International Journal of Sustainable Agricultural Research
2017 Vol. 5, No. 2, pp. 27-37
ISSN(e): 2312-6477
ISSN(p): 2313-0393
DOI: 10.18488/journal.70.2018.52.27.37

INVESTIGATING CONSTRAINTS TO POULTRY MANAGEMENT PRACTICES AMONG SMALLHOLDER FARMERS IN BENUE STATE, NIGERIA

Evangeline Mbah[1]

[1]*Department of Agricultural Extension and Communication, Federal University of Agriculture, Makurdi, Nigeria*
Email: evanmbah@gmail.com Tel: 07037898918

Article History
Received: 27 July 2018
Revised: 29 August 2018
Accepted: 3 September 2018
Published: 5 September 2018

Keywords
Poultry
Management
Constraints
Smallholder
Farmers
Nigeria.

ABSTRACT

The study was carried out to assess poultry management practices among smallholder farmers in Benue state, Nigeria. Questionnaire was used to collect data from a sample of 80 respondents used for the study. Descriptive statistics such as frequency, percentage, mean score as well as inferential statistics which include factor analysis and logit regression were used for data analysis. Results revealed that 56.7% of the respondents were between the ages of 21 and 40 years, 47.5% had household size of 6-10 persons, 88.6% were literate having 1-10 years of farming experience (93.8%). Findings also show that 48% of the respondents practiced intensive system of poultry while 41.3% of them indicated that major reason for choice of poultry management system is because it is cheap/less expensive. Types of poultry management practices include proper sanitation (80%), cull sick birds (76.3%), brooding of chicks (73.8%) and use disinfectants (70%). Results further indicate constraints to poultry management which include technical, labour and input related factors. The study recommends that efforts are needed in promoting increase in poultry production through adequate pests and diseases control to enhance productivity.

Contribution/Originality: This study documents that extensive and semi-intensive systems of poultry management were mostly practiced by the farmers in the area where the research was conducted. It also established that poultry management practices were highly constrained by technical, labour and input-related factors.

1. INTRODUCTION

Livestock production is an important component of agricultural in developing countries, Nigeria inclusive which is an instrument of socio-economic change, improved income and quality of rural life (Okunmadewa, 1999). The increasing demand for animal food products and the trends in production and consumption strongly suggest that much of the demand for meat can be met through increased poultry production (Delgado *et al.*, 2001).

Poultry production occupies a prominent position in livestock keeping which accounts for 36.5% of total protein intake (Akpabio *et al.*, 2014). Poultry production has long been recognized as one of the quickest ways for a rapid increase in protein supply in the shortest run. There has been a recorded improvement in poultry production sub-sector in Nigeria with its share of the Gross Domestic Product (GDP) increasing in absolute terms (Adedeji *et al.*, 2013).

In Nigeria, poultry accounts for about 30.28% of the total livestock production (Kughur *et al*., 2014). The types of poultry that are commonly reared in Nigeria are chicken, duck, guinea fowl, turkey, pigeon and ostriches. Apantaku *et al.* (1998) reported that most Nigerian diets are deficient in animal protein which results in poor and stunted growth as well as increase in spread of diseases. Poultry products mainly meat and eggs represent important food for improving the nutritional status particularly of the most vulnerable population namely; children and pregnant women. Poultry eggs and meat play a very important role in bridging the protein gap in Nigeria and they are generally accepted (Adedeji *et al*., 2013).

Poultry birds mature earlier than most breeds of livestock and bring about economic return within relatively short periods of about 10-12 weeks. Production systems in small and large poultry holdings include layers, broilers, cockerels and indigenous chickens. These breeds (exotic and indigenous chickens) are culturally acceptable, technically and economically viable. This is an asset over which the poor and the disadvantaged population of this nation actually have control (Binjing, 2007).

The increasing demand for animal food products and trends in consumption and production strongly suggest that much of the demand for meat can be met through increased poultry production (Delgado *et al*., 2001). Poultry production systems are however influenced by some factors which are types of poultry (birds), housing, socio-economic background of the farmer, health and disease, feed source and feeding, sales and disposal (Adedeji *et al*., 2013).

However, smallholder poultry farmers face the challenges of improving productivity of their flock in terms of quantity of food (meat) and incomes generated from their sales. In the past years, many small-scale operators in the poultry industry have been forced out of business due to problems ranging from shortage and high cost of feed, inadequate veterinary services and drugs, improper management practices, poor quality of equipment and other inputs.

