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RESEARCH ARTICLE

Status of Climate Smart Poultry Production Practices in Kwara State, Nigeria

Ifabiyi, J.O. [1]*, I. K. Banjoko [2], O.M. Shuaib [2], A.O. Oladejo [2] and S.E. Komolafe [3]

[1]*Department of Agriculture, Phoenix University Agwada, Nasarawa State, Nigeria.*
[2]*Department of Agricultural Technology, Kwara State Polytechnic, Ilorin, Nigeria.*
[3]*Department of Agricultural Extension and Rural Development, University of Ilorin, Ilorin, Nigeria.*

Abstract

Climate Smart Poultry Production strategy encompasses the use of practices that increase resilience and stability in poultry production, thereby helping poultry farmers adjust to climate alteration threats**.** This study assessed the Status of climate poultry production practices in Kwara State, Nigeria. A three-stage sampling procedure randomly selected one hundred and fifty farmers for the study. The data was collected through the questionnaires. Frequency count, percentage, and mean were used to analyze the data collected. The result showed that feeding management was practiced by about 94%, about 84% of the poultry farmers practiced processing and preservation of poultry products, and about 74% converted poultry droppings into compost manure. The findings showed that about 74% of the respondents have a high level of climate-smart poultry production practices. High cost of feeds (mean=1.62), high temperature, and lack of start-up capital (mean=1.46) were the main constraints affecting poultry production. The study, therefore, recommended that the government ensure that all poultry farmers have access to extension services and that the extension service providers ensure that information on climate poultry production practices is disseminated to all the farmers. Grants/credits should be provided to reduce the high cost of feeds.

Keywords: Climate Smart; Poultry Farmers; Status; Small-Scale.

1. Introduction

Unpredictable weather patterns negatively affect the output and income of many people in the universe. Small-holder farmers are highly vulnerable to climate change, influencing their productivity and livelihoods (Dhanya *et al.*, 2022; Chand & Biradar, 2017). Climate change refers to fluctuations in climatic conditions (IPCC, 2001). These alterations in climatic conditions have resulted in unpredictable rainfall outlines and extreme flooding (IPCC, 2007). The decline in poultry production outputs and the amplified risks of famine and food and nutrition insecurity among the farmers was due to the high incidence of climate change (FAO, 2008). The incessant alteration in climatic situations and unsustainable utilization of natural resources has driven several people into poverty and food insecurity (Ifabiyi *et al.,* 2022).

Climate alteration and poultry production appear to be interconnected in such a way that it directly affects poultry production outputs inform of unpredictable variations in temperature and rainfall patterns that affect poultry biological processes (Tubiello and Fischer, 2007). Also, this negatively affects the output and income of the poultry farmers.

Climate change negatively affects poultry farmers through its impacts on the quantity and quality of feedstuffs, water for production, the growth of birds, an outbreak of poultry diseases, and the prevalence of pests (Notenbaert et al., 2016; Rojas-Downing *et al.*, 2017).

***Corresponding author: J.O. Ifabiyi**
Email: oluwaseunifabiyi@gmail.com
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Poultry Production significantly contributes to the livelihoods and protein requirements of several people in Nigeria. Poultry production also helps ensure that many Nigerians have food and nutrition security. The Nigerian poultry industry contributes about 25% to the Agriculture GDP (Netherlands Enterprise Agency, 2020).

In order to ensure that poultry farmers can continue production, it is essential to utilize the Climate Smart approach, which is attainable through Climate Smart poultry production practices.

Climate poultry production practices denote an agricultural approach that significantly increases poultry production and resilience (adaptation) and reduces greenhouse gas emissions (mitigation) (FAO, 2010). It is a tool to boost outputs, given the need to ensure food security despite the climatic challenges (Long *et al.*, 2016; Oladele, 2011; Onada and Ogunola, 2016).

The poultry farmers' adoption of climate-smart poultry production practices would enhance productivity and build their resilience and mitigation to climate alterations. The prevalent fluctuations in climatic situations threaten outputs and income of poultry farmers. This exposed the poultry farmers to higher risks of food insecurity. It is essential to assess the status of climate-smart practices among the poultry farmers in Kwara State, Nigeria, as Arslan *et al.* (2013) stated that the utilization of useful practices has been low and based on the fluctuating environmental issues (Rege *et al.*, 2011). Also, there is inadequate facts on the use of climate smart poultry production practices in the study area. This established the gap to be filled by this study. Therefore, it is an essential to assess the status of climate smart poultry production practices in Kwara State, Nigeria.

The specific Objectives were to:

1. Ascertain the Poultry Production Enterprise Characteristics of the respondents.
2. Identify the respondents' sources of information on poultry production.
3. Assess the climate-smart poultry production practices of the respondents.
4. Determine constraints limiting the poultry production of the respondents.

