

## **RISK MANAGEMENT STRATEGIES ADOPTED BY SMALL-SCALE ARABLE-CROP FARMERS IN KHANA LOCAL GOVERNMENT AREA OF RIVERS STATE, NIGERIA**

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### **ABSTRACT**

*The study investigated risk management strategies adopted by small-scale arable crop farmers in Khana Local Government Area of Rivers State, Nigeria. Crop farmers grapple with clusters of factors on climate change, environment, pests and diseases consequent upon poor yield, post-harvest losses and food insecurity. Adequate risk management strategies are required to forestall the above problems among small-scale crop farmers in the study area. Two-stage random sampling procedure was used to select 17 communities out of 28 communities that constitute the local government area and 6 arable crop farmers from each of the selected communities to give a total of 102 sample size for the study. Structured questionnaire validated by the researchers was used for data collection. The data collected were analyzed with the use of descriptive statistical tools namely, frequency, percentage and mean. Result on sources of risks encountered by the arable crop farmers showed that storage losses (Mean = 3.74), poor farm maintenance (Mean = 3.59), changes in price of farm inputs (Mean = 3.53) are the highest among others. It was found that maintaining health and safety culture (Mean = 3.69), monitoring market prices (Mean = 3.27), direct sales of farm produce without storage (Mean = 3.22) ranked the highest among the other risk management strategies adopted by small-scale arable crop farmers covered in the study. It was concluded that though small-scale arable crop farmers in the study area faced farm risks arising from several factors, they adopted some risk management strategies to mitigate the risks. It was recommended that the Ministry of Agriculture and relevant Research Institutes should invest in storage facilities as a solution to storage losses and storage pest for farm produce in the study area.*

**Key words:** Risk factors, crop yield, climate change, pests, diseases.

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### **INTRODUCTION**

The trends in innovation are impacting on the productivity of various industries including the agricultural industry. The demand for increase in yield, disease resistant varieties, and mitigations

climate change are becoming paramount. These concerns give rise to the shift from traditional system of arable cropping to improved systems. Such improved systems include biotechnology in Seeds and bio-control measures, which embraces improved seed management methods such as seed selection, heat resistant seeds and disease resistant varieties are growing in demand among small-scale arable-crop farmers. Small-scale Mechanization is also trending among small-scale farmers with the potential of resulting in reduction in labour cost and increased farm income. Small-scale farmers in recent times have started adapting to the drip Irrigation system and use of small pumps especially during dry season arable farming and in arid environment where irrigation is practiced. With the above trends posing great relevance in the pursuit of increasing food production, it is predicted that small-scale Arable crop farmers are key in the production of 75% food in the coming years (Sadiq, 2013).

Despite the above potentials, Securing Water for Food (2018)) observed that arable crop farming in developing countries faces varying challenges ranging from poverty, ignorance, illiteracy, use of manual farm tools/methods, inadequate road networks, water and electricity, lack of Modern farm equipment and techniques, lack of scientific and technological know-how, poor farm organization and accountability, lack of leadership, industrialization and privatization to global warming. These challenges over the years have generated untold risks in arable crop farming activities.

In most agricultural zones and farming systems in Nigeria, cultivation and productivity of arable crops are faced by general risks (Olubukola and Bolarin, 2006). The risks and uncertainties are compounded by several factors at various stages of operation. However, risk is an integral part of agriculture. The exposure of farmers to a wide range of risk arising from weather variations, natural hazards, pest and diseases and others affect the economic returns from agricultural production. The livelihoods of farmers are greatly affected and in most severe cases sustainability becomes a matter of high concern. Crane *et al.* (2013) saw risk as the chance of loss or an unfavorable outcome associated with an action. According to Trina and Cindy (2012) there are five sources of agricultural risks which include production risk, financial risk, market risk, legal risk and personal/human risk. Arable-crop farmers most often are confronted by the above risk factors. Production risk deals with anything that directly affects the quantity and quality of production or anything that causes variation in expected production yield such as weather variations, pest and disease, insects attack, fire outbreak, flood, wind, and farm theft (Crane *et al.* 2013). For instance, according to Kahan (2008) production risk implies that low rainfall or drought may lead to low yields of crops, hail or heavy rains could damage or even wipe out crops while outbreaks of pests or diseases could cause major yield losses in crops eventually resulting in farm loss. Kahan (2008) saw marketing risk as price and cost risk where changes in prices are beyond the control of the farmer, rather price of farm products is affected by the supply of the product, demand for the product, and the cost of production. Marketing is the actual activity that helps the farmer to transform farm produce into farm income, when this is not achieved, it results to risk in farm

business. The implication of this risk is low quality of products and loss of farm produce and profit. Trina and Cindy (2012) explained that human/personal risk arises from the disagreement among farm family, divorce, accidents, illness, disability and death of proprietor or employee leading to low farm productivity or disruption in farm activities and performance. In many countries labour migration away from rural areas is a common occurrence. It further constitutes risks with far-reaching implications to crop production and farm profitability.

