World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(RESEARCH ARTICLE)

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Effect of educational level on the technical efficiency of poultry farmers in Oyo state, Nigeria

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World Journal of Advanced Research and Reviews, 2024, 21(01), 2296–2305

Publication history: Received on 10 December 2023; revised on 20 January 2024; accepted on 22 January 2024

Article DOI: https://doi.org/10.30574/wjarr.2024.21.1.0229

Abstract

It is widely recognized that poultry farming productivity is not only influenced by technology/inputs enhancements but also by the efficiency with which available technologies/inputs are used. Technical inefficiency has also been attributed to farmer's inability to correctly use farm inputs as prescribed, poor management practices etc. all of which are affected by the farmers' level of knowledge. This study broadly assessed the effect of educational level of poultry egg farmers on their technical efficiency. A 4-stage sampling procedure was used to select 180 respondents. Structured questionnaire was administered to obtain data; descriptive analysis was used to assess educational level, Data Envelopment Analysis (DEA) to estimate technical efficiency, robust Ordinary Least Square regression to determine the effect of educational level on the farmers' technical efficiency. This study found that 65.5% of the respondents had tertiary education, 15.6% had secondary education, 5% had primary education and 13.9% had no formal education. The mean efficiency of the respondents is 0.426, implying that they are more technically inefficient (57.4%) than they are technically efficient (42.6%). Secondary and tertiary education were found to have positive significant effects on the technical efficiency of the respondents at 1%. That is, farmers' technical efficiency does not stop increasing at tertiary level of education as further search for knowledge facilitates higher efficiency. Therefore, it is recommended that poultry farmers should frequently undergo adequate and relevant education, workshop and training; adopt input minimisation and output maximisation management practices. Manual/literature accompanying drugs, vaccines and other poultry inputs should be clearly explained.

Keywords: Educational level; Technical efficiency; Poultry farmers; DEA; Robust OLS

1. Introduction

Poultry are domestic birds reared for the production of egg and/or meat [1]. Poultry birds include chickens (such as broilers, cockrels, noilers and layers), turkeys, ducks, quails etc. Poultry products provide man with high quality animal protein. According to [2], the global poultry meat and egg production is estimated to be approximately 100 million and 73 million tons per annum respectively.

Layers or laying birds are the chicken birds which are reared commercially for the production of majorly eggs and minor meat. Some of the laying birds can be culled and sold as meat while the entire batch/set of laying birds can be sold off for meat when the egg laying capacity is no longer profitable to the farmer. According to [2], 1.3% of global egg production and 750 kilotons of meat came from the Sub-Saharan Africa (SSA). Organisation for Economic Co-Operation and Development/ Food and Agriculture Organization, OECD/FAO [3], projected an increase in egg production for the sub-region for 2025 with 70% of this to come from Eastern and Western Africa at the growth rates of 4% and 3%,

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respectively. Egg is a nutritious food which have sufficient protein and vitamins such as zinc, iron, vitamins A needed for body growth and development [4]. Poultry by-products include feathers which are useful at the household level and commercially for making pillows, egg shell can be used to feed other farm animals while poultry faeces and other poultry farm wastes can be processed into compost fertilizer to enrich farm soil and fertilize farm pond [5].

The inputs used for poultry egg production include feed, drugs and vaccines, pullets or point of lay (POL), water, housing unit, wood shavings, labour, management, knowledge etc. The skill required to raise poultry is not overly hard [5], however, the inputs must be applied, distributed and used concisely in order to have a good output and high technical efficiency on the farm [2]. The aim of every farmer, like every other producer, is to minimise cost and maximise output. However, according to [1], inefficiency is one of the problems facing poultry production. This is because farmers fail to use production resources efficiently leading to huge hamper on the growth of the agricultural sector of the economy [6, 7]. According to the report of the study conducted by [8], relevant and adequate knowledge enables farmers to handle the birds appropriately, market the farm produce profitably and plan the poultry production efficiently and effectively. It also enables farmers to adopt new technology which can bring about development and higher productivity of their farms [2]. With adequate and relevant education farmers are also able to discern quality birds, use the drugs and vaccines as prescribed. This results into the ratio of output to input being greater than or equals to one [9]. That is, when a farmer is equipped with the relevant knowledge, he will be able to procure quality inputs from the cheapest source, allocate and use them appropriately, apply good management practices and principles, have quality yield and sell his yield to the source which offers highest price. This will ensure that the farmer gets revenue and profit as well as a good reward for his farming activities.

