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Original Research Article

Risks and Risk Management Strategies in Poultry Production: *Implications for Farm Output of Broiler Poultry Farmers in Anambra State, Nigeria*

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Abstract: The poultry farmers are faced with a variety of output and income fluctuations arising from risks associated with the enterprise. This study examined the implications of risks and risk management strategies on the farm output of broiler poultry farmers in Anambra State, Nigeria. Data collected from 200 respondents selected through a multi-stage sampling procedure were analysed with descriptive statistics, and multiple regression. The result showed that the average number of birds owned by the respondents was 271 birds with casualty rate of 3%/stock. The identified serious risk factors were high cost and unavailability of feed, price fluctuation, diseases outbreak, climate change, unpredictable output, sickness/death of owner, inefficient workers, financial risk and insecurity. The risk management strategies practiced include purchase of birds from reputable sources, buying inputs ahead of time, proper and timely medication/vaccination, diversification, bio-security measures, bulk buying, and proper management. The number of years in school, farming experience, number of risk management strategies, stock size, fund/credit availability, extension agents visits, and number of risks experienced significantly determined the output of broiler production. High cost of feed, low selling price, inadequate access to drugs/veterinary services, insufficient funds, transportation difficulties, diseases outbreak, and poor quality chicks are some serious constraints to broiler production. The study concludes that the farmers are conscious of these risk factors and have put strategies in place to curb their effect. However, well trained extension agents should visit the poultry farms and organize free trainings and seminars on effective and better management practices for maximum output.

Keywords: Broiler poultry production, Risk management strategies, Production risks, Farm output, Poultry farmers, Biosecurity measures.

INTRODUCTION

Agriculture is an important economic sector in Nigeria, accounting for 24% of the nation's gross domestic product (GDP) from 2013 to 2019, and 22.35% of the Nigeria's GDP as at Q1 of 2020 (Oyaniran, 2020). It also remains the largest employer of labour in Nigeria, employing more than 36% of the labour force with over 70% of Nigerians engaged in the Agriculture sector mainly at subsistence level. The sector comprises of four main sub-sectors: Livestock, Crops production, fishing and forestry (Food and agricultural organization (FAO), 2023; Oyaniran, 2020).

The poultry enterprise, which is an important sub-sector of livestock in the Agricultural sector, constitutes over 50% of the total livestock population in Nigeria, as at 2010, showing its prominence in livestock sub-sector of the nation's agricultural sector (Adeyonu, *et al*., 2021). Poultry refers to a domestication of a wide range of birds of various species which involves chickens, turkeys, ducks, geese, guinea fowl, pigeons, peacock etc. with chicken being the most commonly raised. The chicken poultry production comprises the raising of broilers and layers. The poultry industry contributes significantly to the development of Nigeria's economy, provides job opportunities and income for the

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inhabitants, and serves as a good source of animal protein, thereby contributing to food security and poverty alleviation (Obike *et al.,* 2017; Ogunyemi & Orowole, 2020). Adeyonu *et al*., (2021) described the chicken poultry industry as the most dynamic, developed, commercialized and fastest growing livestock sub-sector in the country. Notwithstanding its contribution to food security, poverty reduction and growth of Nigeria economy, the poultry industry contends with numerous constraints which include competition between food and feed, dependence on the importation of exotic breed, drought, outbreak of diseases, high cost of inputs, low-quality chicks, inadequate market, etc. all of which constitute a production environment of risks and uncertainties in the industry (Baruwa & Adesuyi, 2018).

