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Risk Sources and Risk Management among Yam Farmers in Shiroro Local Government Area of Niger State, Nigeria

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ABSTRACT

The study investigated the risk source and risk management practices among yam farmers in shiroro local government area of Niger State, Nigeria. A sample of 92 respondents was selected for the study through simple random sampling technique and data were collected using a structured questionnaire. It was found that a greater per cent of the respondent are faced with the problem of poor storage facilities, diseases, and poor market which makes them to adopt strategies like off-farm income generation, membership of association, and adoption of new technology. The study also reveals that soil management techniques, use of advanced storage facilities, membership of association, access to credit, and risk index were efficient with mean efficiency level of 0.842. The study recommends that infrastructural facilities such as good road network, and improved storage facilities. Extension programme should be improved on, and use of improved seedlings should be encouraged among farmers in the study area.

Keywords: Risk, Production, Stochastic frontier, Efficiency.

INTRODUCTION

Food production decisions in Nigeria are made mainly by small scale farmers who face a number of risks. In response, farmers engage in some risk management practices which may have social and economic implications not only on the farming household but the entire economy. Risk is a probability of threat or damage, injury, liability, loss or any negative occurrence that it is caused by internal and external vulnerabilities and may be avoided through pre-emptive actions (Business Dictionary). Risk is an important aspect of farming business, this is as a result of weather, yield, price, government policies, global market and other factors that cause wide swing in farming income (Kimura et al., 2010). Risks have been classified with reference to agricultural production under six traditional sub-groups which include; production risks, marketing risks, financial risks, institutional risks, obsolescence risks and human risks (Emery *et al.*, 1987). These risk-sources are brought about as a result of three main causes which are: environmental variations causing productions and yield uncertainty, price variation causing market uncertainty, and lack of full information. All these are significant in Africa agriculture where unreliable rain, pests and disease out-break cause wide variation in resources availability and crop yield. Hence the farmer cannot plan with certainty, his or her decisions are subjected to risk. However, farmers make decisions in a risky and ever changing environment. Therefore, consequences of their decisions are generally not known when the decisions are made, and outcomes may be better or worse than expected. Changes in technology, legal and social concerns, and the human factor itself also contribute to the risky environment for farmers. However, agricultural risk are not independent but linked to one another and are part of the system which include all available tools, practices and policies designed to manage risk. Today, one of the factors mostly implicated for the current food insecurity woes of the world include extreme weather-induced conditions such as droughts and floods (Adejuwon, 2006). This is as a result of climate change and climate variability which has been identified as long-term and cumulative consequences of a number of human activities such as deforestation and the release of ozone layer depleting gasses through industrial processes (IPCC, 2010). Based on this, research has revealed myriads of impacts on the agro-ecology and agro-economy, which also translates to negative impacts on global and national food securities (Till *et al.*, 2007; Mendelsohn *et al.*, 2000; Boko *et al.*, 2007). Apart from

climate change-related factors, there are also other Socioeconomic, socio-cultural, political, institutional and ecological variables that hamper efforts at attaining maximum food security at global, national and household levels.

Farmers, especially commercial quantity producers, generally do not get into risky situations unless there is a probability of making money. Higher profits are typically associated with higher risks. It is to their advantage that these risky but potentially profitable situations be managed as carefully as possible. Effective risk management involves anticipating possible difficulties and planning to reduce their consequences, not just reacting to unfavorable events after they occur. The two primary aspects of risk management are: anticipating that an unfavorable event may occur and acting to reduce the probability of its occurrence and taking actions which will reduce the adverse consequences should the unfavorable event occurs. The standard approach to risk management in agriculture is linear. The risk is accessed by the farmer, who then determined a strategy to manage it; policy maker would then look at this particular risk and this strategy rather than the broader picture (OECD, 2010). Okereke (2004) point out that some of the specific strategies for managing agricultural risks include use of fertilizer, membership of self-help organizations, adoption of improved crop varieties, speculative produce storage, proper timing of farm operations based on reliable weather information and insurance coverage.

