Measuring the Causality on Cooperatives Membership, Livelihood Diversification and Determinants Among Poultry Farm Holders: A Case Study of South West Nigeria

Popoola, D. P, Adebayo, C.O, Abdullahi, A.

Department of Agricultural Economics and Farm Management. Federal University of Technology, Minna.

popoola.pg917237@st.futminna.edu.ng, +2347034355030

ABSTRACT: *Cooperative membership and livelihood diversification has been observed to influence households' economic situations, while little is known about their interplays as a matter of mutual unexclusivity when they both occurs. This study was hence conducted to investigate the level of cooperative performance, and how cooperative membership influences livelihood diversification alongside some other imperative hypothesized determinant factors, using data collected from 210 poultry farm holders via multistage sampling procedure and analysed with econometric, parametric, and non-parametric analytical tools at 95% confidence interval. Result showed that; majorities of the cooperator respondents are satisfied with; Access to loan (72.38%), Loan repayment (67.62%), Transportation (68.10%), Marketing (67.14%), Training (69.5%), patronage (70%), and Political interference (69.05%) while a relatively large proportion of the respondents (59.04%) are diversified, while a majority (89.52%) of this diversified category secondarily diversifies into non farming activities. Also, the proportion of the cooperator diversified poultry farming household (59.41) narrowly exceeds the noncooperator category (58.72) hence, further econometric analysis conducted showed that; gender of household head, level of formal education, primary labour source, primary occupation, and cooperative membership negatively influenced livelihood diversification, but otherwise for multidimensional poverty, all significant at $P\leq0.1\%$, $P\leq0.5\%$, $P\leq0.01\%$, $P\leq0.01\%$, $P\leq0.01\%$, and $P\leq0.1\%$ probabilistic levels respectively. Finding based recommendations were further proffered.*

KEYWORDS: cooperative membership, livelihood diversification, cooperative performance, poultry farming, south west Nigeria.

INTRODUCTION

Agriculture which remains a general term that encompasses all activities that relates to crop, and livestock production as a means of livelihood is the mainstay of the Nigerian economy, with an estimated population of about 200 million individuals where at least about 70% of these population are primarily or indirectly engaged in agriculture and living a less developed life (Richard and Olajide, 2020; FAO, 2021) also, the largest quota of the world's poor lives in the rural areas, and half of them keeps livestock (Robinson *et al.,* 2011; World Bank, 2016).

According to Federal Ministry of Agriculture (2012), the Nigerian poultry sector is full of small-holder farmers that on the aggregate raises the bulk of their poultry birds for eggs and meat production, but idiosyncratically rears lesser than 1000 birds employing different production methods in accordance with scanty resources at their disposal. In an attempt to confront these constraints over the years, interested farmers usually associate to form members' institutions to pool resources together usually through a "jointly owned and democratically controlled enterprising", called "Cooperative society".

The International Cooperative Alliance (ICA, 2015), defined cooperative as "an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise". Cooperatives help in identifying economic prospects for members; empowers the unprivileged in defending their interests; providing security to the deprived by allowing them convert idiosyncratic risks to a collective risk; and also mediate members' accessibility to the assets which can be utilized to maintain a productive living (International Labour Organization; ICA, ILO, 2015).
Cooperative membership do expose her members to varieties of opportunities in such a way that influences the likelihood of members' livelihood diversification, subject to their interests, and enlightenments. Furthermore, Cooperatives are potential means to promote members' social participation, socioeconomic inclusiveness, and poverty escape route.

Livestock production as a subsector of the agricultural industry can however serve an important livelihood means and a potential pathway to escaping poverty (IFAD, 2011). This can however be the primary livelihood means or secondary livelihood means for the respective less diversified and diversified households, as influenced by households' utility function.

Poultry sector also provides numerous job offers for the populace, hereby providing an income source to the people. It also help provides good animal protein source in their meat, and egg products that possesses high nutrients (Nasiru *et al.,* 2012, Yilmaz *et al.,* 2013).

Whilst many of the existing literatures defined 'diversification' in the terms of income earning, or productive engagements, introducing the 'livelihoods' concept has further broadened the debate

process to an inclusion of the means through which the rural households constructs a varying activity portfolios and support social capabilities in the quest for survival and struggles so as to improve their standard of living (Ellis, 1998).

Regarding some of the existing works on cooperatives, livelihood diversification and existing research gaps this work seeks to address, Ayantoye *et al.* (2017) in their work titled; "determinants of livelihood diversification among rural households in Kwara State", Nigeria, it was obtained that gender, primary occupation, poverty status, marital status, and association membership significantly factors influencing livelihood diversification among the respondents in the study area, this study however will further explore/profile the relationship between cooperative membership and livelihood diversification.

Also, Raphael *et al.* (2017), in their research titled "effect of livelihood diversification on food security status of rural farm households in Abia State Nigeria" using a logit regression obtained that their livelihood diversification was influenced by credit, household size, formal education, membership of cooperatives and income while food security status was influenced by education years, credit access, age, income, and household size while no emphasis was made on cooperative membership as would be addressed in this study.

