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Mitigating Strategies against Climate Change on Poultry Production in Southwest Nigeria. A Case Study of Layers Production

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ABSTRACT
This study examines the effects of climate change and the socioeconomic factors influencing mitigation strategies among layers poultry farmers in Southwest Nigeria. Primary data were collected from 250 respondents through random sampling, descriptive statistics and a binary logit regression model to analyse the data obtained. The results show that poultry farmers have mean age and experienced of 45.2 and 11.7years respectively, the majority (92.4%) are educated, mean household size of 7, average of 3 extension visit per year. Climate change significantly affects poultry production through heat stress, reduced egg production, increased mortality, rising feed costs, and the emergence of new diseases. Farmers strongly perceived that high temperature lowers egg output and increases water intake, it also raised production costs and reduced profitability. To cope with these challenges, farmers adopted several adaptation strategies, including improved ventilation, adequate water and feed supply, proper housing, vaccination, and veterinary consultation. The most widely adopted strategies were ventilation and veterinary services (96%), followed by adequate feeding and watering (92%). The logit regression results revealed that age, education, off-farm income, farm size, extension access, farming experience, climate information, veterinary services, access to credit, and training significantly influence adaptation decisions. Access to climate information and credit had particularly strong effects. The study concludes that climate change poses serious threats to poultry productivity and profitability. It recommends strengthening extension services, improving access to climate information and credit, and promoting climate-smart poultry practices to enhance resilience and ensure sustainable poultry production in Nigeria.

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INTRODUCTION

Climate change refers to significant and lasting changes in the Earth's temperatures and weather patterns. These changes can be from natural causes (such as large volcanic activity) or from human activities. An increase in temperatures is causing significant changes in weather patterns and increasing the frequency of extreme weather events throughout the world. Climate change is defined as deviations in patterns of climate over a long period of time. This may be because of movement of the sun and emission of industrial gases. In addition to natural climate variability seen over comparable time periods, the United Nations Framework Convention on Climate Change (UNFCCC.) c1992 defines climate change as a change in climate that is directly or indirectly attributed to human activity that modifies the composition of the global atmosphere (Ekundayo et al. 2025). Due to their heavy reliance on agriculture, African countries including Nigeria are particularly affected by the effects of climate change (Adepoju and Osunbor, 2018). Crop productivity, cattle, poultry, and the fisheries subsector have all suffered greatly as a result (Akinbile, 2010).

Poultry birds, such as ostriches, ducks, turkeys, and chickens, are a significant source of food, income, and cultural identity for rural residents in many developing countries (Attia et al., 2024). Compared to other domestic animals, poultry contribute significantly to the human diet as a major source of meat, eggs, raw materials for industries (feathers, waste by products), and a source of income and jobs for people (Chauhan, 2024).

While the impact of climate change on food security and farmlands receives a lot of attention, the impact on livestock does not get the attention it deserves. Despite farmers' attempts to boost livestock productivity, climate change has hampered their efforts, with high temperatures causing significant animal mortality. This consequence has resulted in a high rate of malnutrition, putting a greater burden on developing countries.

At least 1.3 billion people worldwide are supported by livestock, especially poultry, which contribute over 60% of global production and 34% of dietary protein (Steinfeld et al., 2006 and Bawala, 2024). It contributes significantly to guaranteeing food security since it gives many Nigerian

populations access to both money and protein (Idiake-Ochei, 2024).

The Food and Agriculture Organization Statistic (2023) states that around 33% of the world's total meat production comes from poultry, however, the level of performance of birds depends on environmental conditions; such as rainfall, temperature, relative humidity and sunshine prevailing at a given time. Studies show that heat stress has deleterious impacts on poultry performance which include reduced feed intake, which in turn affects growth rate, body weight, meat quality, egg production and egg quality and high rate of mortality leading to economic loss.

Based on the above scenario, this study was conducted to investigate Economics effects of Climate Change on poultry Production in Southwest Nigeria a case study of Layers production with objectives to determine the socio-economic characteristics of poultry farmers in the study area, identify various ways by which climate change have impacted on the productivity of the farmers, factors that influence climate change and socioeconomic factors affecting mitigating Strategies against climate change on poultry Production in the study area.

