

ADOPTION OF IMPROVED BROILER POULTRY PRODUCTION TECHNOLOGIES AMONG SMALL SCALE FARMERS IN DELTA STATE, NIGERIA.

Olaroye Ebhodaghe Roseline & Uzoka Iwalewa Omokhekpe

*Agricultural Education Department, Federal College of Education
(Technical) Asaba, Delta State.*

Nenna Mgbedike Godwin

*Agricultural Economics and Extension Department, Chukwuemeka
Odumegwu Ojukwu University, Igbariam Campus, Anambra State, Nigeria.*

Abstract

The study assessed the adoption of improved broiler poultry production technologies among small scale poultry farmers in Delta State. Specifically, assessed the level of adoption of improved production technologies among broiler poultry farmers, ascertained the socio economic variables that influenced the adoption, and identified the constraints to the adoption of improved broiler poultry production technologies in the study area. The population of the study comprised all broiler poultry farmers in the three Agricultural zones of the State. Multi-stage and simple random sampling procedure were used in selecting one hundred and twenty broiler poultry farmers that were used for the study. The respondents were registered broiler poultry farmers from Ministry of Agriculture and Rural Development of Delta State and structured questionnaires were used as instruments for data collection in the study. The analyses of the data were carried out with frequency counts, percentage, mean scores and linear regression analysis. The result indicated that the adoption index was 0.59, it indicated that 59% of the respondents adopted the improved broiler poultry production technologies. The regression analysis indicated significant positive relationship between household size, farm size/number of birds, years of farming experience, number of extension visits, and marital status on the level of adoption at 5% probability level. Factors that constrained the adoption of improved broiler poultry production technologies included high cost of commercial feed, non-availability of improved breed on demand, inadequate contact with extension agents, poor marketing

system and lack of proper training. The study recommended that commercial feed should reach the farmers at a subsidized rate.

Keywords: *Adoption, broiler, improved, production, technologies, farmers.*

Introduction

Smallholder chicken production is an integral part of rural and resource-poor households' livelihoods in sub-Saharan Africa. It accounts for about 80% of the poultry flock in the region. Smallholder chicken production contributes to income generation, food security and supplies social, cultural, and environmental values. It also plays a significant role in poverty alleviation strategies, especially for resource-poor and historically neglected groups (Mulugeta et al., 2022). Alders et al., (2019) observed that poultry keeping stands as an untapped resource that can generate employment for millions of Nigerian youths in rural and peri-urban areas as entrepreneurs, skilled and unskilled workers. Poultry plays significant role in human economy through provision of food while also creating wealth through job provision for our teeming population (Ajala et al., 2020).

The relevance of poultry industry to human lives and human living is as follows: food provision in the form of the supply of protein, vitamins, minerals, and oils; industrial uses such as in the production of vaccines, fertilizers and animal feeds; pharmaceutical importance including preservatives during semen storage; in paint and adhesive production companies as varnishes, adhesives, and printers ink; in leather producing companies as leather tanners and in textile industries during the production of different types of cloth dyes. Furthermore, the hospitality industry relies on it for the supply of feathers for display and comfortable luxury mattresses, pillows and cushions as well as in the agricultural industry in the production of organic fertilizers. Lastly, it provides affordable meat for the nation's populace

especially those in urban areas (Wahyono and Utami, 2018).

A broiler (*Gallus domesticus*) is a type of chicken that is bred and raised particularly for meat production. The distinctive feature of broilers is that many possess white feathers and yellowish skin. Commercial broilers attain slaughter-weight between four and seven weeks of age (Sabo et al., 2019). The broiler industry is able to provide meat in a short run compared to other livestock. The production of broiler is very common among smallholder's farms because it has contributed to the household economy. There has been major development in genetic selection of fast growing meat-type chickens, this informed the production of broiler that weigh over 2 kg at six weeks of age with 3.5 kg of a balanced feed which compares with 2 kg in fourteen weeks with 10 kg feed, although slower growing breeds reach slaughter-weight at approximately 14 weeks of age (Abioja, 2010 as cited in Sabo et al., 2019).

Adoption is a psychological decision making process that an individual goes through in accepting an innovation or new practice (Egwuma et al, 2018). Innovation adoption in this study refers to technologies in broiler management practices such as housing, medication, feeding and environmental hygiene which are applied in modern broiler management practices. All these tend to boost the enterprise and hence increased profitability on the side of the farmer.

In Nigeria, improved management practices have been disseminated to the farmers and it is expected that with the adoption of these practices, broiler farmers can witness increased rate of carcass weight gain, efficient feed to meat conversion, reduced infestation and diseases, thus, improvement in the productivity and profitability in the broilers enterprise (Egwuma et al., 2018).

