

Original Research Article

RISK AND RISK MANAGEMENT PRACTICES: A CASE OF RICE MILLERS IN CROSS RIVER STATE

ABSTRACT

The study evaluates risk and risk management practices of rice millers in Cross River State, Nigeria. Specifically, the study analysed the perception of rice millers on sources of risk in rice milling in the study area, identified and analyze the various risk management practices used by the rice millers, determined the relationship between risk management practices and rice milling output and analyzed the factors affecting the utilization of risk management practices by rice millers. Two LGAs were purposively selected from each of the three agricultural zones in Cross River based on their level of rice production in the State. Proportionate random sampling was used to select 105 rice millers from the list of rice millers in the study area. Data was collected using structured questionnaire and analyzed using mean, frequency table, percentages and standard deviation. Kendall W-statistics, Correlation analysis and binary logistic regression. The study showed that respondents perceived lack of capital, output price risk, input price variability, changes in technology, high cost of labour, high rate of interest and access to input risk as sources of high risk while the risk of theft, ill-health, war and government regulations were considered as low risk in the study area. Also, diversification of enterprise was the most favoured risk management practice in the study area followed by diversification of source of income for the enterprise, cooperative marketing and insurance. There was a weak but positive correlation between risks management practices and rice milling output, $r(103) = 0.227$, $p < .0005$, with risks management practices explaining only 5 percent of the variation in rice milling output. The weak relationship is an indication that risk management practices is not the only determinant of increase in milling output but other factors like direct production inputs and capacity of the mill may also influence output. The binary logistic regression explained 62.3 percent (Nagelkerke R^2) of the variance in utilization of risk management practices and correctly classified 81.0 percent of cases. It showed that variables such as education, household size, mill capacity, farmer of rice, and perceived risk sources were also positively affected the utilization of risk management practices. The implication of the findings are that rice millers require a level of education and orientation in enterprise management to enable them overcome the negative effect of risk in business. Furthermore, since most millers preferred diversification of enterprise to formal insurance and other risk management practices, there is need for the government and other relevant stakeholders to provide the enabling environment for the growth and development of diverse enterprises.

Risk, Risk Management, enterprise diversification, rice millers

INTRODUCTION

Rice (*Oryza sativa*) is considered as "one of the important food grains for most of the world's population" (International Rice Research Institute (IRRI), 2006). Similarly, in Nigeria, rice is

seen as an important staple food for majority of the populace. In the quest to attain food security and rapid urbanization, rice is one of the high emergent crops in Nigeria which has led to its importance in most eateries and in policy formulations.

The rice supply chain is made up of many members one of whom is the rice miller. Rice milling processes are parboiling, drying, milling and packaging for final consumption. Rice milling operations in Nigeria still exist as a small-scale industry as no functional large-scale mills can be seen though substantial differences can be observed even within the relatively small-scale operations. The diversity of these mills could be based on the output capacity, manner of running the mill, (that is if it is operated only as a mill or combined with another business), and the number of functions it can perform (Frederic, Olaf, Akande, Titilola, Akpokodje and Ogundele 2003). Given that rice is a key agricultural product in Nigeria's food chain, rice millers in Nigeria are a significant component as they process rice from the paddy form to finished rice. Rice milling is one of the components of the rice value chain which is the process from production to final consumption (Kaplinsky and Morris 2000).

In most parts of the World, milling of rice is carried out near the farm in small mills and stored in the form of milled rice until it is consumed. According to Pete (2013), the systems of milling differ in many countries across the World. Rice milling in Nigeria is still being regarded as a small scale industry as no functional industrial mills can be found but small clusters of mills located in rice producing areas across the country. Similarly, in Cross River State, small clusters of mills are found in almost all the communities in Local Government Areas (LGAs) where rice is produced. According to Frederic, Olaf, Akande, Titilola, Akpokodje and Ogundele (2003), these mills whose classification vary from 50kg of milled rice every hour for the small size mills to 5000kg for the large size are classified using milling capacity as the common criteria. The major determinant of milling capacity is the number of machines operating in the mill though consideration can also be given to the engine power and type of huller. Based on milling capacity, rice mills are categorized into; small, medium, big and large. The medium sized mills is the commonly used mill type in Nigeria and these mills operate under the same uncertain environment as other enterprises and so face similar business risks (Frederic *et al.*, 2003).