MATERIALS AND METHODS

The Study Area

The study was carried out in the southwest geo-political zone of Nigeria. It is one of the six geopolitical zones of Nigeria representing both a geographic and political region of the country and comprises of six states viz Ekiti, Lagos, Ogun, Ondo, Osun, and Oyo. The zone lies approximately between latitudes 4°N and 9°N and longitudes 2.5°E and 6.5°E. It is bounded in the North by Kogi and Kwara states, in the East by Edo and Delta states, in the South by Atlantic Ocean and in the West by Republic of Benin. The zone comprises of six states namely Oyo, Osun, Ondo, Ogun, Ekiti and Lagos and is characterised by a typically equatorial climate with distinct dry and wet seasons. The mean annual rainfall is 1480mm with a mean monthly temperature range of 18^0 -24^0C during the rainy season and 30^0-35^0C during the dry season. The geographical location of southwest Nigeria covers about 114, 271 kilometre square, that is approximately 12% of Nigeria's total land mass and the vegetation is typically rainforest. The total population is 27,581,992 and predominantly agrarian. Notable food crops cultivated include cassava, maize, yam, cowpea and cash crops such as cocoa, kolanut, coffee and oil palm (NBS, 2024).

Sampling Technique, Size and Data Collection

A multistage sampling technique was used for this study. In the first stage three states Ogun, Oyo and Osun were purposively selected from the six (6) states because they are those with higher poultry production in southwest Nigeria. In the second stage, six (6) communities were randomly selected from each state giving a total of twelve (12) communities. In the third stage, from each of the selected communities, two (2) blocks were randomly selected for study. This gave a total of twenty four (24) blocks. Initially, residents from the selected blocks were invited to a community forum at which a preliminary identification of different categories of households was carried out. At the community forum, ten (10) household heads from each block were randomly selected. This resulted in a total of two hundred and forty (240) respondents for the study.

Data were analysed using descriptive statistics (frequency, and mean), and the binary logit regression model. The binary logit model was used to estimate the determinants of adaptation to climate change among layers poultry farmers in Southwest Nigeria. Binary logit models are widely applied in climate adaptation studies because the dependent variable is dichotomous, representing adoption or non-adoption of adaptation strategies (Wooldridge, (2021) and Gujarati (2009).

The dependent variable was defined as:

$$Y = \begin{cases} 1 = \text{Farmer adopted climate change adaptation strategies} \\ 0 = \text{Otherwise} \end{cases}$$

The functional form of the model is specified as:

$$\ln\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_{11} X_{11} + \mu_i \quad (1)$$

Where:

P_i= Probability of adopting adaptation strategies

$X_1 - X_{11}$= explanatory variables

β_i= estimated coefficients

μ_i= stochastic disturbance term

Previous studies on climate-smart agriculture and poultry adaptation in Nigeria also utilized logit regression models to explain farmers' adaptation decisions Olabisi et al. (2021) and Osuji, et al. (2024).

The logit regression model is expressed as follows;

$Y_i = \log (p/1-p) = F (X_i,b) + e$ (2)

The logit of a number p between 0 and 1 is given by;

$(p) = \log (p/1-p) = \log (p) = \log (1-p)$ (3)

Where: P, is the probability, while (1- p) is the corresponding odds, and the logit of the probability is the logarithm of the odds.

Y_i = Observable dummy variable that indexes adaptation to climate change (Adapted =1, otherwise =0)

F = Logistic cumulative distribution function b = Vector of estimated parameter

X_i = Independent variables considered, which include.