Efficiency is a relative term which relates output to input. Efficiency is simply the ratio of output to input. The concept of efficiency is important as it helps to determine the rate of resources allocation and use [2]. Technical efficiency is the ability of a farmer to produce more of his farm produce with a minimum quantity of his farm resources given the available production technology [7, 10]. A farmer is said to be technically efficient when he is able to minimise his costs and maximise his output and revenue such that his farm's output input ratio is greater or equal to one. The ability of a farmer to be technically efficient is determined by the famer's ability to make informed decisions regarding his farming operations, allocate and use his farm resources efficiently, make institutional improvement on his farm [10] as well as sell his farm output in a manner and cannel that ensure he gets good revenue. Several scholars opined that the factors affecting technical efficiency include age, educational status and level of the farmer, years of experience of the farmer, farm size, housing system, membership of farmer's association [2, 4, 8, 10].

Education is the process of training people in order to bring about the desired change in their attitudes, behaviours, methods, etc. [11, 12]. This is done so that the trained/educated people can join and become part of the facilitators of their community and national development [13]. Education is a life-long process which is not limited to the classroom training alone but also consists of all the life shaping events a man is exposed to throughout his lifetime. Education plus self-confidence allows an individual to have a very good understanding of situations, make informed decisions and act at the right time in order to achieve great success [14]. Education can be given at the market place, place of worship, social gatherings, during interaction with others etc. However, according to [12], the best location for giving the literacy education is the school.

Agricultural education/farmers' education and training is carried out in order to empower farmers/would-be-farmers with the skills needed to be the instruments of growth [15] in the face of the various challenges and changes occurring in the agricultural sector. Farmers require education in diverse areas in order to be able to handle the challenges posed by the growth, development and diversification taking place in the agricultural sector of the economy. Farmers require education to become better equipped at technical management, risk management, financial management, quality assurance management, business risk management, employment of sustainable agricultural practices all of which make agriculture become a profitable venture [11].

There are different types of education including formal education/initial education, informal education and non-formal education as identified by various scholars [16, 17, 18, 19, 20]. Formal education is a type of education given within the four walls of the school, having a curriculum which guides the focus of the pedagogy, and trained teachers to deliver the lecture, the students to be taught and the institution where the pedagogy takes place leading to the award of a certificate that is recognised by the relevant educational bodies. Informal education is a type of education one stumbles on without planning for it. That is, informal education is not a pre-planned education activity; it just happens. Informal education results from experiences one gains throughout the lifetime as a result of having interaction with people, objects or events in the environment. Non formal education is a type of education targeted at a particular group of people in order to make them learn basic skills for economic empowerment like the training given to farmers on crop cultivation, general farm management, health management, family management etc. Non-formal education serves to complement

the education attained in the formal school and to educate out-of-school children [16]. According to [17], the exposure of the farmers to formal education gives them knowledge, while non-formal education gives the farmers the opportunity to have practical training on the job in order to expose them to improved method of farming and informal education. Furthermore, formal education allows the farmer to acquire knowledge relevant to their vocation, non-formal education eposes the farmer to practical training for improved method of farming while informal education allows the farmer to acquire and share innovative information about the happenings in the industry. Education provides the beneficiary with skills which increases income by at least 10% thus eradicating poverty and hunger [18].

There are different levels of formal education as identified by [21, 22, 23, 24]. Level of education is a term used to categorise education programme based on the number of years spent in school, learning experiences, knowledge, understanding, skills, qualification and ability each programme is expected to impart on the learner [16, 21]. Therefore, to categorise a certain level of education, consideration must be given to what the acquired level of education is expected to give the learner such as the needed knowledge, understanding and skills to succeed at a job or the prerequisite for advance learning and the years spent on the education. Based on what is obtainable in Nigeria, and according to scholars [22, 23], the different level of education consists of the primary school education, the secondary school education and the tertiary education. In Nigeria system of education of 6-3-3-4 where a learner is expected to spend 6years in primary school, 3years in junior secondary school, 3years in senior secondary school, making a total of 6years at the secondary school educational level and at least 4years in the tertiary institution. According to [16, 24, 25, 26,], primary education is for ages 6-11, secondary education is for ages 12-17 after which the learner may proceed to tertiary institution.

