Analysis of Risk Management in Poultry Production Enterprises in AKWA IBOM State

By Ebong, V. O & Awatt, N. K

University of Uyo

Abstract- The study analyses risk management strategies among poultry enterprises in Akwalbom State, Nigeria. Multistage sampling technique was to select 122 poultry farmers for the study. Data obtained were analyzed using descriptive, inferential statistics and maximum likelihood estimates. Results of the study revealed that majority 54.9% were male with a mean age of 49 years. All farmers had formal education, 23.2% were primarily farmers with 6 years mean farming experience. The farmers had average household size of 4-6 persons and mean off farm income of N70, 050. About 48.4% were members of cooperative societies and 41.8% had a farm size of 100-200 birds per production cycle. Major sources of risk associated with poultry enterprises in the area included financial/credit risk, health risk and market risk. Most adopted risk management strategies were avoidance measures of fencing and netting and use of foot dips at the entrance. The result of the Maximum Likelihood Estimates revealed that age, off farm income, farm size and medication cost were the factors affecting output of poultry farmers.

Keywords: risk management; risk, poultry; poultry production.

GJSFR-D Classification: DDC Code: E LCC Code: Z2002

ANALYSISOFRISKMANAGEMENTINPOULTRYPRODUCTIONENTERPRISESINAKWAIBOMSTATE

Strictly as per the compliance and regulations of:

Analysis of Risk Management in Poultry Production Enterprises in AKWA IBOM State

Ebong, V. O [α] & Awatt, N. K [σ]

Abstract- The study analyses risk management strategies among poultry enterprises in Akwaibom State, Nigeria. Multistage sampling technique was to select 122 poultry farmers for the study. Data obtained were analyzed using descriptive, inferential statistics and maximum likelihood estimates. Results of the study revealed that majority 54.9% were male with a mean age of 49 years. All farmers had formal education, 23.2% were primarily farmers with 6 years mean farming experience. The farmers had average household size of 4-6 persons and mean off farm income of N70, 050. About 48.4% were members of cooperative societies and 41.8% had a farm size of 100-200 birds per production cycle. Major sources of risk associated with poultry enterprises in the area included financial/credit risk, health risk and market risk. Most adopted risk management strategies were avoidance measures of fencing and netting and use of foot dips at the entrance. The result of the Maximum Likelihood Estimates revealed that age, off farm income, farm size and medication cost were the factors affecting output of poultry farmers. The study recommended reduction in interest rate, training of farmers on feed formulation, diversification into crops and other livestock related activities and purchasing of insurance as measures to help mitigate risk among poultry production enterprises in the study area.

Keywords: risk management; risk, poultry; poultry production.

I. Introduction

Across the globe, risk has a considerable influence on agricultural production and in some parts of the world has led to fundamental changes in production patterns and condition (Maurer, 2014). Risk is considered as an important aspect of farming business. The uncertainties inherent in weather, yields, prices, government policies, global markets and other factors that impact agricultural production can cause wide swings in farm income (USDA, 2006). Typically, farmers make decisions in a risky environment every day. The consequences of their decisions are generally not known when the decisions are made.

Following OECD (2011) production risks caused by weather, pest and diseases as well as market and price risks are more prevalent in agriculture. Risk arises from the high variability of production outcomes, farmers are unable to predict with certainty the amount of output their production will yield, because of external factors such as weather, pest, diseases and other natural calamities (Abimbola, 2013). On the other hand,

marketing (price) risks are more pronounced in agribusiness than in other economic sectors (Maurer, 2014). Both inputs and outputs price volatility are sources of market risk in agribusiness. Prices of agricultural products are typically volatile and farmers face a considerable price uncertainty. The price is usually not known as at when production decisions are taken. Prices vary with levels of production and demand at the time of sale (Iheke and Igbelina, 2016). Inelastic demand for many agricultural products are often cited as the main explanation for agricultural price variability where small increases in production can result in large price swings (World Bank, 2004).

According to Anton (2009), risk management strategies start with decisions on the household; on the set of outputs to be produced, the allocation of the land, the use of other inputs and techniques including irrigation and the diversification of activities on and off farm. Farmers can also manage market risk with instrument which includes insurances and future markets. Following Harwood, Coble, Pery and Somwani (2000). Risk Management can be seen as choosing among alternatives to reduce the effects of risk. Effective risk management therefore involves anticipating outcomes and planning a strategy in advance given the likelihood and consequences of events not just reacting to those effects after its occurrence (Effiong, Enyenihi and George, 2014). Keeping poultry is a part of life in rural Africa (Sonaiya, 2005) and it accounts for 25% of local meat production in Nigeria (Okunlola and Olofinsawe, 2007).

