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Risk Coping Behaviour of Small Scale Poultry Farmers in Ogun State, Nigeria

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ABSTRACT

Poultry farmers in Nigeria are faced with diverse forms of risks. In the absence of any form of insurance and the almost inexistent credit markets, households have devised strategies to at least mitigate the effect of these risks on their livelihoods. This study analyzed the risk-coping strategies and potential of 116 small scale poultry farmers in Ogun State. The analytical techniques used included descriptive statistics, Mean Absolute Deviation (MAD) and the Ordinary Least Square (OLS) regression model. Results revealed that the major idiosyncratic risks faced by the farmers were death of birds, high costs of inputs and low poultry production. On the other hand, the major types of covariate risks faced by the poultry farmers include outbreak of diseases, rainfall shocks and hard economic times. Coping methods that were mostly used included drawing from personal savings, rearing of resistant breeds and restocking of birds. Econometric analysis revealed that factors such as number of years of formal education of the household head, initial capital outlay and proportion of non-farm to the total monthly income had positive impacts on the risk-coping potentials of the poultry farmers. The negative impacts of factors such as household size on the potential of the poultry farmers to cope with risks were also noted. Thus, the risk behavior of farmers and the factors influencing such behavior should be considered in the design and development of effective programs for the farmers.

Key words: Risk-coping, poultry, farmers, Nigeria

INTRODUCTION

In developing countries, among many other challenges, individuals, especially those who are resident in the rural areas survive on low incomes under high levels of uncertainty. This is as a result of low returns from farming which is the major source of their livelihood. Specifically, approximately 70% of the workers in low income countries are employed in the agricultural sector, thereby exhibiting higher vulnerability to risky and uncertain situations (World Bank, 2004). These factors range from climatic variability, crop yield failure, input price variability, incidences of pests and diseases, environmental degradation, pollution from industrial sites, oil spillage, insecurity, among others. These factors make small-scale farmers inadequately equipped against risks and uncertainties (Ayinde, 2008) with likely decline in their consumption expenditures. Coping strategies are also adopted by households in order to mitigate the impacts of the risks and uncertainties. It is assumed that the behavior of households would vary depending on whether

or not they have access to measures to cope with emergencies. That is, accessibility of risk-coping measures constitutes a critical constraint for household strategy and possibly serves as key determinant of whether the maintenance or increase of the standard of living will be adopted as the objective of household strategy or not (Vigh, 2008). However, the gravity of losses recorded from risk exposure by farmers is also a function of the nature of the enterprise. Precisely, livestock is perceived as the most risky enterprise and investors always exercise a lot of caution in the integration of such in the sensitivity analysis of the entire project's feasibility.

About 70% of the world's rural poor depends on livestock as a viable and active component of their livelihoods (FAO, 2002). Majority of livestock farmers are also into poultry (Epprecht *et al.,* 2007). Among the rural poor, poultry is a crucial means of livelihood which sometimes serves for augmenting households' protein consumption and sources of income in times of financial distress (Maltsoglou and Rapsomanikis, 2005; Roland-Holst *et al.,* 2007). This is owing to the fact that earnings from poultry production, for instance through sale of eggs or birds, can be tapped into fairly quickly to meet household needs in the event of a shock (Obi *et al.,* 2008). In addition, poultry contributes to household nutrition, as many rural poor households rely on their own poultry production to supply the majority of their animal source of protein and essential micronutrients. These micronutrients are vital for child nourishment especially in rural areas of developing countries where chronic malnutrition and micronutrient deficiencies are very high (Iannotti *et al.,* 2008).

In Nigeria, production activities of poultry farmers are characterized by high level of risks. These include high costs of inputs and veterinary services which reduces productivity and net returns from the investment. In some cases, outbreak of diseases could wipe out the entire population of birds in a poultry leading to the death of the business enterprise itself. Further, theft of birds and market glut could force the farmers to sell off their products below production costs. This leads to reduction in profit, limited access to formal financial systems for credit and insurance, negligible capital investment and low savings (Oparinde, 2008) among others. Also, many of the existing poultry farms are folding up and prospective investors are becoming increasingly reluctant to invest due to the associated production risks and uncertainties. These uninsured risks threaten the livelihood and existence of the farmers as they seem to have adverse long term welfare consequences. In other words, the persistence of these risks in many cases could result to a decline in consumption below subsistence levels. This in turn, has negative implications for the nutrition, health, schooling and other human and physical assets which have prospects as income sources (Baez, 2006).

