



RISK MANAGEMENT STRATEGIES IN FOOD CROP PRODUCTION IN IKWUANO LOCAL GOVERNMENT AREA OF ABIA STATE, NIGERIA.

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ABSTRACT

The study tried to analyze risk management strategy in some selected food crop products in Ikwuano Local Government Area of Abia State. A structured questionnaire was employed to collect relevant primary data from 95 food crop respondents from four clans that constitute the local government area. Descriptive statistics and multiple regression analysis technique were used for data analysis. The results showed that the predominant risks in the study area are natural, social as well as destruction by animals. It was noted that 95.84 % of the respondents faced pests and disease attack as the major food crop risk. The respondents adopted modern and traditional ways of managing risk. Farm size, average prices of food crops, inputs and off-farm income were major significant factors influencing the reduction of risk on the output of the farmers. The study therefore suggests that farmers as a matter of urgency should be educated so as to enable them appreciate and imbibe the use of modern techniques to combat risk. Farmers should be encouraged to own large farm size to promote diversification of crops as well.

Keywords: Natural and social risks; Risk management

INTRODUCTION

Risk management, in essence is the process of assessing risk and then developing strategies for managing the risk. Jones (2002) stressed that risk management is the sum of all proactive management-directed activities within a business (program) that are intended to acceptably accommodate the possibility of failure in elements of the program. Harwood *et al.* (2004) noted that in dealing with risky situations, risk management involves choosing among alternatives to reduce the effects of the various types of risk. It typically requires the evaluation of trade-offs between changes in risk, changes in expected returns, entrepreneurial freedom and other variables.

Farming risks, according to Utomaliki *et al.* (2005) can be categorized into natural risks which include climatic factors such as rain, drought, flood, temperature and so on and socio-economic factors such as age, farming experience, level of education and income or financial level of the food crop farmers. Certain constraints such as inadequate availability of inputs especially improved seeds, seedlings, brood stock, credit, fertilizers, agro-

chemicals and farm machinery have made producers to become more risk averse. Furthermore, capital inadequacy and affordability constitute serious limiting factors to most micro-agricultural enterprises. Other risk factors like post harvest risk such as damage to crops and price of products reduce the quality and value of these crops. The risks faced by the farmers and all those involved in farming activities are enormous despite the fact that some food crop enterprises are economically viable. Farmers accepting this reality of risk have taken some measures which help minimize the effect of risk.

The challenging task today in our society is to produce enough food for our teeming population. It is a well known fact that any country that cannot feed her population effectively has little or no respect in the international politics no matter how well she develops technologically. Onyekole (2006) stressed that farming risks as they affect the production of crops are marketing risks, socio-cultural risks and other risks due to climatic technological factors. Most responses to risk have a cost associated with them as farmers would like to avoid major losses but would also prefer to be in a position to benefit from favourable event according to Perry (1997). Harwood *et al.* (2004) stressed that risk management involves finding the preferred combination of activities with uncertain outcomes and varying levels of expected returns for an individual farmer. Walker *et al.* (1999) pointed out that some risk management strategies reduce risk within the farms operation, others transfer risks outside the farm and still others build the farm's capacity to bear risk. It is not uncommon to observe that farmers find ways of coping with risk and protecting themselves from the decisions they make today not knowing what may happen tomorrow.

Risk responses are commonly grouped into production, marketing, financial response. Harwood *et al.* (2004) opined that most farmers use a combination of production, marketing and financial responses in their risk management strategies. Mejeha (2005) stressed that insurance serves as a means of providing protection against losses due to accidents or unforeseen events. Production responses have traditionally been very important in risk management and some of these strategies include diversification. Sonka and George (2004) opined that by managing a number of enterprises together on the farm, producing the same enterprises in different physical locations or managing the same enterprise at different periods of time, growing crops in different land parcels, selecting and changing production practices are part of production responses to risk in farming. The market-related responses according to Mapp *et al.* (2003) could be seen in the following ways such as obtaining market information with respect to price changes and the past profitability of enterprises will place the farmer in a better position to predict the future. Chandra (2001) stressed that contract farming and minimum price contracts tend to provide farmers with the opportunity to secure price insurance and guarantee the producer a minimum price for harvest delivery.

Earning off-farm income is another strategy that farmers may use to mitigate the effects of agricultural risk on farms. This earning can as well provide a more reliable stream of income than farm returns and can offer a form of diversification. The incentives for diversifying income sources, according to Mishra and Goodwin (2001), will depend on the level and variability of returns when considering a risk averse producer. If farm households are risk averse, then they would be willing to supply relatively more labour to stable off-farm occupations than they would otherwise. They may seek out other types of off farm income such as interests and dividends to counter negative fluctuations in farm income. Mishra and Goodwin (2001) however identified unearned off-farm income to include social

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security, pensions and investments, together with farm net cash income while farm household income can be categorized as earned off-farm income, wages and salaries.

The study examined the risk management strategies adopted by the food crop farmers, determine factors influencing reduction of risk on food crop production and also identified various types of farming risks in the study area.