Poultry is an important aspect of economic development in Nigeria economy because it serves as a source of food, income, employment and poverty alleviation (Adene and Oguntade, 2006). Poultry offers a range of uses to human which include provision of meat and egg, research and medicinal purpose, production of manure which helps to improve soil fertility and also feathers from poultry birds provides human with aesthetic value. Specifically the roles of poultry in providing the much needed animals protein for the increasing population cannot be over emphasized (Udoh and Etim, 2009).

According to Akpabio, Okon, Angba and Abu (2007), Poultry production is the second most important subsector of most developing countries. In Nigeria it is estimated to be above 140 million birds which make it to be well developed in poultry industry among West

Author α σ: Department of Agricultural Economics and Extension, University of Uyo, Uyo. Nigeria. e-mail: nseduawatt@gmail.com

African Nations. Daily Independent report of 2014 shows that 14 million people are directly or indirectly engaged in commercial poultry while the rural family poultry with cumulative value of N320 billion are managed by 85million people.

Poultry industry in Nigeria has suffered a great deal of losses, which affects poultry farmers as well as poultry consumers (Ogeke, 2009). Nigeria presently produces above 550,000mt of poultry meat per annum and 700,000mt of eggs (FAO, 2014). Despite this, the country is far from meeting her domestic demand when compared with developed countries that are involved in poultry production due to high level of risk involved in poultry production activities (Atteh, 2004).

In Nigeria, factors that range from climatic variability, crop yield failure, input price variability, incidences of pest and diseases, environmental degradation, pollution from industrial sites, oil spillage, insecurity among others are the factors that make farmers inadequately equipped against risks and uncertainties (Ayinde, 2008). In developing countries, farmers also lack access to both modern instruments of risk management such as agricultural insurance, future contracts or guarantee funds and emergency government assistance as such farmers rely on different "traditional" coping strategies and risk management techniques which are mostly inefficient (Wenner, 2010). A general lack of accurate information on the risks sources and mitigation strategies in the livestock sector combined with insufficient veterinary and breeding services, non-existence or inadequate regulations concerning production, commerce and animals health control are also other important obstacles to the mitigation of risks in poultry production (FAO, 2008). These factors bring about uncertainty in poultry production and thus affects the supply of poultry products in the market.

The importance of risk management associated with poultry production will be better appreciated when it is realized that 70% of Nigerian population are farmers (Ekong, 2010) and 4 in every 10 Nigerian are involved in poultry farming (Saddiq, et al 2016). These farmers generally lack the understanding of risk as well as approaches to managing risk.

There is therefore a need for a thorough assessment of risk management strategies adopted by poultry farmers in the state and also, an understanding of the types of risk being faced by these farmers and how their businesses are affected by these risks. Specifically, the study examined the socio economic characteristics of poultry farmers, identified the major risks faced by poultry farmers in the area, examined the risk management factors in poultry production and determined factors affecting the output of poultry production enterprises.

II. Methodology

This study was conducted in AkwaIbom State, Nigeria. AkwaIbom State lies in the south -south geopolitical zone of the country. The state lies between Latitude $4°33'$ and $5°33$ North and Longitude $7°25'$ and $8°21$ East. The 2006 census of the Nigeria Population Commission put the state's population at 3,920,208 out of which 2,044,510 are male while 1, 875,698 are female(NPC 2006). The state falls within the tropical zone. Its dominant vegetation is the green foliage of trees and shrubs and the oil palm tree belt which holds the highest density of the cash crop in the world. A multistage sampling technique was used to select 122 poultry farmers for the study. Data collection was through personal interviews and the use of well-structured questionnaire. Descriptive, inferential statistics with multiple regression models were used to analyze data collected.

The Model used is Specified in the Implicit form as:

$$Y = F(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9) + e$$

Y = Poultry output (annual sales in Naira)

X_i = Age (years)

X_2 = Educational qualification (Years of formal education)

X_3 = Farming experience (Years)

X_4 = Off farm income (₦)

X_5 = Cooperative membership (member = 1, non-member = 0)

X_6 = Farm size (number of birds stocked)

X_7 = Labour Cost (₦)

X_8 = Medication cost (₦)

X_9 = Feed cost (₦)

e = Error term

a) Likert Scaling

On major risk faced in poultry production enterprises, a 3 point Likert scale was used to assess the level of severity of each risk encountered by respondents based on Not severe, Severe, Very severe. Rank 1 was considered the most severe risk and Rank 29 was the least severe risk.

A4 point Likert scale rating of Strongly agree, Agree, Disagree, and Strongly disagree was employed in examining the risk management strategies adopted in the study area by the respondents. In achieving this objective, a high mean score indicates a general high adoption rate of a risk management factor and a low mean score signifies a low adoption rate.

