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POULTRY FEED CRISIS IN NIGERIA: IMPLICATION FOR POULTRY PRODUCTION IN KWARA STATE

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ABSTRACT

This study examined the influence of high cost of poultry feed on poultry production. Specifically, it investigated the causes of high cost of poultry feed, determined how cost of poultry feed has affected poultry production and identified coping strategies to high cost of feed. The study employed the use of interview schedule to proportionately sample 171 (68%) out of 251 registered poultry farmers using Taro Yamane formula. Data were analyzed using both descriptive and inferential statistics. Results revealed that respondents' poultry farming experience has a mean of 13.5 years, 43.3% raised broilers and layers while 72% obtain a bag of poultry feed at an average price of ₦6,780 ($9.78). It was further established that respondents perceived climate change due to erratic rainfall (30.4%) and hoarding of poultry feeds by sellers (18.7%) as causes of high cost of poultry feed, majority (94.7%) were affected with low profit (4.61±.723). Furthermore, respondents use alternative feed sources (4.60±.786) as coping strategy while years of experience and cost of feed were found to influence poultry production. The Binary Logistics Regression result shows that there is a significant relationship between the years of poultry farming experience of poultry farmers, coping strategies to high cost of feed and the perceived effects of high cost on poultry production while the result of the Chi-square test also showed a significant relationship between the perceived effects of high cost of poultry feed and the coping strategies adopted by poultry farmers.

Keywords*:* Cost of feed; influence; poultry production; strategy

INTRODUCTION

The livelihoods of at least 1.3 billion people worldwide are supported by livestock, which also provides 34% of the world's protein supply. Livestock contributes roughly 40% of overall agricultural output in industrialized countries and 20% in developing ones (FAO, 2022). Large-scale livestock production and related food chains substantially satisfy the

increasing demand for livestock products. However, hundreds of small-scale producers depend on livestock for their livelihoods (FAO, 2023).

Beyond food production, farm animals play other significant economic, social and cultural roles and provide a variety of functions and services (Soussana *et al.*, 2017). They are an essential part of the agro-ecosystems (FAO, 2021). Livestock production is the rearing of animals ranging from cattle, poultry, sheep, goats, rabbits, snails, pigs etc for meat, eggs, leather and other materials. Growth in livestock production in both developed and developing countries has been led by poultry. Poultry includes domesticated birds such as chickens, ducks, turkeys and geese raised to produce meat or eggs for human consumption (Mozdziak, 2019; Bello *et al*., 2022). There has been an upsurge in the consumption of poultry meat, notably in East and Southeast Asia and Latin America, particularly in China and Brazil. Currently, Nigeria is noted as having the second largest chicken population in Africa, with a standing stock of about 180 million birds producing more than 14 billion eggs and 454,000 tonnes of meat annually (Makasi, *et al*., 2020). Poultry production helps to generate income, creates employment opportunities for the populace, improve human nutrition, and provide quality food, organic fertilizer (manure) and a renewable asset among majority of the rural household (Bello *et al*., 2022). They are highly valuable globally because of the immense contribution they make, which are not limited to food security, protein supply, and peoples' livelihood. They fit into urban and peri-urban poultry production, and in many parts of the world, they generate income over which women have control, thus contributing to the millennium goals regarding gender issues (Vaarst *et al.*, 2015).

The Nigerian poultry industry contributes approximately 25% to agricultural GDP (Makasi *et al.*, 2020). The federal government encouraged farmers to upgrade from subsistence to commercial agriculture. Poultry production in Nigeria has become a fast-growing business in the country especially among youths as there is constant and rapid increase in the rate of unemployment (Amos, 2006). It is an entrepreneurial response to the income growth of the country coupled with the rapid population growth and development which has caused an increase in consumer demand for poultry products. Nigeria poultry industry is posited as growing consistently and steadily to a population of 30 million, a number representing more than 60% of the National Poultry Population. It was noted further that upon investment, the sector is worth over ₦ 2 trillion. (Makasi *et al.*, 2020). Before the 21st century, poultry birds raised on the farm scavenge for much of their feed, feeding on insects, grains spilled by ruminant animals and plants on the farm. This was supplemented with grains and household wastes (Mehari, 2016). However, this method does not supply birds with adequate nutrients and supplements needed for growth and development. Poultry requires feed that has high quality nutrition to make them healthy and grow well, hence the need to formulate a nutritionally complete feed to provide all the nutrients needed by the poultry birds without them having to scavenge for their feed. Feed ingredients are therefore selected based on nutritive value, palatability, cost and other factors. These ingredients are classified into cereals example are maize, wheat sorghum, maize been the commonly used cereal etc, protein meal (soybean cake, fish meal), fats and oils (palm oil, sunflower oil), minerals and vitamins (calcium) and water (Ravindra *et al.*, 2015).

