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Research Article

Analysis of Sources of Agricultural Risk and Management Strategies among Crop Farmers in Imo State, Nigeria

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Abstract

The study was aimed at identifying sources of agricultural risks faced by crop farmers in their changing environment and the coping strategies employed. Multi stage sampling technique was used to select 180 farmers affected by risks and uncertainty. Questionnaire was used to collect data and descriptive tools such as percentage and mean were used to analyze the data. The study revealed that farmers faced myriads of risks in food production business. These risks were grouped into weather, environment and social related risks. The weather risk faced included heavy rainfall with a high mean of 3.36, flooding (M = 3.20), drought (M = 2.77), extreme temperature (M=3.05), pests/diseases outbreak (M=3.16). The social risks included fire outbreak (M = 3.02), illness (M = 3.28), land dispute (M = 3.01), death (M = 3.02) among others. The economic risks were market failure, price fluctuation and lack of capital among others. To cope, the farmers employed the following strategies – intercropping, cooperative farming, borrowing of money, off-farm investment, education/training, saving more money, storage of crops, insurance of crops and many more. They are faced with the problems of lack of sufficient fund, high cost of land and labour, poor marketing facilities among others. Government should subsidize inputs and make farming attractive to young ones.

Keywords: Agriculture, Risks, Farmers, Flooding, Weather, Management

INTRODUCTION

Agriculture is central to the livelihoods of the rural poor and in the attainment of the Millennium Development Goals (MDGs) (Ghalavand et al., 2012). Agricultural production is typically a risky business. Farmers face a variety of price, yield, and resource risks, which make their incomes unstable from year to year. In many cases farmers are also confronted by the risk of catastrophy. Crops and livestock may be destroyed by natural hazards such as hurricanes, floods, fire, and drought. The farmer or his family can also be disabled by accidents, sickness, or death (Hazell et al., 1986).

The types and severity of the risks confronting farmers vary with the farming system and with the climatological, policy, and institutional setting. Nevertheless, agricultural risks seem to be prevalent throughout most of the world. They are particularly burdensome to small-scale farmers in developing countries. There is also strong evidence that farmers are typically risk-averse (Binswanger, 1980; Hazell, 1982), and that they seek to avoid risk through various managerial and institutional mechanisms. For example, they may diversify their crops, favor traditional techniques over modern technology, and enter into sharecropping arrangements. The incidence of risk and risk-averse behavior in farming is important to policymakers for three reasons.

Climate risk in agriculture represents the probability of a defined hydro-meteorological hazard affecting the livelihood of farmers, livestock herders, fishers and forest dwellers. Risk refers to a probability that can be estimated from prior information, while uncertainty applies to situations in which probability cannot be estimated. Both risks and uncertainties

contribute to choice of appropriate management practices by the decision-makers in agriculture (Selvaraju, 2012). Farmers to some extent understand the risks and uncertainties of climate at their location and optimize the management practices based on years of experience. However, growing demand, changing climatic conditions, intensification and spread of agriculture to marginal production environments warrants improved climate risk management and decision support systems to enable appropriate choice of practices and strategies to match the current and future climate risks.

Risk is a function of the vulnerability and capacity of communities and economies in relation to the hazards they confront. The increased vulnerability and inadequate coping capacity within communities have most definitely increased the impact of hazards on their lives and livelihoods (World Bank, 2006). This trend can be attributed to flawed development practices and continued emphasis on reactive approaches to handling disasters. It is possible to reduce risks by improving pre-event preparedness, designing and implementing risk mitigating strategies, developing reliable and timely early warning and response systems, and spreading residual risks through innovative risk financing instruments. Therefore risk reduction must be mainstreamed in policies and programs for sustainable development.

Agricultural production and farm incomes are frequently affected by natural disasters such as droughts, floods, cyclones, storms, landslides and earthquakes. Susceptibility of agriculture to these disasters is compounded by the outbreak of epidemics and man-made disasters such as fire, sale of spurious seeds, fertilizers and pesticides, price crashes etc. All these events severely affect farmers through loss in production and farm income, and they are beyond the control of the farmers. With the growing commercialization of agriculture, the magnitude of loss due to unfavorable eventualities is increasing (Raju and Chand, 2008). Agriculture is deeply interconnected with weather and climate, the main drivers of agricultural production, but also the dominant factors in the overall variability of food production (Selvaraju et al., 2011) and a continuing source of disruption to ecosystem services (Howden *et al*., 2007). Rainfall quantity and its distribution are key factors determining the rainy season characteristics, farming systems, field crop production and livestock rearing. Both inter-annual and intra-seasonal rainfall variability constrains crop production in the tropics and subtropics. The above situation is common in Imo State and not much has been done to find out how the farmers cope and this necessitates the study.

