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Multidimensional poverty and its drivers.

Evidence from poultry farming households, Oyo State. South West Nigeria.

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Abstract

This study examines the determinants of multidimensional poverty level among poultry farming households in Oyo State. A multistage sampling technique was employed to collect data from 210 poultry farmers within four local government areas of the state using a well-structured questionnaires. Descriptive statistics, Z-test, Alkire-Foster indices and Tobit regression model was used in data analysis. Results shows that; relative to education dimension, highest incidence of deprivations among the poor poultry farming households exists in the health and standard of living dimensions where 88% of the poor poultry farmers are deprived of access to clean water and poor access to quality healthcare which is about 47% and 11%, respectively for the Nonpoor category. There exists a significant difference between the deprivation scores of the Poor and Nonpoor with respect to these indicators at 1% level. About 20% of the poultry farming households are multidimensionally deprived with an average deprivation intensity of 47%. With respect to determinants of poverty levels, years of formal education, age, household size, cooperative membership, primary labour source, farm size, and quality health access determine the level of multidimensional poverty

among poultry farming households in the study area, proceeded by recommendations to government for poverty reduction policy.

Keywords: Poultry farming, Poverty dimensions, Poor and Nonpoor households, Multidimensional Poverty Index (MPI), Determinants.

1.0 Introduction

1.1 Background to the study

The largest share of the world's poor lives in rural areas, and half of the poor keep livestock [20, 23]. In the livestock subsector of the Nigeria economy, the need to secure the quality and quantity of food supply for the increasing population, as well as the need for animal proteins, and tendency to maintain a wholesome and balanced diet, have all made the Poultry sector a significant industry worldwide.

The agriculture sector contributions to Nigeria's Gross Domestic Product (GDP) via the various sub-sector including; Crop (87.2%), Livestock (9.0%), Fishery (3.0%) and Forestry (1.2%) respectively, making the livestock sector the second largest contributor [11, 14]. The Nigerian poultry industry is however dominated by small-holder farmers rearing less than 1000 birds [13], employing different production strategies alongside inadequate resources available to them resulting to low productivity, inefficient production and low income earnings; which is linked to poverty. Poverty is described as a serious menaces challenging many African countries, a social problem whereby the household income is insufficient to ensure suitable livelihoods, consequently leading to hunger, malnutrition, ill health and mortality from illness [15].

Agriculture has been the locus of poverty in Sub-Saharan countries, especially in Nigeria where over 80% of the country's population are directly or indirectly dependent on agriculture for their livelihood while contributing about 24.11% of the nation's GDP, more than 70% of Nigerian people are however poor[14, 17]. Poverty reduction and elimination hence remain key issues of development globally.

Although, measurement and analysis of poverty have widely hinged on the single dimension; expenditure/monetary approach which abounds in many existing literatures. The multidimensional approach has not been widely used, whereas recent developments in literature have highlighted serious limitations of monetary approach to poverty measurement [12].

[8] studied poverty among farming households in Osun state, Nigeria, while [5] examined income inequality and poverty among farming households in Southwest Nigeria, all using the income approach. On the other hand, [2] investigated the trend and determinants of multidimensional poverty in rural Nigeria using a multidimensional approach, the Alkire-Foster methodology and the logit model were employed in the analysis. The result showed that more than one-third have no education. The health, asset and education dimensions contributed most to poverty, household size was larger for female headed households compared to male headed households, [9] analyzed the determinants of farm household poverty in south-western Nigeria. The paper build on sample survey data collected in 2005. They found that 30% of the households were poor, subsisting below the average poverty line of 1985 naira (1US = 126 naira) per capita per month. The prevalence of poverty was found to be higher among older, small-scale farmers and those who do not belong to any farmers' cooperative group. Econometric analysis shows that households with smaller number, headed by male and educated head were better-off in terms of poverty than their counterparts with larger number, headed by female and uneducated head.