Similarly, Anwasia (2015) observed that the major problems confronting smallholder poultry farmers in Nigeria is lack of proper management in terms of feeding, housing, health care and traditional methods used by poultry farmers among other factors are responsible for the low productivity. Other problems include rising cost of the major inputs such as feeds, drugs and equipment which are major setback in the poultry industry. It therefore becomes pertinent to carry out this study to investigate constraints to poultry management practices among smallholder farmers in Benue state, Nigeria. The study sought to answer the following research questions. What are socio-economic characteristics of poultry farmers in the study area? What are various types of poultry management practices used by smallholder farmers in the study area? What are sources of information on poultry management practices in the study area? What are constraints to poultry management practices in the study area?
The specific objectives were to:

i. describe socio-economic characteristics of poultry farmers in the study area;
ii. identify types of poultry management practices used by smallholder farmers;
iii. identify sources of information on poultry management practices; and
iv. identify constraints to poultry management practices among smallholder farmers in the study area.

1.1. Statement of Hypothesis

The following hypothesis was empirically stated and tested:
H_{01}: There is no significant relationship between socio-economic characteristics of the respondents and poultry management practices in the study area.

2. METHODOLOGY

The survey was carried out in Benue State, Nigeria. Benue State is located in North Central Nigeria. It is delineated into three agricultural zones, namely; zone A (Logo, Ukum, Kastina-Ala, Vandeikya, Konshisha, Kwande

and Ushongo), Zone B (Makurdi, Guma, Gwer East, Gwer West, Gboko, Tarka and Buruku) and Zone C (Ado, Agatu, Apa, Obi, Ogbadibo, Ohimini, Oju, Okpokwu and Otukpo). The state comprises a total of 23 Local Government Areas with Makurdi as the state capital. It lies between longitude 8^0 and 9^0 E, latitude 7^0 and 8^0 N with an estimated population of 4,219,244 people (National Population Commission, 2006). The state shares boundaries with five other states namely; Nasarawa State to the north, Taraba State to the east, Cross-River State to the south, Enugu State to the south-west and Kogi State to the west. The state also shares a common boundary with the Republic of Cameroon on the south-east. It occupies a landmass of 34,059 square kilometers.

Benue State has two main seasons; the wet (rainy) and the dry season. The rainy season starts in April and ends in October with its peak in May and September while the dry season starts in November and ends March. The great influence of the river Benue on the climate gives a mean annual temperature of about 32.5^0C. The predominant occupation of the people of Benue State is farming with over 80% engaged in it. Major crops grown are rice, groundnut, cowpea, cassava, sweet potato, maize and sorghum. Tree crops grown include citrus, mango, oil palm, cashew and guava. Livestock raised include cattle, sheep, goat, pig, rabbits and poultry. The people in the state also engage in non-farm activities such as trading, civil service among others. The inhabitants of this state are mainly the Tiv, Idoma, Igede, Jukun and other ethnics groups. Map of the study area is shown in figure 1.