Globally, the poultry sector is dealing with the effects of feed and feed grain shortage that is attributed to Covid-19 pandemic. In different countries all around the world, the pandemic has led to the closure of most poultry feed companies, closure of farms, loss of employment and others (MI, 2022). The poultry feed supply was disrupted due to lockdown

in different countries like Brazil and Argentina had to reduce their export of raw materials of poultry feed such as soybean and maize, which led to a shortage and scarcity of dry feed in several developing countries. In several African countries, the cost of poultry feed has increased drastically as a negative impact of the pandemic. (Attia *et al.,* 2020). The major and most challenging problems faced by farmers in poultry production presently in Kwara state and Nigeria as a whole are high cost of feed, inadequacy of feed sources in terms of quality and quantity, high cost of the feed ingredients regardless of the production system and geographical location (Oladoku & Johnson, 2012). The National president of Poultry Association of Nigeria opined that constant exportation of soybeans and maize which are the main ingredients for poultry feed from Nigeria may spell doom for industry (Sowole, 2021). There is the scarcity and near absence of Soybeans and maize in the Nigerian markets. The factors responsible for this been the scarcity and high cost of this crops, climate change, increased competition between humans and animals for the feed ingredients especially maize and soybean and activities of traders buying and hoarding the grains (Aremu, 2022). Intelligence and field reports have also indicated that the Soybeans in seeds and meals are being exported out of the country thereby causing the present crisis of feed scarcity and high cost of feed (Sowole, 2021).With the growing prominence in empirical studies on coping strategies as a necessity to develop effective policy process that will translate to improved poultry production among poultry farmers in Nigeria, it is unfortunate that none of the previous studies provided information on the influence of high cost of feed on poultry farmers in Kwara state.

In light of this research gap, this study therefore assessed the influence of cost of feed on poultry production among poultry farmers in Kwara State, examined the perceived causes of high cost of poultry feed, determined how cost of poultry feed has affected poultry production and identified the coping strategies to high cost of feed used by poultry farmers.

MATERIALS AND METHOD

The Study Area

Kwara State was created on 27 May 1967 and currently the state consist of 16 local government areas namely Asa, Baruten, Edu, Ekiti, Ifelodun,Ilorin East, Ilorin West, Ilorin South, Isin, Oke Ero, Pategi, Oyun, Kaiama, Offa, Moro and Irepodun. The state is in the north central geopolitical zone of Nigeria located on the latitude 8˚30'N and longitude 5°00E (Yusuf *et al.*, 2015).

With a total land area of 34,600 km^2 and an annual rainfall of 1,500 mm, the main source of the state's economy is Agriculture as most Kwaran residents are involved in either crop or animal production.

Sampling and Data Collection

The target population for this study was registered poultry farmers. Using the list of 251 registered members obtained from Kwara state Ministry of Agriculture, 171 respondents were proportionately sampled and used for the study. This accounted for 68% of registered poultry farmers using the Taro Yamane (1967) sample size determination formula for finite population as shown below:

$$n = \frac{N}{1+N(e)^2}$$

Where:
n= sample size
N= Study population (251)
e= Error of precision of 4.3%
1 = Constant

The Taro Yamane formula predicted 171 (68%) as the minimum that could be sampled from the population. Data were collected from the respondents using a well-structured interview schedule. The perceived causes of high cost of feed were measured by developing some causal statements for respondents to react as either Yes (1) or No (0). The level of effects developed by Bhaskaran and Praveena (1982) was adapted into this study to measure the level of effects of high cost of poultry feed on the respondents.