Legesse and Drake (2005) defined risk as the influence of an undesirable result which occurs due to natural or human action. Adeyonu, *et al*., (2021) and Iheke and Igbelina (2016) explained that agricultural production decisions are taken in the environment of risk which affects the production and marketing decisions of the farmer and the entire farming operations as yield, product prices, input prices and quantities are usually unknown with certainty when investment decisions are being made. The factors that affect the decision of the farmers cannot be predicted with complete accuracy, though, Abimbola *et al*., (2013) enumerated them to include climate variability, input price variability, technology change, theft, insecurity, incidence of pest and diseases, equipment breakdown, high cost of veterinary services, change in government policy, borrowing money with sudden change in interest rates, scarcity of labour at peak time and change in health and wellbeing of the farmers. Iheke and Igbelina, (2016), and Kahan (2013) classified risks in livestock farming into: production (drought, heavy rainfall and diseases and pests); marketing (supply/cost of inputs, demand for a product/price and cost of production); financial risk (loan and its cost); institutional (change in policy at the local, national and international levels); risk related to inflation and interest rates, and personal/human risks (accidents, illness, civil unrest and death).

The poultry farmers, like other farmers, are faced with a variety of output and income fluctuations arising from risks associated with the enterprise. These risks exert negative effect on the farmers' output, and income (Iheke and Igbelina, 2016). Nyikal and Kosura, (2005) explained that risk is an inherent feature of poultry production and a major concern among poultry farmers in Nigeria due to their inability to predict input prices, outputs and their prices, government policies and climate accurately. Hence, risks directly affect farmers' income and output, and can also be a threat for the future of their farms. Iheke and Igbelina, (2016) identified the major risks encountered by the chicken poultry farmers as production risk, financial risk, price/marketing risk and casualty risk while the severe risk situations were disease outbreak, pest attack, price fluctuation, market, culling, death of the farmer, theft and burglary, fire outbreak, and power failure. These risks, however, vary from location to location, type of poultry and management practices engaged by the farmer (Iheke & Igbelina, 2016). Iheke and Igbelina (2016) further emphasized that many chicken poultry farmers in Nigeria are less equipped to mitigate risks associated with production, income, and their health, and Abimbola *et al*., (2013) cautioned that the failure to mitigate the risks associated with poultry production could lead to a serious reduction in poultry production which can result into lower productivity, malnutrition and ill health. Chilala (2019) lamented that despite a very successful improvement in bird performance, a gap still existed between the potential of the birds and the actual performance of the birds due to a large number of infectious and non-infectious risk factors. The inability of the poultry farmers to properly manage the risk factors has been attributed to low adoption of risks and uncertainty management strategies, and to the fact that Nigerian farmers do not have adequate understanding of risks and uncertainties as well as risk management skills or approach to manage problems and reduce consequences of risks and uncertainties. These management strategies, if adopted by the farmer, can determine the farmer's output (Iheke & Igbelina, 2016).

The Nigerian government, in a bid to ensure food security and assist farmers, introduced several intervention agencies and funds for the development of agriculture. Notable among them were the Commercial Agriculture Credit Scheme (CACS), which enabled many of the leading commercial poultry producers to expand dramatically from 2008 to about 2013, Nigeria Incentive-Based Risk Sharing Scheme for Agricultural Lending (NIRSAL) which aimed to de-risk agricultural lending and thus make commercial banks more willing to lend to the agricultural sector. The NIRSAL scheme was helpful to the poultry sector because the bird flu scares of 2005 / 2006 and 2009 heightened their perception of risks associated with the poultry business, thereby discouraging banks from lending to poultry farmers (Odukoya, 2020). Oyaniran and Omomia, (2018) reported that the Nigerian Government strengthened the Anchor Borrowers Program, which enabled small- and medium-scale farmers to participate in agricultural lending schemes by being linked to off-takers whose guarantee enabled small farmers to access funding. All these efforts by the Government were to curtail the negative effects of risks to the farmers and ensure that the farmers adequately mitigate against the negative effects of risks, such as low output (Odukoya, 2020; Oyaniran & Omomia, 2018; Oyaniran, 2020). These challenges have stifled Agricultural productivity, affected the output and income of the farmers, and the contribution of the sector to the country's GDP (Baruwa & Adesuyi, 2018; Oyaniran, 2020).

It becomes obvious that numerous factors are responsible for the output of chicken poultry farmers.