Wroblewski and Wolff (2010) defined risk as "the potential negative impact to assets, investments, or profitability of investments in the agricultural industry that may arise from some present process or future event". According to another school of thought, "it is the chance of loss

or an unfavorable outcome associated with an action while uncertainty is not knowing what will happen in the future and the greater the uncertainty, the greater the risk". Laurence, Gene, Steve, Doug and Rod (2013) are of the opinion that "for an enterprise manager, risk management involves optimizing expected returns subject to the risks involved and risk tolerance". Agricultural enterprises like any other enterprise, take decisions in an environment of risk. The consequences of such decisions are usually unknown at the time the decisions were taken and the result could be better or worse than what was anticipated. "Agricultural enterprises face situations of high probability of adverse consequences which may significantly disrupt their businesses" (Laurence *et al.*, 2013).

The source of risk and its severity varies depending on enterprise type, prevailing government policies, geographic location and weather conditions. "Risk is a major concern in developing countries like Nigeria where enterprises have imperfect information to forecast things such as input prices, product prices, and weather conditions, that might impact the enterprise in the future" (Nyikal and Kosura 2005); (Pannell, Malcom and Kingwell 2000). The kinds and harshness of risk encountered by enterprises vary from location to location and the incorporation and understanding of such effects at the enterprise level will be of immense benefit to policy makers in the development of appropriate strategies that can help enterprises endure the many risks that are encountered by them.

According to Porter (1985), "many firms are attempting to have sustainable efficiency to maintain a long-term competitive advantage". In order to be successful in having this competitive advantage, the level of risk needs to be analyzed to understand its effect on the performance of the enterprise for proper management.

The general objective of the study is to evaluate risk and risk management practices of rice millers in Cross River State, Nigeria.

To meet the general objective, the study focused on the following specific objectives;

1. Analyse the perception of rice millers on sources of risk in rice milling in the study area
2. Identify and analyze the various risk management practices used by the rice millers.
3. Determine the relationship between risk management practices and rice milling output
4. Analyze the factors that affect the utilization of risk management practices by rice millers.

RESEARCH METHODOLOGY

STUDY AREA

The area of study in this work is Cross River State, Nigeria. The coordinates of the State are latitudes $5^{\circ}32'$ and $4^{\circ}27'N$ and longitudes $7^{\circ}50'$ and $9^{\circ}28'E$. It has a land mass of 23,072.425 sq.km with an estimated 3.2 million people living in it (State Bureau of Statistics (SBS), 2012). Cross River State was created in 1967 though known then as South-Eastern State and renamed Cross River State in 1976. It is composed of the former Ogoja and Calabar provinces sectioned into 18 administrative parts called Local Government Areas (LGAs). Agriculture and Tourism are the key sectors that drive the State economy. The Agricultural sector is divided into private and public sub-sectors. The major food crops cultivated in the State include plantain, maize, cassava, yam, banana, rice and groundnut while the key export crops are oil palm and rubber.

SAMPLING PROCEDURE/ METHOD OF DATA COLLECTION

The population for this study is all rice millers in Cross River State while the sample frame is all the 141 registered rice millers in the State comprising 136 males and 5 females. The State is divided into three agricultural zones namely; Ogoja, Ikom and Calabar. Two LGAs were purposely picked out of the three agricultural zones based on their level of rice production in the State. Thereafter, proportionate random sampling method was applied to choose 75% of rice millers in each of the selected LGA totaling 105 rice millers within the study area. The primary data for this study was collected using structured questionnaire which was served on the selected rice millers in the area of study.

