

Adoption of Improved Technology Packages Among Poultry Farmers in Gokana Local Government Area, Rivers State

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Abstract

This study focused on the Adoption of Improved Technology Packages Among Poultry Farmers in Gokana Local Government Area, Rivers State. The study adopted a descriptive survey research design. The population of the study consist of all registered poultry farmers in Gokana Local Government Area. Multi-stage sampling techniques were used to select 62 poultry farmers. Data was collected through the use of structured questionnaire. Data collected from the field were analysed using descriptive statistics, and inferential statistics. compounded commercial feeds such as Ultima, Top-feed, Hybrid feed etc., have been embraced and adopted by the poultry farmers based on mean score ($\bar{x} = 4.76$). Farmers are utilising and adopting the improved technology package by rearing hybrid breeds of birds such as Frizzled feather, Isa brown, Noiler, Naked neck etc. based on mean score ($\bar{x} = 4.66$). Majority of the farmers in the study area have adopted the improved technology package and do vaccinate, and cull their birds. Fumigate their pens and ensuring that their footbath is filled up with disinfectants regularly based on mean score ($\bar{x} = 4.39$). Farmers have embraced and adopted proper record keeping and deep litter system of management as a result of its cost advantage based on mean score ($\bar{x} = 4.37$). Farmer are still on the verge of trying and acclimatising the relative benefit, cost advantage, compatibility and workability of battery cage, electric brooding, artificial incubation, and hydroponics fodder production process based on mean score ($\bar{x} = 3.82$). The study concluded that the farmers have adopted the various improved technology packages with few percentages of the respondent still on the trial stage. It was recommended that proper farmers training scheme and routine scientific orientation should as well as specific demonstration and training programmes such as exposition and awareness camps should be organised for the farmers.

Keywords: *Adoption, Improved technology, Poultry farmers*

INTRODUCTION

Poultry is viewed as one of the cheapest sources of animal protein and the easiest avenue through which this animal protein can be increased, and ensure protein availability in human diet which serves as primary source of amino acid for body building, provide vitamins and minerals which indirectly supplement deficiency of protein in human system (Ajuwa, Elenwa, & Isife, 2024). The development and transfer of technologies and farming techniques increased the efficiency of poultry production. This has led modern poultry farms to grow rapidly in size, concentrate near sources of inputs or output markets and opt for vertical integration (Ao *et al.*, 2021; Chen *et al.*, 2024; Mahanty *et al.*, 2023).

Rural households and communities in Nigeria participate in the rearing of ducks, chickens, guinea fowls, and various other poultry using traditional methods. This practice frequently employs free-range systems, which enable the birds to search for food and move about freely while taking advantage of their natural environment. The reduction in poultry production negatively impacts household earnings. Furthermore, insufficient feeding methods and poor nutrition also contribute to reduced performance. This occurs as the birds rely solely on chicken waste and the limited feed components they manage to find through scavenging and other unconventional methods. Remarkably, a range of innovative technologies for poultry farming have been created to boost productivity and minimize losses (Ajuwa *et al.*, 2024).

Ajuwa *et al.*, (2024) noted that the products of technology and development remains important factor in global development transformation of the economy in general and agricultural particular. This means that the use of technologies in productive engagements such as poultry production will enable farmers explore greater opportunities and overcomes challenges in the agricultural subsector. It is on the basis of the foregoing that the study seeks to examine the adoption of improved technology packages among poultry farmers in Gokana Local Government Area, Rivers State.

The objectives of this study were to;

- i. identify the socio-economic characteristics of the poultry farmers in the study area.
- ii. determine the stages of adoption of improved technology packages among poultry farmers in the study area
- iii. identify the factors that drive the farmers to adopt the improved technology packages in the study area.
- iv. identify the constraints faced by farmers in adopting improved technology packages in the study area.

Study Area

The study was carried out in Gokana Local Government Area (GOLGA), in Rivers State. Rivers state have twenty-three (23) local Government Area of which Gokana is one. Gokana Local Government Area was created in the 1991 with its administrative headquarters in Kpor and its traditional headquarters in Giokoo. It has an area of 126 km², density 2,607/km² and a population of 228,828 at the 2006 census. It has the geographical coordinate of latitudes 4^o 40' 5N and 4^o 43' 19.5N and longitude 7^o 22' 53.7E and 7^o 27' 9.8E. The predominant occupant of the area is the Ogoni ethnic group. They speak predominantly Gokana language and partly Khana language (Ogoni language). The most prevailing occupation of the occupants of the area is farming (cultivation of crops and rearing of some domestic animals) and petty trading on agricultural products. It is also blessed with some natural endowment among which is crude oil, and fertile-agricultural support soil

Research Design

The study adopted a descriptive survey research design.

