Evaluation of Risk Attitude of Rice Farmers in Kwara State, Nigeria

***Ayinde, O.E., Bello, K.A. and Ajewole, O.O.**

Department of Agricultural Economics and Farm Management, University of Ilorin, Ilorin, Nigeria

Received: March 23, 2016; Revised: August 19, 2016; Accepted: August 30, 2016

Abstract

Risk is synonymous with agriculture especially rice production which is a major staple food in Nigeria. Attitude of rice farmers to risk taking is an important factor to be considered in productive activities. The present study evaluates risk attitude of rice farmers in Kwara State using 3-stage random sampling techniques to select 120 rice farmers. Descriptive statisitics as well as analytical techniques namely Cobb-Douglas production function and Tobit regression were employed as tools of analysis. The result showed that 46.7% of the respondents are experienced in rice farming, while 68.3% of the respondents engage in other profitable enterprise apart from farming. The result of the risk attitude showed that rice farmers are risk averse (86.0%) based on the selected determinants of risk aversion including household size, rice output, total asset and total farm income. It is therefore recommended that policy makers should put into consideration risk attitude of farmers and effort should be made to increase farmers' asset and income.

Keywords: Agriculture, Rice, Risk, Safety

1.0 Introduction

Agricultural production and decisions are generally made under the influence of risks and uncertainties [1]. In many cases, farmers are confronted with risk of pests and diseases which perhaps cause product prices to decline leading to returns displaying high variability. Returns vary with the farming system, climatic conditions, institutional policy setting, innovation attitude of farmers and many other factors. Small-scale farmers exist at the margins of modern economy; they have one foot in the market economy and the other in subsistence. They are thus neither fully integrated into the economy nor wholly insulated from its pressure subjecting them to more influences of risks than other segments of the population [2]. Farmers, when embarking on any productive activity, are uncertain about what actual outcome will be uncertain and the risk that goes hand in hand with farming. They are pervasive features of the farm environment [3]. Environmental variations, price variation, social risk, financial risks are some of the major risks confronting agricultural production in Nigeria [4].

Rice is one of the major agricultural crops produced in Nigeria. The relative ease of preparation and convenience in storage have contributed significantly in making rice a highly acceptable dish in several homes [5]. However, the long chain activities associated with rice production namely planting, harvesting, parboiling, drying, milling, threshing and distribution expose producers to high degree of risk. Despite its relative importance as Nigerian major food and industrial materials, the domestic supply of rice is still considered insufficient to match the consumption demand leading to augmentation of shortfall through import [6]. Also, the locally produced rice is subjected to various levels of risks; wide seasonal unpredictable fluctuations in climate and market prices. Furthermore, information on alternative technologies or market situation outside the immediate locality is often lacking.

Farmers' attitude and behaviour under risk differs. Rural farmers are poor, risk averse and always skeptical of losing their little resources. The practical implication is that fewer resources are devoted to risky or perceived risky activities given the fact that a single crop failure especially in rice production can be threatened. Lack of clear understanding of farmers' attitudes towards risks remains an important factor inhibiting increased agricultural productivity in Nigeria. Therefore, analyzing and revealing the risk and model of small-scale agricultural entrepreneurs is a requisite to good planning in agricultural production and innovation [7]. It is against this background that the present study seeks to identify socio-economic characteristics of rice farmers; determine farmer's attitude towards risk and their characteristic influence on the choice of rice farming; and examine the factors influencing farmer's attitude towards the risks in rice production in the study area. The concern of this study becomes more important in that most predictions, projections and farm planning for small farmers are carried out without adequate consideration and incorporation of famers perception of risk and uncertainties inherent in farming.

