

**POULTRY FARMERS SOCIO-ECONOMIC CHARACTERISTICS AND PRODUCTION LIMITING  
FACTORS IN SOUTHWEST NIGERIA**

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**ABSTRACT**

Interventions to solve poultry farmers' production problems have not given desired results. Few researches have linked poultry production problems with farmers' socioeconomic features. The research analysed this linkage in southwest Nigeria. Ekiti, Lagos and Ondo States were purposively selected. Simple random selection of 320 farmers was made. 307 were successful for analysis. Descriptive statistics and Probit model were used to analyse the data. 52.12% of the farmers fall within 31 to 50 years of age and 67.10% of the farmers belong to cooperative group. Membership of cooperative increases the probability (0.416) of a poultry farmer having power supply problem and decreases the probability (-0.472) of a farmer facing poor market access. For sustainable poultry production in the region, farmers should be assisted on power supply to individual farm. Also, membership of cooperative should be encouraged among poultry farmers to boost market access.

**Keywords:** Poultry, Socio-Economic Feature, Farmers, Production, Problem, Nigeria, Southwest

## INTRODUCTION

The economic importance of poultry sub-sector and products cannot be overemphasised. The poultry industry provides employment to a significant number of the population. It serves as source of income to the farmers, protein in diets and the by-products, such as feathers, are used in making household items like decorations while the droppings are used for organic manure. The poultry industry contributes approximately 58.2% of the overall animal production in Nigeria (Amos, 2006). As such, the demand for poultry products has been on the increase due to many factors; some of which are rising population, urbanisation and increasing income (Food and Agricultural Organisation, 2020a). Notwithstanding these usefulness, the poultry enterprises are bedevilled with many production challenges. A poultry production challenge is any limiting factor, problem or difficult situation that makes the farmer to use more than necessary level of input to get a unit amount of output, suffer more cost than planned to obtain a unit level of output, reduces farmers' capacity utilisation or limits the transformation of input to output and which the farmer must resolve or deal with to maximise his output; the output which can either be chicken or egg.

Many authors have identified poultry production problems to include low capital base, inefficient and ineffective management, poor pricing, poor marketing and diseases (Alabi *et al.*, 2000; Carter, 2005). Adebayo & Adeola (2005) reported that a lot of poultry entrepreneurs have left the business forcefully as a result of problems like high cost of feeds, veterinary services and drugs as well as poor equipment quality. Also, lack of foreign exchange in Nigeria to pay for imports is also adversely affecting the importation of feeds and drugs for livestock. All these pose great challenge to the survival and expansion of poultry business in Nigeria towards meeting protein requirements of the populace and assisting the government in the implementation of the ban on poultry products importation. Other poultry production problems like poor record keeping, wrong choice of breed, poor feed supply, inaccurate budgeting and starting too large project were identified by Carter (2005). Roys Farm (2016) reported poultry problems as lack of productive breeds, poor housing, poor feeds and feeding, lack of access to drugs, poor management/care, poor training, poor record of expenses and income as well as poor transportation of poultry products. Obidike (2011) stated poultry production challenges as poor extension service, poor road network, lack of money to buy information media like newsletter, lack of processing and storage facilities, finance and unfavourable climatic conditions. It is worthy to note that each of these problems falls under biological, institutional, socio-economical or technical category which, according to Sonaiya (2020), contributes to non-sustainable poultry production in Africa.

Further, Aromolaran, Ademiluyi & Itebu (2013) reported poultry problems in Ibadan, Oyo State, Nigeria, from the highest to the minimum, as disease and pest attack, difficulty in credit and loan procurement processes, high cost of drugs and vaccination, market and price fluctuations, lack of technical-know-how in poultry handling, feed quality availability, high mortality of the birds, unsatisfactory healthy breeds availability, accessibility of feed, high cost of feeds and poor infrastructure like water and electricity supply. Other studies of problems relating to farm operations, particularly poultry farming, include Akinfiresoye & Agbetoye (2013), Alho (2015), Bola-Badmus (2020), Das (2015), Food and Agricultural Organisation (2020b), Meta Economics Consulting Group (2013), Naira Land (2020), Osakwe (2017) and Shiferaw & Muricho (2011).

