

Evaluation of Biosecurity Practices in Small – Scale Poultry Production in Rivers State, Nigeria

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Abstract

The study evaluated bio - security practices of small – scale poultry production in Rivers state. The objectives of the study were to: ascertain the socio-economic characteristics of small - scale poultry producers in Rivers State, ascertain the importance of biosecurity to small - scale poultry producers in Rivers State, ascertain the awareness of biosecurity practices among small - scale poultry producers, determine the adoption of biosecurity measures by small - scale poultry producers in Rivers State. The study used survey design. A multistage sampling technique was used and a sample size of three hundred (300) poultry farmers was used for the study. The result showed that most of the respondents were males and the mean age of respondent was 40.5 years and experience in poultry farming was 18 years. All the respondents had formal education. Major bio-security measures employed by poultry producers include: constant cleaning of poultry house and surroundings and disinfection, washing of hands before and after handling poultry birds/products, providing foot-dip with disinfectant, proper washing of feeding/water troughs, Ensure adequate ventilation for the birds, isolation and quarantine of sick and infected birds etc. Based on the findings of the this study, it is recommended that aggressive sensitization of the poultry producers through seminars, workshops and conferences by relevant authorities on the advantages of adoption of bio - security measures in their farms and encouraging fellow farmers to do so.

Key words: Adoption, bio - security measures, small – scale poultry producers, practice

INTRODUCTION

Bio - security practices are simple steps you can take to keep diseases out of your farm, and out of our food supply. Biosecurity refers to procedures used to prevent the introduction and spread of disease causing organisms in poultry flocks. Because of the concentration in size and location of poultry flocks in current subsistent and commercial operations and the inherent disease risk associated with this type of production, it is imperative that poultry producers practice daily bio - security measures (Alalade, Olorunfemi, Olaoye, Ladipo, Yusuf, 2018). Developing and practicing daily bio - security procedures as best management practice on small poultry farms will reduce the possibility of introducing infectious diseases such as Avian Influenza and Newcastle disease as well as many others. According to Agbola (2014), micro and small – scale poultry producers are producers with one to two hundred birds (broilers or layers) in their farms.

The growth of the poultry industry in Nigeria and Rivers State in particular is constrained by several diseases which result in severe production and economic losses (Ekiri, Armson, Adebowale, Endacott, Galipo, Alafiatayo, Horton, Ogwuche, Bankole, Galal, Maikai, Dineva, Wakawa, Mijten, Varga and Cook (2021)). The primary method of spreading disease causing microorganisms between poultry flocks is the use of contaminated equipment or exposure to contaminated cloths and footwear of humans. Infected animals, such as wild birds and rodents, can also be a source of disease for poultry flocks. Disease causing

viruses and bacteria can be transported from one flock to another on bird transporting equipment, trucks, tractors, and other farm equipment as well as egg flats and cases (Tasie, Wilcox and Kalio, 2020).

Human and animals are also important ways of transporting disease causing organisms. Disease causing microbes have been found on human's clothes, shoes, skin, and hair. Animals and insects such as dogs, cats, mice, rats, free flying birds, flies, beetles, and mosquitoes are also known to be carriers of disease organisms. As a result, many hatcheries and breeder facilities utilize shower in and shower out protocols as part of their bio - security programmes. It is a known fact that poultry producers in the study area had suffered huge losses due to diseases and this situation has resulted to complete collapse and failure of poultry business in the area (Olu – Igbanibo and Ahaotu, 2019). Therefore, it is on this basis that this work was designed to ascertain the adoption of bio - security measures by small – scale poultry farmers in Rivers State.

Objectives of the Study: The broad objective of this study was to evaluate the awareness and adoption of bio - security measures by poultry farmers in Rivers State; the specific objectives include the following: ascertain the socio-economic characteristics of small - scale poultry producers in Rivers State.; ascertain the importance of biosecurity to small - scale poultry producers in Rivers State.; ascertain the awareness of biosecurity practices among small - scale poultry producers ; and determine the adoption of

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biosecurity measures by small - scale poultry producers in Rivers State.