***Corresponding Author: Tel: 08038309935, E-mail: serapholuwaferanmi@gmail.com, attanda24@gmail.com**

2.0 Methodology

2.1 Study Area and Sampling Procedure

Kwara State comprises 16 Local Government Areas with a population estimate of about 2.3 million people according to National Population Commission Census of 20016. The State shares boundaries with Oyo, Ondo and Osun States to the South; Kebbi and Niger States to the North, Kogi State to the East and Republic of Benin on the West. The daily temperature ranges between 21^{o}C to 33^{o}C, annual rainfall ranges between 1000 mm and 1500 mm while average annual temperature ranges between 30^{o}c and 35^{o}C. The state enjoys two distinct climate seasons, the Wet (Rainy) and the Dry (Harmattan) seasons which in addition to the fertile soil, make the state favourable for arable crop production such as rice, millet, yam and cowpea. Kwara State is divided into four (4) zones by the Kwara State Agricultural Development Project [8] in consonance with ecological characteristics, cultural practices and projects administrative convenience. Zone A: Baruten and Kaiama Local Government Areas; Zone B: Edu and Patigi Local Governent Areas; Zone C: Ekiti, Ifelodun, Offa, Oyun and Zone D: Isin and Oke-Ero Local Government Areas.

Three-stages sampling procedure was employed for the study. The first stage was a purposive selection of Zone (B) which consists of Edu and Patigi Local Government because rice producers in the state are concentrated in these regions. The second stage involves the random selection of six (6) villages from Edu Local Government and six (6) villages from Patigi Local government. The third stage involves the random selection of 10 rice farmers from each village making the total sample of 120 respondents.

2.2 Cobb-Douglas Production Function

Risk aversion index for each farmer was estimated using a hybrid equation Cobb-Douglas Utility Function Model [9]. A Log Linear (Cobb–Douglas) using utility function model analysis was estimated in which the relationship between the direct input vectors (x) and rice yield was established. The adapted form of risk utility function model was used to develop the respondent attitude for risk [7].

$$\text{Ln } Y = b_0 + b_1 \text{Ln } X_1 + b_2 \text{Ln } X_2 + b_3 \text{Ln } X_3 + b_4 \text{Ln } X_4 + b_5 \text{Ln } X_5 + E \quad (1)$$

Where Y = rice output of the farmer in ton/ha, b = estimated coefficient of parameters of explanatory variables, b_o = constant term, E = error term. X = explanatory variables.

For the purpose of this study, five explanatory variables were computed: X_1= Quantity of rice seed planted in kg/ha, X_2 = Fertilizer kg/ha, X_3 = Labour utilization in Manday/ha, X_4 = Insecticide in litre/ha, X_5= Tractor hour. The "optimum" (most) suitable ridge parameter R was then determined from the fitted equation (1) to select the most significant direct (variable) determinant of yield, which was used to solve the following equation.

$$K_{(S)} = \frac{1}{\theta}\left[1 - \frac{PiXi}{PyFiUy}\right] \quad (2)$$

Where K(s) = the risk aversion parameter

θ	=	coefficient of variation of yield,
Pi	=	input price,
Py	=	output price,
Xi fi	=	lasticity production of the 1th input,
uy	=	mean yield

The risk aversion parameter K was be used to classify sampled famers into three (3) distinct groups as follow: Low risk ($0 < K_1 < 0.4$); Intermediate risk ($0.4 \leq K_1(s) < 1.2$); High risk ($1.2 < k(s) < 2.0$).

2.3 Tobit Regression

Tobit regression was used to analyse the determinant of risk aversion among rice farmers.

$$Wi = \alpha Vi + \mu i \quad (3)$$

$$Wi = O, \text{ if } \alpha \text{ vit } \mu > W_o \; (I = 1,2,3 - - - - - - - - - - , N) \quad (4)$$

$$\text{If } \alpha \text{ vi} + \mu > W_o \quad (5)$$

Where Wi is the dependent variable (risk aversion level), e.g. $0 < K < 2$, the independent variables, (Vi) were as follows: age (AGE, V_1),Household Size (HSZE, V_2), Rice Output (RO, V_3), Number of farm holdings (NFH, V_4), Total Asset (TA, V_5), Total farm income (NFI, V_6) Access to Credit (ATS, V_7),Access to Extension Education (AEE, V_8), Access to Fertilizer (AF, V_9), Membership of Farmer's Cooperative (MFC, V_{10}), Access to Fadama Land (AFL, V_{11}), Insurance (I, V_{12}), Access to Market Information (AMI, V_{13}).