2. Methodology

The research was conducted in Ilorin, Kwara State Nigeria. One hundred and fifty respondents were used for the study. The sampling procedure involved a three-stage process. The 1st step involved randomly selecting three (Ilorin south, Ilorin East and Ilorin West) Local Government Areas in Ilorin, Kwara State, Nigeria. The 2nd step involved a random selection of five communities within each selected local Government Area, and the 3rd step involved the random selection of 10 poultry farmers within each community. A total number of one hundred and fifty respondents were selected for the study. The source of information on poultry production was measured on a scale of Yes and No, where Yes=1 and No=0. The climate-smart poultry production practice was measured on a scale of Yes and No, where Yes =1 and No = 0. The constraints of poultry production were measured using a 3-point Likert-type scale where Not a factor =1, Less severe = 2, and Highly severe = 3. The data collected was analyzed with frequency counts, percentages, and means.

3. Results and Discussion

3.1. Poultry Enterprise Characteristics of the Respondents

findings presented in Table 1 revealed that the average poultry birds raised were 283 chickens, 14 turkeys and 4 ducks. The finding shows that the respondents were small scale poultry farmers. This conclusion is premise on classification by Elysee *et al*. (2020) who reported that small-scale farm contains less than 1,000 birds.

Table 1. Poultry Farming Characteristics of Respondents

Variables	Frequency	Percentage	Mean	Std.Deviation
Total Number(s) of Poultry Birds reared				
Chicken				
0	18	12.0		
1 – 100	93	62.0	283 Chickens	196.547
Above 100	39	26.0		
Turkey				
0	87	58.0		
1 – 100	54	36.0	14 Turkeys	37.49
Above 100	9	6.0		
Duck				
0	141	94.0		
1 – 100	6	4.0	4 Ducks	1.09
Above 100	3	2.0		
Type of Poultry Housing System				
Deep litter system	60	40.0		
Cage system	54	36.0		
Free range system	12	8.0		
Both Deep litter system and Cage system	24	16.0		
Main Sources of Water for Poultry Production				
Borehole	69	46.0		
Rivers	15	10.0		
Wells	42	28.0		
Rainfall	21	14.0		
Pipe Borne Water	3	2.0		
Access to Veterinary Services				
Yes	99	66.0		
No	51	34.0		
Poultry House/Pen Ownership Type				
Owned	120	80.0		
Lease/Rent	30	20.0		
Poultry Farming Operating Period				
Festive/Seasonal period only	45	30.0		
All Year Round	105	70.0		
Sources of Credits				
Personal Savings	66	44.0		
Family/Neighbour	9	6.0		
Friends	15	10.0		
Cooperative Societies	45	30.0		
Banks	15	10.0		
Access to Extension Services				
Yes	72	52.0		
No	78	48.0		
Main Motive for Poultry Production				
Consumption Purpose	18	12.0		
Commercial Purpose	30	20.0		
Consumption and Commercial Purposes	102	68.0		

The result revealed that about 40% of the farmers used deep litter system. About 46.0% sourced water from boreholes. About 66.0% have access to veterinary services while 34.0% have no access to veterinary services. The ownership of poultry house pens showed that only 80.0% owned the pen. The result showed that about 70.0% of the poultry farmers were into all-year-round production. Access to extension services among the poultry farmers showed that more than halve of the respondents (52.0%) had access to extension services. The findings presented in Table 1 showed that the main motive for engagement in poultry farming was for both consumption and commercial purposes (68.0%).

3.2. Sources of Information on Poultry Production

The findings in Table 2 revealed that the majority of the poultry farmers sourced information from internet/social media (78.0%), family members (74.0%) and Neighbour/friends (66.0%), television (64.0%), and radio (58.0%). This implies that poultry farmers use wide range of sources to access poultry information.

Table 2. Sources of Information on Poultry Production among the Respondents

Source of Information	**Yes**	
	Frequency	**Percentage**
Poultry Farmers Association	84	56.0
Ministry of Agriculture	39	26.0
Radio	87	58.0
Cooperative society	60	40.0
Family members	111	74.0
Television	96	64.0
Newspaper/ magazines	51	34.0
NGOs	27	18.0
Neighbours/Friends	99	66.0
Internet /social media/phone	117	78.0
Religious organization	39	26.0

3.3. Climate Poultry Production Practices

The findings in Table 3 revealed that feeding management was practiced by about 94%, processing and preservation of poultry products 84%, brooding of chicks, provision of medication to birds and fumigation of poultry pens before stocking 82% respectively. The findings further showed that about 84% of the respondents practiced processing and preservation of poultry products and about 74% converts poultry droppings into compost manure. This finding agrees with Olorunfemi *et al.* (2019) which stated that the intensification in agricultural production can occur through the farmers' adoption of climate smart agricultural. Climate change poses significant challenges to poultry production worldwide, primarily through increasing temperatures and extreme weather events that exacerbate heat stress in animals (Maze et al., 2024; Abdel-Wareth et al., 2018; 2019; 2020; 2022; 2023; 2024; Metwally et al., 2020; Fawaz et al., 2022, 2023).