Personal characteristics of the farmers, type of poultry, perceived risk factors, risk management strategies, availability of credit amongst other factors have been mentioned as factors responsible for the dwindling output of chicken poultry production (Adeyonu, *et al*., 2021; Chilala, 2019; Iheke & Igbelina, 2016; Odukoya, 2020; OECD, 2011; Ullah *et al*., 2016) but a gap still exists in identifying the determinants of broiler poultry output in several areas of Nigeria since this could be influenced by personal characteristics, geographical location, and type of enterprise (Adeyonu, *et al*., 2021; Ullah *et al*., 2016). It is on the basis of this that this study examined the implications of risks and risk management strategies on the farm output of broiler poultry farmers in Anambra state, Nigeria. The study was guided by the following research questions:

i. What attributes define the broiler farmers and their farms?
ii. What are the risks encountered in broiler production in the study area?
iii. What risk management strategies are practiced by the broiler farmers?
iv. What factors determine the output of broiler production in the study area?
v. What are the constraints to broiler production in the study area?

Specifically, the study identified the special attributes of the broiler farmers and farms, ascertained risks encountered in broiler production, identified risk management strategies practised by the broiler farmers, examined the factors that determined the output of broiler production and identified the constraints to broiler production in the study area.

Obike *et al*., (2017) listed risk sources/factors in poultry production as diseases outbreak, cost of inputs, lack of quality feed, unfavourable weather condition, theft and snake attack, lack or high cost of medication, lack of technical-know-how, inadequate credit facilities, marketing risk, production risk, casuality risk. Risk perceptions vary with farmer's location, climate, kind of poultry birds and method of poultry farming, and it is the responsibility of the farmer to know the aspect, attributes and extent of the risks that affect his farm business to take appropriate decisions to manage the risks (Adeyonu *et al*., 2021; Obike *et al.*2017). Obike *et al*., (2017) noted that enterprise diversification, marketing and production strategies are the main risk management strategies utilized by poultry farmers, while Adeyonu *et al*., 2021) categorized risk management strategies into majorly disease prevention and financial management.

Obike *et al*., (2017) as well as Namusoke *et al., (*2022) opined that output of farmers are likely to be negatively affected by the number of risks (risk index) encountered in their farming activities but with appropriate risk management strategies in place, there will be increased output of poultry production.

2. MATERIALS AND METHODS

This study was carried out in Anambra State, Nigeria. Anambra State has 21 Local Government Areas and four Agricultural Zones – Awka, Aguata, Anambra and Onitsha. The State is located in South East Nigeria between longitude 60 43'E and 70 22'E, and latitude 50 32'N and 60 47'N. It is bounded on the North by Kogi State, on the West by River Niger and Delta State, while Imo and Enugu States are on its South and East respectively. Anambra State has a land area of about 4,416km2 a population of over 4,000,000 people. Anambra State has 2 main seasons: Dry and Rainy seasons, with the dry season lasting from late October to early May while the rainy season occurs between May and early October (National Bureau of Statistics, 2017; NPC 2006; Onubogu, 2021; Anumudu *et al*., 2020).

The population of the study comprised all the broiler poultry farmers in Anambra Agricultural zone of Anambra State. A multi-stage sampling technique was employed in this study. In the first stage, one Agricultural zone, Anambra agricultural zone was purposively chosen due to the number of poultry farms in them. The second stage involved a random selection of 200 poultry farmers from the zone.

2.1 Measurement of variables/Data analysis

Descriptive statistics such as frequencies and percentages were used to identify the attributes of the broiler farmers and farms.

To ascertain the risk situation among the broiler farmers, the risk management practices adopted by the broiler farmers, and the constraints to broiler farming in the study area, the farmers indicated the extent/level of their choices from a list of options given to them. Their choices were based on a 5-point Likert scale with corresponding values of 5, 4, 3, 2 and 1 respectively. The scales for risk situation among the broiler farmers, and Constraints to Broiler farming in the area were structured into Very Serious (VS), Serious (S), Not Sure (NS), Unserious (U), and Very Unserious (VU); while the scale for the risk management practices adopted by the farmers was based on; Practiced very well (PVW), Adequately practiced (AP), not sure (NS), Slightly Practised (SP), and Not practiced (NP). The criteria reference or cutoff point of 3.00 $\left(\frac{(5+4+3+2+1)}{5} = \frac{15}{5} = 3\right)$ was adopted for all. Hence, any Risk situation or Constraint with mean value of 3.00 and above was regarded as Serious, otherwise Unserious; while any Risk management practice with mean value of 3 and above was regarded as Adequately Practised, otherwise, Not adequately practiced.