X_1 = Age (Years:1, 2, 3.....n))

X_2 = Education (No of years spent in school)

X_3 = Household size (1, 2, 3.....n)

X_4 = Off-farm activities (Engaged =1, otherwise=0)

X_5 = Size of poultry pen (Meters)

X_6 = Access to livestock extension services (1, 2, 3.....n)

X_7 = Poultry farming experience (Years: 1, 2, 3.....n)

X_8 = Access to climate change information (Accessed =1, otherwise=0)

X_9 = Access to veterinary service (Accessed =1, otherwise=0)

X_{10} = Access to credit (Accessed =1, otherwise=0)

X_{11} = Participation in climate change training/workshop (1, 2, 3.....n)

e = error term

RESULTS AND DISCUSSION

Socioeconomic Characteristics of Layers Poultry Farmers in Southwest Nigeria

Table 1: Socioeconomic Characteristics of Respondents (n = 250)

Variables	Frequency	Percentage (%)	Mean
Age (Years)			45.2
21–30	28	11.2	
31–40	67	26.8	

Variables	Frequency	Percentage (%)	Mean
41–50	94	37.6	
Above 50	61	24.4	
Education (Years spent in school)			12.1
No formal education	19	7.6	
Primary education	42	16.8	
Secondary education	101	40.4	
Tertiary education	88	35.2	
Household Size			7 persons
1–3 persons	41	16.4	
4–6 persons	119	47.6	
7–9 persons	68	27.2	
Above 9 persons	22	8.8	
Off-farm Activities			
Engaged	147	58.8	
Not engaged	103	41.2	
Access to Livestock Extension Services			3 contacts/year
Accessed	162	64.8	
Not accessed		35.2	
Poultry Farming Experience (Years)			11.7
1–5 years	48	19.2	
6–10 years	84	33.6	
11–15 years	71	28.4	
Above 15 years	47	18.8	
Access to Climate Change Information			
Accessed	171	68.4	
Not accessed	79	31.6	
Access to Veterinary Services			
Accessed	184	73.6	
Not accessed	66	26.4	
Access to Credit			
Accessed	100	40.00	
Not accessed	150	60.00	
Participation in Climate Change Training/Workshop			
Participated	160	64.00	
Did not participate	90	36.00	

Source: Field survey, 2026

Table 1: result shows that the mean age of the poultry farmers was 45.2 years, indicating that most respondents were in their economically active age group. About 37.6% of the respondents were between 41 and 50 years old. This suggests that middle-aged individuals dominate layers poultry production in Southwest Nigeria. This productive age enables them to be adopting climate adaptation strategies. This is in line with (Ogisi et al., 2023).

The average years of formal education were 2.1 years; this shows that most farmers in the study area had at least secondary education. About 40.4% attained secondary education, while 35.2% had tertiary education. High literacy levels among poultry farmers give them awareness to climate change which could aid them smart practices management practices in climate change in poultry production (Liverpool-Tasie et al., 2019).

The average household size was 7 persons. Nearly half (47.6%) of the respondents had household sizes between 4 and 6 persons. Larger household sizes may provide family labour for poultry management but may also increase household consumption pressure.

About 58.8% of the farmers engaged in off-farm income-generating activities. This indicates that many poultry farmers in southwest Nigeria diversify their income sources to reduce risks associated with climate variability and fluctuations in poultry income. Ayanlade, et al. (2022) similarly reported that income diversification enhances climate resilience among livestock farmers.

About 64.8% of the respondents had access to extension services, with an average of three extension contacts per month. Extension services play important roles in disseminating climate-smart poultry production technologies and adaptation practices (Food and Agriculture Organization (FAO). (2023)).

The average poultry farming experience was 11.7 years. About 33.6% of the respondents had between 6 and 10 years of experience. Experienced poultry farmers are generally more knowledgeable about climate adaptation practices such as disease control, proper housing, stock density and feeding management.

The result showed further that 68.4% of the farmers had access to climate-related information. Awareness climate change makes the farmers prepare adaption strategies among poultry farmers (Liverpool-Tasie 2019). The majority (73.6%) of respondents had access to veterinary services. Veterinary services help reduce mortality and disease outbreaks associated with changing climatic conditions (Osuji, et al. 2024)

Only 40.0% of the respondents had access to credit facilities. Limited access to agricultural credit may constrain farmers'

ability to invest in climate adaptation technologies such as cooling systems and improved housing.