Furthermore, the relationship between poultry farming and poverty in the study area despite the widespread poultry production activities in South West Nigeria, in which Oyo State has the highest number of registered poultry farmers in Nigeria [10, 19]. In furtherance to the existing multidimensional poverty studies, this study besides exploring the multidimensional poverty levels (headcount, incidence and intensity of deprivations) among

the ten indicators of the three dimensions suffered by the poor, the relative deprivations of the non-poor is also analysed by exploring the relative dimensions wherein they are deprived albeit their deprivation counts do not sufficiently accrue to place them below the poverty line. Also, their poverty status by socioeconomic and demographic status was explored.

This study therefore attempts to profile the welfare status, and assess the determinants of the level of multidimensional poverty among poultry farming households in Oyo State with the specific objectives of estimating the multidimensional poverty status differentials of poultry farmers in the study area and analysing the determinants of their poverty levels.

2.0 Research methods

2.1 Study area

This study was carried out in Oyo State, South West Nigeria. The state's land area covers 35,743KM^2, situated within latitude 3°N and 5°N; between longitude 7°E and 9.3°E. The mean maximum and minimum temperature is 26.46^{0}C, 21.42^{0}C respectively while the relative humidity is 74.55%. With the state being an agrarian state, cash crops like cocoa, rubber, kolanut, citrus, and food crops like rice, vegetables yam, cassava, and corn are cultivated. Rural households in the State also rear sheep, goats, local chickens and pigs. Four (4) Agricultural Development Project (ADP) zones exist in the state as categorized by the Oyo state Agricultural Development Project (OYSADEP); Ibadan/Ibarapa zone, Oyo zone, Ogbomoso zone and Saki zone. All four ADP zones have varying degrees of poultry production activities. Furthermore, intensive rearing of exotic breeds of cockerels, layers and broiler birds have become widespread in the study areas.

2.2 Sources of data and/ Sampling techniques

The data for the study was obtained from primary sources through the aid of a well-structured questionnaire. A multistage sampling technique was employed. The first stage

involved random selection of two agricultural zones which were Ibadan/Ibarapa and Oyo Agricultural zones from the four Agricultural Zones in the State (Ibadan/Ibarapa, Oyo, Saki, and Ogbomoso Zones). The second stage involved a random selection of three Local government areas under the Oyo agricultural zone and one Local government in Ibadan/Ibarapa Zones, due to the relatively larger poultry production activities in the Oyo agricultural zone compared to Ibadan/Ibarapa. The third stage involved a random selection of 19 villages from Ido, Afijio, Oyo central, and Oyo west local government areas, from which 240 poultry farmers were randomly selected in the final stage and only 210 responses were used in data analyses due to incomplete questionnaires. The Statistics and Data (STATA) '14 analytical software was used in data analysis.

2.3 Analytical techniques

a. Multidimensional Poverty Index (MPI)

The multidimensional poverty index (MPI) measure developed by [6] was used to measure the multidimensional poverty among the poultry farmers. The methodology includes two steps: an identification method (ρk) that identifies 'who is poor' by considering the range of deprivations they suffer, and an aggregation method that generates an intuitive set of poverty measures ($M\alpha$).

i. Choice of weighted dimensions, indicators and weights.

In line with [7] three dimensions; health, education, and standard of living were used to compute the multidimensional poverty indices (MPI) of the respondents. The dimensions and indicators includes;

A. Education: (each weighted equally at 1/6); Years of Schooling, child Enrolment

B. Health: (each weighted equally at 1/6); Quality healthcare and Health as a Limiting factor

C. Standard of Living: (each weighted equally at 1/18); Electricity, Drinking water, Sanitation, Flooring, Cooking Fuel, Assets.