Multiple Regression Analysis

The determinants of the output of broiler production were examined using multiple regression analysis. The multiple regression model was specified as:

$Y= \beta_0 + \beta_1 AGE + \beta_2 SEX + \beta_3 MAS + \beta_4 YIS + \beta_5 BFE + \beta_6 EXV + \beta_7 CAS + \beta_8 RIE + \beta_9 RME + \beta_{10} SCA + \beta_{11} CAV + \mu t$

Where:
Y = Poultry output (number of birds that attain maturity/sale)
μt – Error term
β_0– Constant
β – Coefficients
AGE – Age of the farmer
SEX – (Male = 1, Female = 0)
MAS – Marital Status (Singe = 1; married = 0)
YIS – number of Years spent in formal education
BFE – Broiler Farming experience
EXV – number of Extension Visits
CAS – Casualty (number of birds that die, stolen or attacked by pest)
RIE – Risks experienced (Number of serious risks encountered)
RMS – Risk management Strategies Practised (mean score from the extent of risk management strategies practised)
STS – Stock Size (Number of birds purchased)
CAV – Credit availability

3.0 RESULTS AND DISCUSSION

3.1: Special Attributes of the Broiler Farmers and Farms

Table 1 displays the special attributes of the broiler farmers. Education has been identified as a factor that increases and boosts productivity. The finding of this research affirms that 100% of the farmers went through formal education with the average number of years spent in school as approximately 14 years (OND) and this was attained by up to 58% of the farmers. This suggests that the farmers were well positioned to understand several things about broiler production and will also be able to make decisions based on changing situations. In contrast, Ume, *et al*., (2016) reported an average of 12.4years in school for poultry farmers but affirmed that high educational attainment is a desirable condition for Agricultural development.

According to Table 1, 14% of the farmers had a broiler production experience of between 1-5 years, 74% had between 6-10 years of experience while 12% had above 10years experience. The mean years of experience was 10 years. This implies that the broiler farmers have been long enough in the enterprise to make certain positive decisions because farming experience enables a farmer to be better informed about an enterprise. This concurs with Ume, *et al*., (2016).

The response of the farmers to their source of capital for start-up shows that 56% of the farmers sourced their capital from friends and relatives and collected loan from cooperative groups which they belonged, while 44% of the farmers made use of their personal savings and this limits their scale of product. Majority (52%) of the farmers had no contacts with the extension agents in a season and this is very poor, considering the relevance of extension services in agricultural production. In contradiction to this finding, Ume, *et al.,* (2016) reported a mean contact of 10 visits and noted that extension services are essential for dissemination of innovations to farmers and provision technical assistance. Majority (56%) of the farmers had access to veterinary service while 44% of the farmers did not have access to veterinary service. This shows that the broiler farmers understood the implication of managing unhealthy birds, and, ensured that their birds were healthy. Access and usage of veterinary services is a way of managing risk associated with broiler production (Abimbola *et al*., 2013).

The findings also show that both intensive and semi-intensive housing systems were used by the broiler farmers. 74% of the farmers made use of intensive housing system while 26% made use of semi-intensive housing system. No broiler farmer used extensive housing system because of security reasons, diseases and the need for warmth. The average number of birds stocked by the farmers as shown in Table 1 was 271 birds with only 6% of the farmers breeding less than 100 broiler birds, while 94% of the farmers raised over 100 birds. This is an indication of commercialization of the broiler enterprise in the area. Table 1 further reveals that 82% of the farmers lost between 0%-5% of their birds per stock to diseases and thefts with an average of 2.7% casualty rate per stock. This low rate could be because they had security in the farm and also gave regular medication.