Furthermore, in the study of Ogbanje *et al. (*2014), titled; "off-farm diversification among small-scale farmers in north central Nigeria", using a multistage-sampling methodology in the selection of 180 farming households, revealed that farming activities as a primary occupational means, off-farm work experience, formal education, and off-farm works significantly raised the rate of diversification, whereas the age, hours, leisure, farm size, on-farm work hours, farm assets' current worth, and crop income negatively affects off-farm diversification, while cooperative membership effect was not emphasized as would be addressed by this study.

It is worth noting that, the bulk of existing studies on livelihood diversification (such as; Adepoju, A.O., & Obayelu, O.A., 2013; Raphael *et al*., 2017; Pur *et al*., 2016; Ayantoye *et al* , 2017; Dilruba, K., & Bidhan, C., 2016) generalised, while a few focused on crop farmers (such as Okiemua *et al*., 2019; Owusu *et al*., 2011; Ogbanje *et al*., 2014; Jude *et al*., 2019), without substantive counts of works focusing on livestock farmers (Xuhuan *et al*., 2019 focused on ruminant producers) hence, this study resolutely focused on livestock (poultry) farmers to bridge the existing wide research gap, in addition to providing strong empirical basis to better understand what the livelihood diversification situation is and as influenced by cooperative membership, and how to better exploit it or provide favorable interventions and necessary policy options.

This research thereby sets to investigate the level of cooperative performance, and how cooperative membership influences livelihood diversification alongside some other imperative hypothesized determinant factors in South West Nigeria, by proffering specific responses to the following empirical questions;

i. How much are the cooperatives performing in the study area?
ii. What is the livelihood diversification index, and livelihood diversification profile of the cooperator and noncooperator farmers in the study area?
iii. What are the determinants of livelihood diversification of poultry farm holders in the study area?

Theoretical Framework
Concerning the theoretical background as of emphasis on what, who, when, and where (Whetten, David. A., 1989), this study adapted the rational choice theoretical background in investigating the incidence of cooperative performance, and how it influences livelihood diversification among poultry farm holders alongside some other crucial/imperative hypothesized determinant factors in South West Nigeria.

Rational choice theory
The fundamentals of "rational choice theory" is of the belief that people decides, or makes individual best decisions under some dominating situations which will result to either a rational outcome or an irrational one (Steven, 2002). A rational choice is based on logic. The theory of rational choice for consumers' behaviour is rooted in some or all of the following axioms, which also explains the decision making behavior of a an ith firm: (1) Availability of some alternatives (2) The consumers will prefer either of two alternatives, or be indifferent. (3) The consumers are *transitive* in their preference. (4) The consumer will select the alternative or combinations preferred the most (Sanje Rode, 2013).

A poultry farmer may decide to join a cooperative society in order to maximize her utility which consequently might influence her decision to choose a livelihood strategy or a combination of livelihood strategy from the available sets of livelihood activities in order to increase her utility. Invariably, non-diversification may be due to limited access to information, and may yield a different outcome for a cooperator. Supposing that there are two feasible outcomes, say; a Cooperative member or a Noncooperator, where the probability of A; P(A) equal the probability of cooperative membership while the probability of B; P(*B*) equals otherwise (i.e. a Noncooperator).

If a jth farmer decides to join cooperative, her utility/satisfaction function (U) as a cooperator if s/he resolves to join cooperatives which can be well be expressed this time as U_i = f(AnB'), and if she is not a Cooperator as; U_i = f(A'nB) where; "*f*" is also a function which attributes a specified value (utility function) to a selected alternative. With the afore as sole possible outcome(s), it remains clear that; P(A) + P(B) = 1, meaning a 100% nonadditive chance of occurrence for "*A*" or "*B*" and are exclusively mutual.

The decision to diversify (Si) as influenced by cooperative membership can further determines the level of utility derived given as; $U_i = pr (S_i/A-1)$ and when more than one strategy is combined from the available sets of alternative strategies $(S_1, + S_2, \ldots\ldots + Sn)$, say S_1, S_3 and S_4, to enhance satisfaction, the utility is expressed as; $U_i = f(S_1 + S_2 + \ldots Si/1-A)$ or $Pr (S_1 + S_3 + S_4/1-$

MATERIALS, AND METHODS

Study area/ Data Source.
This study was conducted in Oyo State, South West Nigeria. The State comprises of 33 local Government areas (LGAs) with an estimated population of about 7.8 million persons (NBS, 2017) and the land topography covers about 35,743 km^2 situated within latitude 2°N and 5°N; between longitude 7°E and 9.3°E. Data were collected from the poultry farm holders, via multistage sampling technique.

In the first stage, Oyo State was purposively selected from the existing 6 States in the South West zone due to existence of large number of poultry farmers therein (Federal Department of Livestock and Pest Control System, 2007), followed by a stratification into non heterogeneous and non overlapping categories of; dense poultry production area and less dense poultry production area strata, based on concentration of poultry production activities, from which two agricultural zones, one per strata (i.e., Oyo and Ibadan/Ibarapa respectively) were randomly selected, out of the four existing Agricultural Zones within this State.