Population of the Study

The population of the study consist of all registered poultry farmers in Gokana Local Government Area. The total population of the study is one hundred and twelve (112) Rivers State Agricultural Development Programme (RSADP) registered poultry farmers obtained from the ADPs Zonal office at Ebubu, Eleme Local Government Area, Rivers State, Nigeria.

Sampling Procedure and Sample Size

Multi-stage sampling techniques were used to select the communities and the farmers from the two respective dichotomies of the study area. Firstly, ten (10) communities were purposively

selected; five (5) communities from the riverine dichotomy and five (5) communities from the upland dichotomy of the seventeen (17) communities in Local Government Area based on their history and predominant rate of poultry production. Secondly, a proportionate simple random sampling technique were used to select the total of ten (6) farmers from each community selected, thirty (30) farmers for the Riverine communities and thirty (30) for the upland communities respectively to have a total of a hundred (60) farmers which constitute the sample size of 60 respondents. After the survey additional two farmers were added making it 62 farmers.

Data Collection Methods and Sources

The major source of data was primary data. The primary data was collected through the use of a well-structured questionnaire, in line with the specific objectives of the study. The respondents were allowed for a week interval to give sufficient time to provide the necessary reliable answers.

Method of Data Analysis

Data collected from the field were analysed using descriptive statistics, and inferential statistics. The descriptive statistics tools such as mean, frequency distribution, percentage, ratios and tables were deployed in analysing objective one (1) the socio-economic characteristics of the poultry farmers in the study area and objective two (2) sources of information on the types of improved technology packages on poultry production among the respondents while 5-point Likert type summated rating scale with the options awareness, interest, evaluation, trial, and adoption were use to analyzed objective three(3); Stages of adoption of the improved technology packages among the farmers in the study area, Also 4-point Likert type summated rating scale with the options the options very low extent, undecided, high extent, very high extent; for objective five (4) factors that drive the farmers to adopt the improved technology packages in the study area. and 5-point Likert type summated rating scale with the options strongly agree, agree, undecided, disagree and strongly disagree were used to analyzed objective (5) the constraints faced by the respondents in adoption of improved technology packages among poultry farmers in the study.

RESULTS AND DISCUSSIONS

Socio-Economic Characteristics of the Respondents

From the Table 1, gender of the respondents was male 75.8% and female 24.2% which engages in the poultry production in Gokana local government area. This implies that the poultry production in Gokana Local Government Area is tremendously dominated by the men which are assisted by other members of the family in order to foster efficient management process. This is in line with the finding of Aphunu and Akpobasa (2009) in the study of adoption of improved poultry management practices in Ughelli in which males also dominated poultry sector. These males' folks engaging in poultry production are income providers of their family so they would adopt technology that will help elevate their efforts of income generation.

The result of age distribution of the respondents shows that 77.4% of the respondents were within the age distribution of 21-40 years old and 22.6% were within 41-60 years old respectively. This implies that majority of the respondents belong to the young active, agile and middle-aged group in their prime, that is willing to learn and utilises new technologies which in-turn encourage adoption of such technology thereof. This conformed to Yinusa (1999) findings who observed that the age bracket of 21-40 years comprises of innovative, motivated and adaptable individuals who are actively engaged in economic productive processes.

Marital status shows that 21.0% of the study population were single, 75.8% of the population were married, 1.6% of the study population were separated\divorced while 1.6% of the study population were widow\widower. From the result above majority of the poultry farmers are married implying that they engage in poultry production as a full-time job for profit maximization, earning a living and to help the state 's livestock sector to align properly with national goals in livestock production.

Level of Educational indicated that 6.5% had primary education, 19.4% had secondary education and 74.2% had tertiary education as their highest level of education. This is postulated that almost all the poultry farmers in the study area have one form of formal education. The result suggests that education is probably one of the main drivers of successful poultry management that acquisition of formal education is necessary for all poultry farmers to enable them understand scientific agriculture. The finding corroborates with the findings of Idio and Okoro, (2017).

Household size showed that 14.5% of the respondents have household size less than 5 persons; 79.0% of the respondents have a household size of 5-10 persons, 6.5% respondents have a household size of 11-15 persons. This indicated that the poultry business in the study area thrive in a fairly large family as it serves as a prerequisite for coordinating and harmonizing decision evaluation and valuation. And that more persons in the household, more available hands for collective farm work.