Literature on Nigeria poultry industry is huge and has been on the increase, over the years, focusing directly on economic, management, marketing and production studies. But few, like Adebayo & Adeola (2005) and Akintunde & Adeoti (2014),

linked the socio-economic factors of poultry farmers with production and disease management. This research added to existing literature on poultry study by linking production limiting factors (problems) to the socio-economic features of poultry farmers. In terms of methodology, the study adopts Probit regression analysis which is unique in analysing the relationship between poultry production problems and the farmers' socio-economic characteristics. By analysing poultry production problems along the socio-economic physiognomies of individual farmers, it adds to the national efforts of bridging protein deficiency gap which can be obtained quicker through poultry business (Orakpo, 2011). Therefore, the objective of the study is to analyse the interrelationship between some of the problems of poultry farming and the socioeconomic characteristics of poultry farmers in the study area.

Additionally, many interventions have been implemented to solve production problems of the poultry farmers but they have not given the desired results. This is because such interventions are applied in blanket without considering the specificity of the problems along socio-economic features of the farmers. All poultry farmers cannot face similar problems and where a problem is considered to be common, the perceptions of the farmers about it vary based on their socio-economic characteristics. Consequently, this research is important for many reasons. This is the first approach, based on available literature, at analysing poultry production problems along the socio-economic characteristics of the farmers. The research outcome is an additional information for policy formulation and implementation of projects and programmes on solving the problems of poultry farmers. It is also a sustainable approach at specifying a model for institutional interventions that are aimed at solving poultry farmers' problems. Sustainable approach of proffering supports to poultry farmers is considered as a method that can be used repeatedly to provide production stimulus packages to the farmers in the present without jeopardising and losing the interest of interventionists in the approach in the future.

The mentioned poultry production problems in Nigeria are comparable with Jamali, Soomro, Halepoto, Hashmi & Shaikh (2011) for Pakistan that reported inadequate modern poultry equipment, lack of adequate poultry rearing knowledge, absence of marketing knowledge, lack of modern communication facilities, inadequate infrastructure and logistic support, lack of financial credit, lack of private investment, absence of government help and guidance, problem of getting reasonable price, expensive poultry feed and ingredients. Mentioning and rating problems of an enterprise as done by the authors are excellent but not sufficient for resolving them. There is need for narrowing the problems along the socio-economic characteristics of the farmers. To examine the problems along the socioeconomic features of the farmers is a veritable source of input for intervention as all farmers cannot have the same problems; which is the focus of this study. Resolving poultry production problems across the socio-economic features of the farmers offers sustainable approach to developing the poultry industry in Africa. By so doing, the interventions will be specifically tailored to the segment of the farmers that need the supports rather than giving all the farmers. Thus, improving institutional mechanism adjustments that support sustainable development of the poultry industry. This is in line with "management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations"; the definition of sustainable development by Food and Agricultural Organisation (2020c).

## **METHODOLOGY**

The southwest Nigeria was the study area; made up of Ekiti, Lagos, Ogun, Ondo, Osun and Oyo States as shown in figure 1. It features high population in Lagos State. Survey design was adopted and data were collected with questionnaire and

interview on six production challenges and the basic socio-economic characteristics of the farmers. Two-stage sampling technique was used. At the first stage, three states: Ekiti, Lagos and Ondo were purposefully selected based on population, growing poultry business and market availability. One of the reasons for the selection of the three states is the advantage of their participation in the World Bank/State Commercial Agriculture Project. Ogun State could have been chosen but most of the farmers are close to Lagos and more or less have similar characteristics with the poultry farmers in Lagos State. The second stage is the simple random sampling of 320 poultry farmers in the three states but 307 were successful for analysis.

Descriptive statistics: frequency distribution and percentage were used to analyse the socio-economic characteristics of the farmers. The problems perceived by poultry farmers as limiting production in relation to their socio-economic characteristics were analysed using Probit model for the probability of a farmer belonging to the group that a production problem affects adversely in line with Clamara, Pena & Tuesta (2014) and Tuesta, Sorensen, Haring & Cámara (2015). In the model, the endogenous variable is a binary response of the farmers, Yes or No, that an identified production problem affects her; taking the value of 1 or 0 respectively. It is assumed that for a farmer to perceive a production problem as affecting her depends on the latent variable  $Y_i^*$  which is determined by the farmers' characteristics, the set of exogenous variables, that are included in the vector  $X_i$ . The model is expressed as:

$$Y_i^* = X_i\beta + \mu_i \text{ ----- (1)}$$

for:  $Y_i = 1$  if  $Y_i^* > 0$ ; and  $Y_i = 0$  if  $Y_i^* \leq 0$

where, the subscript  $i$  stands for the individual farmers,  $\beta$  is a vector of parameters and  $\mu$  is normally distributed error term with mean 0 and variance 1.