It should be emphasized that many poultry farmers in Nigeria are less equipped to mitigate risks associated with consumption, income, assets and their health. This could lead to eventual collapse of the poultry industry if intensive and collaborative efforts are not made by all stakeholders to salvage the situation. In particular, the failure to rise up to the challenge of saving the industry could lead to a serious reduction in poultry production and protein intake of people. This results into malnutrition and ill health, lower productivity and output (Bamiro *et al.,* 2009) and consequently lower level of welfare of the farmers. This situation therefore justifies the need for a thorough assessment of existing risk coping strategies of the poultry farmers. Also, an understanding of how the farmers are affected and react to these risks will in due course aid in the design of improved risk management strategies.

In Nigeria, the various Government policies and programmes have not encouraged farming households to help themselves. This is because a top-bottom approach is usually adopted. However, the outcome of these programmes depends to a large extent on the risk behaviour of the small-scale rural farmers. More so, farmers react to policy incentives when allocating resources especially when

faced with shocks from uncertainties under the safety first principle (Sekar and Ramasamy, 2001). Consequently, for sustainable and beneficial development, efforts must be geared towards an understanding of the disparities in difficulties faced by various farmers as well as their efforts at minimizing risks and coping with crisis. Thus, this study will not only assist in identifying the various risks faced by these farmers but would also provide an empirical basis on how poultry farmers adapt to risks and factors that affect their decision to manage risks. In addition, this study will contribute to scarce literature on risk coping behavior and potential of poultry farmers in Nigeria. In the remaining parts of the paper, the materials and methods, results and discussion and conclusion from the study are presented.

MATERIALS AND METHODS

Ogun State is bounded to the North by Oyo and Osun States, to the South by Lagos State and the Atlantic Ocean, to the East by Ondo State and by the Republic of Benin to the West. The State lies within 6.2 and 7.8°N and longitude of 3 and 5°E. It has a total land mass of 16, 762 sq. km and a total estimated population of 4, 054,272 with a density of 139.5 sq^{-1} km (NPC, 2006). The average annual maximum and minimum temperature is 23 and 32°C with a mean annual rainfall of 128 cm in the southern part of the state and 105 cm in the northern part. The vegetation of the state is divided into three: Derived Savanna in the northern part of the State, forest belt in the central region and mangrove swamp in the southern part of the state. The main occupation in the state is agriculture and major crops grown in the area include maize, yam, cassava, cocoyam, kolanut and oil palm while major livestock raised include poultry, pigs sheep and goat.

Primary data used in this study were obtained from 116 representative poultry farming households employing a multi-stage sampling procedure. The first stage was the random selection of one state out of the six states that make up South-West Nigeria. The second stage involved the random selection of one local government in each of the senatorial districts of Ogun State. In the third stage, wards were selected from each local government based on probability sampling proportionate to size of the wards in the LGA while the fourth stage involved the selection of poultry farming households based on probability sampling proportionate to size of poultry farming households in each ward. Hence, a random sample of 55 respondents were selected from 5 wards in Ado-odo/ota LGA, 32 respondents from 4 wards in Odeda LGA and 33 from 3 wards in Ijebu East LGA. In all, 120 poultry farmers were selected but only 116 gave complete questionnaire information. These farmers constituted the sample size that was used in this study.

Factors explaining risk coping ability: Indices of poultry farmers' risk coping ability were constructed with MAD and these were further subjected to Ordinary Least Square (OLS) regression. The model apart from giving the quantitative relationships between the variables and the risk coefficients will also identify the variables' order of importance and their contributions to the risk levels. The regression model is specified as follows based on previous studies (Allub, 2000; Sekar and Ramasamy, 2001; Ayinde, 2008):

$$D = f (X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}, X_{13}, X_{14,} X_{15,} U) \tag{1}$$

where, D is Risk coefficients of farm plan. This is the estimated deviation of the individual farm's plan with Eq. 3.