Occupation shows that 50.0% of the respondent's engaged in farming, 14% respondents engaged in trading, and 35.5% respondents engaged in civil\public service respectively. This indicated that poultry production is a source of employment opportunities in the study area although sole poultry production is not practiced by majority of poultry farmers in the study area. This suggests that poultry production practice is still at a very low level in the study area. A big size of operation will command full time attention of the poultry farmers without leaving any time for their involvement in a secondary occupation.

Management System shows that 21% of the respondents employed the free-range system of poultry management, 74.2% of respondents utilises the deep-litter system of poultry management while 3.2% of the respondents employed the battery cage system of poultry management. This indicated that the major management system in the study area is the deep-litter system which is very easy to operate, manage and affordable to the farmers.

Source of capital shows that 3.2% of the respondents got their capital from the bank, 90.3% of the respondents got their capital from personal savings, 1.6% of the respondents got their capital from friends/relatives; while 4.8% of the respondents got their capital from government. Preliminary survey conducted on the study area discovers that most farmers do not have access to government loans facilities and poultry production credit facilities as a result of lack of financial intermediaries in the study area. Nevertheless, some of the respondents indicated interest in having access to loan facilities to improve their production rate and enhancing adoption of improved technology packages.

In the area of social participation, 56.5% of the respondents affiliated themselves with a social group by been part of cooperative societies, 8.1% of the respondents participated in trade union, 3.2% respondents are part of NGOs while 32.3% of the respondents belong to traditional thrift societies. This implies that poultry farmers in study area participated in one social organization or the other. This is further explained by Hüseyin (2019), that social group dynamics provides person with readily access to those with similar interest and problems where opinions can be sounded and trustworthy and advisors found people are usually influenced by the decision of

others, which is why it is necessary to help farmers to form cooperatives that will facilitate their levels of technological adoption.

Stock Size indicated that 8.1% of the respondents stocked up less than 100 birds, 22.6% stocked up 101-500 birds, 43.5% stocked up 501-100 birds and 25.8% stocked more than 100 birds. The results implied that most or majority of the farmers in the study area are rejuvenating and small-scale producers. This agrees with the findings of Edie (2002) which stated that Nigerian poultry industry is dominated by small-holder farmers who on the aggregate raise bulk of the birds for egg production and meat, but individually rear less than one thousand (1000) birds using different production strategies in consonance with little resources available to them. And Akanni (2007) which also stated that most of the small-scale poultry farmers have limited finance to raise larger flocks.

stock type showed that 69.4% of the respondents reared broilers, 8.1% reared layers and 22.6% reared day-old chicks. This shows that most or majority of the farmers in the study stocked up broiler bird. This conformed to the findings of Singh (1981) that broiler production is carried out in all part of the country with no religious, social or cultural inhibitions associated with their consumption especially investment in broiler enterprise is attractive because the production cost per unit is low relative to other type of livestock.

Years of farming experience showed that 32.3% of the respondents have less than 5 year of experience, 66.1% have of 6-15 years of experience and 1.6% have 21 years above. This is an indication that most or majority of the respondents in the study have experience in poultry production and are willing to expand their scope in the production process and adopting any new or improved profitable technologies that will enhanced optimum and efficient production which will portend a better future for poultry production in the study area. This is in accordance with findings of Nhemachama & Hassan (2007) that farming experience enhanced a farmer's knowledge and information and high skills in farming techniques and management, which improve the technical efficiency of the farmer.

Table 1: Summary of Response on Socio-economic Characteristics of the Respondents

Variables	Frequency (n=62)	Percentage (%)
Gender		
Male	47	75.8
Female	15	24.2
Age (Years)		
21 - 40 years	48	77.4
41 - 60 years	14	22.6
Marital Status		
Single	13	21.0
Married	47	75.8
Separated/divorced	1	1.6
widow/widower	1	1.6
Level of Educational		
No Education	0	0
Primary	4	6.5
Secondary	12	19.4

Tertiary	46	74.2
Household size (Persons)		
Less than 5	9	14.5
5 – 10	49	79.0
11 – 15	4	6.5
Occupation		
Farming	31	50.0
Trading	9	14.5
Civil/public service	22	35.5
Management System		
Free-range system	13	21.0
Deep-litter system	46	74.2
Battery cage system	2	3.2
Source of Income		
Bank	2	3.2
Personal savings	56	90.3
Friends/Relatives	1	1.6
Government	3	4.8
Social Participation		
Cooperative societies	35	56.5
Trade union	5	8.1
NGOs	2	3.2
Traditional thrift union	20	32.3
Stock Density		
less than 100 birds	5	8.1
101 - 500 birds	14	22.6
501 - 1000 birds	27	43.5
1000 birds and above	16	25.8
Stock Type		
Broilers	43	69.4
Layers	5	8.1
day old chicks	14	22.6
Years of farming		
Less than 5 years	20	32.3
6 - 15 years	41	66.1
21 years and above	1	1.6

Source: Field Survey Data 2021

Stages of Adoption of The Improved Technology Packages Among Farmers

An evaluation of the various farmers stages of the utilisation of the improved technology packages in the study area by the respondent is presented in the Table 2;

Compounded commercial feeds such as Ultima, Topfeed, Hybrid feed etc.