When a household "X" is subject to a deprivation cut-off "z" and a poverty cut-off "k", a household that possesses the indicator of each dimension is scored with the corresponding weight and zero if otherwise. The maximum score is 100 percent; with each dimension equally weighted (where each dimension is 33.3%). A cut-off of 33.3%, which is the equivalent of one-third of the weighted indicators, is used to distinguish between the poor and non-poor. The deprivation headcount (H_o), Average intensity of deprivation (A) and the dimension adjusted head count (M_o) can be obtained using the following model [6];

$$H_0(x;k;z) \equiv \frac{1}{N}\sum_{n=1}^{N} I[c_n \geq k] = \frac{q}{N} \quad \text{.....(i)}$$

$$A(x;k;z) \equiv \frac{\sum_{n=1}^{N} I[c_n \geq k]c_n}{q} = \frac{\sum_{1}^{q} c}{q} \quad \text{.....(ii)}$$

$$M_0 \equiv [\frac{1}{N}\sum_{n=1}^{N} I[c_n \geq k]][\frac{\sum_{1}^{q} c}{q}] = H_0.A \quad \text{.....(iii)}$$

Where: H_o= Head count ratio, A= Average intensity of deprivation, M_0= Adjusted headcount ratio or the multidimensional poverty index (MPI), *q*= the number of people who are multidimensionally poor, *N*= Total population, *C*= is the deprivation score that the poor experience, I () is indicator that takes the value of 1 if the expression in parenthesis is true and zero if otherwise.

b. Tobit regression

The Tobit regression model was used to explore the relationship between poverty depth and the various factors affecting it. It is preferred because it better handles censored dependent variables and it is superior to the logit and Probit models as it measures the

probability and the intensity of multidimensional poverty. Following [22], and used by [1], the model is specified as follow;

$Y_i = Y_i^* = \beta X_i + \mu_i$ if $Y_i^* > C$……..… (iv)

$0 = \beta X_i + \mu_i$ if $Y_i^* < C$…… (v)

Where: Y_i is the weighted multidimensional poverty index; assumes zero value (discrete) when the household is not multidimensionally poor, and continuous when they are poor i.e. equal to Y_i^*. And X_i is the vector of explanatory variables; β is k x 1 the vector of unknown parameters to be estimated (β_0 =Intercept, β_1 - β_n =Slope), and $\mu \sim N(0, \sigma^2)$. C is the deprivation cut off i.e. 0.33. The model is explicitly specified as follows:

$Y_i = \beta_0 + \beta_1 X1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \ldots\ldots + \beta_i X_i + \mu_i$…… (vi)

Where; X_1 = Gender (dummy; Male=1, Female=0), X_2 = Marital status (dummy; 1, if married 0, if otherwise), X_3 = Formal education (years), X_4 = Highest level of education in the household other than household head's (years), X_5= Age, X_6 = Household size, X_7= Years of farming experience), X_8= Farming as Primary occupation (yes=1, otherwise=0), X_9= Access to credit (Yes= 1; No=0), X_{10}= Access to infrastructure i.e. electricity (dummy; Yes= 1; No=0), X_{11}= Sole dependence on primary labour (Dummy; No=1, Yes=0), X_{12}= Farm Size (Number of Stock), X_{13}= Cooperative membership (dummy; Yes=1; No=0), X_{14}= Quality health service (dummy; Accessible =1; Otherwise=0), n= i = 14, μi = Error term.

3.0 Results and discussion

a. Multidimensional poverty indices.

The estimates of Multidimensional poverty index for the poultry farmers in the study area are shown in Table 1. The results reveal that K=3 shows that about 20% of the poultry farmers

are poor, suffering about 47% of the weighted indicators. The mean difference test reveals a significant difference between the deprivations suffered by the Poor and Nonpoor farming households at 1% level of significance, where the average intensity of deprivation suffered by a Poor poultry farming household is higher than that of a Nonpoor counterpart by about 38% on the average.

Table 1. **Multidimensional poverty status of poultry farming households.**

Status	Average intensity of deprivation (A_0)	Headcount ratio (H_0)	Multidimensional poverty index (M_0)	Total Freq.	Percent (%)
MPI Poor	0.46748 (0.12483)	0.195	0.09125	41	19.52
MPI Nonpoor	0.092702 (0.08609)	0.805	0.07462	169	80.47
				210	100
					P=0.0000***
Mean difference	0.37478	0.6125	0.01663		

Source: Field Survey data analysis result. Standard deviation parenthesized. ***P≤0.01, **P≤0.05, *P≤0.1