III. Results and Discussion

The distribution of respondents based on their socio economics characteristics is presented in table 1. The result showed that 54.9% were males with a mean age of 49 years. The result further reveals that young people were involved in poultry production in the study area as the industry is dominated with people who are able to tackle risks challenges that is associated with poultry farming. This finding is within range with the findings of Yusuf and Malomo (2007) who reported a mean age of 44 years for poultry farmers in Nigeria. All respondent had formal education as 41.8% of the respondents were HND/BSc holders and had spent an average of 16- 20 years obtaining formal education. It is seen that educational level of farmers is important in poultry management as this will afford them the opportunity to understand and adopt modern farming practices thereby increasing their responses to risk. Majority (82%) of the respondents were married, only

23% were engaged in farming as their primary occupation and about50.8% had 6 – 10 years poultry farming experience. This result implies that the farmers are well experienced in the business and possess risk bearing abilities. This finding was in line with Oladumi and Fatuase (2014) who reported that majority of poultry farmers have been in poultry business for at least 6 years.

The result further revealed that most (50%) of the respondents had household size within the range of 4-6 persons, A large household size will make family labour available to most poultry enterprises in the study area. This finding is in consonance with the National household average of 5.9 persons (NBS, 2016).

The monthly income range of farmers in the area was ₦30,000 – ₦180,000 with an average monthly off farm income of ₦70,500. 48.4% of the respondents were seen to be registered members of cooperative and 41.8% of the respondents had a flock size of 100 – 200 birds. This result agrees with Omalayo (2018) who stated that majority of poultry farmers have less than 500 birds in their farms and this may be attributed to high cost required to operate in large scale. Survey conducted on farmers nearness to market showed a mean distance of 938.11m which indicates that the respondents did not have markets quite close to their farms. Ogolla (2016), stated that a long distance to market will reduce the possibility of poultry farmers to increase their production because of the risk associated with high cost of transportation. It was also seen that (63.1%) of the respondents had water sources available in their farms thus making supply of clean water readily for farming purposes which in turn will minimize the spread of intestinal disease among birds (Lacy, 2002).

Table 1: Distribution of Poultry Farmers based on their Socio-Economic Characteristics

Item	Selected Variables	Frequency n – 122	Percentage %	Mean
1.	Sex			
	Male	67	54.9	
	Female	55	45.1	
2.	Age (years)			
	27 – 37	16	13.1	49
	38 – 48	50	41.1	
	49 – 59	32	26.2	
	60 – 70	24	19.7	
3.	Educational Qualification			
	No formal education	0	0	
	Primary	2	1.6	
	Secondary	19	15.6	
	ND/NCE	41	33.6	
	HND/BSc	51	41.8	
	Postgraduate	9	7.4	
4.	Years of formal education (years)			
	6 – 10	7	5.7	15
	11 – 15	57	46.7	
	16 – 20	58	47.6	
5.	Marital Status			

	Single	7	5.7	
	Married	100	82.0	
	Separated	3	2.5	
	Widowed	12	9.8	
6.	Primary Occupation			
	Farming	28	23	
	Trading	18	14.8	
	Civil Servant	60	49.2	
	Artisans	3	2.5	
	Others	13	10.7	
7.	Farming experience (years)			
	< 1 – 5	56	45.9	6
	6 – 10	62	50.8	
	11 – 15	3	2.4	
	> 16	1	0.8	
8.	Household size			
	1 – 3	13	10.7	3
	4 – 6	61	50	
	7 – 9	35	28.7	
	> 10	13	10.7	
9	Off Farm Income (N)			
	< 10,000 - 50,000	26	21.3	70,500
	50,001 – 100,000	74	60.5	
	100,001 – 150,000	18	14.1	
	> 150,001	4	3.2	
10.	Membership to cooperative			
	Yes	59	48.4	
	No	63	51.6	
11.	Farm size (Number of birds)			
	100 – 200	51	41.8	
	201 – 400	44	36.9	306
	401 – 600	22	17.2	
	601 – 800	3	2.4	
	>801	2	1.6	
12.	Labour Type			
	Family	53	43.4	
	Hired	68	55.9	
	Family/Hired	1	0.8	
13	Distance to market(m)			
	100- 1000	91	74.6	938.11
	1001-2000	22	18	
	>2001	9	7.4	
14	Distance of source of water(m)			
	Sources of water at the farm	77	63.1	41.5
	100- 200	43	35.2	
	201- 400	2	1.6	

Source: Field Survey Data, 2022

a) Major Risk Faced in Poultry Production Enterprises

Results on table 2 reveals the major risks encountered by poultry entrepreneurs. These risk were categorized into environmental risks, human/personnel risk, financial/credit risk, production risk, market/price risks, legal/institutional risk and health risk. Twenty-nine (29) variables were selected based on the these major sources of risk and a 3 point Likert scale was used to assess the level of severity of each risk encountered by respondents. The most severe risk were: high interest rate with mean score of 2.61, failed vaccines with a mean score of 2.50 and disease outbreak with a mean score of 2.47.