The following objectives have been set out:

a) Identify sources of risks faced by farmers in the area;
b) Describe risk management strategies employed by farmers; and
c) Examine constraint to managing risk in the area.

METHODOLOGY

The study was carried out in Imo state, Nigeria. Imo State lies within latitudes 4°45'N and 7°15'N, and longitude 6°50'E and 7°25'E with an area of about 5,100 sq km. It is bordered by Abia State on the East, by the River Niger, and Delta State on the west, by Anambra State to the north and Rivers State to the south. The state is rich in natural resources including crude oil, natural gas, and economically exploitable flora like the iroko, mahogany, obeche, bamboo, rubber tree and oil palm predominate. However with a high population density and over farming the soil has been degraded and much of the native vegetation has disappeared. This deforestation has triggered soil erosion which is compounded by heavy seasonal rainfall that has led to the destruction of houses and roads. The rainy season begins in April and lasts until October with annual rainfall varying from 1,500mm to 2,200mm (60 to 80 inches). The state an average annual temperature above 20 °C (68.0 °F) with an annual relative humidity of 75%, reaching 90% in the rainy season. The dry season experiences two months of Harmattan from late December to late February. The hottest months are between January and March. The estimated population is 4.8 million and the population density varies from 230-1,400 people per square kilometer. Multi-stage sampling technique was employed in selecting sample for the study. The first stage involved the selection of three agricultural zones in the state, namely, Owerri, Orlu and Okigwe Agricultural zones. The second stage involved the purposive selection of 2 local government areas from each zone with cases of disasters affecting crop production, making six (6) area councils. The third stage involved the purposive selection of the affected communities in the areas with cases of natural disaster. The final stage was the proportionate random selection of 180 farmers from the lists of 1,805 households affected by the disasters obtained from the various community leaders of the affected areas. Data were analyzed descriptively. Objectives 1, 3 and 4 were achieved using percentages, while objective 2 was achieved on a 4 point likert – scale measurement of highly serious, serious, moderately serious and not serious assigned weight of 4,3,2 and 1. The weight was added and divided by 4 to give 2.50. And mean 2.50 and above was regarded as serious risks, while mean less than 2.50 was not regarded as serious

RESULTS AND DISCUSSION

Sources of Risks faced by Respondents

Table 1 shows the various risks faced by the farmers in the study area. The risks were in 3 categories: Weather/Natural risks, social risks and economic risks. The high mean scores shows the seriousness of each to the farmers productive life. The weather risks included pest/disease attacks with a mean score of 3.16, heavy rainfall (M = 3.36), flooding (M – 3.20) drought (M= 2.)7), insufficient rainfall (M = 2.75), extreme temperature (M = 3.05). Again, the social risks were fire outbreak (M = 3.02), which occurs regularly in the dry season. Illness/sickness (M = 3.28) constitute risk in food production as it puts farming people out of business. Other sources of risks were loss of land title (M = 3.49), theft of farm produce (M = 3. 30), loss of labour through migration (M = 3.27), death of labourer (M = 3.27) among others. Economically, market failure (M = 2.88) constitute risks in food production. Price failure (M = 88), lack of capital (M = 2. 98), inaccessibility of farm produce (M = 3 .08), demand and supply volatility (M = 3.09), death of crops (M = 3. 10), low yield (M = 3. 06) and land degradation (M = 3.22) were risk faced by the respondents.