DATA ANALYSIS

Data obtained from the field was analyzed using mean, frequency table, percentages and standard deviation. Kendall W-statistics was used to determine the coefficient of concordance of the rice miller's judgment of risk management practices. Data were collected using a 4 point rating scale and ranking. The Kendall W-statistics was used to calculate the agreement between the millers since they are more than two and determine how much their ranking agree with each other. Correlation analysis was run to determine the relationship, direction and strength of the relationship between risk management practices and milling output.

A binary logistic regression model was used to examine the factors affecting rice millers' decision to use risk management practices. This model was chosen considering the possibility that risk management practices are not mutually exclusive and that there was the possibility of simultaneous utilization of multiple practices.

137 Model Specification;

138 The risk management practices considered was specified thus;

$$139 Y_{ij} = X'_{ij}\beta_j + \varepsilon_{ij}, \quad \dots (1)$$

140 Where Y = Risk management practices used by the miller (Dummy variable = 1 if there was high
141 utilization (mean value greater than or equal to 2.5) and 0 if there was low utilization (mean
142 value less than 2.5)

143 X_1 = Sex (Dummy variable 1 if male, 0 if female)

144 X_2 = Education (number of years in schooling)

145 X_3 = Age (age of miller in years)

146 X_4 = Household size (number of people in a household)

147 X_5 = Ownership of mill (1 if owner and 0 if not the owner)

148 X_6 = Experience (number of years engaged in rice milling)

149 X_7 = Rice mill size (milling capacity in kg)

150 X_8 = Farmer of rice (Dummy = 1 if miller farms rice, 0 if not)

151 X_9 = Milling output for 3 years (kg)

152 X_{10} = Perceived risk sources (mean score of respondents)

153 β_j is the unknown parameters and

154 ε_{ij} is the observed error term.

155 The variables selection were guided by previous related studies like Velandia *et al.*, (2009),
156 Mishra and El-Osta (2002), Pennings and Leuthold (2000).

157

158 RESULTS AND DISCUSSION

159 On the level of risk perception of respondents, the study showed that respondents agree that
160 seven (7) out of the eleven (11) perceived risk sources were high since these seven sources had
161 means above the group mean of 2.5. The high risk sources included lack of capital, output price
162 risk, input price variability, changes in technology, high cost of labour, high rate of interest and
163 access to input risk. The risk of theft, ill-health, war and government regulations were
164 considered by respondents to have low risk with the risk of war being the lowest risk factor with
165 a value of 1.30 (Table 1). Satit *et al.* (2002) in their study on "sources of risk and risk
166 management strategies for small holder farmers in a developing economy" found out that "the

variability of input prices was perceived as the most important risk source on the farm". Increased wage rate and high land rental were also found to be the main factors that push up production cost for the farmers. This study tends to agree with their findings as input price variability and high cost of labour were also found to be among the 7 high sources of risk for rice millers in the study area. This result is in line with those of Patrick *et al.* (1985), Martin (1996), and Flaten *et al.* (2005) who opined that "marketing risks associated with the variability of product and input prices were the most important sources of risk considered by farmers in their respective study areas".

Table 1: Level of risk source perception of respondents

Risk Sources	Very Important	Important	Less Important	Not Important	Mean	Std. Dev	Level of Risk
Output Price Risk	77	23	4	1	3.68	0.60	High
Access to Input Risk	25	62	13	5	3.02	0.75	High
Input Price variability Risk	22	58	20	5	2.92	0.77	High
Risk of Theft	1	9	40	55	1.58	0.69	Low
Risk of Ill-Health	-	19	52	34	1.86	0.70	Low
War	-	4	23	78	1.30	0.54	Low
High Cost of Labour	25	47	26	7	2.86	0.86	High
Lack of Capital	92	11	1	1	3.85	0.46	High
High Rate of Interest	24	49	18	14	2.79	0.95	High
Government Regulations	-	51	50	4	2.45	0.57	Low
Changes in Technology	20	47	25	13	2.70	0.92	High
Mean value					2.5*		