The importance of poultry as a cheap source of protein, whether the egg or the meat, shows that every opportunity to maximise its production or increase the ratio of output to input must be explored. Education helps farmers to be more competitive, productive and successful [27]. According to [11, 21]; farmers require extensive education in many agricultural subjects and specific agricultural training so as to make informed decisions affecting the farm business in areas such as selection of viable animal/crop species, selection of efficient and cost effective machineries, sourcing for low/no interest agricultural credit/fund, developing and use of cost-saving feed and feeding formulation, developing and practicing conservation practices, marketing of farm produce at profit, efficient record keeping etc. in order to successfully succeed Furthermore, farmers with higher level of formal education will find it easier to compete favourably with their contemporaries than farmers with lower level of education. It is against this backdrop that this study seeks to determine the effect of educational level on the technical efficiency of poultry farmers in Oyo state. The specific objectives are; to assess the educational level of the respondents; to estimate the technical efficiency of the poultry farmers in the study area; to determine the effect of educational level of the respondents on their technical efficiency and to suggest ways of improving the technical efficiency of the respondents.

Many scholars have conducted several researches into the technical efficiency of farmers, effect of education/training on the technical efficiency and productivity of farmers. [8], investigated factors that influence profitability of poultry farming enterprises in Kira Town Council. The factors considered by the study are feeds, diseases and farmers' knowledge. Purposive sampling technique was used to select One (1) extension worker, 1 NAADS officer, 1 supplier of feeds and 1 for birds/ pullet as key informants (KIs). While simple random sampling technique was used to select 118 farmers out of which 106 were accessed. Interview guide was used to obtain qualitative information from some of the selected six (6) informants while a 5-likert scale questionnaire was used to obtain data and other qualitative information from the farmers. Qualitative data was analysed using content analysis building on the emerging themes and sub themes from the field notes. Regression analysis was used to examine the relationship between factors under study and profitability of poultry farming enterprises. The study concluded that feeds, poultry diseases and a farmer's knowledge were strong predictors of profitability. The results of multiple regression showed that profitability was mostly influenced by farmer's knowledge followed by poultry disease and then feeds. The study recommended that farmers should form farmers associations where views, market information and other relevant information concerning poultry farming can be shared. Also, government should provide easy access to extension workers by the farmers.

[10], analysed factors affecting the technical efficiency of banana farmers. Using Data Envelopment Analysis (DEA) model and considering the variable return to scale, the study discovers that the efficiency of farmers was about 87% for both input and output oriented VRS. The result of the Tobit regression analysis revealed that the TE of the banana farmers is affected by factors such as age, experience, education of farmers and farm size. The study recommended that farmers should be trained and encouraged to adopt improved agricultural mechanization.

[11], conducted a large Australia-wide survey by collecting information about farm finance, changes to farm management practices as well as information about education and training and a smaller survey of farmers who attended one of three training courses for farmers. The study considered education and training and propensity to change at macro level, while the influence of training on changes to practice is considered at the micro level. The study

concluded that education and training enhance the ability and willingness of farmers to make successful changes to their management practice. The training also provides opportunity for interaction between participants and with the trainers resulting in alteration of values and attitudes toward new practices.

[28], examined the effect of farmers education on farm productivity as evidenced by small- scale maize producing farmers in North Bench District, Bench Maji Zone. The study collected cross sectional data from 200 maize producing farmers. The data was analysed using descriptive statistics and Cobb-Douglas production function model. The study revealed that higher education contributes to maize farmers' productivity. Formal schooling enables farmers to adopt new farm technology, non-formal education exposes farmers to better method of farming while informal education allows the farmers the means of exchanging better farming ideas. The study recommended that farmers should endeavour to acquire the needed skills and knowledge in modern farming.