3.0 Results and Discussion

3.1 Socio-Economic Characteristics

Majority of the households encountered in the study comprises males representing 99.2%, only 0.8% of the respondents are female. The ages of the respondents showed that majority of rice farmers in the study area are youths representing age group 21 to 30 and 31 to 40 for males and females respectively. This implies that the farmers have enough energy to supervise and manage the farm effectively against risk. Larger percentage of the respondents are married (88.3%), this implies that majority of them have family responsibilities which probably will influence their risk behaviours. Educationally, only 22.5% of the respondents have no formal education, majority of the respondents (77.5%) have a form of education. About (68.3%) of the respondents have other occupations other than farming which probably means they have another source of income which can serve as cushion in case of exposure to risk. Majority of the farmers are experienced in rice farming (46.7%) which probably means that they are familiar with rice farming methods that possibly reduced their exposure to risk.

3.2 Risk Aversion Parameters

The F- value of 61.961, which is significant at $P< 0.01$, showed that the specified model correctly fits the data; the model explained 76.70% of the variation in rice output. The entire input variables have positive influence on rice output. With respect to the influence of tractor, the non-significance of tractor hour may be as result of tractor being used by a negligible proportion of the respondents. The positive sign of the coefficient of the independent variables agree with a priori expectation. The data showed that fertilizer is the most elastic input followed by herbicide, rice seed, insecticide, labour and tractor hour respectively. Fertilizer co-efficient was used to calculate the risk aversion parameter as presented in Table 1.

Table 1: Determinants of Rice Output (Y); Utility Function Model Table

Variable	Coefficient	P. Value
Intercept	3.583 ***	0.000
Rice seed	0.61 ***	0.000
Fertilizer	0.330***	0.000
Labour	0.258 ***	0.000
Insecticide	0.106 **	0.24
Tractor hour	0.033	0.215

F = 61.961; R^2 = 76.70%; Adjusted R^2 = 75.5%; * Significant at 10%; ** significant at 5%; *** significant at 1%

The distribution of respondent according to risk aversion parameter result showed that majority of the farmers (86%) are risk averse, which implies that they are less inclined to take risk in (Table 2). This is likely to affect agricultural policy in the area because the farmers are less inclined to take risk. It is also expected that high yielding innovations with potential of increasing farm produce, income and ultimately reduce poverty in the study area may not be adopted.

Table 2: Respondents according to risk aversion parameters

Risk Aversion Parameter	Frequency	Percentage
0.00 – 0.40 (Low Risk Averse)	5	4.0
0.41 - 1.19 (Medium Risk Averse)	11	10.0
1.20 - 2.00 (Higher risk Averse)	104	86.0
TOTAL	**120**	**100**

Tobit regression was run by the use of the risk averse parameter as the dependent variable (Table 3). Since most respondents (86.7%) are highly risk averse, the few respondents who are outside the risk averse group cannot be successfully regressed as a separate category. Hence, the whole data was put together and left censored. Generally, household size, rice total output, total asset and total farm income were significant. The sigma (ŏ) value of 0.4196 with a 'Z' value of 15.492 was significant at 1%. This depicts the fitness of the model in explaining the risk averse parameters. The positive coefficient of the other variable indicates a direct relationship between risk aversion and such variables. The rice output is negative and significant at 10%, indicating that meaning the higher the rice output, the lower the farmer's risk aversions parameter. This also means that farmers whose farm output are higher than average tend to be more inclined to taking risk than those whose farm outputs are lesser than average.