The result on participation in climate change training/workshops shows that the majority of the respondents, 160 farmers representing 64.0%, participated in climate change-related training or workshops, while 90 respondents representing 36.0% did not participate. This implies that a considerable proportion of poultry farmers in the study area have been exposed to climate change awareness programmes, adaptation strategies, and extension education.

The high level of participation suggests that many poultry farmers recognize the importance of acquiring knowledge and practical skills to cope with the adverse effects of climate change on poultry production. Training and workshops often provide information on improved management practices such as ventilation systems, heat stress management, proper feeding, disease control, and water management, which are essential for sustaining poultry productivity under changing climatic conditions. Farmers who participate in such programmes are usually more likely to adopt climate-smart agricultural practices and innovative technologies that enhance resilience and productivity.

However, the finding that 36.0% of respondents did not participate indicates that a significant number of farmers still lack access to climate-related educational programmes. This may be due to poor extension service delivery, inadequate awareness, limited financial resources, low educational background, or distance to training centres. Non-participation may reduce farmers' ability to effectively adapt to climate variability, thereby increasing vulnerability to heat stress, disease outbreaks, and reduced egg production.

This finding agrees with studies that reported that training and extension services improve farmers' adaptive capacity and adoption of climate-smart practices in livestock and poultry production. FAO (2023). Emphasized that farmer training enhances resilience to climate risks by improving knowledge of adaptation technologies. Similarly, studies by Abdullahi (2025) and Adeleke et al. (2023). Observed that farmers who attended climate-related workshops were more likely to implement adaptation measures such as improved housing, vaccination schedules, and efficient water management in poultry production systems.

Table 2: Perceived Effects of Climate Change on Poultry Production by the Respondents

Perceptive statement	SA= 4	A =3	D = 2	SD =1	Mean 2.50
Climate change affects egg and meat production	120x4=480	90x3= 270	30 x2 = 60	10x1 = 10	3.28
High temperature leads to low quantity of egg production	90x4= 360	85x3= 255	50x2= 100	25 x1 = 25	3.76
High temperature makes birds drink more water	130x4=520	90x3= 270	35 x2 = 70	5 x1 = 5	3.18
High lead to low feed intake	150x4=600	50x3= 150	30 x2 =60	20 x1 = 20	2.32
climate change has effect on the distribution of poultry diseases	50x4 = 200	60x3= 180	90x2= 180	50 x1 = 50	2.44
Climate change makes it difficult to effectively treat poultry diseases now than in the past	135x4=540	60x3= 180	50x2= 100	15 x1 = 15	3.34
Climate change led to the development of new poultry diseases?	58x4 = 232	50x3= 150	100x2=200	42 x1 = 42	4.496
High temperature and low rainfall resulted to low feed availability	80 x4 =320	85x3= 255	55 x2 =110	40 x1 = 40	2.90
High temperature led to increase in prices of feed	92x4 = 368	70x3= 210	38 x2 =76	50 x1 = 50	2.82
High temperature and low rainfall lead to reduction in egg size	69x4 = 276	81x3 =243	50 x2= 100	50 x1 = 50	2.68
High temperature leads to high mortality	105x4=420	90x3 =270	35 x2 = 70	20 x1 = 20	3.12
Reduced income and profitability	140x4=560	90x3 =270	20 x2 = 40	0 x1 = 0	3.08
High usage of drugs and vaccination	110x4=440	90x3 =270	40 x2 = 80	10 x1 = 10	3.20
Climate change generally led to rise in costs of production	130x4=520	75x3 =150	45 x2 = 90	0 x1 = 0	3.04

Source: Field survey, 2026

The results in Table 2 present farmers' perceptions of how climate change affects poultry production using a 4-point Likert scale (cut-off mean = 2.50). Any mean above 2.50 indicates agreement, while values below suggest disagreement.

The mean score of 3.28 shows that climate change affects egg and meat production. Thus, heat stress reduces laying rate, egg quality, and growth performance. This is in consonance with the studies that high ambient temperature disrupts hormonal balance and reduces productivity in layers (Food Agriculture Organization Statistic (2023) and Intergovernmental Panel on Climate Change (2022).