The Mean Absolute Deviation (MAD) or D for an activity (j) and for the whole farm over all states of nature (years) is estimated, respectively as follows:

$$D_j = S^{-1} \sum_{j=1}^{k} (C_{rj} - C_j) X_j \qquad (2)$$

$$D = \frac{\sum_{j=1}^{k} D_j}{n} \qquad (3)$$

Where:

C_j = Expected returns of activity j
X_j = Level of activity j
C_{rj} = Returns of activity j for state of nature or rj observation r (N)
S = Number of states of nature
    The independent variables include:

- X_1 = Age
- X_2 = Marital Status (married = 1, 0 if otherwise)
- X_3 = Household size
- X_4 = Years of formal education of the poultry farmer
- X_5 = Number of family members earning income
- X_6 = Access to veterinary services by the poultry farmer (1 = Yes, 0 if otherwise)
- X_7 = Years of experience in poultry production of the poultry farmer
- X_8 = Available area of poultry house in hectares
- X_9 = Proportion of poultry house to total available landed area by the poultry farmer
- X_{10} = Proportion of non-farm income to total income of the poultry farmer
- X_{11} = Membership of a cooperative group by the poultry farmer (1 = Yes, 0 if otherwise)
- X_{12} = Amount of capital obtained in naira
- X_{13} = Type of poultry management practiced (intensive = 1,0 if otherwise)
- X_{14} = Risk Preferring (Yes = 1, 0 if otherwise)
- X_{15} = Risk Averse (Yes = 1, 0 if otherwise)

RESULTS AND DISCUSSION

Socio-economic characteristics of respondents: Majority of the respondents were males (62.9%) between the ages of 25-59 and married and 5.47±4.04, respectively. About 99% of the respondents had formal education while less than 1% had no formal education. This could be attributed to the fact that poultry production requires some form of technical knowledge which necessitates the acquisition of formal education. With respect to occupational analysis, most of the households were engaged in farming as their primary occupation while about three quarters (74.1%) of the respondents have less than 10 years of experience in poultry farming. The average number of years of experience in poultry farming stood at 6.8±3.94 years. Implying that majority of the respondents are relatively new entrants into the poultry industry. While most of the respondents (64.7%) are members of one cooperative society or the other, almost all the respondents (94%) have access to veterinary services. This could be owing to the fact that poultry birds are highly susceptible to disease-causing pathogens such as rodents and insects that may wipe out the entire farm. More than two-fifths (43.1%) of the respondents had farm sizes of less than 0.1 ha with average farm size of 0.41±0.79 ha. Almost three-quarters (74.1%) of the

respondents practice intensive system of poultry management while capital is sourced by respondents mainly from informal sources. This could be due to the ease of obtaining loans, low interest rates and other benefits from such informal institutions. The risk behavior of farmers is an indication of how farmers are able to cope with risks. These behaviors differ from one farmer to another. Result shows that, more than half (54.3%) of the respondents are risk averse as expected, 33.3% of them are risk preferring while only 11.4% of the respondents are neutral to risk-taking. The risk behavior of the individual farmers could be attributed to the nature of the business involved a s most of the farmers expressed that poultry farming is a very risky business. The socio-economic characteristics of the respondents are presented in Table 1.

Table 1: Socio-economic characteristics of the respondents

Variable	Frequency	Percentage
Geuder		
Male	43	37.1
Female	73	62.9
Age		
≤30 years	15	12.9
31-50 years	74	63.8
51-60 years	25	21.6
≥61 years	2	1.7
Marital status		
Single	12	10.3
Married	89	76.7
Divorced	2	1.7
Widowed	13	11.2
Household size		
1-5	77	66.4
6-10	36	31.0
>10	3	2.7
Educatioual status		
No formal	1	0.9
Primary	11	9.5
Post-primary	104	89.7
Primary occupatiou		
Farming	42	36.2
Trading	28	24.1
Govt. Salaried job	32	27.6
Artisan	14	12.0
Years of experieuce		
0-4	37	31.9
5-9	49	42.2
>9	30	25.9
Membership of coop		
Yes	75	64.7
No	41	35.3
Access to Vet. services		
Yes	109	94.0
No	7	6.0
Farm size (ha)		
<0.1	50	43.1
0.1-0.5	46	39.7
>0.5	20	17.2

Table 1: Continue

Variable	Frequency	Percentage
Management system		
Extensive	7	6.0
Semi-intensive	23	19.8
Intensive	86	74.1
Source of capital		
Formal institutions	30	25.9
Informal institutions	71	61.3
Both sources	15	13.0
Risk behaviour		
Risk preferer	40	34.5
Risk neutral	13	11.2
Risk averse	63	54.3
Total	116	100.0

Field survey (2011)