Table 1: Special attributes of the Broiler Farmers and farms

Variable	Frequency	Percentage %	Mean/ *Mode*
Age *(years)*			**47.76**
20-*40*	72	36	
41-*50*	112	56	
>50	16	08	
Years in school			**13.98 years**
1-6	20	10	
7-12	64	32	
>12	116	58	
Farming experience			**9.48 years**
1-5	28	14	

Variable	Frequency	Percentage %	Mean/ *Mode*
6-10	148	74	
>10	24	12	
Source of capital			***Other sources***
Personal	88	44	
Other sources	112	56	
Number of extension visits/year			**0.76**
0	112	56	
1-5	88	44	
Membership of cooperative			***No***
Yes	40	20	
No	160	80	
Access to veterinary services			***Yes***
Yes	112	56	
No	88	44	
Farm size(number of birds}			**271 birds**
1-100	12	6	
>100	188	94	
Housing system			***Intensive***
Intensive	148	74	
Semi-intensive	52	26	
Casualty rate/stock			**2.7%**
0%-5%	164	82	
>5%	36	18	

Source: field survey 2025.

3.2 Level of Risk Encountered in Broiler Production

Table 2 displays the various risks encountered by farmers in broiler production and their levels of seriousness. Out of the nineteen (19) risk factors presented to the broiler farmers, ten were identified as serious risk factors, while nine were unserious risk factors to the broiler farmers. These serious risk factors were High cost of feed/unavailability of feed with a weighted mean score of 4.16, fluctuation of prices/marketing risk (3.68) which could result to farmers buying a day old chick and other input at high price, and outbreak of diseases (3.36) which affects broiler production because it leads to the disorder of structure and function of animals thereby causing decrease in the farmers output and loss of money. The other serious risk factors to poultry production in the area were heat stress (3.30), climate change (3.22) (which includes flooding, and unfavourable weather), unpredictable poultry output (3.22), sickness/death of poultry owner (3.14), inefficient workers (3.10), unavailability of credit/financial risk (3.07) and insecurity/civil unrest (3.02). However, changes in income from other sources, policy changes, contaminated feed and water, poor poultry housing, poor poultry housing, high mortality rate, stampeding, drug and vaccine failure, fire outbreak, and theft/attack by animals were not taken as serious risks encountered by farmers in broiler production. The identified serious risks fall within the classification of risks encountered in broiler production according to Kahan (2013) and Igbelina (2016) who classified the risks in poultry farming into production (drought, heavy rainfall and pest and diseases), financial, price/marketing, disease, death of farmer, burglary etc. However, the findings of this research failed to agree with Van *et al.,* (2020) and Abimbola *et al*., (2013) that quality of poultry house, stampeding/flock density, incidence of pest, and change in Government policies are serious risks.

Table 2: Level of risk encountered in poultry production

Risks	Mean scores	Position	Decision
High cost/ unavailability of feed	4.16	1st	Serious
Fluctuations of prices/marketing risk	3.68	2nd	Serious
Outbreak of disease	3.36	3rd	Serious
Heat stress	3.30	4th	Serious
Climate change	3.22	5th	Serious
Unpredictable poultry output	3.22	5th	Serious
Sickness/death of the poultry owner	3.14	7th	Serious
Inefficient workers	3.10	8th	Serious
Unavailability of credit/financial risk	3.07	9th	Serious
Insecurity/civil unrest	3.02	10th	Serious

Risks	Mean scores	Position	Decision
Changes in income from other sources	2.90	11th	Unserious
Policy changes	2.86	12th	Unserious
Contaminated feed and water	2.64	13th	Unserious
Poor poultry housing	2.40	14th	Unserious
High mortality rate	2.26	15th	Unserious
Stampeding	2.02	16th	Unserious
Drug and vaccine failure	2.00	17th	Unserious
Fire outbreak	1.72	18th	Unserious
Theft/attack by other animals	1.01	19th	Unserious

Source: field survey 2025.