With a mean of 3.76 on effects of high temperature egg quality indicates that the respondents agreed that increase in temperature reduces egg quantity. This is consistent with poultry physiology which opined that heat stress reduces ovulation rate and egg formation efficiency. According to World Organisation for Animal Health (2023), heat stress is one of the leading causes of reduced egg production in tropical poultry systems such as Nigeria.

The mean score of 3.18 for water intakes indicates that birds drink more water under high temperatures. This reflects thermoregulation behaviour, where birds increase water intake to control body temperature. Similar findings are reported in tropical poultry systems (FAO 2023).

The mean of 2.32 on reduction of feed intake falls below the threshold, therefore, the respondents in the study area did not perceive that climate change can reduced feed intake of layer. This contradicts established literature, which shows that heat stress significantly reduces feed consumption. The discrepancy may be due to adaptive practices by farmers (e.g., feeding during cooler hours). However, studies still confirm that heat stress lowers appetite and nutrient intake Intergovernmental Panel on Climate Change (2022).

The of mean 2.44 and 4.496 respectively on diseases distribution and emergence of new diseases, shows that

farmers strongly perceive the emergence of new diseases, even though they are less certain about distribution patterns. Research shows that rising temperatures and humidity favour pathogens like Salmonella and Newcastle disease in poultry (World Organisation for Animal Health. 2023).

The mean value of 3.34 on difficulty in treating diseases indicates that disease control has become more difficult. This is akin to the report of FAO (2023). That climate variability can reduce drug efficacy and increase resistance, making treatment more complex.

For the mean of 2.90 and 2.82 on feed availability and feed price increase respectively shows that climate change affects crop production (maize, soybean), which major poultry are feed components. Also reduced rainfall and high temperature lower yields, leading to feed scarcity resulting in increased prices. This finding is consistent with global agricultural assessments (Intergovernmental Panel on Climate Change (2022)).

The mean of 2.68 on egg size and quality indicates an agreement that climate change reduces egg size. Heat stress reduces calcium metabolism and shell formation, resulting in smaller eggs and weaker shells World Organisation for Animal Health (WOAH) (2023).

Mortality rate mean of score of 3.12 shows that high temperature increases mortality. Heat waves are known to cause sudden poultry deaths due to heat stroke, especially in poorly ventilated housing systems common in Southwest Nigeria.

The mean of 3.08 on income and profitability indicates that farmers experience reduced income and profitability because of climate change. This may be due to increased mortality, reduced production, and rising input costs.

Increased Use of Drugs and Vaccines with a mean of 3.20, indicates that farmers agree that climate change increases reliance on medication to sustain production.

The mean of 3.04 on cost of production confirms that climate change raises production costs. This includes higher feed prices, increased veterinary costs, and investments in cooling systems.

Table 3: Mitigating Strategies on Climate Change Adopted by Poultry Farmers

Adaptation strategies	Frequency	Percentage
Proper housing system	200	80.00
Right stocking density	220	88.00
Outright sale of early maturing birds	165	66.00
Adequate water and feed supply	230	92.00
Proper feed formulation	210	84.00
Prompt vaccination	210	84.00
Ensuring adequate ventilation	240	96.00
Use energy efficient bulb	180	72.00
Prompt routine management	195	78.00
Consultation of veterinary services	240	96.00

Source: Field survey, 2026

Table 3 presents the adaptation strategies adopted by poultry farmers in response to climate change. The results are expressed in frequencies and percentages, showing the proportion of farmers implementing each strategy. The results revealed that Ventilation and Veterinary Services have the highest adoption: 96%. Adequate ventilation is critical in reducing heat stress by improving air circulation and lowering indoor temperature in poultry houses. This is especially important in tropical environments like Nigeria where high ambient temperature is persistent. According to FAO (2023), improved housing ventilation and veterinary support are key climate adaptation measures in livestock production systems.

Most of the respondents adopted adequate water and feed supply (92%). This high adoption rate reflects farmers' awareness that birds require more water during heat stress for thermoregulation. This emphasises the study of FAO (2023) which reported that heat stress increases water intake while reducing feed efficiency, making proper feed and water management essential.