Level of Climate Poultry Production

The findings presented in Figure 1 revealed that about 74% of the respondents have high level of climate smart poultry production practices. This finding agrees with Ifabiyi et al. (2022) and Ifabiyi et al. (2023) who reported high status of adoption of Climate smart agricultural practices in Kwara State, Nigeria.

Table 3. Climate Smart Poultry Production Practices

Climate Smart Poultry Production Practices		Yes Frequency	Percentage
Poultry Production Practices			
I.	Feeding Management	141	94.0
II.	Brooding of chicks	123	82.0
III.	Lightening of pens	114	76.0
IV.	Vaccination of Birds	120	80.0
V.	Debeaking of birds	102	68.0
VI.	Provision of medication to birds	123	82.0
VII.	Fumigation of poultry pens before stocking	123	82.0
VIII.	Predators prevention measures	111	74.0
IX.	Sorting of healthy and unhealthy birds	102	68.0
X.	Biosecurity measures -use of foot mats, washing of hands etc.	99	66.0
XI.	Daily cleaning of equipment	120	80.0
XII.	Dubbing (removal of the combs)	78	52.0
XIII.	Despurring (removal of the spur)	66	44.0
XIV.	Flooding/ Run-Off Prevention Measures	99	66.0
XV.	Record Keeping	108	72.0
XVI.	Marketing and Distribution of Poultry Products	111	74.0
XVII.	Processing and Preservations of Poultry products	126	84.0
XVIII.	Packaging of Poultry products	102	68.0
Adaption/Resilience to Climate Change			
XIX.	Stocking/rearing of birds that are tolerant to harsh weather condition	90	60.0
XX.	Reduction of fats in poultry feeds	99	66.0
XXI.	Use of weather forecasting information	105	70.0
XXII.	Adjusting stocking period to the time of favourable weather condition	105	70.0
XXIII.	Stocking quick maturing species/birds	117	78.0
XXIV.	Feeding birds with chilled water	63	42.0
XXV.	Provides enough ventilation	117	78.0
XXVI.	Stocking less during harsh weather condition	96	64.0
XXVII.	Rears more than one type/species of birds	108	72.0
XXVIII.	Planting of trees around poultry house to provide shade	81	54.0
XXIX.	Maintaining grass covers on the ground surrounding the poultry house to reduce reflection of sunlight / heat onto the house	87	58.0
XXX.	Diversify livelihoods/ Supportive Occupations	93	62.0
XXXI.	Use of solar energy to power poultry pens/house	72	48.0
XXXII.	Use of energy efficient bulbs in the poultry house	81	54.0
XXXIII.	Use of electrolytes to replenish lost energy due to heat stress	69	46.0
XXXIV.	Having Poultry farm Insurance	87	58.0
XXXV.	Membership of Association	99	66.0
Mitigation/Green House Gas Reduction Practices			
XXXVI.	Daily and prompt removal of poultry droppings	96	64.0
XXXVII.	Use of feed additives (Anti-Biotics, enzymes) for optimal digestion and assimilation by the birds	96	64.0
XXXVIII.	Use of artificial air-cooling system	60	40.0
XXXIX.	Drying of poultry droppings to reduce water content so as to limit the amount of green-house gases released	69	46.0
XL.	Use of disinfectants on poultry waste to delay decaying	87	58.0
XLI.	Prompt Burying of dead birds	96	64.0
XLII.	Converting poultry droppings into compost manure	111	74.0