The above risks may be partly responsible for low farm output, acute food insecurity, and low motivation for agri-business investments compared to other sectors of the economy. Despite several efforts at improving yield through research, extension service delivery and emphasis on value additions, productions have remained low leading to poor farm income while food insecurity has remained an intractable problem. According to Agricultural Development Division (2019), farmers confront different types of risk but changes in the risks make it compelling to engage in risk management education. Often times, the farmers adopt some risk management strategies such as crop diversification and other income generating activities as means of mitigation. These steps have further depleted interest in farming, creating general apathy in agricultural ventures, which has reflected constantly in low crop yield, while further losses are recorded from farm theft, weather variability and violence leading to death of farm enterprise proprietors (Crane, *et al.* 2013).

The responses to production risk requires crop specialty where crops of greater year to year yield are grown rather than those that are common, diversity of enterprise as a substitute for farm in low yield seasons and flexibility maintenance in operation. To deal with marketing risk, it might be essential for farmers to understand how markets function, how prices are determined and the tools that are available to take advantage of opportunities. For human risk responses could include a good human relationship, health and safety precautions, and trainings for backup supports for essential employees during physical and mental rest. These responses promise greater yield in crop production and profitability, sustenance for small scale farmers and help to take into account the interaction and tradeoffs between different risks, on-farm strategy and government policy (Crane, *et al.*, 2013). How farmers respond to these risks varies from one individual to the other and from place to place and demands an in-depth and careful investigation. In view of the foregoing, this study was designed in specific terms to describe the Socio-economic characteristics of Small-scale arable-crop farmers, ascertain the sources of risks encountered by small-scale arable-crop farmers, and assess the risk management strategies adopted by small-scale arable-crop farmers in the study area.

## **Materials and Methods**

The study was undertaken in Khana Local Government Area (LGA) of the Rivers State, Nigeria. Khana Local Government Area was created in 1992, comprising of 28 communities with its headquarters in Bori (Harry and Umeh, 2018). It is located between latitude 4<sup>0</sup>42N and 7<sup>0</sup>45E approximately longitude 4.700<sup>0</sup>N and 7.350<sup>0</sup>E, (Orubo, 2005). It is bounded in the north by Oyigbo, in the east by AkwaIbom State, in the west by Bonny, Opobo/Nkoro and Andoni LGAs

and in the South by Gokana and Tai local government areas. Khana Local Government covers an area of 560km<sup>2</sup> with the density of 1734.8km<sup>2</sup> and a population of approximately 292,924 (NPC, 2006). Located in the tropical rain forest zone of Nigeria (Orubo, 2005), its environment is conducive for fishing and crop farming with yam, cassava, maize, vegetables as predominant crops in the farming system on an estimated 2,000 hectares of ancestral farmlands. The farming population in the study area is made up of over 30,000 small-holder farmers (SDIC, 2013), out of which 70% (21,000) are arable-crop farmers, which constitute the population of the study. A simple random sampling technique was used to select a sample size of 102 respondents from the study population. The process involved the selection of 17 communities from 28 communities which make up the study area while 6 respondents were randomly selected from each of the 17 communities to give a sample size of 102 respondents. The main instrument for data collection for the study was a structured and validated questionnaire developed by the researchers. Section A captured the socio-economic characteristics of respondents. Section B captured the various types of risk encountered by small-scale farmers while section C elicited information on the risk management strategies adopted by the farmers in the study area. Descriptive statistical tools such as mean, frequency and percentage were used to analyze data to achieve the objectives of the study.