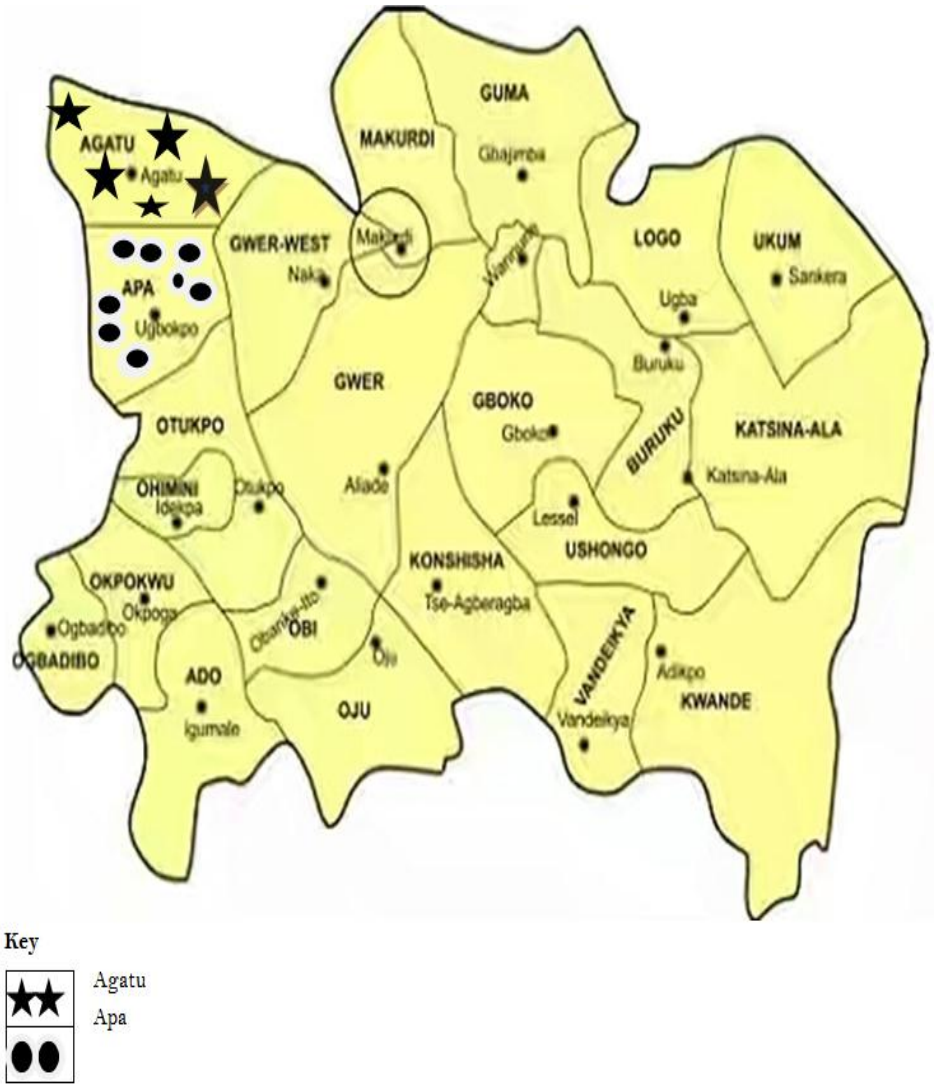

Figure-1. Map of Benue State showing the location of the study area

The population of the study consisted of all smallholder poultry farmers in Benue State, Nigeria. In the first stage, zone C was selected from the three agricultural zones in the state. Apa and Agatu Local Government Areas

were purposively selected from the zone based on the intensity of poultry production in the area. The second stage involved the selection of two (2) council wards each from the two (2) Local Government Areas using simple random sampling technique. Two (2) communities were selected from each of the council wards using simple random sampling technique, making up a total of eight (8) communities. In each of the communities selected, ten (10) poultry farmers were sampled, giving a total of eighty (80) respondents used for the study.

Primary data were collected for this study using structured questionnaire. The questionnaire was divided into four sections, namely; A, B, C and D. Section A focused on socio-economic characteristics of the poultry farmers. Section B centered on types of poultry management practices among smallholder farmers. Section C addressed sources of information on poultry management practices while section D centered on constraints to poultry management practices among smallholder farmers.

Descriptive statistics such as frequency, percentage, mean score and standard deviation as well as inferential statistics like factor analysis and logit regression analysis were used for analyzing data collected for the study.

3. RESULTS AND DISCUSSION

3.1. Socio-economic Characteristics of the Respondents

3.1.1. Sex

Majority (62.5%) of the respondents were females while 37.5% were males (Table1). This implies that females participated more than males in poultry production in the study area. The high percentage of female participation in poultry production was an indication that most women preferred indoor business while at the same time caring for their family. This agrees with the findings of Binjing (2007) who reported that majority of poultry farmers were females.

3.2. Age

Data in Table 1 show that 56.7% of the respondents were aged 21-40% years, 41.3% were between 41 and 60 years, among others. The mean age was about 39 years. This implies that the respondents were in their prime and active age of production. This is consistent with the findings of Anwasia (2015) who reported that the average age of poultry farmers in Nigeria is estimated to be 36 years.

3.3. Marital Status

Entries in Table 1 indicate that 65.0% of the respondents were married while 18.8% were single. This implies that most of the respondents were married, having greater responsibility which has made them to engage in small-scale poultry production for economic empowerment. This is in line with Okitoi *et al.* (2007) who reported that majority of poultry farmers in the study area were married.

