

*Full Length Research Paper*

# Impact of risk attitudes on poverty level among rural farmers in Ogun State

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This study examined the impact of risk attitudes on poverty level among rural farmers in Ogun state. Data used were generated from a farm survey involving 120 farmers randomly selected using a multi-stage sampling technique. Analytical tools used include descriptive, risk behavioural model (safety-first principle), Foster-Greer-Thorbecke (FGT) model and Probit model. The findings revealed that majority of the responding farmers were male (65.8%). The average age of farmers was 49 and 23 years respectively. The average household size was 6, while educational status was very low, as 47.5% had no formal education, while 33.3% had primary education only. The alarming result was that, not a single farmer insured his farm, while a handful was only aware of the activities of the Nigerian Agricultural Insurance Company (NAIC). FGT analysis showed that 40 and 60% of the farmers were poor and not poor respectively. Majority of the farmers were found to be risk averse as 117 of the 120 farmers fell into this category. Risk attitude or risk aversion has no effect on poverty level of farmers, but a direct relationship between the two was observed. Major sources of farm losses were found to be price fluctuation, pest and disease outbreak, illnesses, erratic rainfall pattern, changes in government policies and theft.

**Key words:** Risk attitude, poverty, rural farmers.

## INTRODUCTION

Rural poverty is a dominant feature of life in all the regions of the world, affecting the lives of nearly one billion people (World Bank, 1975; Dike, 1997). It has also been revealed that the majority of the rural people are engaged in farming. Mosley and Verschoor (2005) convincingly argued that farming is a risky business, especially for small scale farms, which operate in precarious conditions in poor countries. An improved understanding of risk attitude can help in analyzing investment or business alternative as well as making day-to-day decisions. Risk attitude can be divided into three types: 1) risk averse, 2) risk preferring and 3) risk neutral (Bromley and Chavas, 1989). Risk averters or avoiders are characterized with preferences for less risky sources of income or investment, while risk preferring individuals are characterized with preference of more risky business ventures and the risk neutral person is the limiting case between risk averters and risk preferring types.

This person will select the alternative with the highest expected outcome, regardless of the probabilities associated with potential gains or losses. The way of managing risks and the extent to which different types of risks are managed depend on such factors as farmer's degree of risk aversion, cost involved, relative size of a risk, correlation of risk with other forms of risk, other sources of indemnity, farmer's perception of the nature of risk, and farmer's income and wealth (Barry et al., 1995; Hardaker et al., 1997; Harington and Niehaus, 1999). Therefore, the study aimed at evaluating the impact of risk attitudes on the poverty level among rural farmers in Ogun State. The objectives are to determine farmer's risk attitudes, examine the determinants of poverty and determine the poverty line.

## METHODOLOGY

### Study area and sampling procedure

Data for the study were generated from a farm survey of 120 farmers selected by multistage sampling procedure. This sampling procedure was accomplished through the ecological classification

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of the state into four (4) zones (ADP zones) namely; Ilaro, Ijebu-Ode, Abeokuta and Ikenne. The first stage of this multistage sampling procedure was the selection of two representative zones from the existing four ADP zones – Abeokuta and Ikenne.

The second stage was the proportionate selection of block areas from each of the two zones (three blocks each) namely; Ilugun, Opeji and Wasimi (Abeokuta zone), and Obafemi, Someke and Simawa (Ikenne zone). The third stage was a proportionate selection of two cells each representing the villages from the six blocks. The cells were Ilugun and Kila (Ilugun block), Alabata and Sanusi-Opeji (Opeji block), Wasimi and Itori (Wasimi block), Obafemi and Ogunmakin (Obafemi block), Owode and Ofada (Someke block), Simawa and Ogijo (Simawa block). The final stage was the random selection of ten farmers each from the twelve cells (villages).

### Analytical technique

Data collected were analyzed using:

(i) **Descriptive statistics** (that is frequency distribution, percentage and mean) was used on the socioeconomic characteristics of farming households.