[17], investigated how the various kinds of education affect agricultural productivity of farmers in the Offinso Municipality of Ghana. Data was obtained from 100 farmers, Municipal Agricultural Development Unit as well as Non-formal Education Section of the Offinso Municipal Educational Directorate selected from eight farming communities in the Municipality. The study revealed that output level increases with increase in the level of education. It was discovered that secondary school education had the highest level of returns on agricultural productivity. Furthermore, the study showed that extension service had greater impact on the productivity of the farmers but low coverage. The study recommended that government and other stakeholders should improve the quality of formal education, extension services and adult literacy classes as well as transportation, access to input and credit facility to farmers in the study area.

2. Material and methods

2.1. Collection of data

The study was carried out in Ibadan metropolis, Oyo state, Nigeria. Structured questionnaire was used to collect primary data from 180 poultry farmers in the study area using a 4-stage sampling procedure. The first stage involved the selection of Ibadan for her larger size and number of farmers found in the city with various number of education and training centres. The second stage involved the purposive selection of the semi-urban local government areas in Ibadan for the concentration of poultry farmers therein. The third stage was the random selection of 4 Local Government areas (LGAs) out of the 6 semi-urban LGAs in the study area. And the final stage was the use of simple random sampling of 50 respondents from each of the chosen LGAs in the study area. A combination of analytical techniques such as descriptive statistics, Data Envelopment Analysis (DEA) and robust Ordinary Least Square (OLS) regression model was used to analyse the data obtained.

2.2. Educational level

Descriptive statistics including frequency, percentage, means, tables and cross tabulation was used to categorise poultry farmers under educational level and other socio economic and demographic characteristics in the study area.

2.3. Technical efficiency

Data Envelopment Analysis (DEA) was used to estimate the technical efficiency of the poultry farmers in the study area. DEA is a widely used non-parametric, linear programing methodology used for measuring the efficiency of decision making units (DMUs). DEA is suitable for the measurement of efficiency when the information about cost and prices is either known or unknown and the behavioral objective is to be considered. Some of the advantages of using DEA includes the ability of DEA to handle multiple and unknown inputs and outputs and to develop a function whose form is determined by the most efficient frontier. However, DEA should be considered as specific for the sample used [2, 29, 30]. The DEA model was specified as:

Maximise ho = $\frac{\sum_{r=1}^{t} U_r Y_{rjo}}{\sum_{i=1}^{m} V_i X_{ijo}}$

Subject to $\frac{\sum_{r=1}^{t} U_r Y_{rj}}{\sum_{i=1}^{m} V_i X_{ij}} \leq 1$ for all j=1,...,n

Ur, Vi >0; r = 1 … s; I = 1,… m.

where

Y*rj* and X*ij* = the amount of the *r*th output and the *i*th input for the *j*th poultry egg farmer,

Ur and Vi= the weights to be estimated by the data of all comparable poultry farmers that are being used to arrive at the relative technical efficiency for the *o*th poultry egg farmer.

t= output variables,

m= input variables and

n= no of respondents

The linear programming version of the model known as the multiplier form is specified as:

Max ho = $\sum_{r=1}^{t} U_r Y_{rjo}$

Subject to $\sum_{i=1}^{m} V_i X_{ijo} = 1$

$\sum_{r=1}^{t} U_r Y_{rj} - \sum_{i=1}^{m} V_i X_{ij} \leq 0$ for all $j = 1, \dots, n$

Ur, Vi >0; r = 1 … s; i = 1… m.

If a poultry farmer is on the frontier, i.e., among the reference set, the solution will be ho=1 and the technical efficiency score is 1, which can be described as being 100% efficient as compared with other farmers of the dataset. Other farmers, using these inputs less efficiently, will be located above the frontier and their technical efficiency score will be less than 1. For example, a poultry farmer having the technical efficiency score of 0.75 can be interpreted as being 75% as efficient as a poultry farmer on the frontier. The relative inefficiency of the units that are not part of the frontier is measured by the distance between the inefficient DMU and the frontier. Thus, by using DEA, efficiency differences are first identified.

