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EFFECT OF CLIMATE VARIABILITY ON HOUSEHOLD POULTRY PRODUCTION IN OLUYOLE LOCAL GOVERNMENT IBADAN

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Abstracts:

Poultry farmers are facing a lot of challenges due to climate variation and it may not be clear in empirical terms what loss farmers incur but it is known to cause more harm to their production than good. The study was carried out in Oluyole Local Government Area of Oyo State. Its headquarters is in the town of Idi Ayunre. The study revealed the following: the socioeconomics characteristics of the poultry farmers; the trend of rainfall and temperature of the study area and the perceived effects of climatic variations. The population of the study comprised rural poultry farmers in Oluyole Local Government Area of Oyo State, Nigeria. Simple random sampling technique was used to select fifty-five rural poultry farmers in the study area. The primary data was collected through the use of interview guide while secondary data on climatic variables was collected from NBS. In order to achieve the objectives of the study, the data collected was subjected to descriptive statistics such as percentage, mean, frequency distribution and table were used. The farmers' average age and household size was 39 years and 8 persons respectively. The amount of rainfall and temperature between 2009 and 2019 was fluctuating with the means 112.34mm and 31.02^{0}C respectively.

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Climatic variation has serious effects on poultry production ranging from reduction in yields to death. Therefore, government through the Nigeria Metrological Station should always make the results of the weather predictions available to farmers at the rural areas. Farmers should use best and avoidable adaptation strategies to cope with effects of climate variation. Also, farmers should diversify on their livelihoods to prevent total loss of capital.

Key Words: Climate, Poultry, Variation and Production

1. Introduction:

Climate variation is a persistent fluctuation in the mean of climatic parameters (temperature, rainfall, humidity and soil moisture) due to change in the composition of atmospheric gases. Krishna (2011) stated that the change in the atmospheric composition is attributed to the emissions of greenhouse gases (GHG) such as Carbon dioxide (CO_2), Methane (NH_4), Nitrogen oxide (N_2O) and other gases. Weather variation is a shift in the mean weather that a given area experiences. Researches had revealed across the globe that there has always been an alteration in the climate that occurs over a period of time which may range from several decades to centuries. It can be for a period of 30-100 years manifesting in earthquakes, flooding, tsunami, tornadoes, fluctuations in rainfall and temperature (Adereti, *et al,* (2021). Intergovernmental Panel on Climate Change (2007) made it certain that climate variation is real. Climate variation is a global issue because it does not only affect the poor and developing countries but is also facing the developed world with flooding, earthquakes, cyclones, tornadoes and wild fires. It is clear that climate variation in many parts of the world adversely affects socioeconomic sectors which include water resources, agriculture, forestry, fisheries and animal husbandry. It is an occurrence that will continue to manifest; mitigating its impact is the only way out. The intricacy of climate variation is now receiving so much attention due to its impacts on both living and non-living creatures (Alade, O. A., & Ademola, A. O. 2013). Poultry farmers are facing a lot of challenges (low egg production, weight lost, reduction of feed intake etc.) due to climate variation and it may not be clear in

International Educational Applied Research Journal

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empirical terms what loss farmers incur but it is known to cause more harm to their production than good. There are many human factors that are responsible for climate variation across the globe like poor environmental sanitation, deforestation, bush burning, drilling of boreholes, fuel combustion, and cement manufacture. Agriculture is responsible for 14 percent of global Green House Gases (GHG) emissions and livestock plays a considerable role in climate variation in terms of their contribution to GHG emissions (Farina *et al.,* 2011). The greatest effect of climate variation has however been predicted to be in the animal production in Sub- Saharan Africa (Adesoji & Famuyiwa, 2010). Livestock accounts for 40 percent of agricultural Gross Domestic Product (GDP) and employs 1.3 billion people while supporting the livelihoods of one billion of the world's poor (Food and Agriculture Organization, 2007).

Poultry production is a major source of protein which has empowered poultry farmers to secure a means of survival and livelihood. Climate variation affects poultry production by reducing poultry yields and nutritional quality of feeds, increasing disease and disease-spreading pests, reducing water availability and making it difficult for birds to survive Ricart and Rico-Amorós (2021). Climate variation manifests as rise in temperature causing a fall in humidity and provides a medium for fungal and bacterial growth. Disease outbreak becomes inevitable; diseases like coccidiosis, haemorrhagic syndrome, fowl pox, and bronchitis will thus be on the increase. Collett, *et al.,* (2020) stated that change in temperature will reduce the rate of poultry feed intake causing poorer performance. Given that the effects of climate variation can only be mitigated, it is pertinent to determine a forehand the perceived effect of the trend by the people most involved.