In the model,  $Y_i$  is the critical threshold such that if  $Y_i^*$  is greater than  $Y_i$ , the production limiting factor is a problem of the farmer and takes on the value of 1 as stated for the model in equation 1. Though  $Y_i$  cannot be observed and we assume that it is normally distributed with same mean and variance. It is therefore possible to estimate the parameters,  $\beta$ , to get information on  $Y_i^*$  in terms of probability. Thus

$$P_1 = P(Y_i = 1|X) = P(Y_i \leq Y_i^*) = P(Z_i \leq \beta X_i) = F(\beta X_i) \text{ ----- (2)}$$

where,  $Z$  is the standard normal variable,  $Z \sim N(0, \sigma^2)$  and  $F = \left(\frac{1}{\sqrt{2\pi}}\right) \int_{-\infty}^{\beta x_i} e^{-z^2/2} dz$  is the cumulative distribution function of a normal variable.

The socio-economic features,  $X_i$ , of the poultry farmers of interest are as follows:

$X_1$  = Age of Household Head (in years)

$X_1^2$  = Age Square

$X_2$  = Farmer's Household Size (number of individual in each household)

$X_3$  = Farmer's Formal Education in Years (No education = 0, Primary education = 6 years,

Junior Secondary School = 9 years, Senior Secondary School = 12 years, NCE/ND =

15 years, HND/B.Sc = 17 years, PGD/Master's degree = 18 years, PhD = 21 years).



Key:  $\longleftrightarrow$  The states chosen for the research;  
 ★ Southwest States by Nigeria geopolitical zones

Figure 1: Map of Nigeria showing the three states for the research and other States  
 Source: Nations Online Project (2020)

$X_4$  = Farmer's Gender (Dummy: 1 = Female, 0 = Male).

$X_5$  = Farmer's Marital Status (Married Dummy: 1 = Married, 0 = Otherwise).

$X_6$  = Main Occupational Group Dummy (1 = Farming, 0 = Non-Farming).

$X_7$  = Membership of Cooperative (Membership Dummy: 1 = Membership, 0 = Non-Membership).

$X_8$  = Farmer's Location (Lagos State Dummy: 1 = Lagos, 0 = Otherwise if Ekiti or Ondo).

$X_9$  = Farm Location (Ekiti State Dummy: 1 = Ekiti, 0 = Otherwise if Lagos or Ondo).

$X_{10}$  = Poultry System (Battery Cage Dummy: 1 = Battery Cage, 0 = Otherwise)

$X_{11}$  = Farming Experience in Years

The change in probability of a farmer having a production limiting factor as a problem, when  $X_i \in \{X\}$  change, *ceteris paribus*, is shown by the coefficient. The analysis allowed the determination of the farmers' socio-economic factors that affect the probability of a production limiting factor as a problem of the farmer by using significant correlations. The analysis was done for six problems of poultry production, the production limiting factors, which are high cost of equipment maintenance, poor power supply, bad road network, poor market access, inadequate access to capital, and inadequate labour supply (Alho, 2015; Arnab, 2017; Das, 2015). The socio-economic factors of poultry farmers adopted: age, level of formal education, gender, experience, type of occupation, whether full-time or part-time farmer, household size, membership of socio-economic group, marital status and poultry system, are in line with Jato (2012), Oluwafemi (2015), Umunna (2003) and, Yusuf & Bukunmi (2015).