3.3 Risk Management Strategies Practiced by the Broiler Farmers

The several risk management strategies practised by the broiler farmers are displayed in Table 3. Eleven (11) out of the 16 risk management strategies presented to the farmers were graded as 'adequately practised' because they had mean scores higher than 3. The rest (5) were graded as 'not adequately practised'. The adequately practised risk management strategies include buying birds from reputable source (3.56), buying feeds and other inputs ahead of time (3.44), proper and timely medication/vaccination (3.40), mixed farming/diversification (3.36), biosecurity measures (3.36), and disease prevention activities (3.34). Disease prevention activities is a risk management strategy practised by the broiler poultry farmers to prevent diseases incidence which could lead to high mortality rate of the poultry bird and financial loss. Farmers diversify as a way to manage risk so that in case of failure of one enterprise, they could fall into another enterprise. Obike *et al*., (2017) noted that enterprise diversification, marketing strategies and production strategies are the main risk management strategies utilized by poultry farmers. Adeyonu *et al*., 2021 stressed that medication and vaccination are necessary risk prevention and management strategies employed by poultry farmers. Other risk management strategies adequately practised by the broiler farmers, according to table 3, are proper feed and water management (3.24), bulk buying of inputs (3.22), good financial management (3.14), having sources of non-farm income (3.14), and regular maintenance of poultry house (3.08). This shows that the broiler farmers in the study area were informed about the risk factors in broiler production in their area, and hence, managed such risks to the best of their ability. This further explains the low casualty rate witnessed in the area. These risk management strategies adequately practiced by the broiler farmers in the study area are similar to those identified by Adeyonu *et al*., (2021).

However, contrary to the assertions of Oyaniran and Omomia (2018), Odukoya (2020), and Oyaniran (2020), the broiler farmers in the study area did not engage in any form of Government supported risk management strategy. Also, relaxation of pen house before stocking, regular medical check for the farmers, training workers/labourers, agricultural insurance scheme, and credit borrowing were not adequately practiced by the farmers as risk management strategies.

Table 3: Risk Management Strategies Practiced by the Broiler farmers

Risk management strategies	Mean score	Position	Decision
Buying birds from reputable source	3.56	1st	Adequately practised
Buying feeds and other inputs ahead of time	3.44	2nd	Adequately practised
Proper and timely medication/vaccination	3.40	3rd	Adequately practised
Mixed farming/diversification	3.36	4th	Adequately practised
Biosecurity measures	3.36	4th	Adequately practised
Disease prevention activities	3.34	6th	Adequately practised
Proper feed and water management	3.24	7th	Adequately practised
Bulk buying of inputs	3.22	8th	Adequately practised
Good financial management	3.14	9th	Adequately practised
Having sources of non-farm income	3.14	9th	Adequately practised
Regular maintenance of poultry house	3.08	11th	Adequately practised
Relaxation of pen house before stocking	2.94	12th	Not adequately practised
Regular medical check for the farmer	2.94	12th	Not adequately practised
Training of workers/Labourers	2.86	14th	Not adequately practised
Agricultural insurance	2.44	15th	Not adequately practised
Credit borrowing	2.34	16th	Not adequately practised

Source: field survey 2025.

3.4 Determinants of the Broiler Farmers' Output

The multiple regression results are displayed in Table 4. The value of R^2 which is 0.71 indicates that the listed variables jointly explains up to 71% of the variations in the output of broiler production. The significance of the F statistic confirms the overall significance of the regression analysis. The result clearly reveals that seven out of the 11 variables examined were significant at either 5% or 1% levels. Five variables (years in school, broiler farming experience, number of risk management strategies practiced, stock size, and fund/credit availability) had positive effect on the output of broiler production, while two variables (extension contact and risks experienced) had negative effect on output of broiler production.