METHODOLOGY: The study was conducted in Rivers State. The State is made up of 23 Local Government Areas. The state has a population of 5,185,400 people (NPC, 2006) and is located on latitudes 4° 45' North and longitudes 6° 51' East of the equator (RSADP, 2014). Rivers State is bounded on the South by the Atlantic Ocean, to the North by Imo and Abia States, to the East by Akwa Ibom State and to the West by Bayelsa and Delta States (RSADP, 2014). The design of the study was survey

design and this type of research gathers data at a particular point in time with the intention of describing the nature of existing conditions or identifying standards against which existing conditions can be compared or determining the relationship that exist between specific events (Ezekiel, Oguzor, Onyeukwu & China, 2017). The population of the study comprised of all poultry farmers that operate at a small - scale level in Rivers State. There are principally three agricultural zones in Rivers State and the three Agricultural zones and the accompanying Local Government Areas are as follows:

Agric. Zones	LGAs	Headquarters
Zone 1	Eleme, Gokana, khana, Tai, Obio/Akpor, Port Harcourt, Oyigbo, Ogu/Bolo	Bori
Zone 2	Degema, Abua/Odual, Bonny, Andoni, Asari-Toru, Akuku-Toru, Opobo/Nkoro Okrika.	Andoni
Zone 3	Ikwerre, Emohua, Ahoada East, Ahoada West, Ogba/Egbema/Ndoni, Omuma, Etche	Omuma

A multistage sampling technique was used to select respondents for the study. In stage one, two Local Government Areas were selected randomly from each of the three agricultural zones. For stage two, five (5) communities were randomly selected from each Local Government Area giving a total of Thirty (30) communities and in stage three ten (10) poultry farmers were also selected randomly making a total of three hundred (300) poultry farmers as samples size for the study. Primary and secondary data were used for the study. Primary data were collected through the use of structured questionnaire and secondary data were collected from published and unpublished materials. The data collected were analyzed using percentages and mean score. A five point likert scale options of strongly Agreed (SA), Agreed (A), Undecided (U), Disagreed (D) and Strongly Disagreed (SD) was used. The options were assigned a rating score of 5,4,3,2 and 1 respectively. The decision rule was taken at a mid-point of 3.00 mathematically.

$$\frac{5+4+3+2+1}{5} = \frac{15}{5} = 3.00$$

Hence, any item above 3.00 was accepted, items below 3.00 were rejected while items at 3.00 are undecided. Thus, to analyze each objective, the total responses from the respondents on each of the options, that is, how many respondents responded on Strongly Agreed (SA), Agreed (A), Undecided (U), Disagreed (D) and Strongly Disagreed (SD). Each number was multiplied against the option and added to the next number. The total was divided by the sample size of the population to arrive at a mean score which give rise to decision rule (any item above 3.00 were accepted, item below 3.00 were rejected while items at 3.00 are undecided).

RESULTS AND DISCUSSIONS

Objective 1: Ascertain the socio-economic characteristics of poultry farmers in Rivers State

Table 1: Socio-Economic Characteristics of Small-Scale Poultry Producers in Rivers State, Nigeria.

Variables	Number	Percentage (%)	Mean
Gender			
Male	184	62	
Female	116	38	
	300	100	
Age			
20 – 29	64	21.3	
30 – 39	120	40	
40 – 49	70	23.3	40.5
50 – 59	33	11	
60 - above	13	4.4	
	300	100	
Marital status			
Single	80	26.7	
Married	180	60	
Widow	5	1.7	

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Divorce	35	11.6	
	300	100	
Farming Experience			
1 – 10	190	63.3	
11 – 20	50	16.7	18 years
21 – 30	15	5	
31 – 40	20	6.7	
41 – above	25	8.3	
	300	100	
Household Size			
1 – 4	200	66.7	
5 – 8	80	26.7	
9 – 12	20	6.6	
	300	100	
Level of Education			
FSLC	70	23.3	
WASSCE	120	40	
OND	35	11.7	
HND / B.Sc.	30	10	
MSc / PhD	3	1	
	300	100	
Number of Birds			
5 – 50	30	10	
51 – 150	130	43.3	
151 – 300	15	5	
301 – 450	33	11	
451 – 600	55	18.3	
601 – above	37	12.4	
	300	100	
Member of Co-operative Society			
Yes	194	64.7	
No	106	35.3	
	300	100	
Formal Training in Poultry			
Yes	50	16.7	
No	250	83.3	
	300	100	
Management Practices			
Deep Litter System	142	47.3	
Battery Cage System	91	30.3	
Both	67	22.4	
	300	100	
Extension Services			
Yes	34	11.3	
No	266	88.7	
	300	100	