Third sampling stage involved a random selection of three Local Government Areas (LGAs) per Ibadan/Ibarapa Zone (Ibadan North, Ibadan South, and Ido), and Oyo agricultural zones (Oyo Central, Oyo west, and Afijio) which is followed by a random selection of 10 farm settlements/communities; one community/farm settlement within the Ibadan North, Ibadan South LGAs and two from Ido LGA (owing to relatively larger poultry production activities taking place in Ido), while one community/Farm settlement was selected per Oyo central, Oyo west, and four communities/farm settlements from Afijio LGA (owing to relatively larger poultry production activities taking place in Afijio), from which a total of 240 farming household was randomly selected in total, while 210 was utilized owing to quality of responses

Analytical techniques.

Cooperative performance.
To determine cooperative performance in the study area, a three point likert-scale was employed. The values ranges from 3-1, and the corresponding indentation is denoted as follows;
Major problem = 3, Minor problem = 2, Satisfactory = 1.

Livelihood diversification measurement.

Margalef Index (MI).
This study applied MI to measure poultry farming households' livelihood diversification due to its higher discriminating capacity. The "K" Diversity (MI) was developed by Margalef (1957; 1991). The Margalef index is specified and adapted for this study as follows:

$$\text{Margalef indices} \left(D_i\right) = \frac{S_i - 1}{Ln(N_i)}$$ …………………………………………….. (1)

Where;
N_i = Gross number of samples' diversity units, S_i = Total Number of farmer's managed diversity units for any i^{th} household, Ln= Natural logarithm, MI is a nondiscrete value sets (of 0-1) where; MI≤ 0 = less diversified, and MI $>0\leq 1$ = otherwise.

Measuring the effect of cooperative membership, income, and multidimensional poverty on livelihood diversification of poultry farming households in the study area.

Tobit parametric maximum likelihood estimate.
Due to the inconsistency, and biasness of the dependent variable in the least square estimate for the regression parameter having dualised limits (Greene, 2012), this study rather employed a censored regression model, which is a standard Tobit model, suited for dualised limited dependent variables boundaries. An implicit function of the model is given as;

$$Y_i^* = X_i'\beta + \varepsilon_i$$ ……………………………………………………………………… (2)

Where Y_i^* is the livelihood diversification dependent continuous variable that assumes the value of 1 if $Y_i^* \geq 1$ and vice versa.
The structural forms of the dependent variable y_i is expressed as follows;

$$Y_i = \begin{cases} \varphi \text{ if } y_i < \gamma = 0 \\ \gamma \text{ if } y_i > \varphi < y_i' \\ y_i' \text{ if } y_i > \gamma = 1 \end{cases}$$ …………………………………………….…… (3)

Where;
φ = lower limit,
$\gamma, and \ y_i'$ = Upper and topmost limit categories.
The logarithmic likelihood explicit function of the model can be represented as follows, assuming that the error term, ε, dully obeys a normalized distribution; 0 σ^2 i.e., ($\varepsilon \sim N(0, \sigma^2)$.

$$log = \sum_{i=1}^{N}\left[I_i^\gamma \ log\Phi\left(\frac{\gamma - X_i'\beta}{\sigma}\right) + I_i^\phi\left(\frac{X_i'\beta - \phi}{\sigma}\right) + \left(1 - I_i^\gamma - I_i^\phi\right)\left(log\theta\left(\frac{y_i - X_i'\beta}{\sigma}\right) - log\sigma\right)\right]$$ … … …. (4)

The implicit regression function can be specified as follows:
$$Y_i = \beta_0 + \beta_1 X1 + \beta_2 X_2 + \beta_3 X_3 + \ldots\ldots + \beta_{15} X_{15} + \mu_i$$ …………………….……… (5)

Where;

X_1 = Cooperative membership (dummy; Yes=1; No=0), X_2 = Primary labour of source (Dummy; Paid labor=1, Family Labor=0), X_3 = Farm income (₦), X_4= Gender of household head (dummy; Male=1, Female=0), X_5= Farming as primary occupation (dummy; Yes= 1 =0, if otherwise), X_6= Level of education of household head (years), X_7= Marriage status (dummy = 1, if married =0, if otherwise), X_8= Multidimensional poverty (multidimensional welfare score), X_9= Access to quality health (dummy; Yes= 1 =0, if otherwise), μi = Error term.

RESULT AND DISCUSSION

Cooperative performance.

The various hypothesized variables influencing cooperative performance in the study area and their intensity, using a three point likert-scale are presented in table 1. The result showed an appreciable cooperatives performance in the study area. This may largely be due to efficient management of well-organized cooperatives societies.