Table 2: Idiosyncratic and covariate risks encountered by respondents

Idiosyncratic Risks	Frequency	Percentage
Income risks		
High costs of inputs	104	89.7
Rednction in profit	69	59.5
Loss of employment	9	10.8
Low poultry production	89	76.7
Asset risks		
Theft	79	68.1
Death of birds	112	96.6
Breakdown of equipments	17	14.7
Loss of eggs	90	77.6
Lack of credit	56	48.3
Accident	11	9.5
Fire outbreak	3	2.6
Health risks		
Consumption of hatchery waste	10	8.6
Ill-health	29	25.0
Covariate risks		
Outbreak of diseases	108	93.1
Flood	19	16.4
Hard economic times	64	55.2
Policy changes	39	33.6
Rainfall shock	72	62.1
Labour shortage	48	41.4

Field survey (2011)

Major risks encountered in poultry farming: This section examines the most and the least reported risks encountered by poultry farmers in the study area. These risks are classified into idiosyncratic (individual risks that affect only a particular individual in the community) and covariate risks (common risks that affect all members of a community or region). Idiosyncratic risks experienced by the farmers in this study were further classified into three namely: Income risks, asset risks and health risks.

Table 2 reveals the major types of income risks faced by respondents as high cost of inputs (89.7%), low poultry production (76.7%) and reduction in profit while loss of employment was the least reported income risks faced by respondents in the study area. With respect to asset risks, the major asset risks faced by the respondents were mortality of the birds (96.6%), followed by loss of eggs (77.6%) and theft of both birds and eggs (68.1%). However, the least reported asset risk in the study area was fire outbreak (2.6%). Results also revealed the major health risk reported in the study area as ill-health (25.0%) followed by consumption of hatchery wastes (8.6%). This is as a result of the fact that ill-health affects the productivity of the farmer and consequently leads to reduction in profit of the farmer. In times of low production due to factors such as heat stress in birds and disease outbreaks, farmers in a bid to maintain profit reduce the amount available for family consumption. This in turn leads to reduction in the family protein intake and consumption of hatchery wastes which are poultry products such as cracked eggs and dead birds. These hatchery wastes have been found to be harmful to humans as they are sources of or breeding grounds for infectious diseases.

The major covariate risks which respondents were exposed to also presented in Table 2 include outbreak of diseases (93.1%), hard economic times (55.2%) and rainfall shocks (62.1%). In the event of outbreak of diseases, birds easily spread these diseases through the feed they consume, water, biological agents and the air. This could lead to a massive spread of epidemic diseases which could eventually wipe out the whole farm. The hard economic times experienced by the respondents could be attributed to the recent global economic crises. On the other hand, the least reported covariate risk experienced by the farmers was flooding. This was reported by only 16.4% of the respondents.

Risk-coping strategies adopted by poultry farmers: The major types of coping mechanisms adopted by respondents as shown in Table 3 were personal savings (83.6%), rearing of resistant breeds (78.4%), restocking (69.8%), diversification into off-farm activities (60.3%), informal borrowing (43.1%) and a change to rearing of other livestock (38.8%). On the other hand, the least reported coping strategies by the respondents include changing to intake of plant protein (6.9%), help from religious/charitable organizations (2.6%), petty trading (18.1%) and insurance adopted by only 20.7% of the respondents.

Table 3: Major risk coping strategies adopted by the farmers

Coping strategy	Frequency	Percentage
Personal savings	97	83.6
Rearing of resistant breeds	91	78.4
Restocking	81	69.8
Change to rearing of other livestock	45	38.8
Diversification into off-farm activities	70	60.3
Informal borrowing	50	43.1
Formal borrowing	26	22.4
Reduction in poultry production	26	22.4
Insurance	24	20.7
Petty trading	21	18.1
Change to intake of plant protein	8	6.9
Help from religious or charitable organization	3	2.6

Field survey (2011)

Table 4: Determinants of risk coping behaviour of poultry farmers

Variables	Coefficient	t-value
Gender	0.063	0.14
Married	0.199	0.39
Household size	-0.239	-2.21**
Years of formal education	0.526	1.83*
No. of household members earning income	0.266	1.96
Access to Vet. services	-0.591	0.64
Years of experience in poultry farming	0.373	6.36
Proportion of poultry house to total farm area	-0.889	-1.28
Proportion of non-farm income to total income	1.067	3.84***
Membership of cooperative	-0.489	-1.07
Amount of capital	4.4e-08	2.02**
Poultry management (semi-inteusive)	-0.458	-0.42
Poultry management (inteusive)	0.462	0.47
Risk behaviour (risk neutral)	-0.219	-0.03
Risk behavior(risk averse)	0.462	0.97
Coustant	15.337	7.82***

***Significant at 1 **at 5, * at 10%, No. of observation = 116, F (15 , 97) = 7.78, Prob > F = 0.000, R^2 = 0.746, Adjusted R^2 = 0.676, Root MSE = 2.129

Factors influencing the risk coping behaviour of poultry farmers: Table 4 presents the results of the analysis of Ordinary Least Square regression model (exponential function) for the factors influencing the risk coping behavior of poultry farmers in Ogun State. The adjusted R^2 value of 0.676 is an indication that the model is well fitted. The table reveals that the factors influencing the risk coping behavior of poultry farmers in Ogun state are; household size, proportion of non-farm income to total farm income, years of formal education, number of household members earning income, years of experience in poultry farming and initial capital outlay.