MATERIALS AND METHODS

Study Area

The study was conducted in Ikwuano Local Government Area of Abia State. It lies within the rain forest zone of Nigeria with an average rainfall of 201mm. The dry season begins towards the end of October and end in March and rainy seasons begins in April and end in October. The major occupation of the people is farming with a population of 161,423 people (NPC, 2004). Cropping system are mainly mixed cropping and intercropping and the farmers' cultivate such food crops as cassava, yam, cocoyam, maize, rice, melon. The study area is inhabited by four clans.

Sampling Procedure and Data Collection

Twenty four respondents were purposively selected from each clan because of their interest in the food and tuber crops used in the study. These crops were cassava, vegetable, melon, maize, rice, cocoyam and yam. Questionnaire was used to collect primary data from the four clans in the study area. The sample frame was obtained from the Local Government Secretariat, Agricultural Department as well as extension agents of the Agricultural Development Programme (ADP) in the area. Information were primarily sought on the major crops grown, types of risks faced by farmers, various risk management strategies adopted by the farmers, prices of harvested food crops, quantities of output and socio-economic characteristics of respondents. Five villages, namely Nodoro, Umudike, Amawom, Ahiake and Ariam were selected from each of the four clans of the local government area using simple random sampling technique.

Data Analysis

Data on study objectives which covered the identification of various types of farming risks and risk management strategies were analyzed with the aid of descriptive statistical tools such as frequency and proportion, while those on factors influencing the reduction of risks on food crop production were analyzed using multiple regression equation. Implicitly, its function is stated as follows:

$$Y = f(X_1, X_2, X_3, \dots, X_8 + e) \quad (\text{eqn.1.0})$$

Where:

Y = Output of food/tuber crops (₦)

X1 = Cropping system (multiple cropping = 1; mono-cropping = 0)

X2 = Farm Size (ha)

X3 = Farm input used (₦)

X4 = Level of education (year)

X5 = Farming experience (year)

X6 = Age (year)

- X7 = Average prices of food crops (₦)
- X8 = Off-farm income (₦)
- e = Error term.

RESULTS AND DISCUSSION:

The major types of food crop grown in the study area are yam, cassava, melon, vegetables, melon, rice, cocoyam (Table 1). The table shows the percentage with multiple responses distribution of the respondents according to the food crops produced by the respondents.

Table 1: Major types of food crops grown in the study area.

Major food crops	Frequency	Proportion (%)
Yam	63	66.32
Cassava	93	97.89
Rice	11	11.58
Cocoyam	31	32.63
Melon	91	95.79
Vegetables	92	96.84
Maize	83	87.37

Source: Field survey, 2007.

The results showed that cassava is the most predominant food crops grown closely followed by vegetable production with 96.84% and melon as the third major food crop grown by the respondents. The results further showed that farmers in the study area mostly produce some of these food crops either through mixed cropping or inter cropping system while rice production is mostly produced as a sole crop. Some farmers produce all the above types of food crops in their farm.

The farming risks encountered by the farmers in the study area are hereby presented in Table 2. Farming risk could best be described as a situation in which the farmer is aware of the range of possible outcomes as well as probability associated with each outcome. The frequency and degree to which the outcomes can occur are fairly predictable. Farming risk according to Utomaliki *et al.* (2005) can be categorized into natural risks which include climatic factors such as rain, drought, flood, temperature and so on.

The results in Table 2 however showed that the predominant types of risk in the study area are mainly natural and social. It showed that pest and disease attack constituted the natural risk (about 96.84%). One aspect of natural risk is weather which also commands a high proportion of 82.11%. Animal attack also constituted a high risk to farmers as it affected their food crop production. In essence, natural risk recorded the highest percentage because of its uncontrollable nature and the environment. Adeyeye (1994), concerning this assertion stressed that only a form of insurance can save the farmers from the dilemma of natural hazards.

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Table 2: Risk encountered by the food crop farmers

Farming Risk	Frequency	Proportion (%)
Pest and Disease attack	92	96.84
Weather	78	82.11
Erosion	48	50.53
Theft	58	61.05
Fire outbreak	24	25.26
Drought	2	2.11
Flood	27	28.42
Animal attack	84	88.42
Crop failure	35	36.84
Market risk	45	47.37

Source: Field survey, 2007.

Risk response are commonly grouped into production, marketing, financial (money) response. Harwood *et al.* (2004) opined that most farmers use a combination of production, marketing and financial responses in their risk management strategies. Onyebimama (2004) emphasized that insurance is a risk management tool used to pool or transfer risk.

The results in Table 3 showed that about 97.79% of the food crop farmers adopted the use of scarecrow especially for birds as risk management strategy while about 93.68% diversified their production as the measure of risk management they adopted. These two strategies had the highest percentages even though setting of traps and mixed cropping respectively had values of 88.42% and 75.79% of which were equally high. Based on the results, it implies that the food crop farmers in the study area were technically inefficient in the use of this strategy. This, to a great extent will reduce crop yield and hence may affect their farm income negatively.

Table 3: The risk management strategies adopted by the farmers.