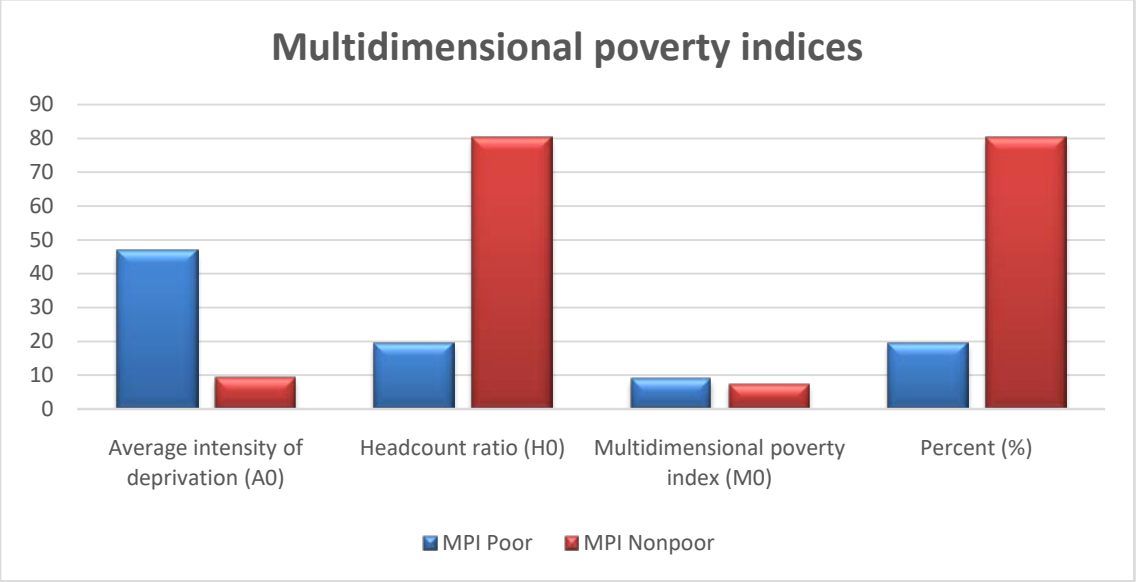

Fig. 1: Multidimensional poverty indices for the poultry farming households

b. Multidimensional poverty status of respondents.

Table 2 shows the cross tabulated incidence of deprivation across the various weighted dimensions among the poor and Nonpoor poultry farmers in the study area. The deprivation status of the Poor and Nonpoor is presented for comparison purpose where the Nonpoor are likely to be deprived in some dimension with deprivation counts not sufficiently accruing to categorise them as poor.

With respect to standard of living and health dimensions, the result shows that about 55% and 27% respectively are deprived of access to clean water and quality healthcare respectively, wherein 88% of the poor poultry farmers in the study area were deprived of access to clean water and poor access to quality healthcare. Also, fairly huge proportion (about 36%) of the total population of poultry farming households were deprived of asset acquisition while about 23% of the total population of poultry farmers in the study area used substandard cooking fuel.

Table 2: **Cross tabulation of the incidence of deprivation across various indicators by poverty status.**

Dimensions	**Pooled N=210**			**Poor N=41**			**Nonpoor N=169**			**P-Value**
Education	Freq.	Mean	Sddev	Freq.	Mean	Sddev	Freq.	Mean	Sddev	
Basic enrolment	14(6.67)	0.1556	0.0416	13(31.71)	0.1138	0.078	1 (0.5)	0.1656	0.012	P=0.000 ***
Child Enrolment	20 (9.52)	0.1507	0.0490	14 (34.15)	0.1097	0.080	6 (3.55)	0.1608	0.031	P=0.000 ***
Health										
Quality Health Care	55 (26.19)	0.0734	0.1230	36 (87.80)	0.0203	0.055	19 (11.24)	0.1479	0.052	P=0.000 ***
Sickness	24 (11.43)	0.1476	0.0531	9 (21.95)	0.1301	0.069	15 (8.88)	0.1518	0.047	P=0.018 ***