(ii) **Risk behavioural model**, which was used to measure risk. Sekar and Ramasamy (2001) have described the principle as one of the best approaches to the measurement of risk. The model is expressed as follow following Shahabuddin et al. (1986) and Sekar and Ramasany (2001):

$$R_i = \frac{E_i^* - E_i}{\sigma} \quad (1)$$

Where,  $R_i$  = risk aversion index;  $E_i^*$  = disaster level of income;  $E_i$  = expected income from the farm;  $\sigma$  = standard deviation of household income;  $i = 1$  to  $n$ ;  $n$  = number of farmers.

$$E_i^* = A_{\min} + C_{ot} - L_{as} - N_{ai} \quad (2)$$

where  $A_{\min}$  = Minimum Consumption

$$\text{Need } A_{\min} = X(F - C/2)$$

where  $X$  = Minimum calories/person (2250 kg/day) (Olayemi, 1998);  $F$  = household size;  $C$  = number of children;  $C_{ot}$  = credit outstanding;  $L_{as}$  = liquid asset + livestock;  $N_{ai}$  = non-farm income.

$$E_i = Q(1 + DMG) - C_i \quad (3)$$

Where  $DMG$  = Weighted crop damage variable;  $C_i$  = Cost of input;  $Q$  = Quantity produced.

A multiple regression model was also estimated using ordinary least square (OLS) method according to Shahabuddin et al. (1986) and Allub (2000).

$$R_i = B_0 + \sum_{i=1}^n B_i X_i + e_i \quad (4)$$

Where  $R_i$  = risk behavioural index;  $B_i$  = vector of unknown parameters;  $X_i$  = vector of explanatory variables;  $e_i$  = error term. Risk behavioural index is given as:

$$1) \text{ Risk aversion holds when } \frac{\partial^2 R}{\partial (Emv)^2} < 0,$$

$$2) \text{ Risk neutrality holds when } \frac{\partial^2 R}{\partial (Emv)^2} = 0 \text{ and}$$

$$3) \text{ Risk preference holds when } \frac{\partial^2 R}{\partial (Emv)^2} > 0$$

where  $R$  is the index and  $Emv$  is the expected monetary value (Joost et al., 2001; Just and Pope, 1978; Isik, 2002).

The independent variable ( $X_i$ ) considered to determine the risk behaviour is as follows:

$X_1$  = Non-farm income (₦);  $X_2$  = Total farm size income (ha);  $X_3$  = Farm income (₦);  $X_4$  = Farm experience (years);  $X_5$  = Age (years);  $X_6$  = Number of cooperative societies ( $D = 1$  if yes, otherwise  $D = 0$ );  $X_7$  = Household size;  $X_8$  = Educational level (years);  $X_9$  = Gender of farmer ( $D = 1$  if male, otherwise  $D = 0$ );  $X_{10}$  = Access to extension services ( $D = 1$  if yes, otherwise  $D = 0$ );  $X_{11}$  = Access to credit facilities ( $D = 1$  if yes, otherwise  $D = 0$ );  $X_{12}$  = Access to use of modern inputs ( $D = 1$  if yes, otherwise  $D = 0$ );  $X_{13}$  = Ownership of cultivated farmland ( $D = 1$  if yes, otherwise  $D = 0$ );  $X_{14}$  = Disposable assets (stored grains, stored tubers, livestock, etc. (₦));  $X_{15}$  = Primary occupation;  $X_{16}$  = Secondary occupation;  $X_{17}$  = Land acquisition method;  $R_i$  = Risk aversion index.

(iii) **The Probit model:** It was used to determine the impact of the explanatory variables on the dependent variable that is the impact of risk attitudes on the probability of being poor. The model is expressed as follows:

$$R_i = B_i + B_2 X_1 + U_i \quad (5)$$

Where  $R_i$  = Risk aversion index; if  $R_i < 0$  = Risk neutral if  $R_i = 0$  = Risk preference if  $R_i > 0$ ;  $B$  = Vector of unknown coefficient;  $X_1$  = Vector of explanatory variables;  $U_i$  = Error term.

(iv) **Measure of poverty line:** Foster et al. (1984) was used in the assessment of poverty in the study area. The FGT measure is given as:

$$P\alpha = \frac{1}{n} \sum_{i=1}^q \frac{[Z - Y_i]^\alpha}{Z} \quad (6)$$

Where  $P\alpha$  = Weighted poverty index;  $n$  = Total number of households;  $q$  = Number of households;  $Y$  = Per capita expenditure of household;  $Z$  = Poverty line; when  $\alpha = 0, 1$  or  $2$ ,  $P_0 = q/n$ .

For greater policy relevance on how the poor live and the economic environment in which they operate, the FGT model is used to determine the incidence, depth and severity of poverty. Poverty incidence is the fraction of the population that falls below the poverty line. Poverty depth is the extent to which the income of the poor lies below the poverty line. Poverty severity however, describes the distribution of those below the poverty line.