Akanni (2007), considered poultry production as a high risk investment by most financial institutions due to high rate of poultry mortality, low productivity and low levels of loan repayments. This situation has led to skepticism on the part of financiers when considering financial request for poultry production hence, the high interest rate. This result reveals that poultry farmers are faced with limited credit facilities to purchase items and this limits productivity and expansion in the sector. In addition, Butcher and Yegeni (2009) listed the causes of

vaccine failure to be improper administration/handling of vaccines, maternal antibodies, stress, poor timing, immune suppression, poor management practices, poor quality of vaccines and modifications in vaccines. He further stated that a well-designed, well timed and soundly executed vaccination coupled with good management, nutrition and bio security will decrease the probability of disease problems and increase the likelihood the flock will perform to its genetic potential. Saddiq*et al.* (2016), Identified outbreak of diseases as the highest source of risks in poultry businesses. This he attributed to the prevalence of widespread diseases such as Avain Influenza, Newcastle, Gomboroetc coupled with weather conditions. These diseases require reliable vaccines which are not often available (Lawal*et al.*, 2009). This result further agrees with

Ihekeand Igbelina (2016) who maintained that disease outbreak was among the most severe risk faced by poultry farmers and those risks directly affects farmers' incomes and can be a threat to the future of their farms (Briner and Finger, 2012).

From the result, it can be deduced that the most prevalent sources of risks in the area are financial risk, health and marketing risks.

The survey revealed the least severe risk in the study area to be: rotting of eggs at storage, ill-health of farmers/worker, inadequate information to upgrade production technique, accumulation of drugs and technological failure. This indicates that poultry farmers in the area maintained good hygiene conditions. This may be attributed to the fact that the use of this measure is cost effective (Effiong *et al*., 2014).

Table 4.2: Distribution of Respondents Based on Major Risk Faced by the Poultry Production Enterprises

S/N	Factors	NS	S	VS	Mean	Rank
	Environmental Risk					
1	Fluctuation in weather	20(20.5)	66(54.1)	31(25.4)	2.05	14
2.	Shortage of feed	58(47.5)	52(42.6)	12(9.8)	1.62	22
3.	Shortage of water	38(31.1)	64(52.5)	20(16.4)	1.85	19
	Human and Personnel Risk					
4.	No brooding technical knowhow for mass production of chicks	66(54.1)	43(35.2)	13(10.7)	1.57	23
5.	Inadequate information to upgrade production technique	72(59.0)	41(33.6)	9(7.4)	1.48	27
6.	Poor personal management	18(14.8)	62(50.8)	42(34.4)	2.20	9
7.	Ill-health of farmer/worker	70(57.4)	47(38.5)	5(4.1)	1.48	28
	Financial/ credit risk					
8.	High interest rate	2(1.6)	43(35.2)	77(63.1)	2.61	1
9.	Unavailability of credit facilities	15(12.3)	51(64.7)	50(41.0)	2.29	7
	Production risk					
10.	Low output	34(27.9)	58(47.5)	30(24.6)	1.97	16
11.	Technological failure	62(50.8)	53(43.4)	7(5.7)	1.55	25
12.	Poor parent stock	42(34.4)	68(55.7)	12(9.8)	1.75	20
13.	Low quality of feed	57(46.7)	53(43.4)	12(9.8)	1.63	21
14.	Theft	22(18.0)	85.(69.7)	15(12.3)	1.94	17
15.	Death of birds	8(6.6)	72(59.0)	42(34.4)	2.28	8
16.	Inadequate stock	25(20.5)	54(44.3)	43(35.2)	2.15	11
17	Erratic power supply	18(14.8)	62(50.8)	42(34.4)	2.20	9
	Market/price risk					
18.	Transportation problems	21(17.2)	79(64.8)	22(18)	2.01	15
19.	High cost of improved breed	13(10.7)	79(64.8)	30(24.6)	2.14	12
20.	High cost of feed	8(6.6)	69(56.6)	45(36.9)	2.30	6
21.	High cost of vaccines	7(5.7)	59(48.4)	56(45.9)	2.40	5
22.	Rotting of eggs at storage	83(68.0)	37(30.3)	2(1.6)	1.34	29
23.	Fluctuation in prices of output	2(1.6)	65(53.3)	55(45.1)	2.43	4
	Legal/ institutional risk					
24.	Un favourable government policies	27(22.1)	57(46.7)	38(31.1)	2.09	13
	Health risk					
25.	Accumulation of dungs	66(54.1)	48(39.3)	8(6.6)	1.53	26
26.	Failed vaccines	6(4.9)	49(40.2)	67(54.9)	2.50	2
27.	Disease outbreak	4(3.3)	57(46.7)	61(50.0)	2.47	3
28.	Accident	59(48.4)	58(47.5)	5(4.1)	1.56	24
29.	Inadequate veterinary services	27(22.1)	79(64.8)	16(13.1)	1.91	18