2.4. robust Ordinary Least Square

To assess the effect of educational level on the technical efficiency of the respondents, the efficiency scores from the DEA are regressed on educational level of the respondents. Regression was carried out with robust option in order to take care of heteroscedasticity. The OLS model is specified as:

$Y^* = X\beta + \varepsilon_i$

Y* is the dependent variable (i.e. the technical efficiency score from DEA analysis)

X is the independent variables (including the educational level of the respondents)

Where β denotes vector of unknown parameters

ε are unobserved scalar random errors

The empirical OLS model specified to analyse the effect of ICTs use on the TE of the poultry egg production of the respondents can be expressed as

$Y^* = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \varepsilon_i$

Where:

Y* = Technical efficiency score for the poultry farmers

X_1 = age of the poultry farmers (years)

X_2 = level of education

X_3 = sex of the respondents (dummies: female=0, otherwise 1)

X_4 =years of experience (years)

β = Parameters ε_i = Error term

3. Results and Discussion

3.1. Socio-economic characteristics of the respondents

Table 1 shows the socio-economic characteristics of the respondents in the study area. The table reveals that 71.7% of the respondent were male while 28.3% were female. This shows that poultry farming is dominated by male farmers than female farmers in the study area. The table also revealed that 11.1% of the respondents were between the age of 21-30, 27.2% were between the age of 31-40, 31.7% were between the age of 41-50, 21.7% were between the age of 51-60 while only 8.3% were 60years and above. The mean age of the respondents as shown on the table is 44years. This finding is consistent with that of [4, 31]. This shows that the respondents were old enough to have passed through the different types of education identified by the study. It also showed that majority of the respondents, if exposed to formal education, could have attained the tertiary education as indicated by [24, 26]. From the table, majority of the respondents, 68.3%, were married while 26.7% were single, 2.8% were divorced while 2.2% were widowed. This shows that majority of the respondents were family people with dependants. The dependants could provide help with the farm work [2, 4]. Some of the respondents (13.9%) had no formal education, while 5% had primary education, 15.6% had secondary education while 65.5% had tertiary education. This result show that majority of the respondents had tertiary education. This could be out of need to acquire more knowledge needed to cope with the increasing complexity of farming and farm management. This is also supported with the finding of [13]. Furthermore, having a higher education is expected to improve the ability of the farmer to make informed decision for higher efficiency and productivity. This is in line with the finding of [4]. The table also revealed that 75% of the respondents had 2-10years of poultry farming experience, 20% had 11-20 years of experience while 5% had more than 20years of experience. The average year of experience is 9. This shows that the farmers have sufficient experience to be technically efficient in carrying out various farming activities. 30.56% of the poultry farmers in the study area reared 1-500 birds, 62.22% reared 501-10,000 birds while 7.22% reared more than 10,000 birds. This reveals that majority of the respondents reared 500-10,000 birds which makes them a medium scale poultry farmer.

Table 1 Distribution of the respondents by their socio-economic characteristics

Socio-economic characteristics	Frequency	Percentage (%)
Sex		
Male	129	71.7
Female	51	28.3
Total	180	100.0
Age (years)		
21-30	20	11.1
31-40	49	27.2
41-50	57	31.7
51-60	39	21.7
>60	15	8.3
Total	180	100.0
Mean	*44*	
Marital status		
Married	123	68.3
Single	48	26.7
Divorced	5	2.8

Widowed	4	2.2
Total	180	100.0
Level of Education		
No formal education	25	13.9
Primary education	9	5.0
Secondary education	28	15.6
Tertiary education	118	65.5
Total	180	100.0
Years of experience		
1-10	135	75.0
11-20	36	20.0
>20	9	5.0
Total	180	100.0
Mean	*9*	
Number of birds		
1-500	55	30.56
501-10,000	112	62.22
>10,000	13	7.22
Total	180	100.0

Source: authors' computation, 2023.

3.2. Technical efficiency of the respondents

Table 2 shows the distribution score of the technical efficiency of the poultry farmers in the study area. The technical efficiency here depicts the ratio of output to input. The table reveals that the mean technical efficiency of the respondents is 0.4264, that is, approximately 43% while the minimum and maximum efficiency are 0.14 and 1 respectively.