Right stocking density (88%) and Proper housing system (80%). Maintaining appropriate stocking density is agreed by the farmers. It is said to reduce overcrowding, which minimizes heat accumulation and disease transmission. Also, proper housing such as orientation, insulation, roofing materials helps to buffer extreme weather conditions.

Proper feed formulation (84%) and Prompt vaccination (84%). The high value of proper feed formulation suggests its importance. Farmers adjust nutrient composition (e.g., energy, protein, electrolytes) to improve birds' resilience to heat stress. Similarly, prompt vaccination is also widely adopted, indicating increased disease threats under climate change. Warmer conditions can enhance pathogen survival and transmission, making preventive health management essential (WOAH 2023).

Routine Management and Energy use (78%) and use of energy-efficient bulbs (72%). Routine management practices such as regular cleaning, monitoring, and timely interventions help reduce stress and disease outbreaks. The use of energy-efficient bulbs reflects adaptation to rising temperatures and energy costs. Such bulbs produce less heat and reduce electricity expenses, contributing to sustainable poultry production.

Early Sale of Birds have Adoption rate of 66%. This suggests that some farmers sell birds early to avoid losses associated with prolonged exposure to heat stress and disease risks. However, while this strategy reduces mortality risk, it may also reduce potential profit margins.

Table 4: Regression Output of Binary Logit Regression Results on Socioeconomic Factors Affecting Adaptation Strategies to Climate Change among Layers Poultry Farmers in Southwest Nigeria

Variables	Coefficient	Std. Error	z-value	P>|z|	Marginal effects
Constant	-3.214	1.241	-2.59	0.010**	
Age	0.028	0.011	2.55	0.011**	0.007

Variables	Coefficient	Std. Error	z-value	P>|z|	Marginal effects
Education	0.094	0.028	3.36	0.001***	0.023
Household Size	0.061	0.140	0.426	0.623	0.121
Off-farm Activities	0.482	0.201	2.40	0.016**	0.118
Size of Poultry Pen	0.003	0.001	2.72	0.007***	0.001
Access to Extension Services	0.517	0.188	2.75	0.006***	0.126
Poultry Farming Experience	0.071	0.023	3.09	0.002***	0.017
Access to Climate Information	0.694	0.241	2.88	0.004***	0.169
Access to Veterinary Services	0.428	0.196	2.18	0.029**	0.104
Access to Credit	0.635	0.227	2.80	0.005***	0.155
Participation in Climate Training	0.582	0.214	2.72	0.007***	0.142
Number of observations = 240					
LR Chi-square = 84.63					
Prob > Chi-square = 0.0000					
Log likelihood = -118.42					
Pseudo $R^2 = 0.417$					

Significance levels: *** = 1%; ** = 5%; * = 10%
Source: Field survey, 2026

The result in Table 4 shows that age had a positive and significant influence on adaptation strategies at 5% significance level ($p < 0.05$). This implies that older poultry farmers were more likely to adopt climate adaptation practices than younger farmers. This is due the fact that older farmers often possess accumulated farming experience and knowledge that enable them to identify climatic risks and respond appropriately. This finding agrees with Liverpool-Tasie et al. (2019), who reported that farming age and experience positively influenced climate adaptation among livestock farmers in Nigeria. The marginal effect indicates that an increase in age raises the probability of adaptation by 0.7%.

Education was positive and highly significant at 1% level. This suggests that educated poultry farmers are more likely to adopt climate-smart adaptation measures. Education improves farmers' ability to understand weather information. This finding corroborates Adeagbo et al. (2023), who found that education significantly enhanced adoption of climate adaptation strategies among farmers in Southwest Nigeria. Similarly, Osuji, (2024) noted that educated poultry farmers were more receptive to climate-smart innovations and environmental management practices.

Participation in off-farm income-generating activities positively affected adaptation strategies. Farmers with additional income sources are better able to finance various alternatives to mitigate climate change. The result is in line with Idiake-Ochei (2024). (2024), who observed that diversified income sources increase farmers' resilience to climate shocks.