## **RESULTS AND DISCUSSION**

### Socio-economic characteristics of respondents

The socio-economic characteristics of respondents in terms of age, main occupation, cooperative membership and farming experience are shown in table 1. From the table, 0.65, 31.60, 35.83, 16.29, 12.70 and 2.93% of the respondents were less than or equal to 20, from 21 to 30, 31 to 40, 41 to 50, 51 to 60 and greater than or equal to 61 years of age respectively; implying that the farmers were mostly adults. Also, 68.73 and 31.27% had farming and non-farming as their main occupation in that order. 67.10% belonged to farmers' cooperative and 32.90% did not belong to any cooperative group. This indicates that some farmers were not part of cooperative to harness socio-capital. Further, 65.47%, representing the majority, had from 1 year to 6 years of poultry experience, only 2 farmers representing 0.65% had less than 1 year experience while 23.78% had 7 to 12 years of experience with 1.63, 2.93 and 3.58 having 13 to 18, 19 to 24 and 25 to 30 years of experience. Only 6 (1.95%) of the farmers had more than 30 years of experience. This implies that the farmers had reasonable knowledge on poultry production and its problems such that they could report on poultry production problems as they are affected.

### Poultry production limiting factors and socio-economic features of the farmers

The regression results of the effects of socio-economic features of poultry farmers on poultry production problems are shown in Table 2.

Table 1: Socio-economic characteristics of respondents

Characteristic	Frequency	Per cent
<b>Age (years)</b>		
≤ 20	2	0.65
21 – 30	97	31.60
31 – 40	110	35.83
41 – 50	50	16.29
51 – 60	39	12.70
≥ 61	9	2.93
Total	307	100.00
<b>Main Occupation:</b>		
Farming	211	68.73
Non-farming	96	31.27
Total	307	100.00
<b>Membership of farmers' group:</b>		
Membership	206	67.10
Non-membership	101	32.90
Total	307	100.00
<b>Poultry farming experience (years):</b>		
< 1	2	0.65
1 – 6	201	65.47
7 – 12	73	23.78
13 – 18	5	1.63
19 – 24	9	2.93
25 – 30	11	3.58
> 30	6	1.95
Total	307	100.00

Source: Field Survey (2019)

Difficulty in equipment maintenance

Equipment maintenance is one of the technical requirements for sustainable poultry production in Africa (Sonaiya, 2020). As shown in table 2, for high cost of equipment maintenance as a poultry production problem, only farmers' location of Lagos State dummy is significant at 1%. Other factors, including Ekiti State location do not have significant effect on the probability of difficulty in equipment maintenance, in terms of high cost, among the farmers. The coefficient of farmers' location of Lagos State dummy is negative of -0.658. This means that poultry farmers in Lagos State have lower probability of difficulty in equipment maintenance than the farmers in other states, Ekiti and Ondo. As one move from one Ekiti or Ondo State poultry farmer to a Lagos State poultry farmer, the probability of difficulty in equipment maintenance declines. In other words, as one moves from Lagos to any of the other two states, the probability that equipment maintenance is a problem increases among the farmers. This implies that farmers in Ekiti and Ondo States experience more difficulty in

maintaining their equipment compared to farmers in Lagos State; indicating that the two states face more challenges in fulfilling the technical aspect of equipment maintenance towards sustainable poultry production.

The result is comparable to Akinfiresoye & Agbetoye (2013) that reported lack of proper maintenance of farm machineries and 40 per cent of them in poor working condition in Ondo State. The likelihood of lower difficulty in equipment maintenance faced by poultry farmers in Lagos State than in other two states may be due to the larger economic activities in Lagos State than in other two states. With higher level of economic activity, there will be higher demand for equipment maintenance in the State. Maintenance service is more readily available in Lagos State for the service providers to make more money. The associated reasons for this include the fact that Ekiti and Ondo States are neighbouring states and their combined population is less than that of Lagos State and cost of living is higher in Lagos than in the other two states.

#### Problem of poor power supply among poultry farmers

Problem of poor power supply to farms is an institutional and socio-economical concern all over Africa that must be resolved because of the necessity of power for her sustainable poultry production (Sonaiya, 2020). From Table 2, only two factors, membership of cooperative and farmer's state of location (Lagos) are significant at 10% and 1% levels, respectively, in explaining whether a farmer faces the challenge of poor power supply. Other factors are not significant. Being a member of cooperative group increases the probability of power supply as a problem from the positive sign of the coefficient, 0.416. This means, farmers that are members of socio-economic group, cooperative, have higher probability of facing power supply problem than those that are not members. Farmers that depend on group for electricity source sharing will have more problem as Meta Economics Consulting Group (2013) reported that every poultry farmer has personal power generation backup to bridge power outage because the poultry industry is highly dependent on power supply as electricity takes substantial share of production cost. It was established that "it is essential that poultry farmers have their own electricity backup as the scale of potential losses from power failures is extremely high".