## RESULTS AND DISCUSSION

The distribution of the socioeconomic characteristics of the farming households is shown in Table 1. The result indicates that 79 (65.8%) of the responding farmers are males, while 41 (34.2%) are females. The modal age of the farmers is between 41 and 50 years as 35 (29.2%)

**Table 1.** Socioeconomic characteristics of farmers (n = 120).

<b>Socioeconomic characteristics</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Sex</b>		
Male	79	65.8
Female	41	34.2
<b>Age</b>		
21 – 30	15	12.5
31 – 40	26	21.7
41 – 50	35	29.2
51 – 60	18	15.0
> 60	26	21.7
<b>Marital status</b>		
Single	0	0
Married	120	100
<b>Household size</b>		
1 – 3	27	22.5
4 – 6	51	42.5
7 – 9	28	23.3
> 10	14	11.7
<b>Educational level</b>		
No response	2	1.7
Primary	40	33.3
Secondary	17	14.2
Tertiary	4	3.3
No formal education	57	47.5
<b>Land acquisition</b>		
Tenancy	21	17.5
Lease hold	5	4.2
Purchase	9	7.5
Inherited	70	58.3
Gift	10	8.3
Borrowed	5	4.2
<b>Farm size (ha)</b>		
0 – 0.4	32	26.7
0.4 – 0.8	29	24.2
0.8 – 1.2	6	5.0
1.2 – 1.6	22	18.3
1.6 – 2.0	9	7.5
> 2.0	22	18.3
<b>Occupation</b>		
Farming	105	87.5
Non-farming	15	12.5
<b>Farming experience (year)</b>		
1 – 10	28	23.3
11 – 20	28	23.3

**Table 1.** Contd.

21 – 30	19	15.8
31 – 40	6	5.0
> 40	39	32.5
<b>Awareness of NAIC</b>		
Yes	12	10.0
No	108	90.0

Source: Field survey (2009).

**Table 2.** Farmer's risk attitude.

<b>Risk attitude</b>	<b>Frequency</b>	<b>Percentage</b>
Risk averse	117	97.5
Risk preference	3	2.5
Risk neutral	0	0
Total	120	100

Source: Field survey (2009).

belong to this group. All the respondents interviewed were married. The highest household size recorded in the study is between 4 and 6 members representing 42.5% of the farmers. Also, 40 (33%) farmers had primary education, while 57 (47.5%) respondents had no formal education.

On land acquisition, about 70 (58.3%) of the respondents inherited their land. The farm size cultivated by the respondents fall between 0 to 0.4 ha size representing 32 (26.7%) respondents, which shows that the farmers are operating on small scale production – a total of 74.2% cultivate not more than 1.6 ha. The small hectareage usually cultivated by farmers makes it imperative for them to have other sources of income, especially non-farm sources to complement the meager income they get from farming. The result shows that 87.5% of the respondents take farming as their primary occupation, while 15 (12.5%) were those involved in non-farming activities. In terms of farming experience, the result reveals that 76.6% of the farmers have farm experience of 11 years and above. Out of all the respondents, 102 (90%) are not aware of the existence of the Nigeria Agricultural Insurance Company (NAIC), while 12 farmers (10%) are aware of the company. However, none of the respondents had a farm insurance policy; this might be due to the small size production (Table 1).

Table 2 shows the result of the risk behavioural model (safety first principle). Out of the 120 farmers, 117 (97.5%) are risk averse, while 2.5% have preference for risk. None of the respondents are neutral. The high proportion of farmer's risk aversion follows findings by Binswanger and Silless (1983) where they reported

evidence that poor peasant farmers are risk averse.

Table 3 shows the result of the Probit model used on the farmer's risk attitude ( $R_i$ ) on the determinant of poverty. It reveals that  $R_i$  does not affect the poverty status due to the non-significance of the aversion index in the Probit model used; however, it has a positive coefficient of 0.00099 showing a positive relationship to poverty or probability of being poor. This result is supported by the findings in a study carried by Booij and van de Kuilen (2006) and Dohemen et al. (2005). This means that the higher farmer's aversion to risk, the higher the probability of being poor. Only three (3) out of the 120 responding farmers are risk preferers, while others are risk averse (Table 2). The reason in addition to the fact that majority of the farmers are risk averse may explain the non significance of the risk attitude (risk aversion).