Table 2 Distribution score of the Technical Efficiency (TE) of the poultry farmers

Technical efficiency (TE) range	**Frequency**	**Percentage**
0.05-0.25	54	30.00
0.26-0.45	68	37.8
0.46-0.65	26	14.4
0.66-0.85	14	7.8
0.86-1.00	18	10.0
Total	180	100.0
Maximum Technical Efficiency = 1.00 Minimum Technical Efficiency = 0.1388 Mean Efficiency = 0.4264 Standard deviation = 0.2491		

Source: Authors' computation, 2023

This shows that the respondents are more technically inefficient (57%) than they are efficient. It means that the respondents could reduce their inputs use by 57% to produce the same level of output. The respondents' technical inefficiency can be attributed to inefficiency in inputs allocation, distribution and use [7, 10, 31]. Farmers' efficient use of inputs can be affected by their level of education. This summation is in line with the findings of [10, 31].

3.3. Effect of level of education and other variables on the technical efficiency of the respondents

Table 3 below shows the effect of level of education and other variables on the technical efficiency (TE) of the respondents. A robust OLS regression model was used for the analysis in order to guard against heteroskedasticity. Technical efficiency scores (dependent variable) are regressed on the independent variables including level of education. The results show that Prob> F indicating that there were no omitted variables. The R-squared value of 0.1954 shows that 19.5 percent change in technical efficiency is explained by the explanatory variables. The results also show that secondary education and tertiary education have positive effect on the technical efficiency of the respondents. This shows that an investment on training and education will improve the technical efficiency of the respondents.

Table 3 below shows that no formal education was found to have a negative significance on the technical efficiency of the poultry farmers. This means that farmers who have formal education are technically inefficient. On the contrary, secondary and tertiary education were found to be significant at 1% with positive coefficients. This means that the higher the level of education of a farmer, the higher the technical efficiency of the farmer. From the table, a 10% increase in the level of knowledge from secondary level to a higher level, i.e. tertiary level, will increase the farmer's technical efficiency by 1.92%. This shows that farmers should not stop schooling at the secondary level but they should strive to attain tertiary education. Furthermore, a 10% increase in the level of knowledge at the tertiary level leads to 1.54 increase in technical efficiency. Consequently, farmers who have attained tertiary education should keep seeking knowledge by attending relevant trainings, seminars and workshops in order to increase their efficiency at farming. This is in line with the findings of [15, 32, 33].

Table 3 Robust OLS regression results showing the effect of level of education and other variables on the TE of the respondents

Dep. Variable: Technical Efficiency (TE)	**Ordinary Least Square (OLS) Regression**		
	Coefficients	Robust Std. error	t-statistics
Sex	0.018	0.044	0.40
Age	0.002	0.002	1.01
Education:			
No formal education	-0.071	0.072	-0.98
Primary education	0.019	0.048	0.40
Secondary education	0.192***	0.068	2.83
Tertiary education	0.154***	0.050	3.10
Years of experience	-0.006	0.004	-1.64
Constant	0.290***	0.111	2.61
R-squared = 0.1954; Adj R-squared = 0.1863			
F (2, 177) = 21.50; Prob> F = 0.0000			

Significance level: *** 1%; No. of Observations: 180; Source: Authors' computation, 2023

4. Conclusion

Technical efficiency is determined by the efficiency with which the farmer allocates, distributes and use both the inputs and the outputs. This efficiency is further influenced by the farmer's level of knowledge and understanding of the manual which accompanies some tools and inputs, farmer's understanding of the effect of each decision on the farm productivity, farmer's understanding of the workings of agricultural market etc. with the seemingly importance of farmer's level of education to the farmer's technical efficiency, there is a need to assess the effect of level of education on the technical efficiency of poultry farmers, so as to improve where necessary.