On state location, moving from farmers in Ekiti and Ondo States to Lagos State reduces the probability of poor power supply as a production problem from the negative sign of the coefficient (-0.718). This means that poultry farmers in Lagos have lower probability of facing power supply as a production problem than those

Table 2: Regression results of poultry production limiting factors that are affecting the farmers

	High cost of equipment maintenance	Poor power supply	Bad road network	Poor market access	Inadequate access to capital	Inadequate labour supply
Socioeconomic factors	Coefficient (P>/z/)	Coefficient (P>/z/)	Coefficient (P>/z/)	Coefficient (P>/z/)	Coefficient (P>/z/)	Coefficient (P>/z/)
Age (X <sub>1</sub> )	-0.033 (0.514)	0.067 (0.286)	-0.094 (0.246)	0.015 (0.785)	0.117 (0.074)	0.117 (0.035)*
Age Square (X <sub>1</sub> <sup>2</sup> )	0.000 (0.513)	-0.001 (0.202)	0.001 (0.278)	-0.000 (0.980)	-0.001 (0.067)	-0.001 (0.041)*
Farmer's Household Size (X <sub>2</sub> )	0.092 (0.062)	0.027 (0.653)	0.014 (0.817)	0.059 (0.254)	0.049 (0.449)	0.042 (0.399)
Farmer's Formal Education (X <sub>3</sub> )	-0.014 (0.850)	0.063 (0.497)	0.068 (0.475)	0.061 (0.453)	0.176 (0.057)	-0.041 (0.600)
Farmer's Gender (X <sub>4</sub> )	-0.200 (0.275)	-0.208 (0.333)	-0.397 (0.074)	-0.124 (0.525)	-0.178 (0.453)	-0.080 (0.665)
Farmer's Marital Status (X <sub>5</sub> )	0.184 (0.390)	-0.454 (0.102)	-0.324 (0.266)	-0.158 (0.489)	0.227 (0.417)	-0.085 (0.695)
Main Occupational Group (X <sub>6</sub> )	0.161 (0.337)	-0.255 (0.209)	-0.072 (0.732)	0.258 (0.166)	0.913 (0.001)***	0.280 (0.105)
Membership of Cooperative (X <sub>7</sub> )	-0.296 (0.065)	0.416 (0.033)*	-0.043 (0.838)	-0.472 (0.008)**	-0.319 (0.135)	-0.237 (0.145)
Farmer's location (X <sub>8</sub> ) – Lagos State Dummy	-0.658 (0.001)***	-0.718 (0.003)***	-0.743 (0.003)***	-0.623 (0.002)***	-0.164 (0.483)	-0.291 (0.122)
Farmer's -location (X <sub>9</sub> ) - Ekiti State Dummy	-0.241 (0.197)	-0.016 (0.948)	-0.175 (0.497)	0.043 (0.837)	-0.045 (0.855)	0.222 (0.242)
Poultry System (X <sub>10</sub> )	-0.044 (0.787)	0.259 (0.198)	0.054 (0.802)	0.062 (0.731)	0.125 (0.570)	-0.082 (0.621)
Farming experience (X <sub>11</sub> )	-0.029 (0.049)	0.003 (0.859)	0.002 (0.910)	-0.016 (0.283)	-0.004 (0.817)	-0.017 (0.232)
Constant	1.068 (0.327)	-0.300 (0.818)	3.534 (0.038)	0.170 (0.885)	-2.199 (0.118)	-1.891 (0.105)
<b>Model Features</b>						
Loglikelihood	-196.401	-120.931	-108.178	-167.774	-115.442	-192.199
No. of Observation	307	307	307	307	307	307
LR Chi Square (12)	26.160	30.990	21.230	37.640	45.220	27.330
Prob > Chi Square	0.010	0.002	0.047	0.000	0.000	0.007
Pseudo R-Square	0.062	0.114	0.089	0.101	0.164	0.066

Level of Significant: \*Significant at 10%    \*\*Significant at 5%    \*\*\*Significant at 1%

Source: Author's Computation from Field Survey (2019)

in Ekiti and Ondo States. This infers that farmers in Ekiti and Ondo States are confronted with power supply problem more than those in Lagos State. One reason for this is that Lagos State share of total electricity consumption is 20.60% compared with the combined estimates of 7.46% for Edo, Delta, Ondo, and part of Ekiti States as well as 11.90% for Oyo, Ogun, Osun, Kwara and part of Ekiti States (Osakwe, 2017).