Standard of Living										
Electricity	51 (24.29)	0.0421	0.0238	25 (60.98)	0.0216	0.027	26 (15.38)	0.0470	0.020	P=0.000 ***
Clean Water	115 (54.76)	0.0251	0.0277	36 (87.80)	0.0068	0.018	79 (46.75)	0.0295	0.027	P=0.000 ***
Sanitation	44 (20.95)	0.0439	0.0226	25 (60.98)	0.0217	0.027	19 (11.24)	0.0493	0.017	P=0.000 ***
Housing	22 (10.48)	0.0497	0.0170	12 (29.27)	0.0393	0.027	10 (5.92)	0.0522	0.013	P=0.000 ***
Cooking fuel	47 (22.38)	0.0431	0.0232	26 (63.41)	0.0203	0.027	21 (12.43)	0.0487	0.018	P=0.000 ***
Asset	76 (36.19)	0.0267	0.0354	29 (70.73)	0.0163	0.026	47 (27.81)	0.0401	0.024	P=0.000 ***

Source: Field Survey data analysis result. Percentages parenthesized. ***P≤0.01, **P≤0.05, *P≤0.1

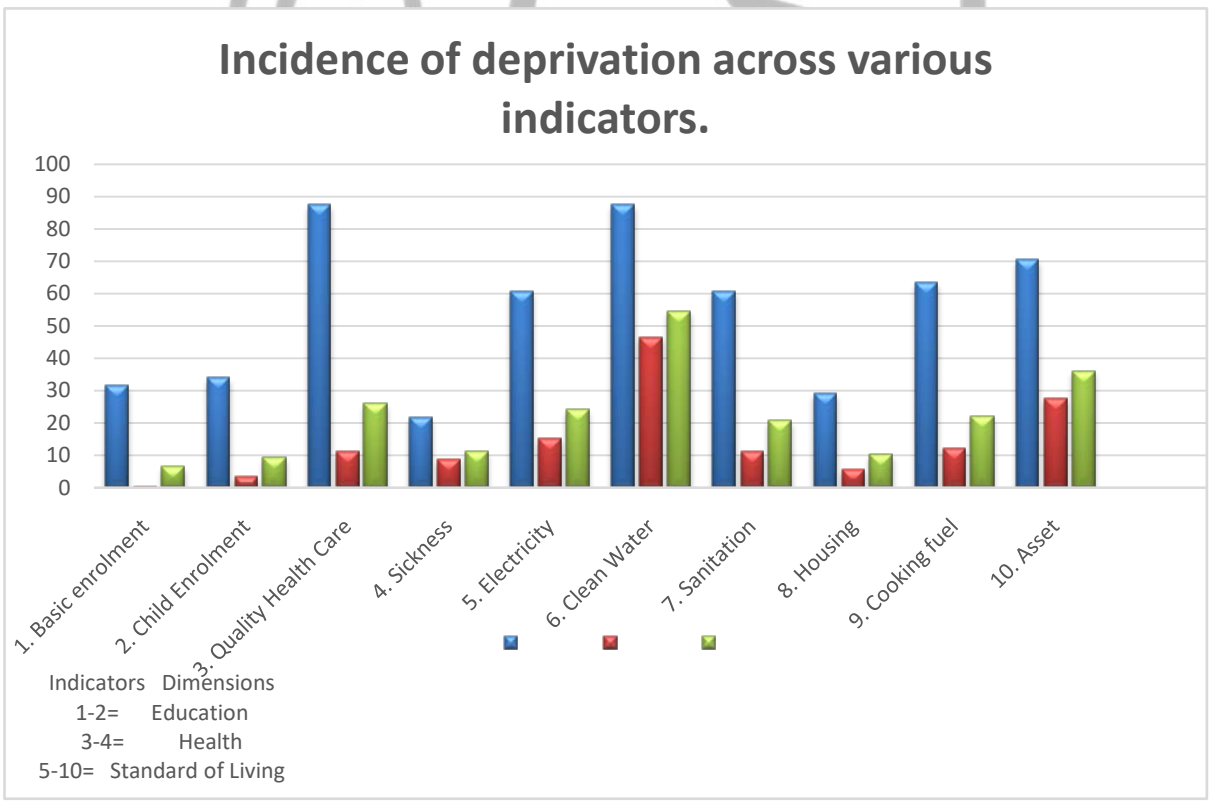

Fig.2: Incidence of deprivation across various indicators

c. Multidimensional poverty status by socioeconomic characteristics

From Table 3, the MP status of the respondents by gender shows that, although the female headed households suffered higher deprivations, when compared to the male headed households, the mean difference test showed no significant difference in the poverty status of the two household categories.