The findings of the study show that some of the poultry farmers in the study area had no formal education while some had formal education. The poultry farmers who had formal education had it in different levels; some of the farmers had primary education, some secondary education while some had tertiary education. The study shows that the technical efficiency of the farmers is low. This means that there is need for improving the technical efficiency of the poultry farmers. The assessment of the effect of educational level shows that both secondary and tertiary levels of education had 1% positive significant effect on the technical efficiency of the poultry farmers. This means that the higher the level of education, the higher the technical efficiency of the poultry farmers. It is therefore suggested that farmers should endeavor to reach the highest level of education i.e. tertiary level. Furthermore, those who have attained the highest level should seek for more knowledge by attending relevant trainings, workshops and seminars so as to keep up with the ever dynamic nature of agricultural activities.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

[1] Mamman B.D., Anzaku T. A. K. and Umar H. S. Profitability evaluation of broiler production among small-scale commercial poultry farmers in Nassarawa - Eggon Local Government Area of Nasarawa, State, Nigeria. International Journal of Agriculture and Earth Science. ISSN 2489-0081 2016 www.iiardpub.org. 2016; 2 (1)

[2] Akomolafe, A. M., Akin-Olagunju, O. A. and Yusuf, S. A. Effects of information and communication technologies use on technical efficiency of poultry egg production in Ibadan, Oyo State, Nigeria. Nigerian Journal of Rural Sociology. 2021; 21(1): 202-1 6

[3] OECD/FAO Agricultural Outlook 2016-2025, OECD Publishing, Paris. http://dx.doi.org/10.1787/. 2016.

[4] Otunaiya, A.O., Adeyonu, A.G. and Bamiro, O.M. (2015): Technical Efficiency of Poultry Egg Production in Ibadan Metropolis, Oyo State, Nigeria, *Economics.* Vol. 4(3), doi: 10.11648/j.eco.20150403.12.

[5] Hilmi Martin, Frands Dolberg and Brian Clarke. Products and profit from poultry. Diversification booklet number 3 (Second edition). Rural Infrastructure and Agro-Industries Division, Food and Agriculture Organization of the United Nations Rome. ISBN 978-92-5-107064-2. 2012.

[6] Onyenweaku, C.E. and Effiong, E.O. Technical efficiency in pig production in Akwa-Ibom State, Nigeria. *Paper presented at the 40th Annual Conference of the Agricultural Society of Nigeria held at NRCRI, Umudike.* 2006.

[7] Ewung Bethel, Djomo Raoul Fani and Egbeadumah Maryanne Odufa. Analysis of technical efficiency of poultry farmers in Cross River State, Nigeria. International Journal of Research Studies in Agricultural Sciences (IJRSAS). ISSN 2454-6224 http://dx.doi.org/10.20431/2454-6224.0204005. 2016; 2(4), PP 40-45

[8] Natukunda Yvonne. Factors that influence profitability of poultry farming enterprises in Kira Town Council, Wakiso District – Uganda. A dissertation submitted to the School of Management Sciences, Uganda Management Institute. 2014.

[9] Hamra C.F. An assessment of the potential profitability of poultry farms: a broiler farm feasibility case study. A Research Paper Submitted to the Faculty of The University of Tennessee. 2010.

[10] Hossain Md. Moyazzem, and Majumder Ajit Kumar. Analysis of factors affecting the technical efficiency: a case study. International Journal of Economics and Statistics, ISSN: 2309-0685. 2018; Vol. 6.

[11] Kilpatrick Sue. Education and training: impacts on farm management practice. Centre for Research and Learning in Regional Australia Locked Bag 1-313 University of Tasmania Launceston, Tasmania Australia. http://www.crlra.utas.edu.au. 2000.

[12] Adesemowo P. O., & Sotonade O. A. T. Basic of education: the meaning and scope of education. ResearchGate. https://www.researchgate.net/publication/361813544. 2022.