3.4. Level of Education

Table 1 show that 45.0% of the respondents had tertiary education, 22.5% had primary education, 18.8% had secondary education while 13.8% of the respondents had non-formal education. This implies that most respondents were educated. This is in line with the findings of Adedeji *et al.* (2013) who observed that most poultry farmers are educated ranging from primary education to tertiary education.

3.5. Household Size

About 53% of the respondents had a household size of 1-5 persons while 47.5% had a household size of 6-10 persons (Table 1). The mean household size was 6 persons. This implies that the respondents had relatively few numbers of family members who serve as source of labour used in poultry production. This agrees with Kughur *et al.* (2014) who pointed out that majority of the poultry farmers in Nigeria have household sizes ranging from 6-10 persons.

3.6. Estimated Annual Income

Results in Table 1 show that 55.0% of the respondents had an annual income of less than or equal to ₦50,000, about 23% of the respondents had annual income of ₦50,000- ₦100,000, about 19% obtained ₦100,001- ₦150,000 while about 14% of the respondents had annual income of above ₦150,0000. The mean annual income was ₦81,925. This implies that the respondents had low income which could affect their level of poultry production.

3.7. Major Occupation

Data in Table 1 reveal that majority (61.8%) of the respondents were farmers, 18.8% were civil servants, 10.0% were petty traders, 7.5% were students while 2.5% of the respondents were artisans. This shows that the respondents were also engaged in non-farm occupations in order to obtain additional income to be economically stronger.

3.8. Number of Birds

Majority (81.3) of the respondents had 1-50 birds, about 11% had 51-100 birds, 6.3% had 101-150 birds while 1.3% of the respondents had above 150 birds (Table 1). The mean number of birds was about 38. This implies that majority of the respondents were small-scale poultry farmers.

3.9. Farming Experience

Results in Table 1 show that majority (93.8%) of the respondents had farming experience of 1-10 years, 3.8% had farming experience of between 10 and 15 years while 2.5% had farming experience of more than 15 years. The mean farming experience was about 5 years. This implies that the respondents have not been involved in poultry production for a long period of time. The findings agree with Binjing (2007) who stressed that most poultry farmers have farming experience of 1-10 years.

3.10. Extension Contact

About 78% of the respondents had no contact with extension agents while 22.5% of the respondents had contact with extension agents in the last one year (Table 1). This implies that poultry farmers in the study area rarely had contacts with extension agents in a year. This may affect their access to information on poultry management practices. This result agrees with Ochieng *et al.* (2013) who asserted that extension visits to poultry farmers in Nigeria have been low.

3.11. Membership of Farmers' Organization

Data in Table 1 show that majority (93.8%) of the respondents did not belong to any farmers' organization. This implies that there is less interaction with other poultry farmers in the area. This result disagrees with Adedeji *et al.* (2013) who observed that majority of farmers belonged to poultry associations.

Table-1. Distribution of Socio–economic characteristics of the respondents (n=80)

Socio-economic characteristics	Frequency	Percentage	Mean score
Sex			
Male	30	37.5	
Female	50	62.5	
Age (years)			
≤20	1	1.3	
21-40	45	56.2	38.90
41-60	33	41.3	
Above 60	1	1.3	
Marital status			
Married	52	65.0	
Single	15	18.8	
Widowed	10	12.5	
Divorced	3	3.8	
Level of education			
Non-formal education	11	13.8	
Primary education	18	22.5	
Secondary education	15	18.8	
Tertiary education	36	45.0	
Household size (numbers)			
1-5	42	52.5	
6-10	38	47.5	5.60
Farming experience (years)			
1-10	75	93.8	5.10
11-15	3	3.8	
Above 15	2	2.5	
Estimated annual income (Naira)			
≤50,000	36	55.0	
50,001 -100,000	18	22.5	81,925.0
100,001 -150,000	15	18.8	
Above 150,000	11	13.8	
Extension contact			
Yes	18	22.5	
No	62	77.5	
Membership of farmers' organization			
Yes	5	6.3	
No	75	93.8	
Major occupation			
Civil service	15	18.8	
Farming	49	61.3	
Artisan	2	2.5	
Student	6	7.5	
Petty trading	8	10	
Number of birds			
1-50	65	81.3	37.90
51-100	9	11.3	
101-150	5	6.3	
Above 150	1	1.3	

Field survey, 2017

3.12. Types of Poultry Management System Used by Smallholder Farmers

About 48% of the respondents practiced intensive system of poultry management, 28.7% of them practiced free range (extensive) system of poultry management while 23.8% practiced semi-intensive system. This implies that the use of extensive system and semi-intensive system is generally more prevalent in the study area than the intensive

system of poultry management. This is consistent with the findings of Ochieng *et al.* (2013) who reported that the free range production system and the semi-intensive system were the most practiced by farmers followed by the intensive system of poultry production.

