

EFFECTS OF CLIMATE CHANGE AND ADAPTATION STRATEGIES ON POULTRY PRODUCTION IN BOLORUNDURO METROPOLIS, ONDO-EAST LGA, ONDO STATE

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ABSTRACT

The study investigates effects of climate change and adaptation strategies on poultry production in Bolorunduro metropolis in Ondo-East local government area of Ondo State. A multistage sampling procedure was used to select 76 poultry farmers randomly and information was collected on socio-economic and other poultry farm characteristics using structured questionnaire. Data were analysed with descriptive statistics and probit analysis. Result shows the mean age of farmers was 46.0±9.1 years and 65.8% were male. Farmers' awareness on climate change was found to be influenced by age, education, income access to information and credit. Climate change reduce productivity and lead to heat stress in poultry. Hence, farmers should be trained on climate change with access to information and credit.

Keywords: Climate, climate change, adaptation strategies, poultry

INTRODUCTION

The rural economy are faced with serious challenges ranging from poor soil fertility, inadequate finance and land, lack of amenities, limited input use and climate change. These problems lead to low productivity thus frequently exacerbating low income, poverty, and food insecurity (Nyoni, 2018). Farmers are inherently vulnerable to climate change due to dependence on natural resources and direct weather inputs for production (Shisanya and Mafongoya, 2016). Moreover, they do not have the infrastructure and technology in place to protect themselves and their livestock from climate extremes, including increasing temperatures (Hachigonta *et al.*, 2013). Climate change has been the most paramount problem facing agriculture with huge devastating effects on livestock production. The negative effects of climate change on livestock production particularly poultry production has attracted scholars attention in development literature. The effects of climate in livestock production cannot be over-emphasized, it determines the distribution of crops and livestock on the farm; influences the productivity and heat stress of poultry. These have become more threatening not only to the sustainable development of socio-economic activities but most importantly to poultry production in particular. Climate change can manifests in a number of ways on poultry production including but not limited to heat stress, drop in feed intake and egg production, weaknesses and ultimate death of birds. Adeniji *et al.* (2013) posited that climate change is predicted by the scientists to have serious impact on agriculture most especially poultry and the livelihood of the population of the developing countries. The effects of climate change on poultry could be relatively more severe if adaptive strategies are not put in place to cushion the effects of on poultry birds (Ilori *et al.*, 2012).

Poultry farmers in developing countries frequently contend climate change which threatens to compound existing challenges, particularly in such rural subsistence economies with limited adaptive capacity. Poultry is important animal for socio-economic, cultural and nutritional roles in the livelihood of households in Nigeria and many developing countries. Poultry include fowl, turkey, duck, goose, ostrich, guinea fowl (Iwena, 2020) which provides not only economic potentials to households but contribute significantly to human food as a primary supplier of meat, egg, raw materials to industries, source of income and employment opportunities to the people relative to other domestic animals (Padhi, 2016). Poultry is effective for food supply, income generation, and means of livelihood and for poverty alleviation in both rural and urban families in Nigeria. The income from poultry is recognized as a good source for supplementing earnings, providing eggs and meat for family consumption and stimulates economic growth of resource of the households in rural areas (Saweda *et al.*, 2019). Poultry birds are considered as a delicacy which could be slaughtered during special activities cultural activities and traditional occasions and functions such as wedding/naming ceremonies. In cases It could also serve as alternatives source of income or cash to meet emergency

need of the households since in rural areas, poultry is particularly valuable, as chickens are relatively easy to sell compared to other more expensive livestock which are not easily handy (Nyoni, 2021). Despite the essential roles of poultry in households' income, livelihoods and diet or food consumption, several challenges, such as predation, theft, pests and diseases and climate change beset or impede production (Win *et al.*, 2019). Climate change may aggravate existing challenges on poultry production, yet research on the impacts of climate change on rural poultry production remains scanty or limited. Moreover, poultry farmers' perception of the effect of climate change is yet to be empirically investigated. Hence, it is important to investigate the effects of climate change on poultry production. It is important therefore to investigate the effect of climate change and adaptation strategies on poultry production. Finding of this study will contribute toward the generation of information and enrich our knowledge which may be of future value in the context of investments in rural poultry sector. The specific objectives of the study are to identify the adaptation strategies, constraints to climate change and identify factors influencing poultry farmers' awareness of climate change among poultry production.