Table 1. **Cooperative performance profile in the study area.**

Incidence / Cooperative performance variables		MAJOR CONSTRAINTS		MINOR CONSTRAINTS		SATISFACTORY	
		Freq	Perc.	Freq.	Perc.	Freq.	Perc.
Funding	**Access to loan**	27	12.86	31	14.76	152	72.38
	Loan repayment	22	10.48	46	21.90	142	67.62
Facilities	**Transportation**	28	13.33	39	18.57	143	68.10
	Marketing	18	8.57	51	24.29	141	67.14
Training		23	10.95	42	20.00	145	69.05
Low patronage		19	9.05	44	20.95	147	70.00
Political interference		17	8.10	48	22.86	145	69.05

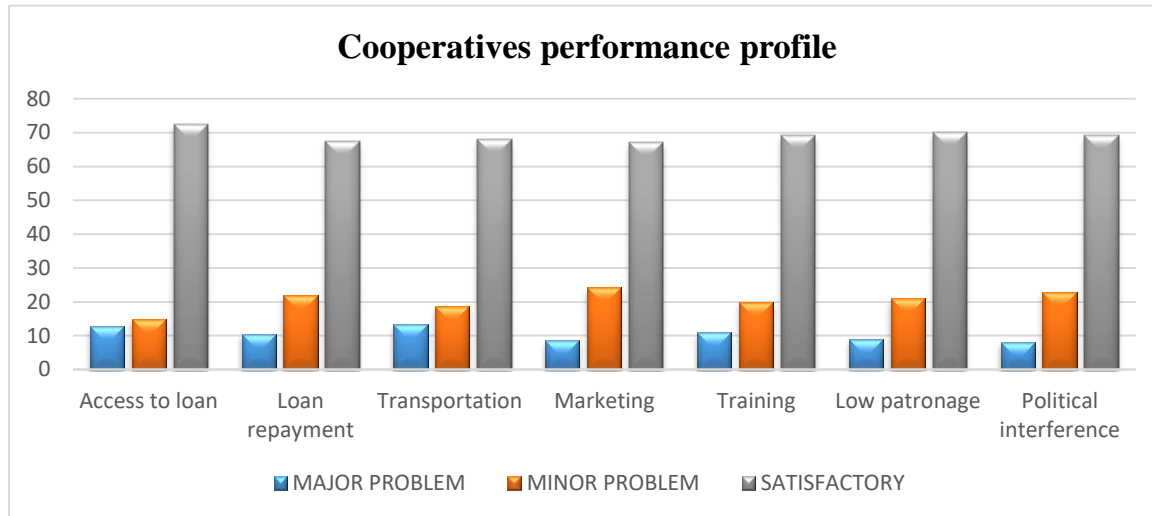Source: Field Survey data analysis result.

Fig. 1. **Cooperative performance profile in the study area.**

Cooperative membership and livelihood diversification status.

The result shows that about 59.41% of the cooperator category diversified their livelihood activities, while it is 58.72% for the noncooperator category. This implies that, the proportion of the diversified cooperator household narrowly exceeds the noncooperator category hence, further econometric analysis was conducted and the result is presented in table 5.
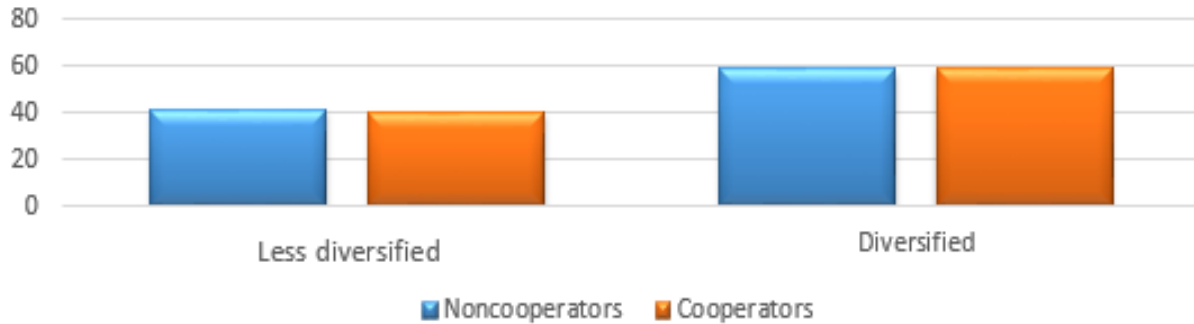
Table 2. Distribution of Cooperative membership and livelihood diversification status

Cooperative membership Status	Less diversified		Diversified		Pooled	
	Freq.	Perctg.	Freq.	Perctg.	Freq.	Perctg.
Noncooperators	45 (0)	41.28	64	58.72	109 (0.3648)	100.00
Cooperators	41 (0)	40.59	60	59.41	101 (0.3691)	100.00
Total	**86**	**40.95**	**124**	**59.05**	**210**	

Source: Field Survey data analysis result. Mean diversification indices parenthesized.