Table 1. Key risks faced by farmers in agricultural production sources of risk

Sources of Risk	HS	S	MS	NS	Mean	SD
Weather/Natural Risk						
Pest/disease attack	80	63	24	13	3.16	0.918
Heavy rainfall	93	65	17	5	3.36	0.768
Flood/Storm	78	70	22	10	3.20	0.861
Drought	55	50	54	21	2.77	1.012
Insufficient rainfall	30	60	80	10	2.75	0.831
Extreme temperature	53	95	20	12	3.05	0.820
Social Risk						
Fire Outbreak	64	71	30	15	3.02	0.927
Government policy/Laws	50	67	43	20	2.81	0.965
Illness/Sickness	91	54	31	4	3.28	0.828
Loss of land title	98	75	5	2	3.49	0.611
Theft of products	88	69	13	10	3.30	0.832
Land dispute/conflict	76	54	27	23	3.01	1.043
Loss of labour	84	71	15	10	3.27	0.837
Death of farm worker	74	65	23	18	3.08	0.968
Injury	68	54	33	25	2.92	1.056
Economic Risks						
Market failure	68	50	60	10	2.88	0.938
Price fluctuations	75	54	37	14	3.05	0.961
Lack of capital	64	71	23	22	2.98	0.988
Inaccessibility of farm inputs	71	68	27	14	3.08	0.923
Demand & supply volatility	76	54	41	9	3.09	0.919
Disruption of market	70	63	29	18	3.02	0.977
Seedling death	64	77	32	7	3.10	0.826
Low crop yield	73	54	44	9	3.06	0.922
Degradation of land	79	64	34	3	3.22	0.806

Field data, 2015. Highly serious, S- serious, MS- moderately serious, NS- not serious

Risk Management Strategies of Respondents

Risk management could be in the form of prevention, mitigation and coping. Table 2 shows respondents preventive strategies to include extension services with 85% response, training/education (65.5%), market information (87.2%), use of improved seeds and fertilizer with 91% and 79.4% respectively. The respondents, mitigation strategies included spraying against pests/diseases (73.8%), intercropping (93.8%), fadama cultivation (81.1%), storage of crops (70%), expenditure planning (74.1%), cooperative formation (91.1%), Mixed cropping and mixed farming with 99.4% and 97.2% respectively. The coping strategies included borrowing (82.2%), off farm work (72.2%), selling of assets (61.1%), share cropping (96.6%), spreading of sales (91.6%), off- farm investment (83.3%), among others.

Table 2. Risk Management mechanisms

Management strategies	*Frequency	Percentage
Preventive strategies		
Extension services	153	85.0
Training and education	118	65.5
Gathering market information	157	87.2
Use of improved seed	164	91.1
Fertilizer use	143	79.4
Mitigation strategies		
Spraying for diseases/pest	133	73.8
Inter-cropping	169	93.8
Fadama cultivation	146	81.1
Storage programme	126	70.0
Cooperative societies	164	91.1
Planning expenditures	134	74.4
Having crop insurance	101	56.1
Price support	70	38.8
Cash contribution	168	93.3
Mixed cropping	179	99.4
Coping strategies		
Borrowing	148	82.2
Off-farm work	130	72.2
Selling of assets	110	61.1
Share cropping	174	96.6
Spreading sales	165	91.6
Investing off farm	150	83.3
Reduced consumption	135	75.0
Saving money in bank	157	87.2

Field data, 2015. *multiple response

Challenges of Risk Management in Agricultural Production

Table 3 showed the challenges farmers faced in managing risks. The challenges included lack of sufficient capital with 96.7% response, high cost of fertilizer (85.6%), poor marketing facilities (80%), lack of storage facilities (87.2%), unpredictable weather (91.1%) high cost of land (100%), high cost of labour (93.3%) and lack of access to weather or meteorological information with 75% response

Table 3. Challenges of Risk Management

Challenges	*Frequency	Percentage
Lack of finance	174	96.7
High cost of fertilizer	154	85.6
Poor Marketing facilities	144	80.0
Lack of storage facilities	157	87.2
Unpredictable weather	164	91.1
High cost of land	180	100
High cost of labour	168	93.3
Lack of access to meteorological information	135	75.0

*Multiple responses

CONCLUSION

Farmers face variety of risk sources which threaten their activities as agricultural producers. The major risk were pests and diseases outbreak, flooding, heavy rainfall, extreme temperature, fire outbreak, loss of land, theft of produce, market failure, price fluctuation, among others. There are preventive, mitigating and coping measures employed by farmers to survive and continue business. Government should provide farmers with credits, subsidies and price support programme to protect farmers against uncertainty.

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