## **Results and Discussion**

### **Socio-economic Characteristics of Small-scale Arable Crop Farmers in Khana Local Government Area of Rivers State.**

Results on Table 1 shows that 36.5% of the small-scale arable farmers in the study area were within the age bracket of 31 and 40. This implies that arable crop farmers in the study area were young and in their productive years. About 52.1% of them were females. This is in agreement with the findings of Daudu, *et al.* (2015) and Harry and Umeh (2018) that females dominated in arable crop farming activities in Khana and Kwara areas of Nigeria respectively. The result also indicated that 47.9% of the farmers covered in the study were married. This implies that they were people with responsibilities, which must include provision of food and other necessities of their families. Ekong (2003) in Albert (2015) stated that marriage imposes a sense of responsibility on someone. Marriage increases a farmers' concern for household welfare and food security which is likely to have a positive effect on their decision to adopt risk management strategies. About 37.5% had between 1-3 members in their household while farm sizes ranged between 1-3 plots and 4-6 plots respectively. This implies that members of the household can provide farm labour required in small-scale farming to reduce labour cost. The larger the household the more land to till and production rate will tend to increase resulting to more income. The results on the number of years involved in farming in Table1 showed that a greater proportion (32.3.7%) of the farmers investigated had spent 1 - 4 years in farming; since most of the respondent fell within 31 - 40 years of age (Table 1), implying that farmers were relatively gathering farming experiences; they are still within active farming years and can easily adopt new risk management strategy than older farmers. On educational level, the result indicated that 33.3% of the farmers had primary school

education while 30.2% had secondary education. This implies that majority of the arable crop farmers may rely on informal sources for knowledge in risk management strategies. This agrees with the finding of Ogunmefun and Achike (2015) that informal insurance measures in managing risk is independent of the level of education farmers have attained rather they attributed such knowledge learnt from their parents, friends and neighbours as essential. About 40.6% of them were full-time farmers while the others are involved in other forms of livelihood. This implies that in the study area, farmers tend to reduce income risks by engaging in other livelihood activities. This is in agreement with Reardon *et al.* (1998) in Ogunmefun and Achike (2015) that there is an increased need for diversified sources of income among farmers. The essence of diversifying income is to balance losses which these farmers may incur as a result of crop/livestock failure. The monthly income of majority of the farmers ranged from N21, 000 to N35, 000. This implies that the farmers subsisted on less than 1dollar (current exchange rate) a day. This places the farmers among the poorest segment in the society.

### **Various Risks Encountered by Small-Scale Arable Crop Farmers in Khana Local Government Area of Rivers State.**

The results of various sources of risk encountered by small-scale arable crop framers were presented on Table 2. It was found that storage loss (mean=3.74) was the highest ranked risk factor. This is because most of the crop losses encountered by farmers did occur during storage. Also, the result indicated that poor farm maintenance practices (Mean =3.59) constituted a serious risk factor. This is critical since poor farm maintenance predisposes the crops to weeds, pests and diseases infestation resulting to total crop failure. Furthermore, changes in prices of farm inputs (Mean =3.53) were found to be among the risks encountered by the farmers in Khana Local Government Area of Rivers State. The market forces governing the supply of farm inputs are unpredictable often leading to high prices of inputs.

### **Risk Management Strategies Adopted by Small-scale Arable Crop Farmers in Khana Local Government Area of Rivers State.**

Table 3 show the risk management strategies adopted by small-scale arable crop farmers in Khana Local Government Area of Rivers State. Maintaining health and safety culture (Mean = 3.69) was ranked 1st among the other risk management strategies adopted by the farmers. Such health and safety culture indicate that farmer avoid such lifestyles that put their health at risk, as well as improving their sanitary conditions in their surroundings. This implies that the farmers adopted human/personal strategy more as a mitigating strategy. Also monitoring market price (Mean = 3.27) was ranked 2nd as a risk management strategy among the farmers. The strategy indicate that farmers maintain knowledge of price changes in the market to enable them sell their produce at a favourable price range. This strategy ensures that farmers may sell their farm produce at least at a break-even price since market prices of agricultural products are constantly fluctuating. By and large, farmers may speculate and understand the market forces to take wise decision on when and where to place their farm produce for sale to attract competitive and favourable prices. Direct sales

of farm products without storage (Mean = 3.22) was ranked 3rd as a risk management strategy adopted. This might be because of the high perishable nature of agricultural produce and lack of storage capacity of small-scale farmers due to inadequate storage infrastructures. Besides, direct sales of farm produce could be beneficial to small scale farmers as a measure to evade multiple middlemen in the marketing channel which deprive the farmers of valuable market prices especially when considered against the small nature of their production. Other strategies include crop diversification (Mean = 3.20). This involved farmer planting different types of crops as a way of ensuring against failure of a particular crop in the field. Furthermore, use of fertilizers (Mean = 3.20) was indicated by the farmers as a strategy. It was based on common knowledge among farmers that adequate fertilizer and manure application improves crop yield. Use of pesticides (Mean = 3.20) was identified as among the strategy. With wise use of pesticides, farmers express that they are able to control field and stored crop products.