[13] Fazilah Idrisa, Zaharah Hassana, Azizah Ya'acoba, Saran Kaur Gillb and Noor Aziah Mohd Awalc. The role of education in shaping youth's national identity. Procedia - Social and Behavioral Sciences. Published by Elsevier Ltd. 2012; 59, 443 – 450

[14] Muhammad Gul. Education system of Pakistan: issues, problems and solutions. www.ipripak.org. 2016

[15] Chakraborty Minakshi. Agricultural education: an instrument for growth and development. Agriculture and Food E-newsletter. www.agrifoodmagazine.com. Article ID: 32724. ISSN: 2581 – 8317. 2020

[16] International Standard Classification of Education, ISCED, Published in 2012 by: UNESCO Institute for Statistics P.O. Box 6128, Succursale Centre-Ville Montreal, Quebec H3C 3J7 Canada Tel: (1 514) 343-6880 Email: uis.publications@unesco.org http://www.uis.unesco.org ISBN 978-92-9189-123-8

[17] Eric Oduro-ofori; Anokye Prince Aboagye; Naa Acquaye and Elfreda Aku. Effects of education on the agricultural productivity of farmers in the Offinso Municipality. ResearchGate. 2015

[18] Madani Rehaf A. (Dr). Analysis of educational quality, a goal of education for all policy. Higher Education Studies. 2019 ISSN 1925-4741 E-ISSN 1925-475X. 2018; 9(1)

[19] Chauhan A.S. (Professor, Ext. Edu. COA, Rewa). Lecture Notes 1: Fundamental of agricultural extension education. http://jnkvv.org

[20] Jaiswal Aparna and Rai Surendra Kumar. Fundamentals of agricultural extension education: class notes. Department of Extension Education College of Agriculture, Balaghat Jawaharlal Nehru Krishi Vishwa Vidyalaya Jabalpur 482 004 (M.P.), India. http://jnkvv.org. 2020

[21] Fratoe, Frank A. The educational level of farm residents and workers. Rural Development Research Report 1979; No 8.

[22] Organisation for Economic Co-Operation and Development. Classifying educational programmes. Manual for ISCED-97 Implementation in OECD Countries – 1999 Edition.

[23] Juergen H.P. Hoffmeyer-Zlotnik and Uwe Warner. How to measure education in cross-national comparison: a matrix of education as a new instrument. Proceedings of Q2006 European Conference on Quality in Survey Statistics. 2006.

[24] Karugu A.M., Kamere I.M., Mugo P. Nigeria education system. Kenyatta University. https://www.ku.ac.kr. 2015.

[25] Amaghionyeodiwe L.A. and Osinubi T.S. The Nigerian education system and returns to education. International Journal of Applied Econometrics and Quantitative Studies. 2006; 3(1)

[26] Olaniyan Olanrewaju. The determinant of child schooling in Nigeria. African Economic Research Consortium, Nairobi. AERC Research Paper 217. 2011.

[27] Franz, Nancy K.; Piercy, Fred; Donaldson, Joseph; and Richard, Robert, "How farmers learn: implications for agricultural educations". Education Publications. https://lib.dr.iastate.edu/edu_pubs/124. 2010; 124.

[28] Habtamu Solomon Korgitet. The effect of farmers' education on farm productivity: evidence from small scale maize producing farmers in North Bench District, Bench Maji Zone. American Journal of Design, 2019; 1(4)

[29] Othman, M., Foo, L. Karim, M. and Andaziz, Y. Total factor productivity efficiency changes in a Malaysian hotel chain, *Int. J. Revenue Management*. 2010; vol. 4, 327-343.

[30] Cidalia, M.L.P. and Juan, M.C.P. Assessing the impact of information and communication technologies on the Portuguese hotel sector: an exploratory analysis with Data Envelopment Analysis. *Tourism & Management Studies,* 2015; *11(1).*

[31] Khan Nisar Ahmed, Majid Ali, Nihal Ahmad, Muhammad Ali Abid and Sigrid Kutch-Brandt. Technical efficiency analysis of layer and broiler poultry farmers in Pakistan. MDPI. https://doi.org/10.3390/agriculture12101742. 2022.

[32] Ashraf M. and Qasim M. Impact of education on farmers earning: a house hold survey data analysis. Educational Research (ISSN: 2141-5161). Available online@http://www.interesjournals.org/ER DOI: http:/dx.doi.org/10.14303/er.2019.234. 2019; 10(1) pp. 200-213

[33] Kabiru Salisu Ahmed. The relationship between education and agricultural productivity: the moderating effect of NGO. Universal Journal of Educational Research. http://www.hrpub.org. DOI: 10.13189/ujer.2020.080317. 2020; 8(3): 866-871.