Table-2. Distribution of respondents according to types of poultry management system (n=80)

Management system	Frequency	Percentage
Intensive	38	47.5
Semi-intensive	19	23.8
Free range (extensive)	23	28.7

Field survey, 2017

3.13. Major Reasons for Choice of Poultry Management System

Reasons for choice of poultry management system include cheap/less expensive (41.3%), require less labour (37.5%), saves time and energy (10.0%), among others (Table 3). This implies that farmers choose a given poultry management system predominantly because it is cheaper/less expensive or because it requires less labour. This is in line with the findings of Ochieng *et al.* (2013) who pointed out that poultry management systems were chosen mostly because it is cheap, less labour intensive and few management interventions are used.

Table-3. Distribution of major reasons for choice of poultry management system (n=80)

Reasons	Frequency	Percentage
Cheap/less expensive	33	41.3
Requires less labour	30	37.5
Saves time and energy	8	10.0
Others	9	11.3

Field survey, 2017

3.14. Types of Poultry Management Practices used by Smallholder Farmers

Types of poultry management practices used by smallholder farmers include proper sanitation (80.0%), culling of sick ones (76.3%), use of disinfectant (70.0%), adequate ventilation (68.8%), provision of appropriate floor space (65.0%), among others (Table 4). This implies that poultry management practices were used extensively by farmers in the study area. This agrees with the findings of Ochieng *et al.* (2013) who observed that poultry management practices consisting of feed supplements, housing, vaccination, ventilation and proper sanitation were mostly practiced by poultry farmers.

Table-4. Distribution of the respondents according to types of poultry management practices used by smallholder farmers (n=80)

Management Practices	Frequency	Percentage
Provision of heater for warmth	42	52.5
Use of disinfectant	56	70.0
Use of clean absorbent litter	43	53.7
Proper sanitation	64	80.0
Restriction of visitors	27	33.7
Provision of appropriate floor space	52	65.0
Provision of lighting	42	52.5
Adequate ventilation	55	68.8
Prevention of cannibalism	43	53.8
Provision of feeding trough and watering devices	44	55.0
De-beaking when the needs arises	27	33.8
Brooding of chicks	21	26.2
Provision of feed at ad libitum	40	50.0
Culling of sick ones	61	76.3

*Multiple responses

3.15. Sources of Information on Poultry Management Practices

Sources of information on poultry management practices as indicated by the respondents include friends/neighbor/relatives (98.7%), fellow farmers (98.7%), radio (72.5%), television (38.8%), internet (37.5%), NGOs (30.0%), extension agents (27.5%), print media (8.7%), cooperative societies (5.0%), research institutes (3.7%) and community leaders (1.3%). This implies that poultry farmers obtained information mostly through informal sources. The findings agree with Mgbada (2006) who observed that sources of information on poultry management available to farmers include contact with extension agents, others farmers, friends and relatives. Kughur *et al.* (2014) also noted that access to adequate information is very vital to increased agricultural productivity.

Table-5. Distribution of respondents according to sources of information on poultry management practices (n=80)

Sources	Frequency	Percentage
Extension agents	22	27.5
Friends/neighbors/relations	79	98.7
Radio	58	72.5
Television	31	38.8
Research institutes	3	3.7
Community leaders	1	1.3
NGOs	24	30.0
Print media	7	8.7
Fellow farmers	79	98.7
Cooperative society	4	5.0
Internet	30	37.5

*Multiple responses

3.16. Constraints to Poultry Management Practices among Smallholder Farmers

Table 6 represents factors analysis of constraints to poultry management practices among smallholder farmers. The constraints were named based on the item loadings. Factors 1, 2 and 3 were named technical, labour and input related constraints respectively.

Variables which loaded under technical constraints include inadequate capital (0.343), lack of technical knowhow (0.738), poor market networks (0.720), harsh weather condition (0.515), poor means of transportation (0.864), lack of timely information (0.789), poor housing system (0.651), poor productivity (0.819) and excessive mortality (0.679). This implies that the respondents in the study area were technically constrained in poultry management practices.