Yam is in the class of roots and tubers that is a staple of the Nigerian diet, which provides some 200 calories of energy per capita daily. In Nigeria, Statistics indicate that over 70 per cent of the population of Shiroro local government area of Niger State engages in yam farming, hence the high level of production of the commodity in the area (NSADP 2012).In Nigeria, the yam production system is dominated by rural farmers (NSADP 2010).According to the International Institute of Tropical Agriculture(2011), Nigeria accounted for about 70 percent of the world yam production amounting to 17 million tones. These farmers operate mainly within the limits of their highly insufficient resources which tend to constrain their capacity and capability to employ most recommended risk management technologies. As such they are often left with only the option of either leaving their farm operations at the mercy of natural risk factors or at least applying somehow ineffective strategies based on indigenous knowledge. This diminishes the ability of these farmers to optimize yam production for both domestic consumption and for income generation thereby affecting the food security prospects of the entire population.

Based on the foregoing, it was thought necessary to explore the various risk sources and the current risk management practices among yam farmers in Shiroro local government of Niger state, Nigeria and its implications for achieving food security in Nigeria. The necessity of this study is underpinned by the fact that there seem to be a gap in knowledge existing in the area of this subject matter in relation to the study area. Therefore, this study was conceived to fill this perceived existing gap in knowledge as a contribution to knowledge towards effective policy formulation.

Similarly, it is hoped that the result could be used for planning and implementation of yam production programme. In this study, risk sources and management practices among yam farmers in Shiroro local government area of Niger State, Nigeria was examined. This study seeks to describe the socio- economic characteristics of the farmers in the study area, identify the various sources of risk in yam production among the farmers in the study area, describe the various risk management practices among yam farmers in the study area, estimate the effect of risk sources and management practices on technical efficiency of yam production in the study area, identify the constraints associated with yam production in the study area.

METHODOLOGY

This study was carried out in Shiroro Local Government Area of Niger State, Nigeria. Shiroro Local Government was purposively selected since their major occupation is yam production. Niger State was formed out of the defunct North Western State in February 1976. The State is located within latitudes 8°12°N- 11°30N and longitude

3°30°E- 7°2°E, which is bordered to the North by Zamfara state, North West by Kebbi State, South by Kogi state, South West by Kwara State, while Kaduna State and federal capital territory bordered the State North East and South East respectively. Furthermore, the State shares a common international boundary with the republic of Benin at Babanna in Borgu Local Government Area of the state. It covers a total land area of 76,000sq/km, with twenty five Local Government Areas (LGAs), more than 80 percent of the population is engaged in agricultural activities. Niger State has one of the largest and most fertile agricultural lands in the country with an average annual rainfall of about 1,400mm and mean average temperature hovers around 32°C.Shiroro Local Government Area occupies an area of 5.015km with a population of 235,404 (NPC, 2006 census). The headquarter is located in Kuta, it has 15 political wards and their major occupation is farming.

The data for this study was obtained from primary source. Five wards were randomly selected. Then twenty households were randomly selected from each of the selected wards, giving a total of 100 household for the study. But only 92 were filled and returned, analysis was done based on the 92 that was received.

Stochastic frontier, five point likert-type scale, and descriptive technique were employed to analyze the data collected.

Descriptive Statistical tools such as mean, percentage and frequency distribution was used to analyze the socio-economic characteristics of the farmers, Five point likert-type scale was used to analyze the various sources of risk in yam production among the farmers, the various risk management practices among yam farmers, and the constraints associated with yam production. The effect of risk sources and management practices on technical efficiency of yam production was analyzed using stochastic frontier.