* *Decision rule:* the decision rule is that any risk source with a mean value of 2.5 and above is considered to be high while those with values below 2.5 is considered to be low

Source: Field survey 2016

The Kendal mean ranking was used to rank the risk management practices predominant in the study area. From Table 2, diversification of enterprise was the most favoured risk management practice in the study area with a value of 3.71 followed by diversification of source of income for

the enterprise with a value of 3.65. Cooperative marketing and insurance rank 3rd and 4th respectively while hedging was the least favoured practice in the study area with a value of 1.58. The reason for the hedging being the least favoured can be attributed to the fact that the respondents do not understand the practice of hedging which is relatively new to them. Enterprise diversification being the most favoured risk management practice in this study is in line with the work of Alimi and Ayanwale (2005) who found crop enterprise diversification as the most accepted risk decreasing approach by onion farmers in Kebbi State, Nigeria. In the same study, they opined that formal insurance and cooperative marketing should be encouraged among farmers. This also supports the finding in this work which ranked the two practices 3rd and 4th respectively.

Table 2: Risk management practices

Practices	Kendal Mean Rank	Order of Mean Rank
Property Insurance	2.87	4th
Diversification of Enterprise	3.71	1st
Diversification of Source of Income	3.65	2nd
Cooperative Marketing	3.20	3rd
Hedging	1.58	5th

Source: Field survey 2016

The Pearson product-moment correlation analysis was performed to appraise the association between risks management practices and rice milling output. **Introductory investigation indicates** that the **association is** linear and the two variables normally distributed, and there were no outliers. Results from Table 3 showed that there was a weak but positive correlation between risks management practices and rice milling output, $r(103) = 0.227$, $p < .0005$, with risks management practices explaining only 5 percent of the variation in rice milling output. Thus, the more the millers are aware of the effects of risk on their output and work hard to improve on the utilization of the available risk management practices, the greater their output would be given the positive relation between the two variables. The weak relationship is an indication that risk management practices is not the only determinant of increase in milling output but other factors like direct production inputs and capacity of the mill may also influence output. This finding is in line with Wallis (2005) who in a review of the 50 largest United States oil companies from 1981 to 2002 discovered that firms that take more risk when it comes to exploration and development earn higher returns than firms that take less. According to the finding, there is a positive payoff

to risk taking but not if it is reckless. Firms that are selective about the risks they take can exploit those risks to advantage, but firms that take risks without sufficiently preparing for their consequences can be hurt badly.

Bowman (1980) in a study however discovered a negative relationship between risks and return in most sectors of the economy, a surprise given the conventional wisdom that higher risks and higher returns go hand-in-hand, at least in the aggregate. This result has since been titled "Bowman Paradox".

Table 3:Correlation result

		Mean of Risk Management Practices	Milling Output 1
Mean of Risk Management Practices	Pearson Correlation	1	.227*
	Sig. (2-tailed)		.020
	N	105	105
Milling Output 1	Pearson Correlation	.227*	1
	Sig. (2-tailed)	.020	
	N	105	105

*Source: Field survey, 2016**. Correlation is significant at the 0.05 level (2-tailed).

