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Managing Farm Risk: Issues and Strategies in Small Scale Poultry Farmers in Osun State, Nigeria

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Abstract

The Nigeria poultry industry faces a lot of losses and high level of risks. The study described the socio-economic characteristics of small scale poultry farmers and farms, identified and examined the risk faced, risks coping methods and determined the effects of farmers' socio-economic and farm characteristics on the risk coping methods employed with a view to investigating the factors that determine the choice of risk coping methods used by small scale poultry farmers in Osun State. Multi-stage sampling technique was used to select nine small scale poultry farmers from two communities from each of the ten Local Government Areas on the predominance of small scale poultry farmers to give a total of 180 respondents for the study. Data on farmers' socioeconomic characteristics, various risks faced and risk coping methods were collected and analyzed using descriptive statistics and multinomial logit (MNL) model. The results revealed that the enterprise was dominated by male (64.4%) with the average age of 41.59 years. Majority was married (84.4%), had tertiary education (58.3%) with small household size, mean years of experience (8.16 years) and mean farm size of 1779.9 m^2. Majority (85%) of the respondents did not have the opportunity of accessing credit and few of the respondents were engaged in off farm activities. The risk faced by poultry farmers were disease outbreak (72.2%), death of birds (60.6%), rainfall shock (25%), inadequate market (22.8%) and high cost of inputs while the risk coping methods adopted were veterinary service (83.9%), money from personal savings (67.2%), fresh clean pure water and high quality feed (43.9%), improved hygiene (28.9%) and cooperative support (17.2%). The result of the MNL model revealed that age, farm size, capital outlay, household size and poultry medication had significant relationship with the choice of risk coping methods used by the farmers. The study concluded that the farmers were able to reduce the risk faced in poultry production by improving their level of hygiene, supply of fresh clean pure water and high feed quality.

Keywords: Farm risks; Poultry farmers; Coping strategies; Osun State

Introduction

In Nigeria, the livestock sector is a source of animal protein and employment for a greater proportion of the population [1]. There is a rise in demand for animal products which is due to improvements in personal income, population growth and increasing urbanization [2]. Therefore improvement in livestock production systems in Nigeria is essential [3]. Integrating livestock enterprise by farm manager in the sensitivity analysis of any project's feasibility need careful consideration because livestock is seeing as the most risky enterprise [4]. High costs of inputs, low veterinary services, theft of birds and market glut reduces productivity and net returns from poultry investment which leads to reduction in profit, and eventually low savings among others make poultry production to be a risky business venture [5]. As a result of aforementioned production risks and uncertainties, many of the existing poultry farms are folding up and prospective investors are reluctant to invest. These will lead to hike in price and could result to a decline in consumption of protein dietary. This in turn, has negative implications for the nutrition, health, schooling and other human and physical assets which have prospects as income sources [6]. Many poultry farmers in Nigeria are less equipped to mitigate risks. This is particularly burdensome to small and medium-scale farmers in the developing countries [7]. This could lead to eventual collapse of the poultry industry if collaborative efforts are not made, it will lead to reduction in poultry production and protein intake of people. This results into malnutrition and ill health, lower productivity and output [8] and consequently lower level of welfare of the farmer. There is therefore the need for concerted efforts to save the poultry industry from total collapse. The risk involved in poultry business needs to be addressed to be able to manage and increase the productivity of the sector to meet the demand for the products. Poultry farmers in Osun State are not an exception to the problem posed by risk in poultry farming. Hence, this study identified these various risks faced by farmers and boosts the confidence level of investors and prospective farmers seeking to understand the various risk coping methods used in the study area. Such current information is useful for policy maker on the poultry sector which is non-existence in Osun State. An understanding of how it affects farmers and their opinion on these risks will assist in proffer improved risk management and coping methods needed. This study therefore seeks to provide answers to the following research questions; what are the socio economic characteristics of small scale poultry farmers in Osun State? What are the various types of risk faced and the risk coping methods used by respondents? What are the farmers' socio-economic and farm characteristics that influence the choice of risk coping methods used by respondents? The main objectives of the study are to describe the socio-economic characteristics of small scale poultry farmers and farms in Osun State; identify and examine the risk coping methods used by small scale poultry farmers in the state; determine the effect of farmers' socio-economic and farm characteristics on the risk coping methods by poultry farmers in the study area.