Source: Field Survey, 2021

Table 1 above shows the socio – economic characteristics of the small - scale poultry farmer in Rivers State. The Table showed that 62% of the respondents were males while 38% were females. This finding is in agreement with Tasie, Wilcox and Kalio (2020) who in their study on adoption of bio - security for disease prevention and control by poultry farmers in Imo State, reported that poultry farming is

dominated by males in Imo State. This could be because of the labour intensive nature of poultry production, which tends to scare women away. The result also shows that majority of the respondents (40%) are between the ages of 30 – 39. The result showed that are young, active and productive and are likely going to adopt innovation faster and also will be able to withstand the tedious nature of

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poultry farming. This finding is in line with that of Eze, Chah, Uddin, Anugwa, Igbokwe, (2017). Again, result in Table 1 indicates that 60% of the poultry farmers are married, 26.7% are single, and 1.7% is widowed while 11.6% are divorced. This result shows respondents that have family responsibilities and would be committed to bio - security practices that would increase profitability. The result showed that 63.3% of the farmers operating poultry enterprise in Rivers State have poultry farming experience between 1 – 10 years, 16.7% between 11 – 20 years, 5% between 31 – 40 years and 8.3% between 41 years and above respectively. Result further attested that 66.7% of poultry farmers have house hold size of 1 – 4, 26.7% 5 – 8 persons and 6.6% between 9 – 12 persons. Findings also indicate that 23.3% of the poultry farmers in the State possessed first school leaving certificate (FSLC), 40% backed West Africa Senior School Certificate Examination (WASSCE), 14% have National Certificate in Education (NCE), 11.7% possessed Ordinary National Diploma (OND) 10% are graduates of Higher National Diploma and first degree while 1% possessed respectively Master degree in the field of

science / Doctor of Philosophy (MSc / PhD). This result shows that the respondents are educated and should be able to carry out good management practices in their farms to prevent spread of diseases and enhance profitability of poultry enterprise. This finding supports Tasie *et al.* (2020) that education enhances managerial acumen.

Furthermore, the study indicates that 10% of poultry farmers in the senatorial districts have birds ranging from 5-50, 43.3% have 51-150 birds, 5% have 151 – 300 birds, 11% have 301-450, 18.3% have 451 – 600 and 12.4% have 600 and above. This shows that poultry producers in Rivers State are mainly micro, small and medium scale operators. This finding is in agreement with Agbola (2014), who posits that micro and small scale producers are producers with between one (1) to two hundred (200) bird in their flock, medium scale producers own between 201 – 500 birds and large scale producers own over 500 birds. Finally, Table 1 shows that 64.7% of farmers who operate poultry production in Rivers State are members of co-operative societies while 35.3% are not members of any co-operative society.

Objective 2: Ascertain the Importance of biosecurity to Poultry Producers in Rivers State

Table 2: Importance of Biosecurity Practices to Small - Scale Poultry Producers in Rivers State.

S/N	Items						Mean Score	Decision
		SA	A	U	D	SD	(x)	
		5	4	3	2	1		
1.	Protection of poultry birds						4.43	Accepted
		200	58	22	10	10	300	
		1000	232	66	20	10	1328	
2.	Reduces the risks of disease transmission to birds						4.50	Accepted
		200	80	10	0	10	300	
		1000	320	30	0	10	1360	
3.	Foot and mouth diseases are prevented						4.28	Accepted
		184	66	15	20	15	300	
		920	264	45	40	15	1284	
4.	Prevention of endemic diseases						4.88	Accepted
		264	36	0	0	0	300	
		1320	144	0	0	0	1464	
5.	Boost income status of poultry producers						4.59	Accepted
		192	100	4	0	4	300	
		960	400	12	0	4	1376	
6.	Increase feed consumption and feed conversion ratio						4.02	Accepted
		81	199	2	0	0	300	
		405	796	6	0	0	1207	
7.	Motivation towards productivity						4.44	Accepted
		205	55	13	20	7	300	
		1,025	220	39	40	7	1331	
8.	Sustain livelihood						4.98	Accepted
		294	6	0	0	0	300	
		1470	24	0	0	0	1494	

Source: Field Survey, 2021.