The level of adoption of innovations in broiler poultry

production technologies by broiler farmers in the study area cannot be ascertained, it is against this backdrop that the study became imperative. The specific objectives were to:

- i. assesses the level of adoption of improved broiler poultry technologies among broiler poultry farmers;
- ii. ascertain the socio economic variables that influenced the level of adoption of improved broiler poultry technologies among farmers; and
- iii. identifies the constraints to the adoption of improved broiler poultry production technologies in the study area.

Methodology

Study area: The study was carried out in Delta State, Nigeria. According to Iwelunmor (2016), Delta State lies approximately between longitude 50° 00' E and 60° 45' E of the Greenwich Meridian, and latitude 50° 00' N and 60° 30' N of the Equator. The State has a total land area of 17,440 km², one third of this is swampy and water logged. Delta State is made up of 25 Local Government Areas with total population of 4.1 million (NPC, 2013).

Population and sampling procedure

Multi-stage involving purposive and simple random sampling technique was used in selecting one hundred and twenty (120) broiler poultry farmers that were used for the study. In stage 1, a purposive selection of one Agricultural Zone (Delta North) was selected from the three agricultural zones in the state. Stage 11 involved a simple random selection of six (6) farming communities from the agricultural zone selected. Stage 111, from these communities' twenty (20) registered poultry farmers each were randomly selected. This gave a total of one hundred and twenty (120) broiler poultry farmers that were sampled for the study.

Methods of Data Collection

A well-structured and validated questionnaire was administered to the respondents to collect the relevant data comprising socio-economic characteristics of the farmers, level of adoption, and constraints to the adoption of improved production technologies among broiler poultry farmers in the study area respectively.

Data Analysis: Data was analyzed using descriptive statistical tools such as frequency counts, percentage, mean scores (Likert type rating scale) and inferential statistics (Multiple linear regression analysis).

The broiler farmers were requested to indicate their level of adoption of improved broiler poultry production technologies on a five (5) points adoption model. The broiler farmers' responses on level of adoption were categorized as thus; Aware (1), Interest (2), Evaluation (3), Trial (4), Adoption (5).

The adoption index and adoption level were calculated thus:

- i. **Computation of the total mean (M) adoption score:** This was computed by dividing the total adoption scores by the number of respondents involved.
- ii. **Computation of the grand mean (M) adoption score:** This was calculated by adding all the mean adoption scores and dividing them by the number of innovations considered.
- iii. **Computation of adoption index:** This was calculated by dividing the grand mean (M) adopted score by the 5 adoption categories.

To identify the constraints against the adoption, a four-point Likert type scale was used: very serious = 4, somewhat serious =3, serious = 2, not serious =1. The constraint was calculated by dividing (4+3+2+1) by 4. This gave a mean value of 2.5. This implies that the mean score equal and above 2.5 was considered a major constraint; while mean score less than 2.5 was considered minor constraints.

Hypothesis testing

socio economic characteristics of small scale broiler poultry farmers do not significantly influence the adoption level of improved broiler production technologies was achieved using linear regression analysis.

Model Specification

The implicit form of the linear multiple regression model that was used in realizing hypothesis was be given as $Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + \dots + b_{10}X_{10} + e_i$ Where Y = dependent variable, a = constant, $X_1, X_2, \dots, X_n$ different independent variables, e_i = error term.

$LAT = (AGE + GEN + EDU + HOS + FXP + FS + MCS + MS + SF + MO + EV + e_i)$

Where:

LAT = Level of adoption of technology A = constant $b_1, b_2, \dots, b_n$ indicate the intercepts or coefficients of the independent variables.

AGE : age of the broiler poultry farmers (will be measured in years).

GEN : gender (male =1; female =2).

EDU : level of education (will be measured in years of formal schooling)

HOS : household size (will be measured by the number of persons living in the household).

EXP : years of farming experience (will be measured in years)

FS : farm size (in number of flock)

MCS : membership of cooperative society

MS : marital status (married = 1; otherwise = 0)

SF : source of fund

MO : major occupation

EV : extension visit

Results and Discussion

The result in Table 1: shows the adoption of improved technology among broiler poultry farmers in the study area. The adoption index was 0.59, this implies that 59% of the respondents adopted the improved broiler poultry production technologies among the small-scale farmers. The adoption rate was relatively high among broiler poultry farmers in the study area. This agrees with the study by Borah and Halim (2017) which stated that financial self-sufficiency, education, exposure to the outer world, decision making capacity etc. were the factors that determined the level of adoption of recommended technologies by the broiler farmers. The farmers in this study have to some level meet up with these factors, hence the more than average level of adoption obtained in the study.