Table 2 shows that none of the farmers were still on the awareness, interest, and evaluation stage of the compounded commercial feeds such as Ultima, Topfeed, Hybrid feed etc. rather 24% of the respondents are on the trial stage and 76% of the respondents are on the adoption stage with a mean score of 4.76. This result clearly shows that compounded commercial feeds such as Ultima, Topfeed, Hybrid feed etc., have been embraced and adopted by the poultry

farmers. This if practice well by the farmers should lead to increase in the production of quality poultry products such as meat and egg which in turn may bring about reduction in the price of these products thereby making them available to the utilization of the final consumers.

Hybrid breeds such as Frizzled feather, Isa brown, Noiler, Naked neck etc.

None of the farmers is still on the awareness and interest stage of hybrid breeds such as Frizzled feather, Isa brown, Noiler, Naked neck etc., 11.3% of the respondents are still on the stage of evaluating the Hybrid breed such as Frizzled feather, Isa brown, Noiler, Naked neck etc.; 11.3% again of the respondents are on the verge of trying the workability of the improved technology package and 77% of the respondents are on the adoption stage of a mean score of 4.66. This shows that the farmers are utilising and adopting the improved technology package by rearing hybrid breeds of birds such as Frizzled feather, Isa brown, Noiler, Naked neck etc. on their farms as a result of their high proficiencies in feed conversion, disease-resistance, weight gain within a considerable shortest period of time.

Vaccination, Culling, Footbath, and Fumigation

The result indicated the level (stage) of adoption of vaccination, culling, footbath, and fumigation. That all the farmers have graduated from the awareness and interest stage of the stage of adoption of vaccination, culling, footbath, and fumigation with 8.1% of the respondents still on the evaluation level (stage). 45.2% of the respondents on the trial level stage, and 46.8% of the respondents on adoption level (stage) with a mean score of 4.39. This revealed that majority of the farmers in the study area have adopted the improved technology package and do vaccinate, and cull their birds. Fumigate their pens and ensuring that their footbath is filled up with disinfectants regularly.

Record keeping and Deep litter system

Table 2 shows that the farmers are no longer on the awareness and interest stage of record keeping and deep litter system of management, 11.3% on the evaluation level; 40.3% on the trial level, and 48.4% on the adoption level with a mean score of 4.37. This signified that the farmers have embraced and adopted proper record keeping and deep litter system of management as a result of its cost advantage.

Battery cage, electric brooding, artificial incubation, and Hydroponics fodder

None of the respondents are still on the interest level of battery cage, electric brooding, artificial incubation, and hydroponics fodder but 6.5% of the respondents are still on the awareness level. 30.6% each on both the evaluation and interest level respectively, while 32.3% of the respondents are on the adoption with a mean score of 3.82. This shows that the respondents are still on the verge of trying and acclimatising the relative benefit, cost advantage, compatibility and workability of battery cage, electric brooding, artificial incubation, and hydroponics fodder production process.

In general, it is postulated that the farmers are very fully aware and interested in the adoption of the packages; this very full awareness and interest in the packages obtained in this study agrees with the findings of Ezeibe *et al.* (2014) that reported that all the poultry farmers in Enugu state had awareness and were interested in the adoption of vaccination of their birds as one of the improved management practices required in their poultry farming. And that they have adopted almost all of the technology packages under the study. Langat *et al.*, (2014) noted that slow adoption rates of Agricultural technologies continue to hinder Africa's food insecurity reduction programmes as well other farmer's agricultural economic empowerment initiatives that have been put in place by different government and non-government agencies.