Household size coefficient is positive and significant at 5%, which means the higher the house size the higher the farmer's attitude to taking risk [7]. This probably means that the responsibility shouldered by these farmers will likely make them take risk of profitable ventures in order to meet their needs since the socioeconomic characteristics showed majorities are male. Total asset is also positive and significant at 10%, which means that the higher the asset, the higher the farmers' attitude to risk total farm income. This could mean, that rice farmers with higher assets might probably have the resources needed for diversification; a necessary safeguard for risk. Total farm income is positive and significant at 5%; this implies that the higher the farm income, the higher the rice farmer's willingness to take risk. This may be attributed to the fact that farmers with higher income having to pay for necessary safety packages such as information and insurance in order to guard against risk

Table 3: Tobit Regression; Determinants of Risk Aversion

Variable	**Coefficient**	**Standard Error**
Constant	1.179**	0.476
Age	-0.439E-01	0.371E -01
Household size	**0.215E-01****	**0.910E02**
Rice total Output	**-0.353E-02***	**0.185E- 02**
Number of farm holdings	0.575E-03	0.477E -03
Total Asset	**0.161E-06***	**0.8316 -07**
Total farm income	**0.232E-06****	**0.114E -06**
Access to credit	0.142	0.101
Access to extension education	0.708E-01	0.110
Access to fertilizer	0.4222E-01	0.321
Membership of farmer's Cooperative	0.742E-02	0.797E-01
Access to Fadama land	-0.713E-01	0.999E-01
Insurance	0.187E-01	0.188
Access to Market Information	0.282E-02	0.315
Sigma	0.4196***	0.271E 0.1

* Significant at 10%; **Significant at 5%; ***Significant at 1%.

4.0 Conclusion and Recommendation

The study showed that majority of the rice farmers in Kwara State are risk averse which means they are less inclined to take risk. The factors that influence their risk attitude include household size, rice output, total assets and farm income. It is therefore imperative for government and policy makers to consider the risk attitude of rice farmers in policy because high yielding technology which is being encouraged to increase farmers' output per hectare may not be adopted by rice farmers. It is also recommended that efforts should be geared towards increasing the income and asset of rice farmers to encourage them in taking risks.

References

[1] Ayinde, O.E., Omotesho O.A. and Adewumi, M.O. (2008). Risk Attitude and Management Strategies of Small Scale Crop Producers in Kwara State Nigeria: A ranking approach. African Journal of Business Management, Vol. 2, No. 12, pp. 217-221.

[2] Adubi, A.A. (2000). The Economics of Behaviour Nigerian Small Scale Farmer Implications for Food Policy in the 1990s. Discovery Innovation, Vol. 12, No. 314, pp. 199-202.

[3] Anderson, J.R. and Dillon, J.L. (1992). Risk Analysis in Dry Land Farming Systems. FAO Farm Systems Management Series No. 2, Food and Agriculture Organization of the United Nations, Rome.

[4] Yesuf, M. and Bluffstone, R. (2007). Risk Aversion in Low-Income Countries: Experimental Evidence from Ethiopia". IFPRI Discussion Paper No. 715 Washington, DC: International Food Policy Research Institute.
[5] Ekeleme, F.A., Kamara, Y., Omoigun, L.O., Tegboru, A., Shelia, J.M. and Onyibe, J.E. (2008). Guide to rice production in Borno State Nigeria. IITA/Canadian International Development Agency (CIDA), Ibadan.
[6] Basorun J.O. and Fasakin, J.O. (2012). Factors influencing rice production in Igbemo-Ekiti Region of Nigeria. Journal of Agriculture, Food and Environmental Sciences, Vol. 5, No. 1, pp. 1-9.
[7] Ayinde, O.E, Muchie, M., Omotesho, O.A., Ayinde, K. and Adewumi, M.O. (2012). Multi-Risk Model of Small Scale Agricultural entrepreneurs in Central of part Nigeria. International Journal of Academic Research in Economics and Management Science, Vol. 1, No. 2, pp. 224-236.
[8] KWADP (1996), Agronomic Survey Report for the year (1996). Kwara ADP 1.
[9] Johnson, B.B. and Covello, V.T. (1987). The Social and Cultural Construction of Risk, Reidel, Dordrecht.