Table 1: *Level of adoption of improved broiler poultry technologies*

Improved Broiler Technology	Aware (1)	Interest (2)	Evaluation (3)	Trial (4)	Adoption (5)	Total	Total Mean adoption score	Grand Mean adoption score	Adoption Index
Application of vaccine/ vitamins on birds	18	12(24)	(18)54	(12)58	(60)300	444	3.70	2.97	0.59
Use of balanced feed	27	(6)12	(12)36	(12)60	(60)300	435	3.63		
Ventilation and lighting	21	(21)42	(12)36	(9)36	(57)285	420	3.50		
Water management	24	(12)24	(21)63	(9)36	(54)270	417	3.48		
Identification & culling of sick birds	39	(9)18	(6)18	(9)36	(57)285	396	3.30		
Cleaning of the equipment	36	(12)24	(12)36	0(0)	(60)300	396	3.30		
Litter management	24	(18)36	(18)54	(18)72	(42)210	396	3.30		
Cleaning of poultry house	36	(12)24	(12)36	(3)12	(57)285	393	3.28		
Management of ecto and endoparasites	33	(15)30	(12)36	(24)96	(36)180	375	3.13		
Detection of good breeds	24	(45)90	(6)18	(12)48	(33)165	345	2.88		
Preparing the brooding unit	45	(27)54	(3)9	(6)24	(39)195	327	2.73		
Slaughter and packaging	42	(27)54	(6)18	(15)60	(30)150	324	2.70		
Keeping daily poultry records	57	(15)30	(12)36	(9)36	(30)150	309	2.58		
Use of brooders	48	(24)48	(9)27	(21)84	(21)105	306	2.55		
Use of improved	51	(27)54	(9)27	(12)48	(24)120	294	2.45		
Use of debeaking machine	57	(21)42	(15)45	6(24)	(15)75	255	2.13		

Use of incubation for hatching	75	(21)42	(6)18	9(36)	(9)45	216	1.80
Total							50.44

Source: *Field survey 2022*

Table 2 shows the result of regression analysis on the relationship between the independent variables and the dependent variable (that is level of adoption of broiler production technologies) among the small scale farmers in Delta State, Nigeria. The result of the analysis indicates that the independent variables significantly influenced the dependent variable given R^2 of 0.640. These variables were able to explain 64.0% of the variation in the level of adoption of broiler poultry technologies by the small scale farmers. The age of farmers in the study area had inverse significant influence on the level of adoption of improved broiler production technologies. This implies that increase in (old) age of the broiler poultry farmer can lower the adoption of broiler production technologies. This result agrees with Ishola and Olukotun (2019) whose findings posited that majority of the broiler poultry farmers belonged to the young and middle-aged group, that is, this favours the learning of new technologies which in-turn will encourage greater adoption of improved poultry production technologies.

Household size exerted significant influence on the level of adoption of broiler production technologies in the study area. The higher the household size the easier it becomes to adopt more of the broiler production technologies. This is because labour becomes cheaper with more number of persons in the household. The result is in line with Sabo et al, (2019), whose result gave the mean household size was 6 persons. This result implies that the respondents have moderately large household size which is a source of farm labour.

Farm size/Number of birds have a significant effect on the level of adoption of broiler production technologies in the study area. This implies that the more birds in the farm, the more careful the farmer becomes in the adoption of improved poultry production technologies in order to maximize profit and to avoid casualty with birds on the farm. This agrees with Ishola and Olukotun (2019) whose study revealed that greater proportion (27.78 %) of the farmers in their study area possessed 200 birds and above. It also agrees with Borah and Halim (2017) who stated that large sized farms were more technology oriented than the small farms. Lack of proper training and awareness along with poor financial condition stood as a hinder for the small sized farms in adopting scientific rearing practices while large sized farms with sound financial condition and good awareness adopted scientific rearing practices as per recommendation.

Farming experience exerted significant influence on the level of adoption of broiler production technologies in the study area. This implies that the higher the farming experiences of the broiler farmer in years, the higher the adoption of broiler production technologies. This shall in turn increase the flock size, income and livelihood of the farmers. This result agrees with Sabo *et al*, (2019), who observed that higher farming experience enables farmers to set realistic goals.

Number of extension contacts with the broiler poultry farmers in the study area exerted positive and significant influence on the level of adoption of broiler poultry production technologies in the study area. This implies that the more the number of contacts by extension agents with broiler poultry farmers, the higher the level of adoption of broiler production technologies by small scale broiler poultry farmers as well as the output of broiler production in the study area. This is in agreement with Msoffe et al., (2018) who stated that in the

developing countries extension service is the major source of information to the farmers. Also, Mandavkar et al. (2020) stated that Information is one of the factors that affects the behavior or adoption of improved technologies in poultry farming.