The negative coefficient of household size indicates that an additional member to the household will reduce the poultry farmers' ability to take risk. This could be attributed to the fact that large sized households have higher consumption needs. Thus, given other constraints, the lower will be the willingness of the poultry farmer to take risk. This is consistent with Sekar and Ramasamy (2001) model for risk and resource analysis of rainfed tanks in South India as well as the findings of Ayinde (2008) on the effects of socioeconomic factors on risk behaviors' of arable farmers in Kwara state.

The proportion of non-farm income to the total income of the poultry farmers was significant at 1% and had a positive impact on the risk-coping potential of the poultry farmers. This indicates that the higher the proportion of non-farm income to total income of the poultry farmers, the higher the ability of the farmers to cope with risks. This is expected as non-farm income is used to augment farm income for meeting the subsistence needs of the farmer and farm family.

With respect to education, the positive coefficient of years of formal education implies a positive impact on the risk ability of the poultry farmers. In other words, the more the number of years of formal education of the poultry farmer, the higher the farmers ability to take risks. This could be attributed to the fact that formal education increases the opportunity of high returns to labour and has an indirect role of improving skill. Consequently it can lead to increase in productivity, household income and welfare. This finding corroborates the findings of Oluwatayo (2004).

Likewise, the positive coefficient of number of household members earning income indicates that an additional household member that earns income will increase the poultry farmers' potential to cope with risks. This could be attributed to the fact that the income of the working member of the household would augment household income in the event of risk. This result however, contradicts the findings of Ayinde (2008) in which the number of household members earning income was found to have a negative effect on the risk behavior of arable farmers.

The number of years of experience in poultry farming was positive and significant. This implies that a year increase in the number of years of experience in poultry farming will increase the farmers' potential to cope with risk. This is as expected since poultry farmers with longer years of experience are expected to have been familiar with the rudiments as well as the technicalities involved in poultry management.

The positive coefficient of initial capital outlay implies that the higher the initial capital outlay, the higher the farmers' potential in taking risks. The high initial capital outlay could arise from additional measures to guard against risks such as regular vaccination of birds. However, this result contradicts Sekar and Ramasamy (2001) safety first model which gives a negative effect of amount of capital on the risk potential of rain-fed farmers.

From the above it is clear that factors such as years of formal education of household head and amount of initial capital outlay increased the ability of poultry farmers to take risks. On the other hand, household size reduced the poultry farmers' ability to take risk in the study area.

CONCLUSION

Households respond to risk differently and this is dependent on the type and level of risks exposed to and the ability to cope with these risks. The behavioral response of farmers to risk could constitute a big threat to the rural economy and make rural households fall back or deeper into poverty as a consequence of the risk management decisions made. Also, the effect of risk on the behavior of farmers is a key issue in development as it underlies the possibilities of small farming households for growth. This study has revealed the various types of risks the farmers are exposed to, their response to the risks and the significant factors influencing the risk coping behavior of poultry farmers. Based on the findings of this study, the study recommends the following:

- **Awareness on benefits of small family size:** Since household size was found to have a negative effect on the farmers' ability to take risk, government should therefore intensify efforts in implementing programmes like family planning programmes which would encourage smaller household size
- **Access to credit facilities:** Amount of initial capital outlay was found to affect the poultry farmers' ability to cope with risks positively. Hence, there should be increased access to credit facilities to enable the farmers increase their initial capital outlay
- **Diversification of livelihood activities:** Farmers should be encouraged to diversify their livelihood activities by engaging in non-farming activities in order to augment farm family income since an increase in the proportion of non farm income to total income had a positive effect on farmers' potential to take risks
- **Improvement in level of education:** Since years of formal education had a positive effect on farmers' ability to take risks. It is envisaged that encouraging farmers to acquire higher level of education would increase farmers' ability to cope with risks

In sum, the risk behavior of farmers and the factors influencing such behavior should be taken into account in the design and development of policies and programmes for the farmers.

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