Research Methodology

Osun State is the study area. It lies within longitude 2.75° and 6.75° Greenwich meridian and latitude 7° and 9° [9]. The average annual rainfall ranges from 1,105 mm in derived savanna to 1,475 mm in the rainforest belt. The mean annual temperature ranges from 27.3°C in the month of June to 39°C in December. The state is divided into three agro ecological zones namely Ife/Ijesha, Iwo and Osogbo with the population of 3.4 million [10]. The people are predominantly peasant farmers cultivating crops and rearing livestock (Table 1).

A multistage sampling technique was used in selecting respondents for the study. The first stage involved a purposive selection of ten Local Government Areas (LGAs) namely Orolu, Ede North, Olorunda, Osogbo, Odo Otin, Ejigbo, Ila, Egbedore, Ifelodun and Boripe in the state due to the predominance of poultry farmers as informed by Poultry Association of Nigeria (PAN), Osun State Chapter. The second stage involved purposive selection of two communities from the list of PAN in each of the ten LGAs based on the information of the predominance of small scale farmers. The third stage involved simple random selection of nine small scale poultry farmers in each of the communities; thus, a total of 180 respondents were sampled.

Primary data were collected with the use of a well-structured questionnaire. Data were collected on farmers' socio-economic and farm characteristics, various risks faced and the various risk coping methods used by respondents. Descriptive statistics was used to analyze the socio-economic characteristics of poultry farmers and the enterprise; identify and examine the risk faced and risk coping methods used by small scale poultry farmers in Osun State. Multinomial logit model was used to determine the effects of farmers' socio-economic and farm characteristics on the choice of risk coping methods used by poultry farmers in Osun State.

The Multinomial logit (MNL) model was employed to analyse five major risk coping strategies employed by the farmers in the study area and it is specified as

$$U_i = \beta X + \varepsilon_I \tag{1}$$

This implies that the decision, U_i, of choosing a particular strategy is a stochastic linear function of farm, farmers and strategies specific attributes (X_i). In this Multinomial logit, the probability of choosing a given strategy, j is equal to the probability that the utility of that particular strategy is greater than or equal to the utilities of all other risk coping strategy in the model [11].

$$P(y = j / X) = \frac{\exp(\beta j X)}{1 + \sum_j^n \exp(\beta j X)} \tag{2}$$

Where Y is a polytomous variable taking on the values {0, 1, 2….j} for methods chosen by the farmers, and X denotes a set of conditioning variables. In this case, Y represents the major risk coping strategies chosen by the livestock farmers while X represents a number of socio-economic variables. The dependent variable (Y_i) is defined as 1, 2, 3, 4, 5 for different risk coping strategies adopted

$$Y_i = f(X_1, X_2 ... X_9) \tag{3}$$

The dependent variables are:

Y_1=Veterinary service; Y_2= Personal savings; Y_3= Fresh clean pure water and high quality feed; Y_4= Improved hygiene; Y_5= Cooperative support

The independent variables are:

X_1= Age of the farmers (years); X_2= Sex of the farmers (Dummy 1 for male and 0, otherwise); X_3=Household size (number); X_4= Education of the farmer (years); X_5= Flock size (number of birds); X_6= Experience in poultry production (years); X_7= Farm size (metre square); X_8= Initial Capital outlay (naira); X_9= Poultry medication (naira); ε_i = Error term.

Results and Discussion

Socio - economic characteristics of respondents

The mean age of the farmers was 41.59 ± 10.36. This suggests that the farmers were young and energetic to meet the rigours of farming as they were in their productive age bracket. This is in line with the result of that many of the respondents are between age 31 and 50, in his study on the Risk Management Strategies Utilized by small scale poultry farmers in Oyo State [12]. Sofoluwe [13] showed that younger farmers are more knowledgeable, adopt better practices and may be more willing to bear risk and adapt to better farming techniques because of their longer planning horizon. Age of the respondents is very

Characteristics	Distribution (%)	Mean
Age of farmers (Years)		
Below 30	16.7	
31 – 40	40.6	
41 – 50	23.9	41.59
51 – 60	15.6	
Above 61	3.3	
Sex		
Male	69.4	
Single	30.6	
Marital status		
Single	11.7	
Married	84.4	
Divorced	3.3	
Below 0.00	0.6	
Years spent in school		
Below 0.00	3.9	
1.00 - 6.00	8.3	
7.00 - 12.00	29.4	12.82
≥ 13.00	58.3	
Farming Experience		
≤ 5.00	42.2	
6.00 - 10.00	34.4	
11.00 - 15.00	13.3	8.16
16.00 - 20.00	7.8	
≥ 21.00	2.2	
Number of birds		
≤ 200	5	
201 – 400	5	
401 – 600	20	773.72
601 – 800	21.7	
≥ 801	48.3	
Source of Capital		
Formal institution	20	
Personal savings	65	
Money lenders	1.1	
Cooperative society	11.7	
Others	2.2	