Fig. 2. Distribution of Cooperative membership by livelihood diversification status.
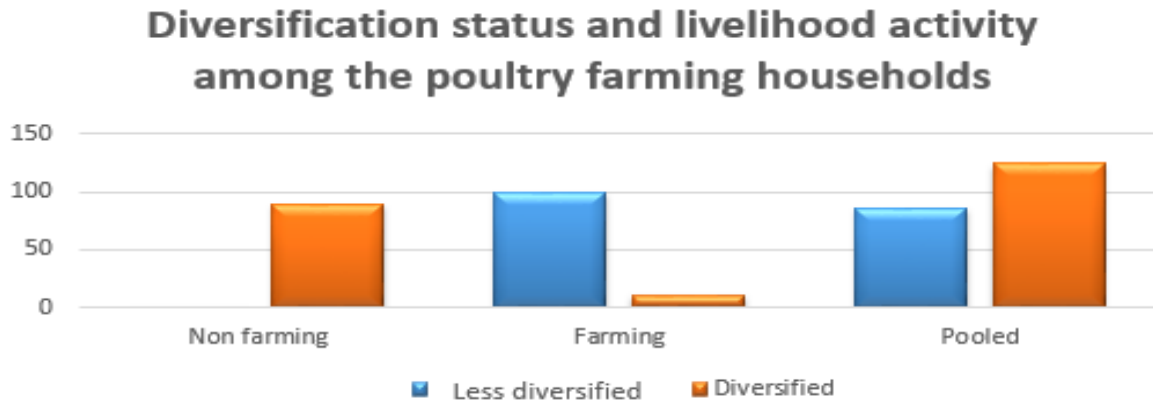3.3 **Diversification status by farming activities among poultry farming households (a).**
The result shows that, a huge proportion of the diversified poultry farming households (89.52%) diversified into non farming activities compared to the relatively fewer proportion (10.48%) in same category who are diversified into farming.

Table 3. Diversification status and livelihood activity among poultry farming households (a).

Diversification Status	Non farming		Farming		Pooled	
	Freq.	Perctg.	Freq.	Perctg.	Freq.	Perctg.
Less diversified	0	0.00	86	100.00	86	100.00
Diversified	111	89.52	13	10.48	124	100.00
Total	111	52.86	99	47.14	210	100.00

Source: Field Survey data analysis result.

Fig. 3. Diversification status and livelihood activity among the poultry farming households. Cooperative membership by livelihood diversification activities among poultry farming households (b).

People diversifies their livelihood activities by managing or participating in different activities in order to increase output or earnings. This is may not always be the case as some important economic processes becomes interfered with while attending to some other activities, hereby bringing about diseconomies to scale in the expected productivity line, owing to externality effect, and or vice versa. The details of the livelihood diversification activities of the poultry farming household is presented in table 4 below. Table 4 buttresses table 3.

Result showed that a larger proportion of the diversified primarily engages in civil services (22.38%), relative to those engaged in trade (10%), Handicraft (10.95%), and others (15.71%).

Table 4. **Cooperative membership by livelihood diversification activities among poultry farming households. (b)**

Statuses	Less diversified		Diversified N=124 (Diversified).								Pooled= 210	
			Public service		Trade		Handicraft		Others			
	Freq	Perc.	Freq.	Perc.	Freq	Perc.	Freq	Perc.	Freq	Perc.	Freq	Perc.
Noncooperators	45	41.28	29	26.61	13	11.9	7	6.42	15	13.76	109	100.0
Cooperators	41	40.59	18	17.82	8	7.9	16	15.84	18	17.82	101	100.0
Total	86	40.95	47	22.38	21	10.0	23	10.95	33	15.71	210	100.0

Source: Field Survey data analysis result.
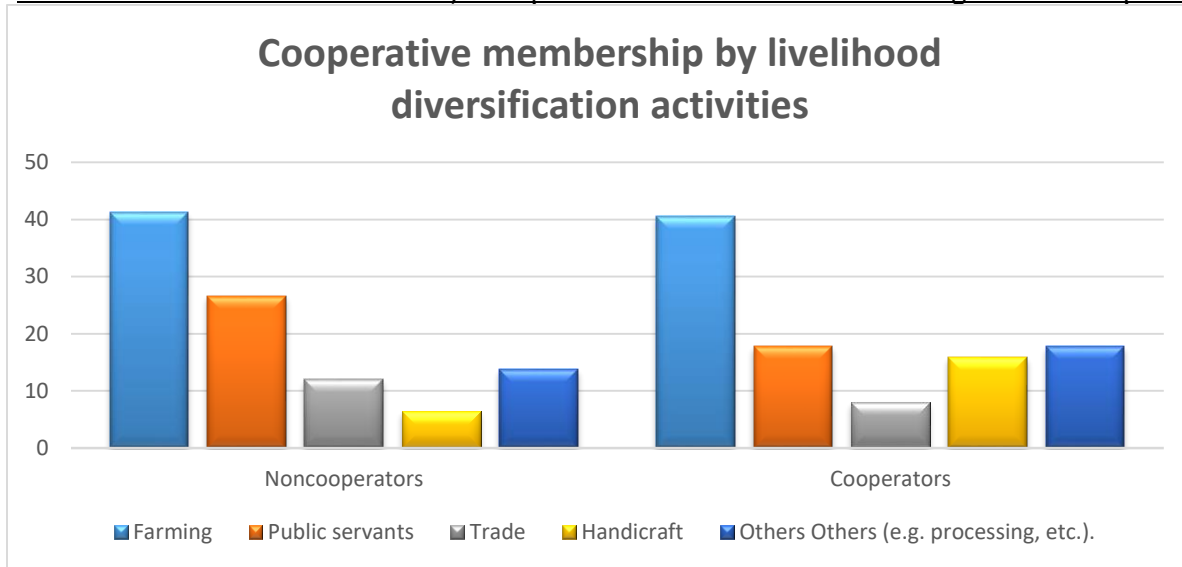
Fig. 4. Cooperative membership by livelihood diversification activities.