Source: Field Survey data, 2022

Note: figures in parenthesis are percentages and frequencies otherwise.
Rank 1 is considered the most severe risk.
Rank 29 is the least severe risk.
NS - Not severe, S – Severe, VS - Very severe.

b) Risk Management factors in Poultry Production

Data from Table 3 showed that fencing/ netting was the most adopted risk management factor in the study area. This finding is synonymous with that of Effiong *et al.* (2014) who maintained that fencing and netting was the most utilized risk management practice adopted by poultry farmers as this is necessary to protect the farm against predators and theft. The second most adopted factor was the use of foot dips at entrances of pen. Respondents practiced the use of foot dips at entrances to prevent introduction of infection, incidence/spread of diseases and cross infection to stock on farms (Kaoud, 2016). Proper storage of input and poultry products ranked third from the survey. This strategy is adopted to cope with production risk as the stored product can increase liquidity of the farm by providing supplementary cash reserve in light of unexpected events.

The finding from table 3, agrees with Salman et al. (2013) who posited that farm insurance was the least utilized strategy in mitigating risk. Consequently, future markets are not usually adopted by poultry farmers because the contracts may not be honoured by both the traders and farmers and may further become a risk if the output is lower than expected (Kahan, 2013).

The result however showed that poultry farmers tend to rely solely on their poultry production enterprises and rarely practiced diversification. Salimonu and Falusi (2009) reports that diversification is not mostly adopted because it sometime requires increase capital and more management time. In this way, diversification while minimizing risk, often reduces potential farm income. Alderman (2008) stressed that diversification can reduce production risk by improving efficiency in resource use and enhance sustainability of the natural resource base. It was also observed that poultry farmers in the area operate in small scale. Hence, unavailability of space may hinder the practice of separation of birds by species as a reduction factor. The result revealed that poultry farmers tend to focus more on the management of production risk by employing various risk reduction factors because no single strategy can cover all the risk likely to be encountered by the farmers.

Table 3: Risk Management Factors in Poultry Production Enterprises

S/N	Factors	SD	D	A	SA	Mean	Rank
	Avoidance/Preventive measures						
1.	Ensuring proper and timely vaccination	-	2(1.6)	49(40.2)	71(58.2)	3.57	4
2.	Use of footdips at the entrance	-	2(1.6)	36(29.5)	84(68.9)	3.67	2
3.	Fencing and netting	-	2(1.6)	32(26.2)	88(72.1)	3.71	1
4.	Disinfecting of poultry house	-	23(18.9)	77(63.1)	22(18.0)	2.64	24
5.	No or controlled access to visitors	-	1(0.8)	71(58.2)	50(41.0)	3.40	8
6	Avoid overcrowding of birds	-	5(4.1)	81(66.4)	36(29.5)	3.25	10
7	Separation of birds by age	2(1.6)	42(34.4)	72(59.0)	6(4.9)	2.67	22
8	Proper ventilation of poultry house	-	18(14.8)	63(51.6)	41(33.6)	3.19	13
9	Control of rodent and pest	-	16(13.1)	78(63.9)	28(23.0)	3.10	16
10	Use of sawdust	3(2.5)	14(11.5)	77(63.1)	28(23.0)	3.07	17
11	Separation of birds by species	12(9.8)	46(37.7)	47(38.5)	17(13.9)	2.56	26
12	Use of disease tolerant breed	6(4.9)	43(35.2)	61(50.0)	12(9.80)	2.65	23
	Mitigation/reduction measures						
13	Diversifying into crop and other livestock activities	16(13.1)	43(35.2)	47(38.5)	16(13.1)	2.51	27
14	Buying input in advance	-	3(2.5)	85(69.7)	34(27.9)	3.25	10
15	Appropriate nutrition in feed	1(0.8)	32(26.2)	82(67.2)	7(5.7)	2.78	21
16	Producing the feed myself	34(27.9)	77(63.1)	10(8.2)	1(0.8)	0.56	30
17	Getting my feed from known source	6(4.9)	39(32.0)	70(57.4)	7(5.7)	2.63	25
18	Getting water from safe and known source	-	5(4.1)	62(50.8)	55(45.1)	3.41	7
19	Getting birds from known as safe sources	1(0.8)	3(2.5)	50(41.0)	68(55.7)	3.52	6
20	Use of preventive medical treatment	-	5(4.1)	78(63.9)	39(32.0)	3.27	9
21	Quarantine of sick birds	-	8(6.6)	78(63.9)	36(29.5)	3.22	12
22	Provision of constant power supply	2(1.6)	28(23.0)	76(62.3)	16(13.1)	2.87	18
23	Proper record keeping	2(1.6)	12(9.8)	73(59.8)	35(28.7)	3.16	14
24	Proper collection of eggs	1(0.8)	11(9.0)	77(63.1)	33(27.0)	3.16	14
	Retention/Coping measures						
25	Keeping extra cash at hand incase of emergency	-	4(3.3)	45(36.9)	73(59.8)	3.56	5
26	Off farm income	2(1.6)	34(27.9)	71(58.2)	15(12.3)	2.81	19
27	Attending extension workshops	6(4.9)	34(27.9)	60(49.2)	22(18.0)	2.80	20