Regarding their poverty and marital status, about 29% of the single poultry farmers fell below the poverty line while deprived in 54% of the averagely weighted indicators with a poverty incidence of 16% for the married category, and were deprived in about 42% of the averagely weighted indicators. The mean difference test shows that the poverty status of single poultry farmers was significantly higher than their married counterpart, and significant at 1% level. Hence, marriage may reduce the intensity of multidimensional poverty, but it is not a safety net out of poverty. With regards to their poverty status by household size, result shows that, the poverty status of poultry farming households with above 4 persons is significantly higher by 0.059277 than households with less than 4 persons at 10% level of significance.

Concerning their poverty status by primary occupation, it was revealed that poverty in households primarily engaged in poultry farming is significantly higher than households engaged in other non farming activities at 5% level. This might be due to problems arising from disease outbreaks, high cost of inputs, and product price instability, compared to those engaged in non farming activities with diversified risks hence, relatively better off. Moreover, result on the poverty status of the poultry farming households by educational status of household head in years showed that about 89% of the poultry farming households where household heads has no formal education were poor. The mean difference test reveals a significant difference in the years of formal education among the poor and non poor poultry farmers at 1% level.

Table 3. **Multidimensional poverty status by socioeconomic characteristics of poultry farmers in the study area.**

Variables	**Multidimensional Poverty headcount (H_0)**					**Average intensity of deprivations /AIOD (A_0)**
	Non Poor		**Poor**		**Pooled**	
Gender of Household head	Freq.	Percent	Freq.	Percent	Freq.	
Male	147	81.67	33	18.33	180	0.459 (0.333-0.778)
Female	22	73.33	8	26.67	30	0.50 (0.444 - 0.556), **P=0.4184**
Marital Status	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	
Married	133	83.65	26	16.35	159	0.423 (0.333-0.778)
Non married	36	70.59	15	29.41	51	0.544 (0.333-0.722) **P= 0.0017*** **
Total	169		41		210	Mean= 0.467
Primary occupation						
Farming	76	76.77	23	23.23	111	0.505 (0.333-0.778)
Non farming	93	83.78	18	16.22	99	0.419 (0.333– 0.667) **P= 0.0284****
Access to credit						
Yes	33	89.19	4	19.52	37	0.444 (0.399-0.50)
No	136	78.61	37	21.39	173	0.469 (0.333-0.778)
Primary source of labour						
Paid	93	91.18	9	8.82	102	0.414 (0.333-0.556)
Family	76	70.37	32	29.63	108	0.483 (0.333-0.778)
Total	**169**		**41**		**210**	**P=0.1447***

Source: Field Survey data analysis result. ***P≤0.01, **P≤0.05, *P≤0.1 Minimum and Maximum AIOD parenthesized.

d. Factors determining the level of multidimensional poverty

The log likelihood estimates for the determinants of the level of multidimensional poverty index among the poultry farmers are presented on Table 4. Gender of household head was negative and significant at 10% level, implying that being a male headed household increases the likelihood of poverty reduction. Similarly, the years of farmers' education was negative and significant at 5%level hence, an additional year of formal education has a likelihood of reducing their poverty status. Also, an additional increase in years of formal education of any other household members besides the household head's reveals a likelihood of reducing poverty status of a poultry farming household, and significant at 1% level. This could be linked to the effect of literate household members positively influencing farmers' rational socioeconomic, and productive decisions. This is in consonance with the findings of [21].

Besides, a year increase in the age of farmers was found to reduce the household's poverty status, and is significant at 1% level. This might be due to the likelihood of older farmers being able to make judicious decisions in their farming activities yielding positive economic benefits. This is in consonance with the findings of [2, 3].