Determinants of livelihood diversification depth.

A simple mean difference significance test will not be a sufficient analysis to conclude an effect estimate or determinant relationship between a dependent variable and an explanatory variable hence, a maximum log-likelihood estimate analysis which is more variable encompassing yet, a robust estimator was employed further.

The result of the Log-likelihood estimate to for the determinants of the level of diversification among the poultry farming households in the study area is shown in table 5 below.

The R^2 was 89%, showing that the model provides a sufficient estimates which was adjusted to 7% based on the nature of explanatory variables in the model. The model's Prob > chi^2 was also significant at 1% probabilistic level.

The result showed that, gender of household head negatively influence the level of livelihood diversification, and significant at 10% probabilistic level. This is likely due to the fact that female headed households in many cases strives to make hands meet in order to meet the livelihood demand of the household thus, will decide to diversify, compared to their male headed household counterparts and contrary to the existing apriori expectation from Ayantoye *et al*., 2017, but attunes the finding of Maja, T., and Oluwatayo, B., 2018.

Also, the level of formal education was found to negatively influence the level of livelihood diversification, and significant at 5% probabilistic level. This is likely due to the fact that, household heads with higher degrees find well paid jobs, or makes more economic rewarding decisions and may not need to get involved in too many livelihood activities, compared to their counterparts with lesser years of formal education and this finding corroborates Maja, T., and

Oluwatayo, B., 2018, but contradicts the existing apriori expectations from Raphael *et al*., 2017, and Pur *et al*., 2016.

Furthermore, primary source of labour negatively influence livelihood diversisation, and significant at 1% probabilistic level. This is likely due to the fact that poultry farmers who engages paid labour usually operate large scale poultry farming hence, are less engaged in some other activities, or may allocate more time supervising employed labour with no much time for other activities especially when a farm manager is not employed unlike the use of family labour.

Also, farming as primary occupation negatively influence livelihood diversisation, and also significant at 1% probabilistic level, which agrees with the findings of Ayantoye *et al*., 2017, and likely due to the fact that poultry farmers who primarily practice poultry farming may less engage in some other economic activities. The reward for this effect as revealed in this study is increased nominal farm income.

However, multidimensional welfare status of poultry farming was found to positively influence livelihood diversisation, and significant at 10% probabilistic level. This corroborates the findings of Oyakhilomen. O, and Kehinde, T, 2016. This is likely due to the fact that wealthy household may tend to diversify their livelihood portfolio, using their existing wealth.

Finally, cooperative membership was found to negatively influence livelihood diversisation. This opposes the finding of Raphael *et al*., 2017, and also significant at 1% probabilistic level. It however attunes with the findings of Ayantoye *et al*., 2017; Lawal *et al*., 2017, and Maja, T., and Oluwatayo, B., 2018. This is likely due to the fact that those who involve in cooperative societies are readily exposed to diverse experiences and opportunities in line with their primary occupation hence, might have to focus and consider further advancement on same and not necessarily consider the choice of physical engagement in multiple economic activities outside their primary engagement where they seek to advance upon unlike their non cooperator counterparts, implying an encouragement of labour/economic specialization.

Table 5. **Determinants of livelihood diversification among the poultry farming households in the study area.**

Variables	Coefficient	Standard error	P-Value (p>t)
Farm income	-1.79e-08	1.79e-08	0.319
Gender of household head	-0.0751712*	0.0494803	0.130
Marital status	0.0542011	0.0452031	0.232
Level of Formal Educational (years)	-0.0080424**	0.0038276	0.037
Primary source of labour	-0.1028923***	0.0398515	0.011
Farming as your primary occupation	-0.7405421***	0.0408655	0.000
Multidimensional wellbeing	0.2142345*	0.1649045	0.195
Quality health access	-0.0512561	0.058477	0.382

Cooperative membership	-0.0892643***	0.0345277	0.010
Constant	0.7122124***	0.1225525	0.000
86 left-censored observations at LD<= 0		Pseudo R^2 = 0.8935	
124 uncensored observations		Adj R^2 = 0.0798	
0 right-censored observations		Prob > chi^2 = 0.0000	

Source: Field Survey data analysis result.