28	Proper storage of input and poultry products	-	6(4.9)	39(32.0)	77(63.1)	3.58	3
	Transfer measures						
29	Insuring my poultry birds	25(20.5)	58(47.5)	36(29.5)	3(2.5)	2.13	29
30	Taking future market	9(7.4)	54(44.3)	51(41.8)	8(6.6)	2.48	28

Source: Field Survey Data, 2022

Note: figures in parenthesis are percentages and frequencies are otherwise.
SA - Strongly agree, A - Agree, D - Disagree, SD - Strongly disagree

c) Factors influencing the reduction of risk on the output of Poultry Farmers

The maximum likelihood estimates using four functional forms in poultry production in Akwa Ibom State are presented in table 4. The exponential function was chosen as the lead equation based on number of significant variables, value of R^2 and F- statistics. The R^2 value was 0.802 which indicates that 80.2% of the total observed variations in poultry output were explained by the variables included in the model while 19.8% of the variation was due to error. The result also shows that 4 variables were statistically significant and conform to a prior expectation. The F-ratio was 50.45 which was statistically significant at 1% indicating a high goodness of fit of the model.

The coefficient of age was statistically significant at 5% and was negatively related to output. This inverse relationship implies that the age of the farmer does not necessarily increase their output. The increase in the output of the farmer depend more on other factors than their age. This is in consonance with Effiong, *et al.* (2014) who found a negative relationship between age and the output of the farmers. The coefficient of off farm income was significant at 10% level and a positive regression coefficient of 0.478. This implies that a unit increase in off farm income of the respondents would lead to an increase in the reduction of risk on the output. Effiong, *et al.* (2014) in Iheke and Igbelina (2016) however reported that increased income will assist farmers in tackling additional risk on the farm without being risk averse. This will lead to an increase in output of the poultry products and will help farmers to generate income needed to manage other forms of risk. Iheke and Igbelina (2016) attributed it to the fact that an increase in income will enable the farmer to adopt proper risk management practices.

Number of birds was significant at 5% and earned a positive regression coefficient of 0.301 which implies that a unit increase in the number of birds by the respondents will lead to an increase in the reduction of risk on the output by 0.301. Ajieh (2010) in Effiong, *et al.* (2014) stated that in situations where farmers have increased farm size and engage in diversified practices, it will serve as a better way of managing risk and reduce impact on the output of farmers. The coefficient of medication cost was significant at 10% and it is positively related to the output. This implies that as the cost of medication increases, the output of the farmer increases by 0.198. Medication can be employed to reduce disease outbreak and mortality of birds. This result is consistent with Iheke and Igbelina (2016) who noted that if medications administered are efficient, it will reduce the risk on the output of the farmers.

Table 4: Estimated Regression Results for the Effect of Risk Reduction Factor of Output

Variables	Linear model	Exponential Model	Double log model	Semi log model
Constant	29684.732 (1.171)	10.062 (51.941)	1.534 (1.461)	-459612.049 (-2.672)
Age	-0.121 (-2.023)**	-0.111 (-2.506)**	-0.102 (-2.447)**	-0.095 (-1.338)
Education Qualification	-0.001 (0.016)	0.057 (1.338)	0.039 (0.964)	0.013 (0.181)
Farming Experience	0.046 (0.787)	0.056 (1.290)	0.042 (1.034)	0.035 (0.507)
Off Farm Income	0.181 (1.870)*	0.418 (5.879)***	0.469 (6.208)***	0.293 (2.282)**
Cooperative Membership	0.046 (-0.766)	-0.012 (-0.282)	-0.024 (-0.577)	-0.060 (-0.862)
Farm Size	0.630 (3.075)***	0.301 (1.994)**	0.195 (1.268)	0.408 (1.556)
Labour Cost	-0.251 (-1.852)*	-0.038 (-0.382)	-0.028 (-0.289)	-0.064 (-0.397)
Medication Cost	-0.011 (-0.082)	0.198 (1.920)*	0.178 (1.528)	0.008 (0.042)
Feed Cost	0.257 (1.498)	0.096 (0.761)	0.169 (2.043)**	0.093 (0.660)