### **Conclusions**

Based on the findings, it is concluded that small-scale arable crop farmers in Khana Local Government Area of Rivers State, Nigeria, adopted some risk management strategies.

Based on the findings of the study, the following recommendations were made.

- (i) Since the study showed that storage losses and storage pest ranked high amongst sources of farm risk, therefore relevant research institutes such as National Root Crop Research institute, National Stored Product Research Institute should invest in storage facilities through adequate research as a solution to storage losses and storage pest for small-scale arable-crop farmers.
- (ii) Extension agencies through agents should embark on the training of arable crop farmers on the use of innovative storage and processing facilities to improve the shelf life of farm produce.
- (iii) Furthermore, proper education and awareness on the benefits in adopting financial and legal strategies should be done by extension agents in other to prepare the small-scale arable crop farmers to overcome farm risks in the study area.
- (iv) Advisory services should be increased by Extension agents for arable crop farmers on best maintenance practices such as soil conservation, disease control and irrigation practices.
- (v) Improved farm incentives such as pesticides, fertilizers, storage facilities improved farm inputs should be provided for arable crop farmers by relevant non-governmental agencies to cope with the effects of farm risks.

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**Table 1: Distribution of Socio-economic Characteristics of the Respondents**

Variables	Frequency	Percentage (%)
Age (Yrs)		
18-30	30	31.3
31-40	35	36.5
41-50	12	12.5
51-60	17	17.7
61-Above	2	2.0
Sex		
Male	46	47.9
Female	50	52.1
Marital status		
Single	33	34.4
Married	46	47.9
Widowed	11	11.5
Divorced	6	6.2
Educational level		
No-formal	24	25.0
Primary	32	33.3
Secondary	29	30.2
Tertiary	11	11.5
Household Size		
1-3 persons	30	31.3
4-6 persons	32	33.3
7-9 persons	17	17.7
10-12 persons	17	17.7
Occupation		
Farming	39	40.6
Trading	21	21.8
Craft	18	18.8
Civil Service	18	18.8
Farming Experience		
1-4 years	31	32.3
5-8 years	21	21.9
9-12 years	14	14.4
13-16 years	11	11.6
17 years and above	19	19.8
Farm Size		
1-3 hectares	36	37.5
4-6 hectares	23	24.0
7-9 hectares	9	9.4
10-12 hectares	13	13.5
13-15 hectares	15	15.6
Monthly Income (naira)		
Less than 5,000	13	13.5
6,000 – 20,000	12	12.5
21,000-35,000	29	30.2
36,000-50,000	27	28.1
51,000 and above	15	15.7

Source: Field Survey, 2023.

**Table 2: Small-scale Farmers Rating of Risks encountered in Khana Local Government Area of Rivers State**

Sources of risk encountered	Mean	Ranking
Loss of market advantage	3.46	5 <sup>th</sup>
Poor farm maintenance	3.59	2 <sup>nd</sup>
Storage pest	3.40	7 <sup>th</sup>
Improper harvesting	3.47	4 <sup>th</sup>
Changes in price of farm inputs	3.53	3 <sup>rd</sup>
Reduction in market price of product	3.42	6 <sup>th</sup>
Climate change/adverse climate	3.32	9 <sup>th</sup>
Storage losses	3.74	1 <sup>st</sup>
Producing low quality products	3.47	4 <sup>th</sup>
High cost of production	3.23	10 <sup>th</sup>
Harvest losses	3.36	8 <sup>th</sup>
Disease	3.13	12 <sup>th</sup>
Death	2.94	13 <sup>th</sup>
Marketing inefficiency	3.16	11 <sup>th</sup>

Source: Field Survey, 2023.

**Table 3: Respondents Rating of Risk Management Strategies adopted by Arable Crop Farmers in Khana Local Government Area of Rivers State**

Risk management strategies adopted	Mean	Ranking
Use of seasonal labour calendar	3.13	6
Monitoring market price	3.27	2
Direct sales of products without storage	3.22	3
Investment in storage facilities	3.03	13
Use of Fertilizers	3.20	4
Agricultural insurance	3.09	9
Crop diversification	3.20	4
Spread of sales during low market price	3.11	7
The establishment of cooperative associations among the farmers	3.10	8
Usage of certified seedlings	2.92	15
Maintaining health and safety culture	3.69	1
Selection of suitable varieties	3.08	10
Production of new varieties	3.07	11
Use of Irrigation method for low rainfall	3.04	12
Use of pesticides	3.20	4
Implementation of processing techniques for production	2.98	14
Fencing of farmlands	3.14	5

Source: Field Survey, 2023.