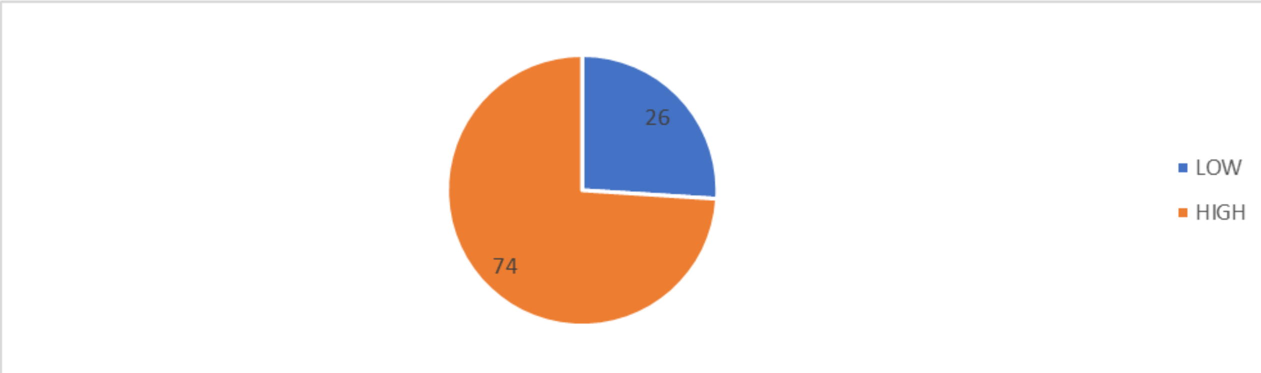

Figure 1. Status/Level Use of Climate Smart Poultry Production Practices

3.4. Constraints Limiting Poultry Production

The result in table 4 showed that high cost of feeds (mean=1.62) was the most severe constraint, high temperature (mean=1.46) and lack of start-up capital (mean=1.46) was ranked second correspondingly. This result indicates that the main constraint limiting poultry production was high cost of feeds.

Table 4. Distribution of respondents by Factors affecting Poultry Production

Constraints	Not a factor	Less Severe	Highly Severe	Mean	SD	Rank
High cost of Feeds	9(6.0)	39(26.0)	102(68.0)	1.62	0.60	1st
High Temperature	6(4.0)	72(48.0)	72(48.0)	1.46	0.61	2nd
Lack of start-up capital	30(20.0)	21(14.0)	99(66.0)	1.46	0.81	2nd
High Cost of production	15(10.0)	57(38.0)	78(52.0)	1.44	0.70	4th
Unavailability of machine/equipment	6(4.0)	81(54.0)	63(42.0)	1.38	0.56	5th
Lack of adequate information/Extension services on poultry production	24(16.0)	63(42.0)	63(42.0)	1.28	0.75	6th
Insufficient water in dry season	39(26.0)	36(24.0)	75(50.0)	1.24	0.84	7th
Marketing Problems	24(16.0)	69(46.0)	57(38.0)	1.22	0.70	8th
Disease outbreak /high Mortality	42(28.0)	36(24.0)	72(48.0)	1.20	0.85	9th
Lack of credit facilities	36(24.0)	51(34.0)	63(42.0)	1.18	0.80	10th
Inadequate technical Know-how	39(26.0)	54(36.0)	57(38.0)	1.12	0.79	11th
Low patronage/consumption of locally produced birds	30(20.0)	72(48.0)	48(32.0)	1.12	0.71	12th
Theft	48(32.0)	39(26.0)	63(42.0)	1.10	0.86	13th
Predators problems	45(30.0)	51(34.0)	54(36.0)	1.06	0.81	14th
Non availability of high-quality birds	27(18.0)	96(64.0)	27(18.0)	1.00	0.60	15th

Source: Field survey, 2024

Elevated temperatures can lead to reduced feed intake, decreased growth rates, compromised immune function, and increased mortality among poultry. Implementing strategic management practices, such as adjusting feeding schedules, providing adequate ventilation, and optimizing housing conditions, alongside the use of these additives, can effectively mitigate the adverse impacts of climate change on poultry production, ensuring sustainable and resilient farming practices in the face of environmental challenges (Hippenstiel et al., 2011; Amer et al., 2022 Abd El Latif et al., 2023; Almeldin et al., 2024). Extensive research has explored novel feed additives and unconventional ingredients in poultry nutrition to optimize nutrition, enhance productive performance, improve health status, stimulate immunity, and enhance egg and meat quality in chickens under heat stress (Abdel-Wareth, and Lohakare, 2023; Lohakare, and Abdel-Wareth, 2023; Paneru et al., 2024).

4. Conclusion

According to the results, the study, therefore, resolved that poultry farmers in Kwara State, Nigeria were small-scale farmers; the farmers mainly used a deep litter system, and the majority of them sourced information from neighbors/friends, television, family members, internet/social media, and radio. The majority of poultry farmers have a high status/level of usage of climate-smart poultry practices. The high cost of feeds was the most severe constraint affecting poultry farmers.

Recommendations

Based on the results, the following recommendations were made:

1. Government should ensure that all the poultry farmers have access to extension services.
2. There should be provision of financial supports inform of grants, loans and tax holiday to the poultry farmers so as to reduce the high cost of feeds and production.
3. Extension service provider should continue to create more awareness on the importance of climate smart practices, so that more farmers will adopt the practices too.

Authors' Contributions

All authors contributed in this research.

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Institutional Review Board Statement

All Institutional Review Board Statements are confirmed and approved.

Data Availability Statement

Data presented in this study are available on fair request from the respective author.

Ethics Approval and Consent to Participate

Not applicable

Consent for Publication

Not applicable.

Conflicts of Interest

The authors disclosed no conflict of interest from the study's conduct, data analysis, and writing until the publication of this research work.

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