Furthermore, an increase in household size has a likelihood of bringing about increase in poverty by 1.8% and was significant at 1% level. This positive relationship is likely due to the fact that large households place a higher demand on household limited income relative to smaller households. This is in consonance with [3, 16]. Cooperative membership was significant at 10% level. This relationship implies that membership of agricultural cooperative societies will likely reduce poverty of a poultry farmer by 3.9%. This could be linked to the effects of various benefits accessible through cooperatives, such as access to; credit, improved production inputs and training which invariably enhance their production activities.

Moreover, sole usage of paid labour reduced poverty by 11.3% and was significant at 1% level. This might be due to the fact that paid labourers are remunerated hence subjected to

managerial supervision, bringing about a relatively higher efficiency and productivity. Furthermore, farm size had a negative relationship, significant at 10% level. This implies that a unit increase in the farm size will likely bring about reduction in poverty status. This might be due to the economies of scale enjoyed when farmers spread their variable production costs over the existing fixed costs. This is in consonance with the findings of [21]. Access to quality health reduced poverty by 21.6%, significant at 1% level. This might be due to the possibility that access to quality health promotes healthy living hence, facilitating farmers' increased efficiency and productivity which invariably translates to higher incomes and reduction in poverty status.

Table 4: **Log likelihood estimates of Tobit regression for the determinants of the level of multidimensional poverty index among poultry farmers**

Variables	Coefficient	Standard error	P-Value (p>t)
Gender of household head	-0.0609746*	0.0433896	0.162
Marital status	0.0396631	0.0363612	0.277
Level of Educational (years)	-0.0043946**	0.0024758	0.077
Highest level of education attained in the household beside Household head's (years)	-0.0117401***	0.0019968	0.000
Age of Household Head in years	-0.003232***	0.0010571	0.003
Household Size	0.0182945 ***	0.0050492	0.000
Years of farming experience	0.0003308	0.0016618	0.842
Cooperative membership	-0.0386649*	0.0235494	0.102
Farming as your primary occupation	0.0084788	0.0277187	0.760
Access to Credit	0.0148478	0.0380494	0.697
Access to infrastructure	-0.0327965	0.046113	0.478
Primary source of labour	-0.1132085***	0.0285638	0.000
Farm size (layers)	-0.000012*	7.39e-06	0.105
Quality health access	-0.2162377***	0.0302981	0.000
Constant	0.8009467	0.0741835	0.000
Pseudo R2 = 1.4002	**LR chi2(15) =177.01**		

Log likelihood = 25.296826	**Prob > chi2 = 0.0000**
169 left-censored observations at k <= 0.33	
41 uncensored observations	
0 right-censored observations	

Source: Field Survey data analysis result. Significance level *** P≤0.01, **P≤0.05,*P≤0.10.

4.0 Conclusion and Recommendations.

This study assessed the determinants of the level of Multidimensional Poverty (MP) among poultry farming households in Oyo state, Nigeria. Results showed that about 20% of the poultry farming households fell below the poverty line, while suffering from about 47% of the weighted indicators on the average where about 80% are non poor but suffering from about 9% of the weighted indicators on the average hereby implying that the SDG goal of zero poverty is yet to be fully attained in the study area. With the highest incidence of deprivation in the health (access to quality health) and standard of living (access to electricity and potable water) dimensions, poverty was however more intense and widespread among poultry farmers lacking access to credit. Gender of household head, years of formal education, highest level of education attained in the household other than household head's, age of household, household size, cooperative membership, primary source of labour, farm size, and quality health access were found to influence the level of poverty among poultry farming households in the study area.

Sequel to the findings from this work, it is recommended that, female headed poultry farming households should be empowered by government and non-governmental organizations. Farmers' years of formal education should be increased, while good housing, clean water, better access to quality health facilities should be provided by the government. Moreover, credit, and good electricity should be enhanced, while discouraging large household size. Medium-large scale poultry production should be encouraged while

discouraging sole dependence on family labor. Finally, Cooperative membership should also be encouraged among poultry farmers in the study area, owing to the positive reduction effect on multidimensional poverty.

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