

# Farmers' Perception and Management of Natural Hazards in Production and Security of Farm Investment in Isuikwuato, Abia State, Nigeria

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Abstract

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This study on farmers' perception and management of natural hazards in production and security of farm investment was carried out in Isuikwuato Local Government Area of Abia State, Nigeria. The study was sought to identify farmers' perceived natural hazards in food production; identify adopted measures used in mitigating impacts of the hazards and determined factors that influenced farmers from taking formal insurance policy against these hazards. Sixty farmers were chosen following a multi-stage random sampling technique. The instrument of data collection was via a set of semi-structured questionnaire which was administered by personal interview method. The data were analyzed using descriptive statistics, 5 point likert scale and probit regression model. The result revealed fire outbreak, outbreak of diseases and pests, flooding, erosion, drought, theft, and ill health as natural hazards experienced by the farmers. The most perceived hazard was fire outbreak and the least perceived was floods. Farmers' level of education, farming experience, previous farm income and enterprise type were significant determinants of farmer's decision to take formal insurance. Experienced farmers mitigated effects of these hazards using cultural techniques. We recommended that government should provide a cushion infrastructure in form of dams to conserve floods and flowing streams to provide water for irrigation and ameliorate effects of occasional droughts and erratic rainfall. Farmers on their part should be encouraged by farm extension agency to take up formal insurance policy from designate companies against losses to their investments.

**Keywords:** Natural Hazards, Farm Investment Security, Cultural Management.

## 1. Introduction

Agricultural production depends much on weather, climate and soil condition. Most times natural disasters occasioned adverse climate and weather elements bring about droughts, extreme temperature and rainfall, flood, erosion, leaching that manifest in animal death, famine, crop failure, loss of properties, food insecurity, mass emigration and negative growth of the economy. Natural disasters to a farmer are hazards that demand prompt attention. Cherry (2010) was of the view that perception is a sensory experience of the world around the perceiver that allows him/her recognize both environmental stimuli and take actions in response to them. She further stated that through perceptual process, information about properties and elements of the environment that are critical to human survival are known. In her opinion, perception not only creates experience of the environment but helps the perceiver to act within the environment.

Perception seems simple and direct, but it is in fact fiendishly complex and very indirect involving use of five senses of sight, smell, touch, sound, and

taste as well as a set of senses to detect changes in body positions and movements. Perceptual process is thus a sequence of steps that begins with the environment, through attended stimulus to perception of stimulus, and leads to recognition and action in response to the stimulus. There are clear indications that farmers have insufficient skill to perceive environmental hazards and this plays important role in occurrence of enterprise failure especially when the farmer has few years of farming experience. A single natural disaster can stunt enterprise growth for many years due to production lost, damaged infrastructure and diversions of scarce resources for recovery needs (Carter, and Barrett, 2006; Harwood et al., 1999). The likelihood that occurrence of natural hazard will result in a decline in wellbeing of farming in an area (vulnerability) can be managed considerably by accurate and timely predication and prompt taking of counter measures to reduce their impact on agriculture (Sivakumer, et al., 2005). Farming is financially risky as on daily basis farmers are confronted with changing weather; erratic product prices, poor yield, pest and diseases attack (Salimonu



Table 1. Description of Variables analyzed by Probit Regression Model

Variable	Variable Type	Hypothesized Variable Sign Eqn. 3	Description of Variable
EXPI <sub>ij</sub>	Binary		1 if the jth household decides to take formal insurance policy; 0 otherwise;
FE <sub>ij</sub>	Continuous	+	Number of years involved in farming;
HS <sub>ij</sub>	Discrete	+	1 if size of household is greater than 4 persons; 0 otherwise
ED <sub>ij</sub>	Continuous	-	Number of years of formal education;
FY <sub>ij</sub>	Continuous	-	Last Year's farm income in Naira;
FS <sub>ij</sub>	Continuous/ Discrete	+	Number of hectares planted with crops/Number of livestock kept;
ET <sub>ij</sub>	Binary	+/-	Enterprise type (Crop=1; Livestock=2; Both=3);
DS <sub>ij</sub>	Continuous	+	Distance of farmer to formal insurance (NAIC,NHIS) office;
$e_{ij}$			Stochastic error term
$\Sigma$			Summation sign

Table 2. Farm Household Socioeconomic Characteristics in Isuikwuato, 2013.