#### Bad road network as poultry production problem

Good transportation infrastructure promotes mobility of resources for employment, income generation and production (Uma, Onwusogbulu & Enwere 2014). The importance of road, a major mode of transportation in Nigeria, for sustainable development of any economic sector, particularly the production sector like the poultry industry, cannot be overemphasised. Of all factors considered to be influencing the probability that a poultry farmer faces bad road network as a problem, as shown in table 2, only farmer's location of Lagos State is significant at 1 percent level with negative coefficient of -0.743. Being a farmer in Lagos have lower probability of having poor road network as production limiting factor. The implication of this is that poultry farmers in Lagos have higher likelihood of access to good road network for the transportation of their inputs and outputs than their counterparts in Ekiti and Ondo States. The farmers in the latter two States are likely facing more bad roads network for their production activities than the former, Lagos State. This is an indication that road infrastructure is better in Lagos than in the other two states. This finding supports Naira Land (2020) on ten cities with the best road infrastructure in Nigeria, which showed Lagos as the first and Akure, Ondo State as the tenth while Ado-Ekiti, Ekiti State was not mentioned. In the road network analysis for southwest Nigeria in Bola-Badmus (2020), all the states in the sub-region are begging for attention for road rehabilitation and reconstruction but it is better in Lagos because of the periodic maintenance done by the State on all road networks through its Public Works Corporation, the agency in charge of road rehabilitation.

#### Poor market access as poultry production problem in relation to socio-economic features of farmers

From table 2, two factors, membership of cooperative and farmer's location of Lagos State, significantly affect the probability of a farmer having poor market access as production limiting factor. The negative coefficient of membership of cooperative, -0.472, shows that being a member of socio-economic group, cooperative, reduces the probability of a farmer having market access as a problem. This means that the farmers that are members of cooperative are less likely to have poor market access as a problem than those that are not members. This is in line with Alho (2015) and Shiferaw & Muricho (2011) that reported membership of cooperative enhances farmers access to input and output markets that is necessary for non-disruptive flow of poultry resources towards meeting sustainability requirements of production (Bessel, 2020). The negative coefficient of -0.623 of farmer's location of Lagos State denotes that poultry farmers in Lagos have lower probability of having market access as a problem than their peers in Ekiti and Ondo States. One reason that could account for this is that the population in Lagos is higher than the combined population of Ekiti and Ondo; thus there is higher consumer spread across Lagos. Markets for farm outputs are available in Lagos and coupled with relatively good road network, farmers can easily move their products to the market. Also, poultry products wholesalers and retailers seemingly visit and purchase at farm gates, distribute and sell to their customers.

#### Inadequate access to capital among the poultry farmers

Financial capital is a major requirement for establishing and growing agricultural enterprises and the sustainable development of the sector. Its inadequacy and lack, in some places, is one of the institutional and socio-economic causes of non-sustainable poultry production in Africa (Sonaiya, 2020). Table 2 reveals that, among the factors considered, only main occupation group significantly affects the farmer's probability of having inadequate capital as production limiting factor. The positive sign of the coefficient of 0.913 shows that having poultry farming as main occupation increases the probability of inadequate capital as production limiting factors. This implies that farmers that have poultry farming as their main occupation are more likely to have inadequate capital as problem than those that have non-farming as main occupation. Engaging in poultry farming with non-farming as main occupation reduces the probability of having inadequate capital as a problem. Farmers that are into any non-farming means of livelihood like wage employment do not need as much funding for farm operations and expansion as they could easily take financial resources from their earned wages and put into the poultry production business anytime there is need. But farmers that are involved in poultry production as their main occupation relies only on the farm for their source of income and need money for inputs acquisition, operations, overhead financial settlements, repairs, maintenance and sales among others. This result is in line with Food and Agricultural Organisation (2020b) that reported lack of capital as general problem in sub-Saharan Africa farm enterprises development. Also, Das (2015) identified lack of capital as one of the problems of farmers.