R² AdjR2 F = ratio	0.635 0.606 21.658***	0.802 0.786 50.452***	0.823 0.808 57.691***	0.487 0.446 11.811***

Note: The figures in brackets are the representative t – ratios
*, **, *** are significant at 10%, 5% and 1% probability

IV. Conclusion

From the result, it was observed that poultry industry the study area is made up of mainly small scale farmers who engage in farming on part-time basis, and had at least 6 years of farming experiences.

It could be concluded that most farmers were faced by various sources of risk and young male individuals who are married owned poultry production enterprises. The most severe farming risk associated in poultry production in the area were credit/ financial, health and marketing risk. Majority of the farmers employed avoidance and preventive measures as their major risk management strategies. Age of the farmer, off farm income, number of birds and medication cost were the major factors influencing the output of poultry production enterprises in the study area. Therefore efforts should be made at reducing interest rate and training of farmers on feed formulation. In conclusion, farmers should be encouraged to diversify into crops and other livestock related activities and purchase insurance as measures to help them manage risk in their poultry production enterprises.

References Références Referencias

1. Abimbola, O., Adepeju, Omowummi, A., Timothy and Abayomi, S. Oyekale (2013). Risk coping behavior of small scale poultry farmers in Ogun State, Nigeria. *Asian Journal of Animal Veterans Advances* 8(6):786-795.
2. Adene, D. F. and Oguntade, A. E. (2006). Nigeria poultry sector country review. Retrieved from http:// ftp.fao.org/docrep/fao/oll/ai352eoo.pdf. Accessed 10 June 2009.
3. Ajich, P. C. (2010). Poultry Farmers Response to Agricultural Insurance in Delta State. *Nigerian Journal of Agricultural Science* 1(1): 43-47.
4. Akanni, K. A. (2007). Effect of micro-finance on small scale poultry business in South Western Nigeria Emir. *Journal of Food and Agriculture*. 19(2): 38-47.
5. Akpabio, I. A., Okon, D. P., Angba, A. O. and Aboh, C. I. (2007). Avain influence scare and the poultry egg production in Uyo Urban, *Nigerian International Journal of Poultry Science*, 6:298-301.
6. Alderman, H. (2008). Managing risks to increase efficiency and reduce poverty. Background Paper for the World Development Report, World Bank.
7. Anton, J. (2009). Managing risk in agriculture: A Holistic Approach an overview of policy measures for risk management, TAD/CA/APM/WP (2008).
8. Atteh, J.O., (2004). Theory and practice of poultry production. Adlek printers. Ilorin, Kwara state, Nigeria. 112-117.
9. Ayinde, O. E., Omotesho, O. A. andAdewumi, M. O. (2008). Risk attitude and management strategies of small scale crop producer in Kwara State Nigeria: A ranking approach. *African Journal of Business Management* vol. 2(12):217 – 221
10. Briner, R. and Finger, R, (2012). The effect of price and production risks on optimal farm plans in swiss dairy production considering 2 different milk quota system. *Journal of Dairy Science,* 96:2234-2246.
11. Butcher, G., D, .and Yegeni (2009). Prevention, diagnosis and control of poultry diseases. Iowa University Press p. 23 – 25.
12. Effiong, E.O., Enyenihi, E. A. George, A. A. (2014). Analysis of farming risk among scale poultry farmers in Etim Ekpo Local Government Area of AkwaIbom State, Nigeria. *Nigerian Journal of Agriculture, Food and Environment*: 10(1):59 – 64.
13. Ekong, A. (2010). An Introduction and Analysis of Organization of Villages and Communities. (available at http://www.uniilorin.edu.ng.../AXR% 202 04.P).
14. FAO (2008). Understanding Avian Influenza, by L. D. Sims, and C. Narrod Rome (available at http://www .fao.org/avianflu/documents/keyai/keybookprefaceh tml).
15. Food and Agricultural Organsiation (FAO), (2014). The State of Food Insecurity in the World 2014 Food Security Indicators.
16. Harwood, J. R. Heifner, K. Coble, T. Pery and Somwani, A. (2000). "Managing risk in farming concepts, research and analysis". Agricultural Economics Report no 774.
17. Iheke, O. R. and Igbelina, C. A. (2016). Risks management in poultry production in Ikeduru Local Government Area of Imo State, Nigeria. *Nigeria Journal of Agriculture, Food and Environment* 12(1):67 – 74.
18. Kahan, D. (2013). Managing risk in farming: Food and Agriculture Organization of the United Nations.
19. Kaoud, H. A. (2016). Disinfection in poultry farms. *Journal of Veterinary Medical Research*. (25)164-173
20. Lacy, M. (2002). Broiler management. Pg 829 – 868 in commercial chicken meat and egg production (D,

B, Bell and W. D. Weaver, Eds). Kluwer Academic Pub. Norwell, MA.