In line with a priori expectation, the coefficients of years spent in school and broiler farming experience were positive and significant at 5%. The coefficient of years in school (education) is 0.799 which implies that there is an increase of approximately 1 bird for each extra year the farmers spends in formal education. An explanation for this is that educated people are risk averse and prudent in resource management, and this could make literate farmers to make better production decisions for increased broiler output and profitability. This is in line with the findings of Namusoke (2022); Obike *et al.,* (2017) and Ume *et al*., (2016). For every extra year of experience in broiler production, the output of the farmers will increase by approximately two birds. This means that farmers with many years of experience in poultry production are likely to attract more output than farmers with less experience. The reason for this is that the more experienced farmers are better informed about poultry management, and prepared to handle the risks and uncertainties inherent in poultry farming. This confirms the reports of Obike *et al*., (2017); and Ume *et al*., (2016) that farming experience is a positive determinant of the output of broiler production, but contradicts Namusoke *et al*., (2022) who reported a negative relationship between poultry output and years of experience of the farmers.

This study ascertained that the coefficient of extension services, against a priori expectation, was negative as the broiler farmers that had contacts with extension agents had 1 bird less than those farmers without extension contact. The insufficient transfers of technologies to the farmers as well as bottlenecks that militate against enhancing the adoption of technology are some of the critical reasons for this negative effect. This finding of a negative relationship between extension contact and broiler output contradicts the positive relationship established in Namusoke *et al.,* (2022), but agrees with Ume *et al.,* (2016) who also reported negative relationship between extension services and farmers' level of production. This they attributed to the fact that in sub-Saharan Africa, extension workers are hardly afforded in-service training and are rarely linked to research and updates, hence, they continue to disseminate outdated information repeatedly to the same audience.

Table 1 showed the various risks encountered by farmers in broiler production and their levels of seriousness. These risk factors have negative effect on the output of broiler production. They lead to decrease in output. The results on Table 4 affirm that the output of broiler farmers will reduce by 2 birds for each increase in number of risks encountered in broiler production. In essence, the casualty will be expected to rise by 2 birds when an extra risk is encountered. Tuz *et al.,* (2020) observed that maximum disease incidence (DI) was recorded in farms that utilize municipal water for their activities and drinking and this affected the output from the farm. Namusoke *et al., (*2022) and Obike *et al. (*2017) likewise identified that the more the number of risks encountered, the less the output of poultry production. Obike *et al.,* (2017) explained that the output of broiler farmers are negatively affected by the risks (risk index) encountered in their farming activities.

The number of risk management strategies practiced by the broiler farmers is a positive determinant of the output of broiler production. According to the results displayed on Table 4, output of broiler production will increase by approximately 4 birds when appropriate risk management strategies are employed. This implies that casualty will be highly reduced with an increase in the number of risk management activities engaged in broiler production. This agrees with Namusoke *et al., (*2022), Obike *et al., (*2017), as well as Tuz *et al.,* (2020) who also found that good management of risks in broiler production is a positive determinant of the output of poultry production.

This study ascertained that stock/flock size had a significant positive effect on output. This could be because the more the flock size the more the human capital and risk perception of the farmer so as to reduce casualty. This confirms the reports of Yusuf *et al.,* (2016), Obike *et al.* (2017) and Afodu *et al*., (2020) who identified stock size (number of birds) as one of the positive drivers of productivity in broiler production. Table 4 further reveals that the output of poultry farmers' who had access to fund/credit would be 1 bird more than the output of their counterparts who had no access to fund/credit. Availability of fund/credit enables expansion of farm operation which in turn will result into increased productivity and farm output. Access to fund will lead to increase in farm size and provision of other necessary poultry management requirements. Ume *et al*., (2016), and Obike *et al.,* (2017) agreed that farmers' access to credit/finance/capital input brought an increase in output of broiler farmers.