#### Inadequate labour supply as a problem among the poultry farmers

Age is the only factor that significantly affects the probability of a farmer having inadequate labour supply as production limiting factor. Age and Age square are significant at 10% level but with positive and negative signs of their coefficients respectively. The age coefficient (0.117) shows that a unit increase in age of the poultry farmers increases the probability of having inadequate labour supply as a problem. But older farmers, represented by the square of age with coefficient of -0.001, are less likely to have the problem. The probability of the problem of inadequate labour supply increase with the age of poultry farmers but get to a maximum and then declines as the farmers become older. This may be due to farm experience that increases with age. As farmers continue in the production activity; knowing the sources of labour and means of getting them to the farm would have been mastered in the long run. In addition, the farm would have been known by the suppliers of labour over many years such that labour services are made available to the older farmers. Older farmers could also be better in farm labour motivation such that farm workers become readily available to them than younger farmers. Farm labour is declining globally due to increasing level of education which makes some labour to shift their services from the farm. Labour supply is one of the major problems of poultry production (Arnab, 2017) and significant contributors to poultry cost of production (Aladejebi, Okojie & Afolami, 2014). Younger farmers, especially the African youths, that are currently being encouraged to embrace agriculture could adopt technologies as substitute for labour to mitigate the problem towards fulfilling one aspect of the socio-economic parts of sustainable development of the poultry sub-sector (Bessel, 2020).

## CONCLUSION

There is a number of production limiting factors confronting poultry farmers in southwest Nigeria. The majority of the farmers are adults with varying level of farming experience. The poultry production problems of the farmers considered in the study are high cost of equipment maintenance, poor power supply, bad road network, poor market access, inadequate access to capital and inadequate labour supply. The study reveals that these challenges vary among the farmer along their socio-economic features. State location of the farmer affects the ease of equipment maintenance as poultry farmers in Lagos State are less likely to have difficulty in equipment maintenance compared with poultry farmers in Ekiti and Ondo States. Membership of cooperative increases the likelihood of having power supply problem on individual farm as sharing of alternative power supply source among the farms is not usually practiced. Each farm has source of power backup because electricity takes up significant portion of production cost. Also, farmers in Lagos State have lower probability of facing power supply problem than those in other two states. The southwest region is not free from the poor conditions of intra and inter-states road in Nigeria. Farmers are confronting the problem like every other road user. But the study reveals that poultry farmers in Lagos are less likely to face poor road network problem than those in Ekiti and Ondo States. Moreover, farmers that are non-members of cooperative, have higher probability of facing poor market access for farm inputs and outputs. Also, farmer's location affects the probability of a farmer having poor market access as a problem. This is because the study shows that poultry farmers in Lagos State are less likely to face poor market access than those in the other two states. Farmers that have poultry production as main occupation have higher probability of facing inadequate access to capital as a problem than those in the other category, farmers having poultry production as secondary occupation. On labour supply, younger farmers have higher probability of facing the problem than older farmers. These production problems, as considered, are institutional, technical and socioeconomic challenges that inhibit sustainable poultry production in Africa.

The study recommends that farmers in Ekiti and Ondo States should be given more attention on equipment maintenance support than those in Lagos State. However, those in the latter state should not be neglected. Due to the crawling power supply condition in the sub-region, poultry farmers should be assisted on power supply generation on and supply to each farm. Solar source of power can be of advantage on individual farm to reduce cost and for the green advantage over fossil-fuel based power generator which most farmers rely on. Government should step up the application of resources for road rehabilitation and reconstruction to boost socio-economic activities. There is need for more efforts on road network improvement in Ekiti and Ondo States than in Lagos State in relation to how poor road networks affect poultry business in each state. Membership of cooperative should be encouraged among poultry farmers to boost their market access. Efforts on achieving this should, however, be more in Ekiti and Ondo States as the poultry farmers in the two states have higher probability of having poor market access as a challenge than those in Lagos State. Poultry farmers should be identified along primary occupation and secondary occupation and windows of financial access and business financing should be given, as a priority, to farmers having poultry farming as main or primary occupation. Lastly, smart labour with the view of increasing labour output and reducing labour input on poultry farms should be promoted among the farmers to mitigate problem of labour supply. These recommendations add to the efforts of achieving sustainable poultry production in Africa.

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