21. Lawal, B. O., Torimiro, D. O., Makanjuola (2009). Impact of Agricultural Extension Practices on the Nigerian Poultry Farmers' Standard of living: A Perceptional Analysis. Tropical and Subtropical Agroecosystems 10 (2009) 465 – 473.

22. Maurer, K. (2014). Where is the risk? Is Agricultural Banking Really More Difficult than Other Sectors? :In D. Kohn (Ed.), Finance for Food: Towards New Agricultural and Rural Finance. Berlin: Springer .pp 139-165.

23. National Bureau of Statistics (NBS) (2016). Social Statistics in Nigeria. https://www.nigerianstat.gov.ng (Retrieved on 30th July, 2020).

24. NPC (2006). Nigeria National Population Commission Census Report. http://www.population.gov.ng. (Retrieved on 2nd July, 2020).

25. Ogoke, C. M. (2009). Agricultural Insurance in present and future Agriculture systems in Africa. Nigerian Agricultural Journal 5 (2): 45-50.

26. Ogoilla, M. A. (2016). Factors influencing poultry production among poultry farmers in Eldorettown, Kenya.www.researchgate.com.

27. Okunlola, J. O. and Olofinsawe (2007). Effects of extension activities on poultry production in Ondo State. South Western Nigeria. Agricultural Journal, 2:559 – 563.

28. Oladunni, M. E. and Fatuase, A. I. (2014). Economic Analysis of Backyard Poultry Farming in Akoko North West Local Government Area of Ondo State, Nigeria. Global Journal of Biology, Agriculture and Health Science 3(1):141-147.

29. Omolayo, J. O (2018). Economic Analysis of Broiler Production in Lagos State Poultry Estate, Nigeria. Journal of Investment and Management 7(1) (35 – 44) 10-11648lj.jun20180701.15.

30. Organisation for Economic Cooperation and Development (OECD) (2011). Risk management in agriculture: what role for governments? www.Oecd.org/agriculture.

31. Saddiq, N. M., Timothy, A. J., Gomina, A. and Hassan, A. A. (2016). Analysis of the threats posed by risks in poultry production among farmers in Kaduna Metropolis of Kaduna State Nigeria. Journal of Animal Production 28 (2): 312 – 320.

32. Salimonu, K. K. and Falusi, A. O. (2009). An Empirical Analysis of Attitude towards risk and the Influence of Socio-Economic and Demographic Factors among food Crop Farmers in Osun State, Nigeria. International Journal of Applied Agricultural and Apicultural Research (IJAAAR), 5 (1): 32-43.

33. Salimonu, K. K. and Falusi, A. O. (2009). Sources of Risk and Management Strategies among Food Crop Farmers in Osun State, Nigeria. African Journal of Food Agriculture Nutrition and Development, 9 (7): 1591 – 1605.

34. Salman, K. K., Ashagidigbi, W. M. and Jabar, K. T. (2013). Correlates of risk aversion among poultry egg farmers in Ibadan, Nigeria. Journal of Rural Economics and Development 19 (1)1-15.

35. Sonaiya, E. B. (2005). Feed resources for small holder poultry production in Nigeria. World Animal Review 82 (1): 25 – 55.

36. Udoh, E. I. and Etim, N. A. (2009). Measurement of farm level efficiency of broiler production in Uyo, Akwaibom State. World Journal of Agricultural Sciences 5 (5): 832 – 836.

37. USDA (2006). Poultry-Production and Value 2008 summary. https://www.nass.usda.gov (Retrieved on 16th June 2018).

38. Wenner, M. D. (2010). Credit risk management in financing agriculture. Innovation in rural and agriculture finance. Focus, 18 (10)1 – 2.

39. World Bank (2004). World Development Report 2004: Making services for the poor people. The World Bank Washington DC USA.

40. Yusuf, S. A; Malamo, O. (2007). Technical Efficiency of Poultry Egg Production in Ogun State. A Data Development Analysis (DEA) Approach. International Journal Poultry of Science 6 (9): 622-629.