Though not as visible in the literature, poultry farmers are already experiencing the adverse effects of climate change. For example, studies have demonstrated that livestock farmers across Africa have associated changes in temperature and rainfall patterns with reduced feed sources, increased livestock mortality, reduced water sources in the dry season, decreased livestock productivity, and the occurrence of new livestock diseases (Ayanlade *et al.,* 2020). Though largely unstudied in the

International Educational Applied Research Journal

A Multi-Disciplinary Research Journal

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climate adaptation literature in Africa, increased dry spells and temperatures in the region can affect poultry production directly and indirectly. Increased temperature and heat stress have been linked to losses in poultry production from death, low egg production (quantity and quality), and reduced growth rate in intensive poultry farming systems commonly found in Africa and Asia Wasti, *et al.,* (2020). When faced with heat stress, chickens reduce their feed intake to regulate their internal temperature which affects their growth and productivity (Vandana *et al.,* 2021). Climate change affects poultry production indirectly because of its effect on maize yields. Maize is a key ingredient in poultry feed and lower maize yields due to climate change affects the availability and price of feed and the profitability of the poultry enterprise. It is important to understand how rural poultry farmers are responding to climate events and their investment in adaptation strategies, to sustaining the growth of this important economic sector in the face of climate change. The decision to adopt a strategy depends on a farmer's knowledge of and confidence in the benefits of a strategy, the scale of his operation, the likely risk associated with not adapting and his financial ability to bear the cost associated with the strategy (Etana *et al.,* 2020). Farmers' perception about climate variability and their experiences of loss due to climate factors are also likely to affect their adoption of adaptation strategies (Esayas *et al.,* 2019).

There is a paucity of information on the extent to which recent changes in climate have impacted on rural poultry production. Household chickens are constantly exposed to extremes of temperatures as they scavenge for feed, which may adversely affect productivity. Eggs and meat production pattern are affected by climate change because periods of high temperature and sunshine intensity makes the birds to drink more water and reduce feed intake which many at times results to high mortality of the chickens, low egg production and low feed conversion. Growth performance of the birds is grossly affected by perturbations in weather conditions in the surroundings (Santos *et al.,* 2015). In view of the stated problems this study provided answers to the following question: What are the social-economic characteristics of poultry house-hold farmers

International Educational Applied Research Journal

A Multi-Disciplinary Research Journal

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in the study area? What are the climate variation trends in study area? What are the perceived effects of climate variation on households' poultry production?.

2. Methodology:

The study was carried out in Oluyole Local Government Area of Oyo State. Its headquarters is in the town of Idi Ayunre. It has an area of 629 km^2 and a population of 202,725 at the 2006 census. It shares boundaries with four Local Governments, viz.: Ibadan South West, Ibadan South East, Ona-Ara Local Government and Ido Local Government – all within Ibadan metropolis. It also shares boundaries with Ogun State through Obafemi Owode, Odeda and Ijebu North Local Governments. The population of the study comprises of rural poultry farmers in Oluyole Local Government Area of Oyo State, Nigeria. Simple random sampling technique was used to select fifty-five rural poultry farmers in the study area. The primary data was collected through the use of interview guide while secondary data on climatic variables was collected from NBS. In order to achieve the objectives of the study the data collected was subjected to descriptive statistics such as percentage, mean, frequency distribution and table were used to present the data.

3. Results and Discussion:

Table 1 revealed that the mean age of the respondents is 39 years which implies that most of the respondents were within their active ages. About 60.09% of the respondents can read and write because they are literates. The mean years of farming experience was 17 years. Mean household size was 8 persons and this might contribute to the expansion of their farms through family labour. About 60% of the farmers were operating extensive method of farming.

Table 1: Distribution of Socio-economic Characteristics of Respondents

Variable	Frequency	Percentage	Mean
Age			

International Educational Applied Research Journal

A Multi-Disciplinary Research Journal

E-ISSN No: 2456-6713

20-29	15	27.27	
30-39	11	20.00	**39**
40-49	17	30.91	
Above 50	12	21.82	
TOTAL	**55**	**100.00**	
Education			
No Formal Education	17	30.91	
Adult Education	8	14.55	
1st Degree	12	21.82	
2nd Degree	13	23.64	
3rd Degree	5	9.09	
TOTAL	**55**	**100.00**	
Year of Farming Experience			
1-10	16	29.09	
11-20	20	36.36	**17**
21-30	15	27.27	
31- above	4	7.27	
TOTAL	**55**	**100.00**	
Farming System			
Intensive	21	38.18	
Semi-intensive	1	1.82	
Extensive	33	60.00	
TOTAL	**55**	**100.00**	
Family Size			
1-5	15	27.27	

International Educational Applied Research Journal

A Multi-Disciplinary Research Journal

E-ISSN No: 2456-6713

6-10	25	45.46	**8**
11-Above	15	27.27	
TOTAL	**55**	**100.00**	

Source: Research's Survey, 2022

Trend of Climatic Variable in the Study Area

Table 2 revealed the trend of rainfall between years 2009 and 2019. The mean amount of rainfall between the periods under consideration was 112.34mm. The maximum amount of rainfall was recorded in the year 2013 while the minimum was recorded in the year 2011. The rainfall was fluctuating within the periods under consideration and the distribution cannot be predicted. This might have serious impact on the poultry production because farmers would not be able to plan for

Their future activities with previous year rainfall experiences. Any sudden changes in rainfall would have adverse effect on behavioural attitude of the birds (Şekercioğlu, *et al.,* 2012).