Table 4: Determinants of Broiler farmers' output

Variables	Coefficient	t-value	p-value
Age	-0.002	-0.708	0.491
Sex	-0.130	-0.547	0.591
Marital status	-0.225	-0.818	0.425
Years in school	0.799**	2.372	0.023
Broiler farming experience	1.741**	2.457	0.019
Extension Contact	-1.028 **	2.130	0.040
Casualty	0.026	0.592	0.557
Risks Experienced	-2.119***	-2.779	0.009
Risk Management Strategies Practised	3.986***	6.637	0.000
Stock size	0.960***	**4.347**	0.000
Credit Availability	1.118***	2.802	0.007
Constant	5.006***	**4.1308**	0.000
R^2	**0.7176**		
$\bar{R}^2$	**0.5821**		
F	**4.1305*****		**0.000**
Durbin-Watson Stat	**1.975**		

Source: Field Survey, 2025**. Note: ** & ***= significant at 5% and 1% levels respectively.**

3.5 Constraints to Broiler Farming in the Study Area

The various constraints militating against broiler production are displayed in Table 5. The response from the broiler farmers indicated that though the 16 issues raised in this study were constraints to broiler farming, 11 were serious constraints while 5 were not serious constraints. The 11 serious constraints to broiler production in the area are high cost of feed with a weighted mean score 3.72, low market sales price (3.28), inadequate access to veterinary services (3.26), insufficient funds (3.24), irregular visits by extension agents (3.24), lack of transportation (3.22), outbreak of diseases (3.20), supply of poor quality chicks (3.14), bad road (3.08), inefficient management (3.02) and unavailability of drugs and vaccine (3.02). The implication of this finding is that the output of the broiler farmers will be hindered by these numerous constraints. High cost of feeds will force broiler producers to sell the birds before maturity less they incur debt. The broiler farmers will not be able to provide adequate health care to the birds due to inadequate access to veterinary services. This will have a negative effect on the birds and eventually a low output for the farmers. Production constraints and diseases create a gap between the potential of birds and the actual performance of the birds even when there is an improvement in other management activities (Chilala, 2019; Iheke and Igbelina, 2016; Onubogu, 2023). Adeyonu *et al*., (2021) as well as Masaki *et al*., (2020) also identified outbreak of diseases, high cost of inputs, low quality chicks, inadequate market, birds' health related issues as serious constraints which affect the output of broiler production if not properly handled.

However, high rate of mortality, unavailable market for the birds, theft and attack of birds by snakes, pest etc., and type of poultry housing, were not taken as serious constraints by the broiler farmers in the study area. This affirms the report of Masaki *et al.,* (2020) that many poultry farmers embrace the precaution of ensuring adequate bio security of their birds and this greatly reduces loss of birds and casualty rate.

Table 5: Constraints to poultry farming in the study area

Constraint	Mean score	Position	Decision
High cost of feed	3.72	1st	Serious constraint
Low market/selling price	3.28	2nd	Serious constraint
Inadequate access to veterinary services	3.26	3rd	Serious constraint
Irregular visits by extension services	3.24	4th	Serious constraint
Insufficient funds	3.24	4th	Serious constraint
Lack of transportation	3.22	6th	Serious constraint
Outbreak of disease	3.20	7th	Serious constraint
Supply of poor quality chicks	3.14	8th	Serious constraint
Bad roads	3.08	9th	Serious constraint
inefficient management	3.02	10th	Serious constraint
Unavailability of drugs and vaccine	3.02	10th	Serious constraint
High rate of mortality	2.84	12th	Not serious
Unavailable market for the birds	2.80	13th	Not serious
Theft and Attack of birds by snakes, pest etc.	2.68	14th	Not serious
Type of housing	2.60	15th	Not serious

Source: field survey 2025

4. CONCLUSION

Based on the findings, this study makes two crucial conclusions; first is that broiler producers in the area are conscious of the several risk factors to broiler production and put management strategies in place to curb the effect of these risks on their birds. Secondly, the positive determinants of the output of broiler production were number of years spent in school by the farmers, broiler farmers' farming experience, number of risk management strategies practised, stock size, and fund/credit availability, while the negative determinants were contact with Extension service providers, and number of Risks experienced by the farmers. The following recommendations are made:

i. There should be free organizations of trainings and seminars for poultry farmers in the effective management practices for maximum output,
ii. Well trained extension agents should visit the poultry farms from time to time to help solve problems and challenges of the farmers,

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