Variable	Frequency	Mean of continuous/Discrete variables	Percentage (%)
Farming Experience (Years):			
Less than 5.0	7	3.9	11.7
5 – 09	10	7.8	16.7
10- 14	15	11.5	25.0
15 – 19	17	17.4	28.3
20 and above	11	26.5	18.3
Household Size (Number):			
1 – 5	17	4.1	28.3
6 – 11	30	8.3	50.0
Greater than 11	13	12.5	21.7
Formal Education of Household head (Years):			
No formal Education	11	5.4	18.5
Primary Education	26	9.8	43.3
Secondary Education	14	13.9	23.3
Tertiary Education			
Farm Size (Hectare):			
Less than 1.0	10	0.6	16.7
1.0-2.0	26	1.7	43.3
2.1-3.0	20	2.5	33.3
Above 3.0	4	4.7	6.7
Farm Income (₦'000):			
45- 70	29	61.0	48.3
71-96	16	83.2	26.7
97-122	8	106.0	13.3
Above 122	7	156.1	11.7
Distance to formal insurance Office (km):			
35 – 40	28	37.4	46.7
41- 45	15	43.7	25.0
Above 45	17	47.2	28.3

Source: Field Survey, 2013

### 3. Results and Discussion

#### 3.1 Socioeconomic Profile of the Farmers

Table 2 revealed the farmers involved in the study as having some reasonable years of farming experience. Few of them (11.7%) had less than five years' experience in farming with as much as 17 or 28.3% of them having farmed for between 15 and 19 years in the area. A reasonable experience in farming no doubt enhances a farmer's awareness of occurrence of natural hazards and compels him/her to device or copy popular or unique mitigation measure to reduce the negative impact. The table further showed that half (50.0%) of the farm households had household size of between 6 and 11 members. Meanwhile, 28.3% of the respondents had smaller households of between 1 and 5 persons while 21.7% of them had larger households of more than 11 persons. Members of the households are persons to implement adopted mitigation for occurring natural hazards. Whether a large household size or a small one would implement adopted measures better, is yet to be known.

Level of education attainment was quite high as cumulatively 85.0% of household respondents received formal education with a reasonable proportion (43.3%) having received secondary school education. Formal and informal knowledge, no doubt is necessary in managing enterprise challenges. The farm sizes were majorly less than three hectares with a good proportion (43.3%) cultivating between 1.0 and 2.0 hectares. It revealed predominantly small scale farm operators more akin to individually and collectively implements measures that ameliorate effects of any natural hazards within the limits of technology that is available.

The means of the various seasonal farm income cohorts ranged from ₦61, 000.00 to ₦156, 000.00. These differences reflect largely the scale of each farmer's operation. Further, majority of the farmers were located farther than 40 kilometers from the formal farm insurance (NAIC) office in Umuahia, the headquarters of the state. This might call for further decentralization of farm formal insurance institution by encouraging establishment of desk officers at level of local governments.

#### 3.2 Natural Hazards, Farmer Perception and Management

Table 2, revealed that farmers in Isuikwuato area had perceived and experienced many natural hazards. The most highly perceived natural hazard was fire outbreak and the least perceived was occurrence of flood. Between these two hazards they also perceived in ascending order the following hazards: theft, pests, enterprise disease, ill health, soil erosion and drought. In response, they applied some

cultural mitigation measures to manage the hazards that included slashing the bush ends farmlands to act as fire break against fire outbreaks; keeping surveillance over farms and harvesting crops promptly to guard against thieves. Other measures were setting of traps for mammalian pests and birds and planting resistant varieties of crops; constructing contiguous earth mounds to block water inflows, planting cover crops (melon) and constructing water channels that ended in distant ditches to control soil erosion and flood. Perception of occasional droughts required them shifting their enterprise and embracing vegetable cultivation along banks of nearby streams.

#### 3.3 Determinants of Decision to Take Formal Insurance Policy by Farmers

Table 3, showed estimates of probit regression analysis on variables hypothesized to influence farmers' decision of taking formal insurance policy to cover their enterprises. The table showed that four out of the seven variables included in the model were statistically significant at different probability levels. The highly significant variables at 1.0% alpha level were years of farming experience, level of formal education of the decision maker, and previous years' farm income. These variables all had positive influence except years of farming experience. This meant that the larger the number of years of formal education acquired by a farmer, and the amount received as previous farm income on an enterprise, the more the farmer decides to take formal insurance to cover the enterprise. These are plausible because both farm income and acquired formal knowledge are cherished motivators that jealously guide an entrepreneur to invest in measures to protect self against inherent losses.

Farming experience having a negative influence on decision to take formal insurance suggests that more experienced farmers employed skills acquired over years to mitigate influence of these hazards and therefore cared less to take formal insurance policy. This observation truly attests to small scale farming intensity that validates their use of cultural measures in providing 'adequate' protection to unforeseeable losses.