Table 4 presents the summary of the farmer's perception of sources of losses in the years 2005, 2006, 2007 and 2008 respectively. As implied from Table 4, little variation exists across the years so an average percentage is used. the result shows that about 96.3% of the farmers perceived price fluctuation of farm produce over the 4 years processes, about 95.3% reported the incidence of pests and diseases, 94% reported their losses due to illness, 94% also reported that climatic condition contributes to their losses. Almost 77% perceived theft as their sources of losses. Figure 1 presents the management strategies, which include preventive, mitigation and coping strategies showed that very few farmers use preventive strategies against risk as only 10.8% used fertilizer to guard against loss or risk,

**Table 3.** Regression analysis of determinants of poverty.

Variable	Coefficient	Standard error	t-statistic	Prob.
X <sub>1</sub>	-7.27×10 <sup>-6</sup>	4.26 × 10 <sup>-6</sup>	-1.70732	0.0878
X <sub>2</sub>	-0.07264	0.033671	-2.157281	0.031**
X <sub>3</sub>	5.62 × 10 <sup>-6</sup>	4.33 × 10 <sup>-6</sup>	1.295605	0.1951
X <sub>4</sub>	0.006876	0.012826	0.536082	0.5919
X <sub>5</sub>	-0.0317	0.017562	-1.805046	0.0711**
X <sub>6</sub>	0.131695	0.356815	0.369084	0.7121
X <sub>7</sub>	0.221458	0.052948	4.182531	0.000***
X <sub>8</sub>	0.160996	0.133899	1.20237	0.2292
X <sub>9</sub>	0.269425	0.458325	0.587848	0.5566
X <sub>10</sub>	-0.39749	0.400314	-0.992953	0.3207*
X <sub>11</sub>	-0.1267	0.207061	-0.611874	0.5406
X <sub>12</sub>	-0.90579	0.488437	-1.854458	0.0637
X <sub>13</sub>	0.184627	0.45774	0.403344	0.6867
X <sub>14</sub>	-1.27 × 10 <sup>-5</sup>	7.29 × 10 <sup>-6</sup>	-1.737584	0.823**
X <sub>15</sub>	0.36057	0.206566	1.745541	0.0809*
X <sub>16</sub>	0.091867	0.151916	0.604719	0.5454
X <sub>17</sub>	0.129561	0.120515	1.075054	0.2824
R <sub>i</sub>	9.90 × 10 <sup>-5</sup>	9.99 × 10 <sup>-5</sup>	0.990495	0.3219

Source: Data analysis (2009); \*\*\* = significant at 1%; \*\* = significant at 5%; \* = significant at 10%.

**Table 4.** Perception of sources of losses.

Sources of losses	2005		2006		2007		2008		Average	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Flood	6	5	8	6.7	8	6.7	7	5.8	7.3	6.1
Pest and disease	113	94.2	113	94.3	118	98.3	113	94.2	114.3	95.3
Fire outbreak	19	15.8	18	15.0	17	14.2	18	15.0	18	15.0
Market failure	5	4.2	8	6.7	5	4.2	7	5.8	6.3	5.3
Price fluctuation / changes	115	95.8	118	98.3	114	95.0	115	95.8	115.5	96.3
Erratic rainfall	111	92.5	115	95.8	113	94.2	112	93.3	112.8	94.0
Drought	14	11.7	10	8.3	15	12.5	14	11.7	13.3	11.1
Changes in government policy	95	79.2	78	6.5	92	76.7	94	78.3	89.8	74.8
Illness	111	92.5	112	93.3	115	95.8	114	95.0	113	94.2
Loss of land	10	8.3	8	6.7	8	6.7	9	7.5	8.8	7.3
Theft	93	77.5	90	75.0	93	77.5	95	79.2	92.8	77.3

Source: Field survey (2009).

3.3% use the outcome of extension services and 0.8% use irrigation to prevent loss or risk. In the coping strategies employed by the farmers, about 83.3% are engaged in off-farm work, 37.5% borrow from friends and relatives, while 32.5 and 28.3% reduce consumption and withdrawal of children from schools respectively. In mitigation strategy, about 93.3% of the farmers practice mixed farming, while 48.3% use local storage methods.

The poverty status of farmers using the two-third mean per capita household expenditure gave a poverty line of N 2,411. Also, the result of FGT analysis gave a poverty

incidence ( $P_0$ ) of 0.4. This signifies that 40% of the farmers fell below the poverty line. The poverty depth ( $P_1$ ) was 0.811, which means that the income of the poor was 11.8% below the poverty line. Poverty severity was 0.0510 and this described the distribution of those below the poverty line.