MATERIALS AND METHODS

The study was carried out in Boloruduro metropolis in Ondo-East local government area of Ondo State. The local government area has an estimated population of 172, 301 people (NPC, 2022). Random sampling technique was used in the selection fifty-five (55) poultry farmers in the metropolis. Data were collected using semi-structured questionnaire with interview schedule. Descriptive statistics and probit regression model were employed in the data analysis. The probit regression was used to identify factors influencing poultry farmers' awareness about climate change. The relationship between poultry farmers awareness and climate change can be formulated as follows:

$$Y_i = \beta X_i + u_i \dots \dots \dots 1$$

where; $Y_i = 1$ poultry farmer is aware of climate change in poultry production; 0 = otherwise; β = estimated parameters; X_i = explanatory variables, u_i = error term. The explanatory variables are operationalized as; age (years); gender (1 = male; 0 = otherwise); household size (numbers); marital status (1 = married; 0 = otherwise); education (years); number of birds (numbers); income from poultry (₦); access to information (1 = yes; 0 = otherwise), number of contact with extension agents (numbers), and access to credit (1 = yes; 0 = otherwise).

RESULTS AND DISCUSSION

Table 1 shows that 21.1% indicated that climate change could lead to reduction in poultry productivity. This finding concurs with Amusat *et al.* (2019) on perception of poultry farmers on climate change in Oyo state. Further analysis shows that 17.1%, 15.8%, 14.5% and 11.8% accounted for high mortality, low income, pest and diseases infestation and low feed consumption in poultry.

Table 1: Effects of Climate Change on Poultry Production

Effects of climate change	Frequency	Percentage (%)
Reduce poultry productivity	16	21.1
Low income	12	15.8
Result in heat stress	8	10.5
High mortality rate	13	17.1
Pests/Diseases infestation	11	14.5
Increase in temperature	7	9.2
Low feed consumption	9	11.8

Source: Field Survey, 2023

Table 2 shows the various adaptation strategies employed by poultry farmers in the study area, the mean and standard deviation from the Likert type scale revealed that item 1, 2, 3, 4, 5, 7 and 8 were highly effective on climate change while item 6 is effective.

Table 2: Climate Change Adaptation Strategies in Poultry Production

S/No	Adaptation Strategies	Mean/SD	Remarks
1	Use improved/resistant breeds of poultry	3.632(0.708)	HE
2	Adequate/Ventilated housing facilities	3.736(0.499)	HE
3	Prompt replacement of fresh water	3.592(0.636)	HE
4	Non-farm activities/Crop diversification	3.776(0.450)	HE
5	Regular maintenance of sanitation	3.632(0.585)	HE
6	Engage in livestock insurance policy	2.262(0.750)	E
7	Raising different breeds of poultry	3.711(0.485)	HE
8	Regular vaccination of birds	3.750(0.466)	HE

Decision: 1 – 2.49 = Not Effective, 2.50 – 3.49 = Effective, 3.50 – 4.00 = Highly Effective

The result of the socio-demographic characteristics (Table 3) shows that the mean age of poultry farmers was 46.0±9.1 years indicating the economic active age which is similar to Amsat *et al.* (2019). The male headed poultry farmers accounted for 65.8% as against 34.2% female poultry farmers and 64.5% were married which is in line with finding by Njongenhle (2021). The mean household size of poultry farmers was 6.0±2.0 member which is higher than average national household size of 5 members. However, majority (52.6%) of the poultry farmers had primary education.

Table 3: Poultry Farmers by Age, Sex, Marital Status, Household Size and Education

Variables	Frequency	Percentage (%)
Age (yrs)		
<30	6	7.9
30 – 44	25	32.9
45 – 59	42	55.3
> 59	3	3.9
Mean/SD		46.0±9.1
Sex		
Male	50	65.8
Female	26	34.2
Marital Status		
Single	15	19.7
Married	49	64.5
Widowed	7	9.2
Divorced/Separated	7	6.6
Household Size		
<5	21	27.6
5 – 7	37	48.7
8 – 10	14	18.4
>11	4	5.3
Mean/SD		6.0±2.0
Education		
No formal education	16	21.1
Primary education	40	52.6
Secondary education	11	14.5
Tertiary education	9	11.8

Source: Field Survey, 2023

Analysis of poultry farmers by primary occupation shows that 36.8% were involved in petty trading while 27.6%, 14.5% and 21.1% practiced farming, civil service works and artisans respectively. This implies that the poultry farmers in the study area engaged in other activities to supplement income in the households. On sources of information about climate change, the poultry farmers reveals that they

gather information from mass media (radio, TV, 26.3%), individual contact, group orientation, NGOs/Religious groups and extension contacts (Table 4). On awareness about climate change (Table 4), 53.9% indicated that they are short of information or awareness about climate change despite this they have a mean flock size of 98.2 ± 43.1 birds with average years of experience in poultry production of about 7.9 ± 2.9 years.