Enterprise type was another variable that had a less but positive significant (10.0% alpha level) influence on decision of farmers to taking formal insurance policy for their enterprises. These were categorized into livestock farming, crop farming or mixed farming. The livestock (poultry) farmers tended to cover their flock more than crop farmers. This probably was on grounds of devastating losses associated with diseases and pests of the animals when poorly managed.

Table 2. Natural Hazard(s), Farmers Level of Perception and Mitigation Measures

Natural Hazard	Farmer Hazard Perception						Mitigation Measure(s)		
	Strongly Perceived	Perceived	Not Sure	Did not Perceive	Strongly Did not Perceive	Total Score	Mean	Rank	
Flood	23 (115)	15 (60)	6 (18)	7 (14)	9 (9)	216	3.60	8 <sup>th</sup>	Constructing contiguous earth mounds to block water inflows; Constructing water channels ending in distant ditches.
Drought	19 (95)	21 (84)	7 (21)	8 (16)	5 (5)	221	3.68	7 <sup>th</sup>	Shifted to stream bank vegetable farming;
Soil Erosion	20 (100)	23 (92)	4 (12)	5 (10)	8 (8)	222	3.70	6 <sup>th</sup>	Intercropped with melon as cover crop; Constructing contiguous earth mounds to block water inflows
Fire Outbreak	24 (120)	27 (108)	3 (9)	3 (6)	3 (3)	246	4.10	1 <sup>st</sup>	Slashing the bush ends of the plot to serve as fire break; Burning plant residues in deep evening hours to minimize fire spread through wind effects.
Pests	19 (95)	27 (108)	9 (27)	2 (4)	3 (3)	237	3.95	3 <sup>rd</sup>	Setting traps for mammalian and avian pests; Erecting scare crows with rags to frighten pests.
Enterprise Diseases	20 (100)	25 (100)	9 (27)	3 (6)	3 (3)	236	3.93	4 <sup>th</sup>	Planting disease resistant crop varieties.
Theft	26 (130)	19 (76)	7 (21)	5 (10)	3 (3)	240	4.00	2 <sup>nd</sup>	Keeping closer watch on farms especially when crops have matured; Harvesting all matured crops early.
Ill health	21 (105)	22 (88)	4 (12)	5 (10)	8 (8)	223	3.72	5 <sup>th</sup>	Reporting to health centers when sick; Routine vaccination pregnant women and infants; Taking prescription from patent medicine dealers.

Source : Field survey, 2013. Figures in parentheses are nominal scores while others are the frequencies

Table 3. Probit Regression Estimates of Determinants of Decision to Take Formal Insurance policy

Variables	Estimates	Standard Error	Z-Value
Farming Experience	-0.056	0.025	-2.248***
Level of formal Education	0.655	0.147	4.450***
Enterprise type	0.151	0.089	1.697*
Farm size	0.039	0.084	0.471
Household size	0.049	0.051	0.973
Previous year Income	0.187	0.059	3.175***
Distance to NAIC, and NHIS Office	0.054	0.066	0.414
Intercept	-2.228	0.460	-4.840***
Pseudo Chi Square	110.01***		
df	53		

\*= Significant at 10.0% ; \*\*= Significant at 5.0% ; \*\*\*= Significant at 1.0%



#### 4. Conclusions and Recommendations

Farmers in the study area had perceived and experienced many natural hazards. The most perceived and experienced hazard was fire outbreak and the least perceived was flood. Other hazards perceived and experienced to varying levels were diseases, erosion, ill health, pests attack, droughts and theft of products.

In event of occurrence of these hazards, those knowledgeable with some cultural skills mitigated their effects. Flood was managed by construction of contiguous earth mounds to block water inflows and construction of water channels that ended in distant ditches. Erosion control involved construction of contiguous earth mounds to block water inflows and planting of leguminous cover crops, especially melon. Pests and diseases were controlled with traps and resistant varieties. Farmer's decision to take formal insurance to cover their enterprise was influenced by farmers' level of education, farming experience, previous farm income and enterprise type.

We recommend that government should provide a cushion infrastructure in form of dams to conserve floods and flowing streams to provide water for irrigation and ameliorate effects of occasional droughts and erratic rainfall. Farmers should be encouraged by farm extension agency to take up formal insurance policy from designate companies against losses to their enterprises. Finally, further decentralization of farm formal insurance institution by encouraging establishment of desk officers at level of local governments will encourage farmers to take up formal insurance policy.

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