The level of effects of high cost of poultry feed on poultry production was thus assessed as shown below:

$$\text{Percentage level of effects} = \frac{\text{Respondent total score}}{\text{Total possible Score}} \text{ x } 100$$

Based on the above calculation, respondents were further classified into two categories of level of effects as shown below:
Category 1: Level of Effects of 12-55 was considered as low
Category 2: Level of Effects of 56-100 was considered as high

Data Analysis

The data collected were subjected to descriptive and inferential statistics. The descriptive statistics used include frequency, percentages, mean, ranking and standard deviation. The inferential statistics used were Binary Logistics Regression and Chi-square test.

Following Kirkwood (2003), the binary regression model was used as shown:

$$Y = (e^{b_o + b_1x_1 + b_2x_2 \ldots\ldots + b_kx_k})(1 + e^{b_o + b_1x_1 + b_2x_2 \ldots\ldots + b_kx_k})$$

Where Y= level of effect (low = 0, high = 1)
X_1 = years of experience (number of years spent in poultry production)
X_2 = Education status (number of years spent in school)
X_3 = Cost of feed (₦)
X_4 = Bird reared (Broiler, layers, cockerel)
X_5 = Sources of feed (Purchased, personally manufactured, locally manufactured)
X_6 = Number of birds
B = coefficient of various explanatory variables

RESULTS AND DISCUSSION

Results in Table1showed that the major causes of high cost of feed include climate change (30.4%). One of the effects of climate change that has affected the availability and

cost of poultry feed is erratic rainfall and drought. This has affected the cultivation of maize and soybean that are the main ingredients of poultry feed. Buying and hoarding of poultry feed by feed sellers (18.7%) and buying and hoarding of feed ingredients by traders (18.1%). This submission is in line with the findings of Aremu (2022) who stated that poultry feed sellers and feed ingredients traders buy feed and feed ingredients in bulk then keep it so that they can sell at a higher price later and this has also contributed to the high cost of poultry feed.

Furthermore, some respondents also believed that cost of transportation of poultry feed from where it is purchased to the farm, lack of government assistance in providing animal feed, grade of maize, quality and sufficient feed, weak government policies on the exportation of major feed ingredients which are soybeans and maize and high demand of feed ingredients by humans and animals are factors which contribute to the high cost of poultry feed. This is in line with the findings of Dalha (2021) who stated that poultry feed ingredients are exported out of the country in large quantities leading to the shortage. The good quality of the soybeans seed produced in Nigeria attracts foreigners leading to exportation of soybeans from Nigeria. All these contribute to the causes of high cost of feed in the study area (Aremu, 2022).

Table 1: The perceived causes of high cost of poultry feed

Causes	Yes	
	Frequency	Percentage
International border closure against feed ingredients and foreign feed	15	8.8
Herdsmen conflicts/disturbance of crop farmers	5	2.9
Insufficient and shortage of feed ingredients	9	5.3
Low production of feed ingredients	16	9.4
High demand for feed ingredients by humans and animals	27	15.8
Climate Change	52	30.4
Buying and hoarding of feed ingredients by traders	31	18.1
Buying and hoarding of poultry feed by feed sellers	32	18.7
Others:		
Cost of transportation	3	1.8
Lack of government assistance	2	1.2
Lack of government policies	1	0.6
High demand by poultry farmers	1	0.6
Inadequate education of farmers on poultry farming	1	0.6
Seeds planted are adulterated	1	0.6
Farmers sticking to a particular feed brand	1	0.6

Results presented in Table 2 shows that low profit, constant increase in price of poultry products, low productivity, decrease in number of birds raised and reduction in quantity of feeds given to birds ranked 1st, 2nd, 3rd, 4th and 5th with mean valuesof4.61, 4.60, 4.49, 4.32 and 4.26, respectively, were the first 5 perceived effect of high cost of feed on poultry production. This implies that poultry farmers experience low profit probably due to high cost of poultry products and low demand for the products, price of poultry products increases constantly due to high cost of feed which means that farmers have to make up for the cost spent on purchasing expensive feed by increasing the price of poultry products so

that they will not run at a loss. Also farmers experience low productivity when they are unable to purchase feed at a high price or when feed are obtained at a high price and it is not enough for the birds, decrease in number of bird and reduction in quantity of feed given to birds implies that poultry farmers reduce the number of birds they raise so that the feed purchased or available will be enough to feed them and they reduce the quantity or amount of feed given to birds to make sure it goes round and it is sufficient for the birds. Constant increase in the price of poultry products due to high cost of feed discourages consumers from purchasing poultry products like before. Poultry farmers may be forced to reduce the number of birds raise (Ekot, 2022).

