off-farm income and output. This result agrees with Effiong *et al*. [9] and Walker *et al.* [17]. Therefore, as farmers diversify their income streams, it will assist them in cushioning the effect of risks on their incomes.

The coefficient of farming experience was positive and significant at a 90% confidence level with a regression coefficient of 203.220, implying a direct relationship between farming experience and increased output. Thus, most experienced farmers bring their knowledge of many years of farming to manage risks in their farms, thereby increasing their cassava output. This result agrees with Effiong *et al.* **[9]** and Ogoke [18].

CONCLUSION

Risks cannot be eliminated in the agricultural production process because agriculture has a high dependence on the vagaries of nature. Thus, many risk management practices have been adopted by farmers to reduce their influence on the output. The study, therefore, concluded that the vital sociodemographic factors influencing the output of Cassava were age, off-farm income, and farming experience.

Based on the conclusion drawn from this study, the following are recommended:

i. Farmers should be encouraged to diversify their farming operations, through which they produce several products rather than a single product (Cassava alone).
ii. The use of improved cassava varieties should be encouraged.
iii. Farmers should take insurance policies because insurance serves as a guard against any catastrophic losses that could arise during the production process.
iv. Young people should venture into farming because they have a higher production capacity and more remarkable ability to manage risk. This will ensure a successor generation for agriculture.
v. Farmers should also invest in non-farm activities that do not have the same risk as farming.
vi. Farmers should form formidable co-operatives that will help them overcome price and market risk to stabilize the prices of their products.

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Table 1: Sampling procedure

Names of communities	Number of registered farmers	Number sampled
Umucheke	40	24
Umuobom	40	24
Umuezedike	20	12
Duruahurumwa	10	6
Umuchima	10	6
Dikenafai	20	12
Umuakam	10	6
Total	**150**	**90**

Source: Ideato South LGA Headquarters

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Table 2: Distribution of respondents based on socio-demographic characteristics

S/N	Variables	Frequency	Percentage (%)
1	Gender		
	Male	39	43.33
	Female	51	56.67
	Total	**90**	**100**
2	Age		
	31 – 40	10	11.11
	41 – 50	20	22.22
	51 – 60	29	32.22
	61 – 70	31	34.45
	Total	**90**	**100**
	Mean	54.5	
3	Educational level		
	Non formal education	5	5.56
	FSLC	63	70
	SSCE/GCE	18	20
	OND/NCE	4	4.44
	Total	**90**	**100**
4	Marital status		
	Married	71	78.89
	Divorced	6	6.67
	Single	3	3.33
	Widowed	10	11.11
	Total	**90**	**100**
5	Household size		
	1 – 5	19	21.11
	6 – 10	58	64.44
	11 – 15	13	14.45
	Total	**90**	**100**
	Mean	8	
6	Annual income		
	1000 – 50,000	62	68.88
	51,000 – 100,000	18	20
	101,000 – 150,000	5	5.56
	151,000 – 200, 000	5	5.56
	Total	**90**	**100**
	Mean	49388.89	
	Farm size(Hectares)		

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0-1	80	88.89
1.1-2.0	8	8.89
Above 2	2	2.22
Total	**90**	**100**
Mean 0.59		
Farming experience		
11-20	10	11.11
21-30	24	26.67
Above 30	56	62.22
Total	**90**	**100**
Mean		
Output (kg)		
100-1000	54	60
1100-2000	36	40
Total	**90**	**100**
Mean	**950**	

Table 3: Distribution of respondents according to types of risks encountered

	Types of risk	Frequency	Percentage (%)
1	Poor yield due to environmental hazards	168	18.99
2	Lack of finance	72	8.14
3	Farmers illness	45	5.08
4	High cost/lack of credit	65	7.34
5	Post-harvest losses	48	5.42
6	Poor pricing/fluctuation in output prices	85	9.60
7	Lack of improved technology	81	9.15
8	Poor transportation	85	9.60
9	Fragmented land holding	52	5.88
10	Lack of storage facilities	62	7.02
11	High cost of land	54	6.10
12	High cost of fertilizer	68	7.68
	Total	**885***	**100**

Source: Field survey 2018

*Total exceeds 90 due to multiple responses

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Table 4: Distribution of respondents according to risk management practice adopted

	Risk management practices	Frequency	Percentage (%)
1	Mixed cropping	90	16.70
2	Off farm investment	87	16.14
3	Mixed farming	89	16.51
4	Contract sales	56	10.39
5	Cultivation of improved varieties	66	12.25
6	Application of fertilizer	73	13.54
7	Proper/timely weeding	74	13.73
8	Insurance	4	0.74
	Total	**539***	**100**

Source: Field survey 2018

*Total exceeds 90 due to multiple responses

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Table 5: Socio-demographic Factors Influencing the output of Cassava

Variables	Linear +	Double log	Semi log	Exponential
(constant)	18864.468	2.323	9.951	-288333.399
	(2.471)***	(3.457)***	(51.032)***	(-6.181)***
Sex	-195 9.739	-.048	-.032	-2557.646
	(-.989)	(-.926)	(-.631)	(-.741)
Age	-277.837	-.217	-.003	-17294.671
	(-.2.452)***	(-.2.064)**	(-1.193)	(-2.366)**
Educational	149.947	-.055	.011	-1295.643
level	(.558)	(-.1.064)	(1.643)	(-.638)
Farm size	-6825.846	-.030	-.252	443.395
	(-1.088)	(-.466)	(-.1.572)	(.098)
Off farm income	2.917	.938	6.357E -.005	41016.393
	(10.731)***	(15.937)***		(10.038)***
			(9.156)***	
Farm experience	203.220	.090	.003	4473.793
	(1.725)*	(1.563)	(1.154)	(1.125)
Marital status	-1492.209	-.026	-.072	945.092
	(-.463)	(-.458)	(-.880)	(.243)
H. Hold size	-327.542	-.015	-.017	657.717
	(-.821)	(-.502)	(-.1.636)	(.182)
R^2	.885	.920	.828	.832
Adjusted R^2	.874	.912	.811	.815
F. ratio	77.886	116.745	48.808	50.129

Source: Data analysis 2018

Figures in parenthesis are T-values

***, **, * = significant at 1, 5 and 10 percent respectively

+ lead equation

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