Model specifications

The formula for computing stochastic frontier is given below

$$Y = \beta_0 + \sum_{i=1}^{n} \beta_i X_i + V_i - U_i \quad (1)$$

Where y is the observed outcome (goal attainment), $\beta_i X_i$ + v is the optimal, frontier goal (e.g., annual production output) pursued by the individual, β'x is the deterministic part of the frontier and $v \sim N[0, \sigma_v 2]$ is the stochastic part. U_i stands for technical inefficiency. The annual yam production (Naira/m²)was used as dependent variable, while the independent variables (X_i, i= 1 … n) are as follow:

X_1	Familylabour (man day)
X_2	Hiredlabour (man day)
X_3	Cost of manure (Naira/ Kg)
X_4	Cost of pesticides and insecticides (Naira/ Kg)
X_5	Cost of yam seedling (Naira/m²)
X_6	Farm size (ha)
X_7	Stake (Naira/m²)

The technical inefficiency component in Equation (1) is given as

$$U = \gamma_0 + \sum_{i=1}^{n} \gamma_i Z_i \quad (2)$$

Z_1	Soil management technique (Yes =1, No = 0)
Z_2	Membership of association (Yes =1, No = 0)
Z_3	Help from extension workers (Yes =1, No = 0)
Z_4	Use of advanced storage facility (Yes =1, No = 0)
Z_5	Use of improved species of yam seedling (Yes =1, No = 0)
Z_6	Access to credit facility (Yes =1, No = 0)
Z_7	Farmer age (years).
Z_8	Tenancy Status (Yes =1, No = 0)
Z_9	Level of education
Z_{10}	Farmer Gender
Z_{11}	Risk index
Z_{12}	Farming experience

Where γ_0, β_0 is the intercept term and $\beta_1, \beta_2 \ldots \beta_n$ are the coefficients of the independent variables $X_1, X_2 \ldots X_n$. While is $\gamma_1, \gamma_2 \ldots \gamma_n$ are the coefficients of the independent variables $Z_1, Z_2 \ldots Z_n$.

RESULT AND DISCUSSION

The description of the socio-economic characteristics of the respondents are presented on Table 1 showing that majority of the respondents are male around 31-40 years of age and with high formal educational status. Majority of the respondents were married and acquire most of their farm land through inheritance with plot size of between 1-5ha, Table 2 shows the distribution respondents based on constraints experienced showing that the most

experienced constraints faced by the respondents are poor storage facilities, poor market, and lack of good roads. Table 3 shows the sources of constraints showing that the most sources of constraints faced by the

Table 1: Socio-economic characteristics of the respondents

Variables	Frequency	Percentage
Age group		
21-30	10	10.87
31-40	35	38.0
41-50	25	27.17
51-60	16	17.39
61 and above	6	6.52
Gender		
Male	90	97.83
Female	2	2.17
Educational status		
Primary	21	22.83
Secondary	11	11.96
Tertiary	54	58.69
Adult education	6	6.52
Marital status		
Single	11	11.95
Married	73	79.35
Widowed	7	7.61
Divorced	1	1.07

Plot	Inheritance	Community land	Rented	Leased	Purchased	Not specified
Plot 1	82	5	2	0	3	0
Plot 2	74	4	0	10	3	1
Plot 3	57	6	5	12	8	4
Plot 4	76	7	3	4	2	0
Plot 5	51	12	9	13	7	0

Plot size	Frequency	Percentage
1-5	55	59.78
6-10	21	22.83
11-15	9	9.78
16-20	3	3.26
21-25	4	4.35

Source: Field Surve, 2013.

Table 2: Distribution of respondents based on constraints experienced

Items	1	2	3	4	5	6	Ranking
Lack of capital	2	48	26	12	4	0	5th
Lack of government support	2	33	35	15	5	2	7th
Poor storage	0	68	22	2	0	0	1st
High price of farm input	2	37	40	13	0	0	6th
Lack of good road	3	57	24	4	4	0	3rd
Poor market	0	60	28	4	0	0	2nd
Inadequate training	2	30	16	24	18	2	9th
Lack of transport	2	9	36	27	12	6	10th
Land tenure system	9	26	36	14	6	1	8th
Low price of product	2	48	35	5	2	0	4th

1=No response, 2=Strongly agree, 3=Agree, 4=Neutral, 5=Disagree, 6=Strongly disagree

Source: Field Survey, 2013.