Table 2: The perceived effects of high cost of poultry feed

Effects	SA	A	U	D	SD		
	%	%	%	%	%	Mean	Rank
Low productivity	62.0	31.6	1.2	4.1	1.2	4.49±.814	3rd
Decrease in number of birds raised	53.8	28.7	13.5	4.1	0	4.32±.859	4th
High input and low output	41.5	44.4	7.0	4.7	2.3	4.18±.925	7th
Inconsistent feeding pattern of birds	39.2	42.1	7.0	7.6	4.1	4.05±1.067	9th
Reduction in quantity of feed given to birds	50.9	33.3	9.4	3.5	2.9	4.26±.972	5th
Health Issues	29.8	22.2	32.2	11.7	4.1	3.62±1.149	12th
Constant increase in price of poultry products	71.9	18.1	8.2	1.8	0	4.60±.715	2nd
Closure of poultry business	38.6	38.0	10.5	11.1	1.8	4.02±1.026	10th
Loss of weight in birds	52.0	25.1	11.1	7.6	4.1	4.13±1.137	8th
Birds mortality due to inadequate feeding	29.2	35.7	21.6	9.9	3.5	3.77±1.085	11th
Low profit	71.3	21.6	3.5	3.5	0	4.61±.723	1st
Low quality of poultry products	53.2	29.8	10.5	2.9	3.5	4.26±1.003	6th

Majority (94.7%) of the respondents are highly affected by high cost of poultry feed and this finding agrees with the report of Anwasia (2015), that the major constraint encountered by small scale poultry farmers is feed cost. As mentioned earlier that feed is an integral component of poultry production which makes up 70% of the total cost of poultry production (Ekot, 2016). This implies that a higher percentage of the cost of poultry production is allotted to feed alone thereby making high cost of feed a major problem for small scale poultry farmers.

Table 3: Level of effect among individual respondents

Percentage range score of effect	Frequency	Percentage	Level of effect
12 – 55	9	5.3	Low effect
56 – 100	162	94.7	High effect
Total	171	100.0	

Table 4 presents result on the coping strategies to high cost of feed adopted by poultry farmers. Results show that poultry farmers (71.3%) use of alternative feed sources based on

cost and availability, mostly, purchase feed when available in bulk (69.0%) and production of poultry feed locally (65.5%) were the 1st, 2nd and 3rd coping strategies to high cost of feed adopted by poultry farmers respectively. This implies that poultry farmers use different feed sources to feed their birds, they purchase feed in bulk when it is available so that they can store it and used in the nearest future and also poultry feed are produced by farmers themselves to save cost. The result agrees with the findings of Ogungbesan *et al.* (2016) who reported that high cost of poultry feed is responsible for the widening animal protein in-take gap and there is the need to produce feed at an affordable price to the farmers through the search and use of cheaper feed ingredients that are always available and have no competition with man's dietary demand.

The use of supplementary feed, crop waste as source of feed and change in the feeding routine of birds ranked fifth, sixth and seventh respectively. This implies that poultry farmers mostly depend on feed made from maize and soybean as other feed sources maybe nutritionally inadequate or they do not have sufficient knowledge on the use of crop waste as feed source (Thirumalaisamy *et al.,* 2016).

Table 4: Coping strategies to high cost of poultry feed

Coping Strategies	SA	A	U	D	SD		
	%	%	%	%	%	Mean	Rank
Use of alternative feed sources based on availability and cost	71.3	22.2	2.9	1.8	1.8	4.60±.786	1st
Purchase of feed when available in bulk	69.0	25.1	2.3	1.2	2.3	4.57±.804	2nd
Use of insect's millets and other sources of protein carbohydrate as substitute for maize	49.7	28.7	9.4	9.4	2.9	4.13±1.104	4th
Change in the feeding routine of birds	34.5	40.4	6.4	11.1	7.6	3.83±1.232	7th
Use of crop waste as feed source	19.9	38.0	14.6	17.0	10.5	3.40±1.272	6th
Use of supplementary feed	38.0	31.0	13.5	13.5	4.1	3.85±1.187	5th
Production of poultry feed locally	65.5	24.0	8.8	0.6	1.2	4.52±.777	3rd