Table 4: Distribution of poultry farmers by primary occupation, sources of information, awareness, flock size, income and years of experience

Variables	Frequency	Percentage (%)
Primary Occupation		
Farming	11	14.5
Petty Trading	28	36.8
Civil Service work	21	27.6
Artisans	16	21.1
Sources of information		
Individual contact	7	9.2
Mass media	20	26.3
Community Orientation	15	19.7
NGOs/Religious groups	17	22.4
Extension agents	17	22.4
Awareness of climate change		
Yes	35	46.1
No	41	53.9
Flock Size		
< 40	6	7.9
40 – 95	17	22.4
96 – 150	41	53.9
> 150	12	15.8
Mean/SD		98.2±43.1
Years of experience		
< 5	8	10.5
5 – 8	36	47.4
9 – 12	28	36.8
> 12	4	5.3
Mean/SD		7.9±2.9

Source: Field Survey, 2023

The results of the probit regression analysis on factors influencing poultry farmers awareness of climate change indicate that, the Log Likelihood was -117.904; LR Chi² (15) = 242.01; Prob>Chi² = 0.000; Pseudo R² = 0.4672 showing the fitness of the model and that the explanatory variables are joint predictors of poultry farmers awareness of climate change in the study area. Further the results show that, age and gender had negative coefficient and significant. This implies that as age increases the probability of poultry farmers' awareness of climate change decreases by 8.5%. This finding is in line with Amsalu *et al.* (2013) that increase in age decreases farmers participation in farm activities. Moreover being female decreases awareness of climate change this may not be unconnected with involvement in household chores. The analysis further revealed that, education, total income, number of birds, access to credit and access to information had positive significant coefficients of poultry farmers' awareness about climate change in the study area. This implies that a year increase in completed education/naira/number of birds increases the probability of poultry farmers' awareness of climate change by 6.5%, 14.25 and 6.5%, respectively in the study area. This suggests that, level of education and availability of income and increase in number of birds can boost farmers' efforts to acquire the needed information on climate change (Amuat *et al.*, 2019; Osmani and Hossain, 2015). It was also revealed on Table 5 that having access to credit and information serve as booster to gaining knowledge on climate change an poultry production.

Table 5: Probit Analysis of Factors influencing Poultry Farmers Awareness of Climate Change

Variables	Coefficient	P>/z/	Marginal Effect
Age HH (yrs)	-0.598(0.275)	0.030**	-0.085
Gender (1=male; 0 = otherwise)	-0.288(0.303)	0.341	-0.041
Marital Stat (1= yes; 0 = no)	0.400(0.427)	0.347	0.057
Household Size (number)	0.444(0.678)	0.512	0.056
Education(yrs)	1.145(0.274)	0.000***	0.063
Total Income (₦)	1.006(0.348)	0.004***	0.142
Access to Credit (1=yes; 0 = no)	1.450(0.439)	0.001***	0.205
Number of birds (number)	0.461(0.229)	0.014**	0.065
Access to Extens.(1=yes; 0 = no)	-0.142(0.269)	0.597	-0.020
Access to information	0.033((0.246)	0.030**	0.0127
Constant	-15.339(5.397)	0.004***	

Source: Author's Computation, 2021 Obs. 76; Log Likelihood -117.904; LR Chi² (15) = 242.01; Prob>Chi² = 0.000; Pseudo R² = 0.4672; *** and ** significant at 1% and 5%.

CONCLUSION AND RECOMMENDATIONS

Climate change has become a serious challenge to farmers with attendant effects and huge devastating effects on poultry production. The negative effects of climate change particularly on poultry production have led to food insecurity and deficiency of adequate animal protein consumption in average households. Climate change threatens to compound existing challenges of the rural subsistence poultry farmers who are with limited adaptive capacity. Hence, it is recommended that poultry farmers should be given access to information and training, education with access to credit facilities to boost their productivity and increase their scope of expansion on the farm.

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