Table 2: Amount of Rainfall Output from Year 2009 – 2018

Year	Output (mm)	Growth Rate
2009	127.89	-
2010	137.8	9.91
2011	91.42	46.38
2012	84.83	6.59
2013	151.24	66.41
2014	103.7	47.54

International Educational Applied Research Journal

A Multi-Disciplinary Research Journal

E-ISSN No: 2456-6713

2015	107.47	3.77
2016	126.27	19.3
2017	95.25	31.52
2018	109.51	14.26
2019	100.35	9.16

Source: NBS

Table 3 revealed the trend of temperature between years 2009 and 2019. The maximum and minimum temperatures within the periods under consideration were 31.75^{0}C and 30.29^{0}C respectively. The mean temperature was 31.02^{0}C. It means the average temperature was too harsh for old broilers because the optimum temperature range (thermo-neutral zone) to enhance broiler performance and health are 33-320C for the first week, 32-280C for the second, 28-260C for the third, 26-240C for the fourth, and 18-240C for the fifth and sixth weeks of age (Cassuce *et al*., 2013).

Table 3: Average Temperature of the Study Area

Year	Output	Growth rate
2009	31.1	-
2010	31.06	0.04
2011	31.75	0.69

International Educational Applied Research Journal

A Multi-Disciplinary Research Journal

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2012	31.9	0.15
2013	30.75	1.15
2014	30.4	0.35
2015	30.29	0.11
2016	31.38	1.09
2017	30.58	0.8
2018	31.18	0.6
2019	30.87	0.31

Source: NBS

Table 4 revealed the passive effects of climate variability by household poultry farmers in the study area. The result of the research shows the following effects: temperature fluctuation increases death rate, climate variation has negative effect on grains availability, climate variation affects poultry productivity and it also has serious effect on egg production and this in agreement with Cornwall's work (Cornwall, 2019).

Table 4: Passive Effect of Climate Variability on Poultry Production

Passive Effects of Climate Variability	SA	A	D	SD	WMS	Rank

International Educational Applied Research Journal

A Multi-Disciplinary Research Journal

E-ISSN No: 2456-6713

Temperature fluctuation increases death rate	**28(50.90)**	**12(21.80)**	**11(20.00)**	**4(7.27)**	**3.16**	**1st**
Climate change has effects on grains availability	**27(40.10)**	**13(23.63)**	**11(20.00)**	**4(7.27)**	**3.15**	**2nd**
Climate variation affects productivity	**21(38.18)**	**24(23.63)**	**6(10.92)**	**4(7.27)**	**3.13**	**3rd**
High Temperature and low rainfall had resulted into high feed availability	**21(38.18)**	**18(32.72)**	**8(14.55)**	**8(14.55)**	**2.95**	**4th**
Price of feed grain are usually high during hot and dry season	**24(40.00)**	**15(27.27)**	**11(20.00)**	**7(12.73)**	**2.95**	**4th**
Global warming has negative effect on egg production	**15(27.27)**	**20(36.37)**	**11(20.00)**	**9(16.33)**	**2.75**	**6th**
High temperature and low rainfall conditions reduces quality of grains	**16(29.09)**	**19(34.55)**	**8(14.55)**	**12(21.82)**	**2.71**	**7th**
High rainfall increases morbidity and mortality rate	**14(25.45)**	**15(27.27)**	**9(16.36)**	**17(30.91)**	**2.47**	**8th**

International Educational Applied Research Journal

A Multi-Disciplinary Research Journal

E-ISSN No: 2456-6713

Increased Sunshine Intensity decreases feed in-take.	**13(23.63)**	**19((43.54)**	**13(23.63)**	**10(18.20)**	**2.40**	**9th**

Source: Field Survey, 2022.

4. Conclusion and Recommendations

In conclusion, the effect of climate variability on household poultry production in Oluyole Local Government Ibadan is significant and would assist the farmers to have better understand of the benefits that could be derived from good or moderate atmospheric conditions without undermining the dangers that could emanate from harsh weather conditions. It was revealed that the average age of the respondents is 39 years which implies that most of the respondents were within their active ages. The mean amount of rainfall between the periods under consideration was 112.34mm. The rainfall was fluctuating within the periods under consideration and the distribution cannot be predicted. This might have serious impact on the poultry production because farmers would not be able to plan for their future activities with previous year rainfall experiences. The mean temperature was 31.02^{0}C. It means the average temperature was too harsh for broilers because the optimum temperature range (thermo-neutral zone) to enhance broiler performance and health are 33-320C for the first week, 32-280C for the second, 28-260C for the third, 26-240C for the fourth, and 18-240C for the fifth and sixth weeks of age (Cassuce *et al*., 2013).The effects range from temperature fluctuation increases death rate, climate variation has negative effect on grains availability, climate variation affects poultry productivity and it also has serious effect on egg production. Therefore, government through the Nigeria Metrological Station should always make the results of the weather predictions available to farmers at the rural areas. Farmers should use best and avoidable adaptation strategies to cope with effects of climate variation. Also, farmers should diversify on their livelihoods to prevent total loss of capital.

International Educational Applied Research Journal

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E-ISSN No: 2456-6713

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