Labour constraints include insufficient labour (0.771), inadequate floor space (0.815), lack of water (0.836) and extremes of weather (0.736). This implies that labour related factors were constraints to poultry management practices in the study area.

Loadings under input-related constraints were high cost of feed (0.773), diseases and parasite infestation (0.489), theft and predators (0.816) and high cost of veterinary services (0.357). This implies that input-related constraints were also predominant factors affecting poultry management practices in the study area. This is consistent with the findings of Kughur *et al.* (2014) who pointed out that the major problems faced by smallholder poultry farmers in Nigeria include high prevalence of diseases, inadequate capital, high cost of feeds, bad quality of water, poor marketing, theft, inadequate space and poor means of transportation.

Table-6. Factor analysis of constraints to poultry production management practices among small-scale farmers

Constraints	Factor 1	Factor 2	Factor 3
High cost of feed	0.314	0.066	0.773*
High cost of vaccines	0.071	0.098	0.621*
Diseases and parasite infestation	0.113	0.266	-0.489*
Theft and predators	-0.001	-0.130	-0.816*
Inadequate capital	0.343*	-0.195	0.064
Lack of technical knowhow	0.738*	0.087	-0.046
Poor market networks	0.720*	0.013	0.047
Harsh weather condition	0.515*	0.176	0.178
High cost of veterinary services	-0.111	0.010	0.357*
Poor means of transportation	0.864*	0.037	-0.098
Lack of timely information	0.789*	0.134	-0.086
Poor housing system	0.651*	-0.005	-0.191
Poor productivity	0.819*	0.076	0.005
Excessive mortality	0.679*	0.293	0.214
Insufficient labour	0.137	0.771*	0.088
Inadequate floor space	0.013	0.815*	-0.029
Lack of water	-0.080	0.836*	0.029
Extremes of weather	0.400	0.736	0.091

Method: Varimax Rotation with Kaiser Normalization
Factor1 = Technical constraints
Factor2 = Labour constraints
Factor3 = Inputs-related constraints

3.17. Relationship between Socio-Economic Characteristics of the Respondents and Poultry Management Practices

Results in Table 7 show that the Chi-square statistics (84.519) is significant at 1% level of probability with sig value = 0.000 indicating that the variables tested affected positively the respondents' poultry management practices significantly. The result shows that sex (p–value = 0.091) and annual income (p–value = 0.035) were all significant at 5% and they both had significant effects on poultry management practices among small-scale farmers in the study area.

Sex (W = 2.849) significantly and positively affected the propensity of respondents to carry out a given poultry management practice at 5% level of significance (sig = 0.091). Annual income (W = 4.447) significantly and positively affected the propensity of respondents to carry out poultry management practices at 5% level of significance (sig = 0.035). This implies that as farmers' income increases, their tendencies to carry out poultry management practices also increases.

The Chi-square statistics (x^2) value of the logit regression model is 84.519 and was significant at 1%. This implies that the socio-economic characteristics of the respondents have significant relationship on poultry management practices in the study area.

The Cox and Snell R^2 value of the logit regression model indicates that 65.2% of the variations of the dependents variables were explained by the logit regression model. The result also shows that the Nagelkerke R^2 for regression is 0.893 indicating that the variables tested accounted for about 89.3% of the variation of the dependent variables. The remaining 11.7% is attributed to the error term.

Based on the results shown above which are statistically significant, the null hypothesis which stated that there is no significant relationship between socio-economic characteristics of the respondents and poultry management practices was rejected and the alternative hypothesis was accepted.

Table-7. Logit Regression of Socio-Economic Characteristics of Respondents and Poultry Management Practices

Variables	B	S.E	Wald	df	Sig	Exp(B)
Sex	-0.114	0.161	0.504	1	0.478	0.892
Age	-5.302	3.141	2.849	1	0.091**	0.005
Household size	0.232	0.733	0.101	1	0.751	1.262
Marital Status	1.394	1.820	0.586	1	0.444	4.030
Level of Education	-0.138	0.216	0.406	1	0.524	0.872
Annual Income	0.000	0.000	4.447	1	0.035**	1.000
Farm Experience	0.104	0.235	0.197	1	0.657	1.110
Farm size	0.102	0.148	0.472	1	0.492	1.107
Extension Contact	-0.390	2.279	0.029	1	0.864	0.677
Farm Organization	-0.341	9.973	0.001	1	0.973	0.711
Occupation	0.131	1.879	0.005	1	0.945	1.139
Constant	-4.656	4.256	14.584	1	0.000	190.425
Cox & Snell R^2 = 0.652						
Chi-sq = 84.519						
Nagelkerke R^2 = 0.893						
-2 loglikelihood = 20.256[a]						