## Conclusion

The results show that majority of the farmers are risk

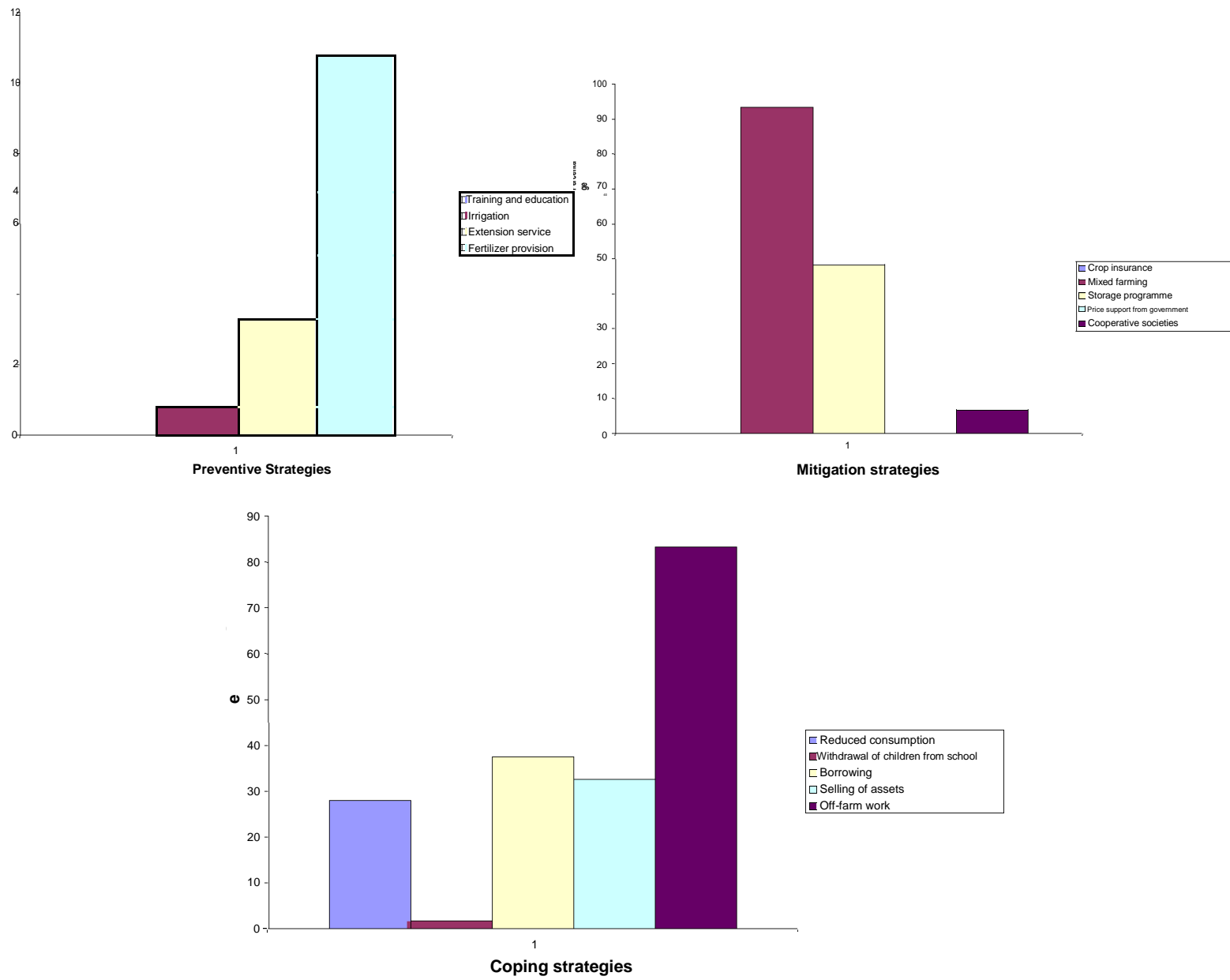


Figure 1. Farmer's risk management strategies.

averse (47.5%), so a little more than half the population are not poor. The result of the FGT poverty analysis showed that 40 and 60% of the farmers were poor and non-poor respectively. Majority of the farmers did not use preventive strategies against risk. Training facilities through extension services should be encouraged. Massive awareness and full functional services should be provided by the Nigeria Agricultural Insurance Company (NAIC).

### Policy implication

Risk attitude in relation to poverty level among farmers can be changed by providing storage facilities and quality of disposable assets such as tubers and grains can be increased substantially; thus, raising the farmer's ability to adjust to shock or risk. Education and extension facilities should be encouraged and provided in order to help widen the knowledge of farmers in adopting new innovations.

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