Table 2: Responses on The Stages of Adoption of Improved Technology Packages

Improved		Awareness	Interest	Evaluation	Trial	Adoption	Sum	Mean	Std. Deviation	Remark
S/n	Technology Packages									
i	Compounded commercial feeds such as Ultima, Topfeed, Hybrid feed etc.	0	0	0	15 (24%)	47 (76%)	295	4.76	.432	AS
ii	Hybrid breeds such as Frizzled feather, Isa brown, Noiler, Naked neck etc.	0	0	7 (11.3%)	7 (11.3%)	48 (77%)	289	4.66	.676	AS
iii	Vaccination, Culling, Footbath, Fumigation etc.	0	0	5 (8.1%)	28 (45.2%)	29 (46.8%)	272	4.39	.636	AS
iv	Record keeping and Deep litter system.	0	0	7 (11.3%)	25 (40.3%)	30 (48.4%)	271	4.37	.683	AS
v	Battery cage, Electric brooding, Artificial incubation, and Hydroponics fodder	4 (6.5%)	0	19 (30.6%)	19 (30.6%)	20 (32.3%)	237	3.82	1.094	TS

AS>3.00=Adoption Stage; TS_2.5-2.9=Trial Stage

Source: Field survey data 2021

Factors That Drive the Farmers to The Adoption of Improved Technology

Table 3 shows the result of the factors that drive the farmers to Adoption of the improved technology packages in the study area. The factors with more than 3.0 and above mean score denote the factor that drive adoption of the improved technology packages and factors with less than 3.0 do not drive adoption of improved technology packages in the study area. The factors are as follows compatibility (4.56), Cost relativity to benefit (4.61), Technical know-how (4.48), Affordability (4.26), Scale of production (4.00), Implementation easiness (4.60), Poultry production cycle (4.08), and Agricultural support policies (4.06). The results above show that all the factors drive and enhance the adoption of the improved technology packages. This conformed to the word of Rogers (2003), that decision to adopt a new technology involves five stages including: knowledge (awareness); persuasion, potentially by gaining sufficient information on the characteristics, benefits, and costs of a new technology; decision; implementation; and confirmation. This is followed by a careful review of the perceived attributes of the technology and the potential benefits and costs of acquiring the technology.

Table 3: Responses on the factors that drive the farmers to the adoption of the improved technology packages

S/n	Factors	Sum	Mean	Std. Deviation	Remark
i.	Compatibility	283	4.56	.716	A
ii.	Cost relativity to benefit	286	4.61	.686	A
iii.	Technical know-how	278	4.48	.695	A
iv.	Affordability	264	4.26	1.100	A
v.	Scale of production	248	4.00	.678	A
vi.	Implementation easiness	285	4.60	.664	A
vii.	Poultry production cycle	253	4.08	1.045	A
viii.	Agricultural support policies	252	4.06	1.006	A

a>3.0= Agree, a<3.0=Disagree

Source: Field survey data 2021

Constraints faced by the farmers in adoption of the improved technology packages in the study area.

Table 4 presents the various constraints faced by the farmers in adoption of improved technology packages in the study area. Any constraint with a mean score of 3.0 and above affects the adoption of the improved technology packages and any below 3.0 do not affect the adoption of technology packages. The constraints include age (3.03), assets (3.55), cost relativity to benefit (4.40), educational background (3.48), gender (2.85), Household size (2.94), inadequate extension contact (4.37), inadequate infrastructural development (4.68), insecurity (4.89), poor access to credit facility (4.82), lack of capital/poor financing (4.73), Lack of involving farmer's in planning (4.61), lack of transportation (4.32), poor extension service delivery mechanism (4.50), poor farmers training scheme (4.47), poor knowledge

level/perception (4.53), poor linkage system (4.61), poor scientific orientation (4.37), poor technology transfer system (4.52), poultry management practice (4.24), risk aversion (4.44), stock density/type (4.10), technology attribute (4.61), training/farm education exposure (4.69), unfavourable government policy (4.69), fear of farming experience (4.10).

These results supported the findings of Aphunu and Akpobasa (2009) in which reported that improved practices are too expensive, lack of training, lack of credit/funds to adopt and lack of government support to be the serious constraints facing the adoption of poultry management practices in Ughelli of Delta State.

CONCLUSION AND RECOMMENDATIONS

The study concluded that the farmers are on adoption stage, have adopted the various improved technology packages with few percentages of the respondent still on the trial stage, trying, studying, and acclimatizing the Battery cage, Electric brooding, Artificial incubation, and Hydroponics fodder, relative to benefit, cost advantage, compatibility and workability. It was recommended that proper farmers training scheme and routine scientific orientation should be organised for the farmers through the extension agencies and other concerned departments by putting up laudable initiatives that will bring about a paradigm shift in the adoption complex of the farmers of the improved poultry technologies. Specific demonstration and training programmes such as exposition and awareness camps should be organised for the farmers.

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