A binary logistic regression was performed to ascertain the effects if any, of selected socio-economic characteristics on utilization of risk management practices. The model explained 62.3 percent (Nagelkerke R^2) of the variance in utilization of risk management practices and correctly classified 81.0 percent of cases. The estimated values of the variables was used as test for the effect of selected socio-economic characteristics on the utilization of risk management practices. Results from Table 4 indicates that Five out of the ten independent socio-economic variables were found to have significantly contributed to utilization of risk management practices. The significant variables; education, household size, mill capacity, farmer of rice, and perceived risk sources were also positive. This result signifies that the higher the level of educational of the miller, the greater the likelihood of utilizing risk management practices. According to findings by Mustafa (2006), the educational level of farmers affected their decision making capacity as the higher educated farmers make better decisions in terms of management skills and resource allocation for profitability. Similarly, large household size was found to be positively related to the use of precautionary saving to deal with risk (Kouame, 2010). The size of mill (capacity)

determines the risk management practices to utilize since the increase in capacity translates to high risk as the values of the enterprise increases. Therefore, as the level of risk increases so the utilization of risk management practices will increase to save the enterprise from collapse due to business risk. Also, the engagement of the millers in other enterprises and high level perception of risk sources by the millers will lead to an increase in the utilization of risk management practices. This findings is corroborated by the finding of Kouame (2010) who using the multivariate probit approach to analyze risk management strategies for cocoa farmers in Cote D'Ivoire, pointed out the importance of farm size, household size, literacy level, engagement in other farm activities and risk aversion as factors that increase the likelihood of adopting risk management strategies.

Table 4: Binomial logistic regression

Variables	B	S.E.	Wald	df	Sig.	Exp(B)
Sex	.510	1.805	.080	1	.777	1.666
Educational Qualification	.458	.104	19.322	1	.000***	1.581
Age	-.049	.075	.424	1	.515	.952
Household Size	.438	.215	4.163	1	.041**	1.550
Ownership of Business	-21.467	25684.842	.000	1	.999	.000
Year of Establishment	.062	.115	.287	1	.592	1.064
Mill Capacity	.032	.010	11.214	1	.001***	1.033
Off Business Activities	1.525	.756	4.072	1	.044**	4.594
Milling Output for 3 years	.000	.002	.084	1	.772	1.000
Perceived Risk Sources	2.336	1.228	3.616	1	.057**	10.337
Constant	-119.911	25685.914	.000	1	.996	.000
-2 Log likelihood	79.313					
Cox & Snell R Square	.467					
Nagelkerke R Square	.623					

Source: Field survey 2016 **Note:** *** Significant at 1%, **Significant at 5%

CONCLUSION AND POLICY IMPLICATION

The level of perceived risk sources by the millers were identified and analyzed using a 4-point rating scale. Seven out of the eleven perceived risk sources were considered by respondents to be high while four were rated as low. The high risk sources included lack of capital, output price risk, input price variability, changes in technology, high cost of labour, high rate of interest and access to input risk. The risk of theft, ill-health, war and government regulations. The Kendal mean ranking was used to rank the risk management practices predominant in the study area and enterprise diversification was found to be the most favoured practice. Pearson product moment correlation analysis was carried out to appraise the connection between risk management practices and rice milling output in the study area. A weak but positive correlation was found to exist between risk management practices and rice milling output.

Also, ten socio-economic variables (sex, educational qualification, age, household size, ownership of mill, experience, size of mill, off business activities, milling output and perceived risk sources) were identified as the independent variables in the study. Risk management practices namely, enterprise insurance, diversification of enterprise, diversification of income sources, cooperative marketing and hedging were also identified and used as dependent variables for this research. Since the data was gathered by means of an ordinal scale, a binomial logistic regression was performed to ascertain the consequences of the selected independent variables on the utilization of risk management practices. The estimated values of the variables was used as test for the effect of the independent variables on the dependent variables. Five of the ten independent variables (education, household size, milling capacity, off business activities and respondents perception of risk sources) were found to have positively contributed significantly to the utilization of risk management practices in the study area.

The implication of the findings are that rice millers require a level of education and orientation in enterprise management to enable them overcome the negative effect of risk in business. Furthermore, since most millers preferred diversification of enterprise to formal insurance and other risk management practices, there is need for the government and other relevant stakeholders to provide the enabling environment for the growth and development of diverse enterprises.

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