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Table 2 above revealed that bio - security practices protect farmers livestock (poultry) ($x= 4.43$). The result also indicated that bio - security reduces the risks of disease to livestock (poultry) which can go a long way to improve productivity and reduce cost of production ($x= 4.50$). The respondents accepted that adoption of bio - security measures eradicates foot and mouth disease on birds to a large extent ($x = 4.28$). Furthermore, the respondents agreed that, the introduction of bio - security practices play a vital role in preventing endemic diseases among poultry farms (x

$= 4.88$). Motivation towards productivity was also recognized as one of the cardinal objective of bio-security practices among poultry producers ($x = 4.44$). The result further indicated that bio-security practices has high income/financial boost potential among small - scale farmers in their various areas of operations ($X = 4.59$). Again the result revealed that bio-security practices in poultry production is a gateway to sustainable livelihood among poultry farmers ($x = 4.98$).

Objective 3: Ascertain the awareness of biosecurity risks among poultry producers

Table 3: Ascertain the awareness of biosecurity risks among poultry producers in Rivers State.

S/N	Items						Mean Score	Decision
		SA	A	U	D	SD	(x)	
		5	4	3	2	1		
1.	Contaminated people	150	150	0	0	0	4.50	Accepted
		750	600	0	0	0	300	
							1,350	
2.	Contaminated Vehicle and equipment	122	100	40	20	18	3.96	Accepted
		610	400	120	40	18	300	
							1,188	
3.	Wild birds	108	190760	2	0	0	4.35	Accepted
		540	6	0	0	0	300	
							1,306	
4.	Feral animals, insects, vermin, domestic livestock and animals	134	89	30	27	20	3.97	Accepted
		670	356	90	54	20	300	
							1,190	
5.	Feed and water	264	20	16	0	0	3.83	
		1320	80	48	0	0	300	
							1,448	
6.	Other poultry	100	200	0	0	0	4.81	Accepted
		500	800	144	0	0	300	
							1,444	
7.	Litter	164	122	10	0	4	4.47	Accepted
		820	488	30	0	4	300	
							1342	
8.	Air	220	80	0	0	0	4.73	Accepted
		1,100	320	0	0	0	300	
							1,420	

Source: Field Survey, 2021

Table 3 above revealed that when people are contaminated with different disease causing agents, they increase bio-security risk among small - scale farmers ($x = 4.50$). The study reveals that contaminated vehicle and equipment can affect bio-security in areas where poultry production is reared ($x = 3.96$). Result in Table 3 indicates that wild birds can also affect bio-security during poultry production ($x = 4.35$). The result showed that feral animals, insects, vermin, domestic livestock and other animals spread the risk of bio-security among small - scale poultry producers in Rivers State ($x = 3.97$). Also the result showed that animal feeds and water can cause the spread of bio-security risk among

small scale poultry producers in the area ($x=3.83$). Furthermore, other poultry within the area where poultry production is carried out can also contribute to the spread of bio-security risks among scale farmers in poultry production ($x=4.81$). The respondents also accepted that litter materials used in poultry production enhances the spread of bio-security risks among small scale poultry farmers in Rivers State ($x=4.47$). Also, the respondents agreed that air circulation within the areas where poultry production is carried out can enhance the spread of bio-security risk among poultry farmers ($x=4.73$).

Objective 4: determine biosecurity measures adopted by poultry producers in Rivers State

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Table 4a: Biosecurity measures adopted by small scale poultry producers

S/N	Items						Mean Score	Decision
		SA	A	U	D	SD	(\bar{x})	
		5	4	3	2	1		
1.	Minimize non - essential human traffic to the farm	184	100	6	5	5	4.47	Accepted
		920	400	18	10	5	1,343	
2.	Limit Visitation to other poultry farm	152	130	18	0	0	4.45	Accepted
		760	520	54	0	0	1334	
3.	Keep all animals out of poultry houses	202	77	11	5	5	4.55	Accepted
		1,010	308	33	10	5	1366	
4.	Practice sound rodent and pest control programmes	143	150	7	0	0	4.45	Accepted
		715	600	21	0	0	1336	
5.	Avoid contact with non-commercial poultry	165	135	0	0	0	4.55	Accepted
		825	540	0	0	0	1365	
6.	Inspect birds daily for disease symptoms	230	70	0	0	0	4.77	Accepted
		1,150	280	0	0	0	1430	
7.	Maximize the Environment/ separate birds of different ages	154	120	13	7	6	4.36	Accepted
		770	480	39	14	6	1309	
8.	Keep area around house and feed bins clean	231	50	9	5	5	4.66	Accepted
		1155	200	27	10	5	1397	

Source: Field Survey, 2021

Table 4a above indicated that minimizing non essential human traffic (\bar{x} =4.47), limitation of visit to other poultry farmers (\bar{x} =4.45), keeping all animals out of poultry houses is another (\bar{x} =4.55), practicing sound rodent and pest control programmes (\bar{x} =4.45), avoiding contact with non-

commercial poultry (\bar{x} =4.77), maximizing the environment optimally (\bar{x} =4.36), and keeping the area around houses and feed bins clean (\bar{x} =4.66) are biosecurity measures practiced by poultry producers in Rivers State.