The Binary Logistics Regression result provided in Table 5 shows the significant influence of socio-economic factors and cost of feed on the poultry production in Kwara State. Overall, the result indicated that only years of poultry farming experience and cost of feed showed positive statistically significant ($p<0.05$) influence on poultry production. An increase in the years of experience reduces the probability of respondents having perceived high effect on poultry production. This implies that a unit increase in years of experience reduces the probability of respondents having perceived high effect of on poultry production. This is confirmed by the odd ratio of 0.440 that is less than 1. This implies that farmers that have been involved in poultry production for a longer period may know how to cope with the effects of cost of feed and may not perceive the effect to be high, due to the experience they have gathered over the years. This is in line with the findings of Obike *et al.* (2017) which revealed that farmers' years of experience helps to strategize in times of difficulties more than farmers with low experience.

In the same vein, increase in cost of feed also reduces the probability of respondents perceiving high effect on poultry production. This implies that a unit increase in the cost of production will reduce the probability of respondents perceiving the high effect on poultry production. This is confirmed by the odd ratio of 0.425, which is less than 1.

Table 5: Binary logistic regression of the relationship between selected socio-economic characteristics and perceived effect on poultry farmers

Variables in the 0Equation	B	S.E.	Wald	Sig.	Exp(B)	95% C.I. for EXP(B) Lower	Upper
Educational status	-0.228	0.540	0.178	0.673	0.796	0.276	2.295
Years of experience	0.820	0.412	3.966	**0.046***	0.440	0.197	0.987
Bird Reared	-0.313	0.461	0.460	0.498	0.731	0.296	1.805
Sources of Feed	0.355	1.055	0.113	0.736	1.426	0.180	11.290
Cost of Feed	0.000	0.003	3.354	0**.048***	0.425	0.165	0.996
Number of Birds	0.000	0.000	0.001	0.978	1.000	0.999	1.001
Constant	4.430	3.513	1.590	0.207	83.911		
Model Summary:							
-2 Log likelihood = 62.903							
Cox & Snell R Square=0.044							
Nagelkerke R Square=0.129							

*Significant at 5% level

The Chi-Square results as shown in Table 6 showed a positive and significant ($p<0.05$) relationship with the use of alternative feed sources based on availability and cost. This indicates that, the use of alternative feed sources is subject to availability and cost of the feed and the more the alternative feed sources are available with lower cost, the more poultry farmers will be able to strategize and cope with using alternative feeds.

Table 6: Chi-square test result

Perceived effects of cost on poultry/ Coping Strategies	Chi-square value	p-value
Use of alternative feed sources based on availability and cost	137.944	0.049*
Purchase of feed when available in bulk	219.168	0.001*
Use of insects' millets and other sources of protein carbohydrate as substitute for maize	236.718	0.001*
Change in the feeding routine of birds	186.044	0.001*
Use of crop waste as feed source	218.723	0.001*
Use of supplementary feed	216.618	0.001*
Production of poultry feed locally	123.068	0.223

*Significant at 5% level

This is in line with the findings of Thirumalaisamy *et al.* (2016) and Yirgu, *et al.* (2017) that using unconventional feed ingredient available locally reduces the cost of poultry feed. Purchase of feed when available in bulk, this implies that purchase of feed in bulk when it is available reduces the effects of high cost of feed on farmers, use of insects, millets and other sources of protein and carbohydrate as substitute for maize and the use of crop waste as feed source indicates that there are other available feed ingredients which have the same

nutritive value with the major feed ingredients and could be substituted for it to avoid the effects of high cost of feed (Elahi *et al.*, 2022). Change in the feeding routine of birds indicates that poultry farmers change the feeding pattern of the birds to save cost by reducing the number of times they are fed in a day.

CONCLUSION

It can be concluded that the major causes of high cost of feed are climate change issues which has posed serious threat to maize and soybean that are the major ingredients in poultry feed. Merchants, who are the feed sellers also hoard these major ingredients, thereby leading to scarcity. It was further concluded that cost of feed had effect on poultry farmers while years of experience in the poultry business has a greater influence in managing the high cost of feed situation in the study area. The study thus recommends alternative ingredients such as insect and millet that can serve as substitute and at the same time has same nutritional value in the feed for poultry production.

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