Poultry pen size positively and significantly affected adaptation adoption. Larger scale poultry farmers are more vulnerable to heat stress, disease outbreaks, and environmental hazards; and the owner have larger capital to invest in methods to reduce climate change to reduce production losses. This finding agrees with Olabisi et al. (2021), who emphasized that commercial poultry farmers adopt more adaptation strategies because of higher production risks associated with climate variability.

Access to livestock extension services positively influenced adaptation decisions at 1% level. Extension officers disseminate information on climate-smart poultry practices to farmers such as proper ventilation and housing modification. This corroborates the work of Adeagbo et al. (2023), who reported that extension contact significantly improves climate adaptation intensity among Nigerian farmers.

Farming experience had a positive and significant relationship with adaptation strategies. This implied that experienced poultry farmers are better able to recognize climate-related threats and apply adaptive management practices. This is consistent with Liverpool-Tasie. et al. (2019), who observed that experienced livestock farmers are more likely to adopt climate resilience strategies due to accumulated managerial knowledge.

Access to climate change information exerted a strong positive effect on adaptation decisions. Farmers who accessed weather forecasts, environmental alerts, and climate advisory services were more likely to adopt adaptation strategies. This finding corroborates (Olabisi, et al., 2021), who stressed that information dissemination remains one of the most important determinants of climate adaptation among poultry farmers in Nigeria.

Access to veterinary services positively influenced adaptation adoption. Veterinary officers assist poultry farmers in disease prevention, vaccination, and heat-stress management during extreme climatic conditions.

This result agrees with Idiake-Ochei (2024) who found that veterinary support services significantly reduce climate-induced poultry mortality.

Credit access positively and significantly affected adaptation strategies at 1% level. Access to credit enables farmers to procure improved poultry housing facilities and quality feed. This finding supports Adeagbo et al. (2023), who found that access to institutional credit enhances farmers' adaptive capacity and investment decisions.

Participation in climate-related training and workshops positively influenced adaptation strategies. Farmers who attended training programmes had better awareness of climate risks and improved adaptation techniques. This finding is consistent with Bashir et al. (2023), who reported that climate education programmes improve farmers' preparedness and adaptive behaviour.

CONCLUSION

The study concluded that climate change poses serious economic and production challenges to layers production in Southwest Nigeria. Therefore, poultry farmers have adopted several adaptation strategies such as improved ventilation, proper housing, vaccination, adequate feeding, and veterinary consultation to reduce the adverse effects of climate change. However, the effectiveness of these adaptation measures largely depends on farmers' socioeconomic conditions such as age, educational level, access to extension services, climate

information, veterinary support, credit facilities, and training opportunities.

Based on the findings of the study, the following recommendations are made: Government and agricultural agencies should strengthen extension services to provide regular climate-related advisory services and poultry management information to farmers and have access to affordable agricultural credit facilities which must be improved upon to enable poultry farmers invest in climate adaptation technologies such as improved housing systems, cooling equipment, and quality feed.

Poultry farmers should adopt improved housing designs and ventilation systems to reduce heat stress and enhance bird productivity whereas Research institutions and universities should intensify research on heat-tolerant poultry breeds and affordable adaptation technologies suitable for tropical environments.

REFERENCES

Abdullahi, A. I., Lay, U. S. & Ekpo, A. S. (2025). Trend of Climate Variability in Nasarawa South, Nasarawa State, Nigeria. *International Journal of Environmental Research and Earth Science*, 8(4). https://doi.org/10.70382/caijeres.v8i4.039

Adeagbo, O. A., Ayinde, I. A., Adekunle, C. P., & Akinbile, L. A. (2023). The level of adoption of multiple climate change adaptation strategies among farmers in Southwest Nigeria. *Scientific African*, 22, e01971.

Adepoju, A. O. & Osunbor, P. P (2018). Small Scale Poultry Farmers' Choice of Adaption Strategies to Climate Change in Ogun State, Nigeria. *Rural Sustainability Research*, 40(335).