Table 4b: Biosecurity measures adopted by poultry producers in Rivers State

S/N	Items						Mean Score	Decision
		SA	A	U	D	SD	(\bar{x})	
		5	4	3	2	1		
1.	Constant cleaning of poultry house and surroundings and disinfection	193	107	0	0	0	4.63	Accepted
		965	423	0	0	0	1388	
2.	Providing foot dip with disinfectants	115	155	15	7	8	4.21	Accepted
		575	629	45	14	8	1,262	
3.	Regular washing of feeding and drinking troughs	149	151	0	0	0	4.49	Accepted
		745	604	0	0	0	1349	
4.	Ensuring good ventilation in the poultry house						4.66	Accepted

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		198	102	0	0	0	300	
		990	408	0	0	0	1398	
5.	Proper disposal of dead birds and other forms of waste	211	40	20	9	20	300	Accepted
		1055	160	60	18	20	1313	
6.	Limitation of human traffic into poultry farm	177	120	3	0	0	4.57	Accepted
		885	480	9	0	0	300	
7.	Isolating and quarantine sick birds	201	90	3	3	3	4.61	Accepted
		1005	360	9	6	3	300	
8.	Providing adequate feeding and drinking troughs	252	10	10	10	18	4.56	Accepted
		1260	40	30	20	18	300	
9.	Daily monitoring of birds	50	194	30	6	20	3.83	Accepted
		250	776	90	12	20	300	
10.	Ensuring adequate temperature level at all time	120	120	20	20	20	4.00	Accepted
		600	480	60	40	20	300	
11.	Ensuring vaccination of the birds as and when due.	10	30	30	180	80	2.33	Rejected
		50	120	90	360	80	300	
12.	Avoiding overcrowding / providing adequate floor space	30	30	30	210	0	2.6	Rejected
		150	120	90	420	0	300	
13.	Hand washing before / after touching poultry / poultry products	90	210	0	0	0	4.3	Accepted
		450	840	0	0	0	300	
14.	Providing adequate light source	60	38	150	52	0	3.35	Accepted
		300	152	450	104	0	300	
15.	Providing Physical security	40	25	10	200	25	2.42	Rejected
		200	100	30	400	25	300	
							755	

Source: Field Survey, 2021

Table 4b above revealed that constant cleaning of poultry house and its surroundings was successfully adopted among poultry farmers operating in a small scale ($x = 4.63$). The result affirmed that poultry farmers operating in a small scale make provision of foot dip with disinfectants as a biosecurity measure ($x = 4.66$). The result agreed that proper disposal of dead birds and other forms of waste were adequately observed among small - scale poultry farmers ($x = 4.38$). Limitation of human traffic into the poultry farms was a biosecurity measure that was adopted among small scale poultry farmers in Rivers state ($x = 4.57$). The result also show that isolation and quarantine of sick birds was adopted among farmers operating in a small scale ($x = 4.61$). The result confirmed that small scale poultry farmers provide adequate feeding and drinking troughs ($x = 4.56$). The result showed that daily monitoring of birds was a biosecurity measure adopted among poultry farmers ($x = 3.88$). Ensuring adequate temperature level at all times was appropriately adopted among small scale poultry producers in Rivers State ($x = 4.00$). Result indicated that hand washing before and after touching poultry and poultry products was sufficiently observed among small scale poultry farmers ($x = 4.3$). The result

showed that provision of adequate light source was a factor of priority among small scale poultry farmers ($x = 3.35$).

Conclusion and Recommendation: Poultry production in the study area is a male and married folks dominated enterprise. The poultry producers are still in their active and productive ages and all of them had formal education. Majority of the poultry farmers in the study area were well experienced in poultry farming, though operated at the micro, small and medium scale levels. Therefore, it is recommended that intensive sensitization of the poultry farmers through seminars, workshops and symposia conferences by relevant authorities on the need to strictly employ biosecurity measures in their farms and encouraging fellow farmers to do so,.

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