Source: Field survey, 2017

Table 1: Percentage distribution of respondents according to their socio-economic characteristics.

important as it has a bearing on the effectiveness in the performance of the various management, operational duties and ability to take risks for any agricultural enterprise. Most (69.4 percent) of the respondents were male implies that poultry production is gender selective and dominated by male. This may be due to the high risks involved in poultry business and women are not good risk takers as observed by Ironkwe and Ajayi [14]. Majority (84.4 percent) of the respondents were married. Continuity and stability of the poultry enterprise will be certain and the use of family labour in various farm operations would also be available. This is in line with study carried out by Akinola [15] that majority of the poultry farmers were married.

The mean year to acquire education was 13 ± 4.04 years. This shows that majority of the farmers were educated and completed their tertiary education. The farmers were well informed and have access to information that can help in coping with the risk facing in poultry production. Similar reports were made by Mafimisebi TE et al. [16] among livestock farmers in South-western Nigeria and by Adewumi BA [17]. In his study on economics of poultry production in Egba division of Ogun State. The mean year of experience in poultry production was 8.16 ± 5.7 which shows that they were not new in the business. According to Akinola farmers' experience is expected to increase the quantity of output by reducing bird and egg losses, increase use of technologies and risk coping methods [15]. The number of years a farmer has spent in business may clearly give an indication of the practical knowledge he has acquired. Ogoke [18] noted that the efficiency of the farmers is borne out of years of farming acquired.

Based on the numbers of birds raised particularly layers, the farmers were small scale poultry farmers as they have less than 1,000 birds with the mean flock size of 773 ± 255.13. One – fifth (20 percent) of the respondents have access to loans from formal institutions while majority (65 percent) got their capital from their personal savings this may be due to high interest rates from commercial banks and lack of collateral because majority were small scale farmers.

Major risks faced by poultry farmers and risk coping methods used

Table 2 shows the sources of risks encountered by poultry farmers in order of importance. The major risks were disease outbreak (72.2 percent), death of birds (60.6 percent), rainfall shock (25 percent), inadequate market (22.8 percent) and high cost of inputs (20.6 percent). This corroborates with the findings of [15] which shows that the major sources of risks were market and production risks.

Majority of the farmers considered veterinary service (83.9 percent), money from personal savings (67.2 percent), pure water and feed quality (43.9 percent) and improved hygiene (28.9 percent) as their major coping strategies while others considered co-operative support (17.2 percent), loan from banks (15 percent), re-stocking (14.4 percent), temporary closure (7.2 percent), lay off of staffs (2.8) and diversification into off farm business (2.2 percent). Most of the respondents adopted veterinary service as risk coping strategy because disease outbreak and death of birds were their major sources of risk.

Estimates of multinomial logit for the determinants of risk coping strategies

The estimation of the multinomial logit model for this study was undertaken by normalizing one category, which is normally referred to as the reference state or the base category. In this analysis, "veterinary service" is the reference state. The results of the multinomial logit model (MNL) indicated that different socio-economic and farm

characteristics influenced the choice of risk coping strategies employed by the farmers. The age of the farmers was statistically significant at 10 percent and positive. The probability of adopting personal savings as a risk coping strategy as the farmer grows older will be increased. As farmers grow older they prefer to adopt personal savings as a coping strategy than to rely on veterinary service (reference state or base category). An increase in the age of the farmer by one year would increase the probability of adopting personal savings as a risk coping strategy by 4.7 (Table 3). The farm size was statistically significant at 10 percent and positive. The result revealed that the probability of adopting personal savings as a risk coping strategy as the farm size increases will be increased. As farm size increases farmers prefer to adopt personal savings as a coping strategy than to rely on veterinary service. An increase in farm size by one metre square would lead to an increase in the probability of adopting personal savings as a coping strategy by 0.04. As farm size increases farmers prefer to save more than to rely on veterinary service. This might be due to high cost of inviting veterinary officers. The capital outlay was statistically significant at 5 percent and negative, this means that as the capital outlay increases, the probability of adopting improved hygiene as coping strategy decreases. An increase in the capital outlay by one naira will lead to a decrease in the probability of adopting improved hygiene as risk coping strategy by 0.00000385. As the capital outlay increases farmers tend to rely on veterinary service. Household size was statistically significant at 10 percent and positive, this means that as the household size increases the probability of adopting cooperative support as a risk coping strategy increases. An increase in the household size by a member will lead to an increase in the probability of adopting cooperative support as risk coping strategy by 1.16. As the household size increases farmers tend to rely on cooperative support than veterinary service. Poultry medication was statistically significant at 10 percent and positive, this means that as the cost of poultry medication increases the probability of adopting cooperative support as a coping strategy increases. An increase in the