Management strategy adopted	Frequency	Proportion (%)
Diversification of production	89	93.68
Off-farm activities	45	47.37
Mixed cropping	72	75.79
Mixed farming	41	43.16
Insecticides	18	18.95
Setting of traps	84	88.42
Scare crow	93	97.79
Erosion control	17	17.89
Improved varieties	6	6.32
Drainage	12	12.63
Cooperative marketing	8	8.42

Field Survey, 2007.

Table 4: Determinant factors influencing reduction of risk on output of farmers in the study area.

Variable	Linear	Exponential	Semi-log	Double-log
Constant (Xo)	-2819.849 (-2.891)*	4.649 (28.764)**	-1717.430 (-1.962) ^s	2.679 (4.430)**
Cropping system	96.294 (4.454)**	0.116 (3.258)**	888.543 (2.904)*	0.209 (0.988)
Farm size	123.597 (3.263)**	0.305 (4.885)**	-8424.671 (-0.573)	0.244 (2.409)*
Input used	0.467 (2.212)*	6.731 (1.925) ^s	18.953 (1.601)	0.424 (5.182)**
Level of Education	1139.167 (0.728)	-1.576 (-0.061)	-1781.76 (-0.099)	-0.132 (-1.061)
Farming Experience	1281.420 (0.692)	2.753 (0.896)	2813.296 (0.180)	0.144 (1.327)
Age	51.258 (0.300)	-3.182 (-1.123)	-1348.554 (-0.329)	-0.408 (-1.440)
Average Prices of Food crops	49.618 (1.406)	1.082 (1.849) ^s	2851.23 (1.830) ^s	0.351 (3.259)**
Off-farm income	0.093 (0.884)	1.101 (0.628)	409.369 (1.096)	0.049 (1.905) ^s
R ²	0.482	0.498	0.248	0.582
Adj R ²	0.434	0.452	0.178	0.544
F-ratio	9.998**	10.680**	3.542**	14.996**

Field survey, 2007; The figures in parenthesis are the respective t-ratios; **, *, ^s indicate significant level at 1%, 5% and 10% respectively.

From the estimated results in Table 4, double-log functional model was chosen as the lead equation based on the number of significant variables, coefficient of multiple determinations, F-ratio and the conformity of the signs to a-priori expectations. Farm size, inputs, average prices of food crops and off-farm income were significant and positively related to the output of the food crop farmers. This could be acknowledged in situations whereby farmers having an increased farm size engaged in diversified practices which then served as a way of managing the farm risk or reducing its effect on their output, an inevitable situation in agricultural production. Onyebinama (2004) however stressed that less than five hectares of farm land is a small farm while above five hectares is large land in terms of total hectareage cultivated in Nigeria agricultural production.

The coefficients of the inputs used by the farmers were positively significant, indicating that inputs used are directly related to the output of food crop farmers in the study area. This could mean that as the input used increases the risk faced by the food crop farmers reduces. It goes further to emphasize that as the input used on the farm are utilized efficiently and in the right proportion, the effect of farm risk on the output of food crop

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farmer could be reduced. In essence, as the input used increases the output of the food crop farmers increases.

The social factors such as education, farming experience and age were non-significant factors. This implies that these variables did not have any influence in terms of reducing risk on farmers output in the study area.

There was a significant and positive relationship between average prices of food crops and the output of the food crop farmers. This implies that as the average prices of food crop increase, the output of the food crop farmers increases. This conforms to a-priori expectation that the higher the price, the greater the quantity produced and supplied. Walker *et al.* (2001) stressed that the higher the average prices of food crop increases in the market, the more risk the farmers are willing to take and the greater their output. The higher the prices of the food crops the more the farmers will be able to prevent or reduce the price risk, because they will be encouraged by their profit to produce more food crops, thus increasing their productivity.

The results also showed that off-farm income was significant and positively related to the output of food crop farmers, which however implies that as off-farm income increases the farmers are able to generate additional capital, which can be invested in food crop production in an event of hazards (risks). The additional capital helps the farmers to tackle additional risk on the farm without being risk averse. This causes increase in the output of the food crop farmers and also makes it possible for the farmers to generate income needed to manage farm risk or reduce its effect on the output of the farmers.

CONCLUSION

The study revealed that cassava, vegetable, melon and maize were the major food crops produced in the study area. Moreso, natural risks, social risks and animal attack on food crops were predominant. Farmers adopted old risk management strategy using scare crow on their farms. Respondents were moderately literate with large family size of about six persons. Farm size, input used, average prices of food crops and off-farm income were significant variables that influenced the reduction of risks on the output of the farmers. The policy thrust which this study will prefer should be fully utilized by stake holders in the agricultural sector because it will help increase food crop productivity and thus help to achieve food sufficiency to the growing population.

Social factors such as education, farming experience and age were non significant hence had no influence in reducing risk level in the study area. There is need to encourage large farm sizes in order to enable farmers to practise multiple cropping which could help to reduce risk. This to some extent could act as insurance to farmers as well as create more confident in their farming activities. In essence, government should provide financial assistance to farmers to assist them to purchase relevant farm inputs and would help to reduce their dependence on off-farm income to boost production. Farmers should be financially encouraged to increase their level of agricultural productivity.

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