Source: Field survey (2018)
t - ratio significant at 5% level of significance

4. CONCLUSION AND RECOMMENDATIONS

The survey was conducted to assess poultry management practices among smallholder farmers in Benue state, Nigeria. It revealed that the use of extensive and semi-intensive systems of poultry management were mostly practiced by the farmers in the study area. Also, the study showed that farmers' choice of a given poultry management system is predominantly because it is cheap/less expensive. The study further revealed poultry management practices which were used extensively by the farmers to include proper sanitation, use of disinfectant, ventilation, among others. Constraints to poultry management practices were technical, labour and input-related factors.

The study recommends that efforts are needed in promoting increase in poultry production through adequate provision of veterinary services for parasites and diseases control to enhance productivity. There is need for the government to encourage non-governmental organizations to collaborate with Agricultural Development Programmes (ADP) and Ministry of Agriculture in providing improved techniques of poultry management practices through seminars, lectures, workshops, etc.

Funding: This study received no specific financial support.
Competing Interests: The author declares that there are no conflicts of interests regarding the publication of this paper.

REFERENCES

Adedeji, O.S., J.A. Ajayi, S.A. Amao and J.O. Aiyedun, 2013. Extent of commercial poultry production in Saki West local government area of Oyo State. Transnational Journal of Science and Technology, 3(5): 68-81.

Akpabio, U., J.K. Kwaga, J. Kabir, V.J. Umoh and J.O. Otalu, 2014. Assessment of some poultry, management practices in Kaduna State, Nigeria. World J. Pub. Health Sci, 3(1): 1-4.

Anwasia, A.I., 2015. Production efficiency of small scale broiler farmers in Delta State, Nigeria. An M.Sc Thesis, Faculty of Agriculture, Department of Agricultural Economics, University of Nigeria, Nsukka. pp: 5-6.

Apantaku, S., A. Omotayo and A. Oyesola, 1998. Poultry farmers' willingness to: Participate in Nigerian agricultural insurance scheme in Ogun State, Nigeria. Proceedings of the Silver Anniversary Conference, Nigerian Society for Animal Production. Gateway Hotel, Abeokuta. pp: 542.

Binjing, R.D., 2007. A comparative study of resource use and productivity in exotic and native chicken enterprises in Plateau state, Nigeria. An M.Sc. Thesis, Department of Agricultural Economics, Faculty of Agriculture, University of Nigeria, Nsukka. pp: 16-18.

Delgado, C.L., M.W. Rosegrant and S. Meijer, 2001. Livestock to 2020: The revolution continues. Annual Meetings of the International Agricultural Trade Research Consortium (IATRC), Auckland, New Zealand, Citeseer. pp: 18-19.

Kughur, P.G., S. Daudu and O.E. Onu, 2014. Factors affecting adoption of poultry innovation by rural farmers in otukpo local Government area of Benue State, Nigeria. International Journal of Livestock Research, 4(8): 14-16.

Mgbada, J., 2006. Effectiveness of information sources on improved farming practices to women farmers in Enugu State, Nigeria. Global Approaches to Extension Practice: A Journal of Agricultural Extension, 2(1): 67-78.

National Population Commission, 2006. National Population Census figure. Federal Republic of Nigeria, Abuja.

Ochieng, J., G. Owuor and B.O. Bebe, 2013. Management practices and challenges in smallholder indigenous chicken production in Western Kenya. Journal of Agriculture and Rural Development in the Tropics and Subtropics, 114(1): 51-58.

Okitoi, L.O., H.O. Ondway, M.P. Obali and F. Murekefu, 2007. Gender issues in poultry production in rural households of Western Kenya. Livestock Research for Rural Development, 19(2): 17-22.

Okunmadewa, F., 1999. Livestock industry as a tool for peverty allevation. Nigerian Journal of Animal Science, 2(2): 21-30.