	M-dim welfare	Cooperative membership	Liv-diversification	Gender	Formal education	H- size	Farming experience	Infrastructure access	Farm size	Paid Labour
Multidimensional welfare	1									
Cooperative membership	0.122032*	1								
Livelihood diversification	-0.14279**	-0.0881	1							
Gender	0.049099	0.038909	0.112939*	1						
Formal education	0.416978***	0.077126	-0.26227 ***	0.1828***	1					
Household size	0.012309	0.091093	-0.01585	0.1189	0.087705*	1				
Farming experience	0.084529	0.086542	0.019527	0.1638*	0.060865	0.371038 ***	1			
Infrastructural access	0.107221*	0.116945*	0.026903	0.0504	0.180585***	0.013646	0.007064	1		
Farm size	0.142589*	0.065821	0.129567*	0.0236	0.008314	0.1505**	0.175655***	-0.00363	1	
Paid Labour	0.299419***	-0.11551*	0.036537	0.1750***	0.185916***	0.1867***	0.151945**	0.13717**	0.0454	1

Fig. 5. Pairwise correlation matrices for cooperative membership, livelihood diversification and instrumental variables.
Source: Field survey data analysis result, 2023.

CONCLUSION AND RECOMMENDATIONS

Cooperative membership and livelihood diversification has been solicited as a means of enhancing household's economic situation or status, while little is known about how cooperatives influences livelihood diversification among farm holders alongside some other crucial hypothesized determinant factors. The analysis carried out showed that within the cooperatives, majorities are satisfied with access to loan (72.38%), loan repayment (67.62%), transportation (68.10%), marketing (67.14%), training (69.5%), low patronage (70%), political interference (69.05%), while a relatively large proportion of the respondents (59.04%) are diversified, and a majority (89.52%) of the diversified category secondarily diversified into non farming activities (public service, trade, handicraft, and processing) compared to the relatively fewer proportion (10.48%) in same category who are secondarily engaged in farming. Also, further analysis that; gender of household head, level of formal education, primary source of labour, farming as primary occupation, cooperative membership negatively influence livelihood diversification, while multidimensional poverty was found to positively influence livelihood diversification among the poultry farming households in the study area at 10%, 5%, 1%, 1%, 10%, and 1% probabilistic levels respectively.

From the afore realities; it is hereby recommended that effective cooperatives management be uphold in order to maintain, and or further improve the existing cooperative performance level in the study area so as to well cushion credit access constraints confronting agricultural activities. Furthermore, cooperative membership was found to negatively correlate with multidimensional poverty hence, cooperative membership should be encourages owing to the way it influences livelihood diversification to improve multidimensional welfare rating. Also, well trained labour should be employed in order to increase managerial efficiency.

Finally, inputs and adequate incentives should be provided to encourage increased participation in farming, especially poultry farming for enhanced provision of adequate and affordable dietary protein needs and reduced malnutrition, alongside its economic benefits. These inputs supply may as well be disbursed through cooperatives aside government offices, owing to the good performance of cooperatives in the study area, and also encourage increased membership and membership participation in cooperatives in the study area to promote better farming experiences.

REFERENCES

Adepoju, A.O., & Obayelu, O.A (2013). Livelihood diversification and welfare of ruralhouseholds in Ondo State, Nigeria. 5(12), pp. 482-489, *Journal of Development and Agricultural Economic* DOI:10.5897/JDAE2013.0497 ISSN 2006-9774 ©2013 Academic Journals

Ayantoye K., Amao J. O. & Fanifosi G. E. (2017). Determinants of livelihood diversification among rural households in Kwara State, Nigeria. International journal of advanced Agricultural research. (5): 82-88. ISSN 2053-1265.

Dilruba, K., & Bidhan, C., (2016). Rural livelihood diversification in West Bengal: Nature and extent. *Agricultural Economics Research Review* 29(2) pp 183-190. DOI:10.5958/0974-0279.2016.00046.X

Ellis, F., (1998). Household strategies and rural livelihood diversification. *The Journal of Development Studies* 35 (1), 1–38.

Federal Department of Livestock and Pest Control System, 2007

Federal Ministry of Agriculture & National Resources (2012). MANR Annual Report.

Food and Agricultural Organization. FAO (2021). Nigeria at a glance. Retrieved 26/03/2021, from: http://www.fao.org/nigeria/fao-in-nigeria/nigeria-at-a-glance/en/.

Greene, W. H. (2012). Econometric analysis (7th Eds). London: Pearson Education. Pp. 1-5.

International Co-operative Alliance (ICA), International Labour Organization (ILO) (2015). A Contribution to the post-2015 development debate (Policy Brief).

International Fund for Agricultural Development. IFAD. (2011). Rural Poverty Report: New realities, new challenges: New opportunities for tomorrow's generation. Rome: International Fund for Agricultural Development.

Jude, N.K, Jürgen P., Mukong, A.K., & Symphorien, O. (2019). Measuring livelihood diversification and forest conservation choices: insights from rural Cameroon. *Forests,* 10(81) pp.1.

Lawal Kamaldeen, Taiwo Abdulahi Olabisi, & Katagum, Bilkisu. (2017). Promoting Rural Livelihood through Cooperative Society in Lagos State: A Study of Farmers Multipurpose Cooperative Societies in Ojo L.G.A of Lagos State Nigeria.