Description	Frequency	Percent
Risks Encountered		
Disease outbreak	130	72.2
Death of birds	109	60.6
Rainfall Shock	45	25
Inadequate market	41	22.8
High cost of inputs	37	20.6
Loss of eggs	30	16.7
Erratic power supply	27	15
Low production	22	12.2
Non availability of credit	17	9.4
Theft	16	8.9
Coping Methods		
Veterinary Service	151	83.9
Personal savings	121	67.2
Fresh clean pure water and high quality feed	79	43.9
Improved hygiene	52	28.9
Cooperative Support	31	17.2
Formal Borrowing	27	15
Re stocking	26	14.4
Temporary closure	13	7.2
Lay offs	5	2.8
Diversification into off farm business	4	2.2

Source: Field survey, 2017

Table 2: Distribution of respondents by risk faced and risk coping strategies.

Variable	Personal savings		Fresh clean pure water and high feed quality		Improved hygiene		Cooperative Support	
	Coefficients	p-value	Coefficients	p-value	Coefficients	p-value	Coefficients	p-value
Age	0.047*	0.087	0.026	0.43	0.021	0.507	2.32E-04	0.995
Household size	0.223	0.638	0.414	0.452	0.055	0.915	1.116*	0.087
Sex	-0.228	0.129	-0.221	0.23	-0.175	0.323	0.056	0.739
Education	-0.036	0.516	0.034	0.615	-0.068	0.289	-0.039	0.565
Stocking density	-0.001	0.222	-8.62E+04	0.419	8.38E-04	0.455		0.961
Experience	-0.047	0.306	0.053	0.299	-0.043	0.438	-0.059	0.318
Farm size	4.52e-04*	0.064	7.03E-05	0.816	1.28E-04	0.676	1.01E-04	0.76
Capital outlay	1.07E-06	0.428	1.52E-06	0.304	-3.85e-06**	0.024	-2.70E-06	0.134
Poultry medication	2.39E-05	0.583	5.42E-05	0.218	2.67E-05	0.608	8.9e-05*	0.066
Constant	-0.789	0.595	-2.388	0.19	0.487	0.776	-0.927	0.621
Log likelihood	-258.8							
Chi – square	39.93							

**, * = Significant at 5, and 10 percent probability level, respectively

Source: Field survey, 2017

Table 3: Estimates of Multinomial logit for the determinants of risk coping strategies.

cost of poultry medication by one naira will lead to an increase in the probability of adopting cooperative support as risk coping strategy by 0.000089. As the cost of poultry medication increases farmers tend to rely on cooperative support, as they get loan from cooperative to get the required drugs and service. The result of the multinomial logit shown in Table 3 revealed that the log of likelihood was -258.80 and the chi square value was 39.93, these support the fitness of the model.

Conclusions and Recommendations

The study revealed that majority of the farmers was male, young and married with high educational status. Majority of the farmers do not have access to credit facilities, small scale farmers and just few of the farmers engaged in off-farm activities. The major risks faced by the farmers were disease outbreak, death of birds, rainfall shock, inadequate market and high cost of inputs. Farmers employed different risk coping strategies, of which the major ones were veterinary service, personal savings, proper water and feed quality, improved hygiene and cooperative support. Of the estimated multinomial logit model: age, farm size, capital outlay, household size and poultry medication affects the choice of risk coping strategies employed by the farmers.

Based on the findings of the study, the following recommendations are suggested in order to improve the risk coping ability of the farmers in the study area:

i. The government and non-governmental organizations should organize trainings and seminars on the effective risk coping strategies in poultry production for the farmers to reduce risk.

ii. Poultry farmers in the study area should be encouraged to join cooperatives in order to have access to better health hygiene practices, veterinary services, extension services, and information that will help to cope with the risk involved in poultry. Efforts should be made to encourage government or private institutions to collaborate with insurance companies to insure farmers against risks.

iii. Government and non-governmental organizations should ensure effective policy formulation to reduce the risk faced and improve risk coping strategies used by farmers in the study area and provides more robust veterinary services, drugs and vaccines to reduce the incidence of disease risk.

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