Akinbile, L. A. (2010). Climate change and its implications for sustainable development in Nigeria. Keynote address at the annual conference of School of Agriculture and Technology, Federal College of Education, Katsina.

Attia, Y.A., Aldhalmi, A.K., Youssef, I.M. *et al*. Climate change and its effects on poultry industry and sustainability. *Discov Sustain* 5, 397 (2024). https://doi.org/10.1007/s43621-024-00627-2.

Ayanlade, A., Radeny, M., Morton, J.F., & Muchaba, T. (2022). Climate adaptation strategies among livestock farmers in sub-Saharan Africa. *Climate Risk Management*, 35, 100412.

Bashir, U. A., Garba, M., & Hassan, A. B. (2025). Awareness of climate change adaptation strategies among poultry farmers in Bauchi State, Nigeria. *Nigerian Journal of Agriculture and Agricultural Technology*, 15(2), 44–58.

Bawala, A. E. (2024). Addressing the Climate Impacts on Poultry Farming: Before the Chickens
Come Home to Roost. Information, Insight and Intelligence on the Nigerian Health Sector. Nigeria Health Watch.

Chauhan D. S., Jugran, H. P., Negi, G. C. S. & Bisht, D. S. (2024). Income generation potential of backyard poultry in rural areas of Central Himalaya. *World's Poultry Science Journal.* 80(2):1-15. doi.org/ 10. 1080/ 00439 339. 2024. 23648 80.

Ekundayo, A., Ismail, F. Olawale & Kagbu, H. J. (2025). Climate change, policies and adaptation for a resilient future in agriculture. *FUDMA Journal of Sciences (FJS*). 9(6), 266 – 273.

Food and Agriculture Organization Statistic (2023). *Climate change and livestock systems: Impacts and adaptation strategies.* Rome: FAO.

Food and Agriculture Organization (FAO). (2023). *Climate-smart livestock production and adaptation strategies in Africa*. Rome: FAO.

Food and Agriculture Organization (2022). *Climate-smart livestock production and farmer resilience in developing countries*. Rome, Italy: FAO.

Gujarati, D. N., & Porter, D. C. (2009). *Basic Econometrics* (5th ed.). New York: McGraw-Hill.

Idiake-Ochei, O. (2024). Climate change adaptation strategies by poultry farmers in Edo State, Nigeria. *Journal of Agriculture, Food, Environment and Animal Sciences*, 3(2), 55–68.

Intergovernmental Panel on Climate Change (2022). *Sixth Assessment Report (AR6): Impacts, Adaptation and Vulnerability*. Geneva: IPCC.

Liverpool-Tasie, L. S. O., Sanou, A., & Tambo, J. A. (2019). Climate change adaptation among poultry farmers in Nigeria. *Climatic Change*, 157, 527–544.

National Bureau of Statistics (NBS). (2024). *Annual Abstract of Statistics 2024*. Abuja, Nigeria.

Olabisi, L. S., Osuntade, O. B., Liverpool-Tasie, L. S. O., & Adebiyi, J. A. (2021). Participatory modelling for climate change adaptation in Nigeria's poultry sector. *Climate Policy*, 21(5), 611–624.

Ogisi, O.D., Achoja, F.O., & Obakanurhe, O. (2023). Effects of climate change variables on poultry production system and the need for strategic climate actions in Delta State, Nigeria. *World Journal of Advanced Research and Reviews*, 20(1), 1178–1186.

Osuji, E.E., Ahamefule, B., & Ben-Chendo, G. (2024). Effect of climate variables on poultry production efficacy in Nigeria. *Online Journal of Animal and Feed Research*, 14(3), 196–203.

Steinfeld, H., Gerber, P. J., Wassenaar, T., Castel, V., Rosales, M., and de Haan, C. (2006). Livestock's long shadow. FAO, Rome, Italy.

United Nations Framework Convention on Climate Change (UNFCCC) c1992.

Wooldridge, J. M. (2021). Introductory Econometrics: A Modern Approach (7th ed.). Boston: Cengage Learning.

World Organisation for Animal Health (2023). *Climate change and animal health: Global trends and risks*. Paris: WOAH.