Maja T, B & Oluwatayo, I. (2018). Livelihood diversification and poverty among rural households in the Capricorn District, Limpopo, South Africa. A paper presented in the 56th annual conference of the Agriculture Economics Association of South Africa. 25-26 Sep, 2018. Lord Charles Hotel, Somerset West.

Margalef, R (1957). Information theory in ecology. A paper presented to the Royal Academy of Sciences and Arts of Barcelona on the occasion of the acceptance of his election to the Academy, April 4, 1957. *Artes de Barcelona,* 23: 373-449, November, 1957.

Margalef, R., (1991). Teoría de los Sistemas Ecológicos (Ecological systems theory). *Universitat de Barcelona Editora, Barcelona.*

Nasiru, M., Haruna, U., & Garba (2012). Economics of Livestock Marketing in Gamawa Local Government Area, Bauchi State, Nigeria.in 2012 8th African Farm Management Association (AFMA) Congress, November 25-29, 2012, Nairobi, Kenya (No. 159412). African Farm Management Association (AFMA).

National Bureau of Statistics (2017). Demographic statistics Bulletin, pp.8

Ogbanje, C. E., .D. Sonny, N. D. Chidebelu, & N. J. Nweze (2014). Off-Farm Diversification among Small-Scale Farmers in North Central Nigeria. *Journal of Economics and Sustainable Development,* 5(13): 136-144.

Ogbanje, C. E., .D. Sonny, N. D. Chidebelu, & N. J. Nweze. (2014). Off-Farm Diversification among Small-Scale Farmers in North Central Nigeria. *Journal of Economics and Sustainable Development*, 5(13): 136-144.

Okiemua, T.O., Joseph, A., & Blessing, E.E., (2019). Effects of livelihood diversification on the poverty status of cassava farmers in Edo South, Edo State, Nigeria. *Albanian j. agric. sci. Agricultural University of Tirana;*18 (1): 1-8.

Owusu, V., Abdulai, A., & Abdul-Rahman, S. (2011). Non-farm work and food security among farm households in Northern Ghana 2011. Food Policy 36: 108–118.

Oyakhilomen, O., & Kehinde, T.O. (2016). Farm households livelihood diversification and poverty alleviation in Giwa Local Government Area of Kaduna State. *The Journal of Sustainable Development* 15(1), 219- 232.

Pur, J. T., Multafu, N. K., Mustapha, B. & Mustapha, S. B. (2016). Determinants of diversification of livelihood activities among rural women in Bade Local Government Area of Yobe State, Nigeria. *International Academic Journal of Social Sciences* 3(9): 50-60.

Raphael, N. E., Chigozirim, N. O., & Daniel, C. N. (2017). Effect of livelihood diversification on food security status of rural farm households in Abia State Nigeria. Scientific papers series management, economic engineering in agriculture and rural development 17(1), pp. 159.

Richard Hawkins & Olajide Sobukola (2020). Insight into agricultural education in Nigeria: a scoping study to identify potential areas of Netherland support. A policy report of the Ministry of foreign affairs. Pp 1.

Richard K. A. (2018). Livelihood diversification strategies to climate change among smallholder farmers in Northern Ghana. *Journal of International Development.* 30, 1318–1338. http://doi.org/10.1002/jid.3330.

Robinson, T.P., Thornton, P.K., Franceschini, G., Kruska, R.L., Chiozza, F., Notenbaert, A., Cecchi, G., Herrero, M., Epprecht, M., Fritz, W., You, L., Conchedda, G., & See, L. (2011). Global Livestock Production Systems. Rome: Food and Agriculture Organization of the United Nations; Nairobi: International Livestock Research Institute.

Sanje, R., (2013). Modern microeconomics. Consumers preferences and utility, first edition. ISBN 978-87-403-0419-0 pp13-16.

Steven, L.G (2002). Rational choice theory: An Overview. Pp.2-6. Source: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=15&cad=rja&uact= 8&ved=0ahUKEwiKpa6X- MnbAhXBD8AKHe2KBWIQFgiqATAO&url=https%3A%2F%2Fbusiness.baylor.edu%2F steve_green%2Fgreen1.doc&usg=AOvVaw2cfb5XQICcIt0fSHzvzkp_.Retrieved: 13/02/2021..

World Bank. (2016). Global Monitoring Report 2015/2016: Development Goals in an Era of Demographic Change. Washington, DC: World Bank.

Xuhuan, D., Zhilong, W., Yao, F., Bo, L., Zihan, Y., Bo, N., & Xu, B., (2019). *Sustainability* 2020, 12, 64; pp.6-7. DOI:10.3390/su12010064.

Yilmaz A.,Erol A., Pinar D., Ahmet C. A.,Yavuz C., ÇağlaYüksel K. K., & Mehmet S. A (2013). Consumer preferences and consumption situation of chicken meat in Ankara Province, *Turkey. Turkish Journal of Veterinary and Animal Sciences*. (37): 582-587.