Table 2: *Multiple linear regression analysis for socio economic characteristics of small scale broiler poultry farms*

Variables	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Sta. error	B	T	
(Constant)	3.288	0.370		8.881	0.000
Age of farmers	0.000	0.045	-0.012	-2.02	0.032**
Gender of farmers	-0.018	0.088	-0.019	-0.20	0.840
Level of education	0.027	0.066	0.041	0.409	0.684
Household size	0.055	0.018	0.144	3.410	0.016**
Major occupation	0.054	0.060	0.088	0.900	0.370
Farm size/no of birds	0.034	0.001	0.156	2.532	0.042**
Years of farming experience	0.003	0.041	0.124	3.245	0.017**
Sources of fund	0.148	0.064	0.225	2.304	0.758
Membership with cooperative society	0.054	0.091	0.059	0.593	0.555
No of times visited by extension staff	0.066	0.038	0.100	3.131	0.020**
Marital status	0.091	0.049	0.107	2.361	0.036**

*P≤0.05, R = 0. 562, R² = 0.640, Adjusted R² = 0.538

Source: Field Survey, 2023.

Table 3 shows the major constraints to the adoption of improved broiler poultry production technologies in the study area. High cost of commercial feed was one of the major constraint to the adoption of improved broiler poultry production technologies in the study area and was ranked first with the mean score of $\bar{x}$ =3.60.

The result above agrees with Osuagwu et al., (2020), whose studies stated constraints on adoption by farmers was high cost of

feeds (86.8%). Studies by Nwozuzu et al., (2021) stated also that the financial incapacitation and high cost of livestock feeds were the major constraints to farmers' adoption of improved technologies. In Akanni and Olukotu (2019) Lack of credits/ fund to adopt improved practices (70.18%), high cost of improved practices (57.89%) and lack of government support (54.39%) were rated the most serious constraints. Contrary wise, in the study by Nwozuzu et al., (2021) it revealed that irrelevant natures of extension package, unavailability of extension agents were perceived not to be a constraint to the adoption of improved technologies.

Table 3: Constraints to the adoption of improved broiler poultry production technologies

Constraints	Serious (4)	S W Serious (3)	Serious (2)	Not Serious (1)	Total	Mean	Rank
High cost of commercial feed	96(384)	6 (18)	12 (24)	06	432	3.60	1 st
Non availability of improved breed on demand	72(288)	24 (72)	18 (36)	06	402	3.35	2 nd
Poor marketing system	63(252)	24 (72)	30 (60)	03	387	3.23	3 rd
Lack of proper training	66(264)	18 (54)	27 (54)	09	381	3.18	4 th
Comfortable with existing practices	48(192)	42 (126)	27 (54)	03	375	3.13	5 th
Lack of awareness	45(180)	39(117)	21(420)	15	354	2.95	6 th
Financial incapacity of farmers	39(156)	42(126)	30 (60)	09	351	2.93	7 th
lack of credit/ funds to adopt	33(132)	51(153)	27(540)	09	348	2.90	8 th
High cost of day old chicks	30(120)	54(162)	27(54)	09	345	2.88	9 th
Improved practices are too expensive	27(108)	57(171)	27 (54)	09	342	2.85	10 th
Outbreak of parasite	36(144)	30 (90)	45 (90)	09	333	2.78	11 th
Lack of government support	24(96)	39(117)	48 (96)	09	318	2.65	12 th
I have no problem with what I am currently doing	33(132)	33 (99)	30 (60)	24	315	2.63	13 th
Inadequate contact with extension agent	33(132)	30 (90)	30 (60)	27	309	2.58	14 th
improved practices are too complex	27(108)	33 (99)	39 (78)	21	306	2.55	15 th
Lack of information	18 (72)	45(135)	39 (78)	18	303	2.53	16 th
Conduct of extension staff	27(108)	36(108)	24 (48)	33	297	2.48	17 th
Distance from extension staff	15 (60)	42(126)	36 (72)	27	285	2.38	18 th
Difficulty in triability	9 (36)	36(108)	36 (72)	39	255	2.13	19 th

Source: Field Survey, 2023.

Conclusion and recommendations

The study revealed that the level of adoption of improved broiler poultry production technologies among small scale broiler poultry farmers in the study area was high. High cost of commercial feed was the highest constraints that hindered adoption. It is assumed that when these problems are solved broiler farmers shall be able to freely adopt more of the improved production technologies. It is recommended that Government, in collaboration with non-governmental agencies could assist to form cooperatives where farmers could assess soft loans to enhance productivity in broiler poultry business.

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