

ASSESSMENT OF DISEASE MANAGEMENT AND BIOSECURITY MEASURES AMONG POULTRY FARMERS IN ADAMAWA STATE, NIGERIA

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ABSTRACT

The study assessed disease management and biosecurity measures among poultry farmers in Adamawa State, Nigeria. Specifically, the study identified the prevalent poultry diseases and parasites in the study area, assessed disease management and biosecurity measures, and also identified the constraints limiting poultry production among the farmers. Multistage sampling technique was used to collect primary data from 113 poultry farmers using a structured questionnaire. Data collected were analysed using descriptive statistics and a four-point Likert-scale. Findings of the study revealed that Salmonellosis, Coccidiosis, and Newcastle Disease were the most common diseases in the area. Similarly, regular change of litter, consistent washing of drinkers/feeders, and also cleaning of the surroundings of the poultry house were the common biosecurity measures among in the area. Foremost among these constraints affecting the farmers were; extreme weather conditions, high cost of feed and other inputs, and inadequate capital and/or credit. Key among the recommendations was the need for the employment of more agricultural extension agents in the area.

Key words: poultry farmers, diseases management, biosecurity, Adamawa State

INTRODUCTION

Across most developing nations, undertaking poultry production by farmers has substantially increased over the years [Adedeji et al. 2014, Sadiq and Mohammed 2017]. In Nigeria, the sector contributes to the nation's economy due to how it has transformed into a commercial enterprise. Furthermore, apart from the economic contributions of the sector, it also contributes significantly to promoting food security by increasing the protein intake of the people [Mamza and Mshelia 2010]. Despite this importance of the sector, the majority of the actors are small-holder farmers [Raheem and Ayanda 2011]. Poultry production activities vary with location across various parts of the country. In Adamawa state, for instance, it is undertaken by a wide range of people in the

State due to its numerous benefits [Apuno et al. 2011, FAO and ICRISAT 2019].

One of the major banes of poultry production across most parts of Nigeria is the high incidence of diseases [Jongur et al. 2009, Adewole 2012, Yitbarek et al. 2016]. Poultry farming business can incur serious losses as a result of various pests and diseases. Specifically, it reduces the growth performance of the birds, which in turn affects the market value of produce. As a consequence, it can exacerbate unemployment in the country thereby affecting the livelihood of many people [Alabi 2012]. Diseases occur due to lack of proper care and management and inadequate nutritious feeding among other factors [Yitbarek and Wosen 2016]. Therefore, disease prevention and control are veritable components of profitable poultry production [Okeoghene 2013, Maduka et al. 2016].

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Adopting strict biosecurity measures will go a long way in reducing the incidence of pests and diseases in poultry farms [Jibril et al. 2016, Odemero and Oghenesuvwe 2016]. Biosecurity is viewed as a plan or set of actions taken to prevent the entry of a disease agent onto a farm (bio-exclusion) and spread among farms (bio-confinement). These measures are aimed at controlling both contagious and infectious poultry diseases. Biosecurity practices also contributes to human health safety. As opined by Yitbarek et al. [2016] and Eze et al. [2017], such measures should be a routine practice on the farm. This is because poultry diseases are dynamic, and can be a recurrent decimal in farms. Hence, the practice of biosecurity has become very necessary to protect the poultry farms from the intentional and unintentional threat of any disease-producing agents on the farms [Ajewole and Akinwumi 2014, Ajewole and Akinwumi 2018]. However, there is a need to improve the knowledge of poultry farmers and other actors in the sector on various biosecurity measures and other poultry risk factors [Malhaam and Rao 2011, Ameji et al. 2012, Tikwe et al. 2015, Odemero and Oghenesuvwe 2016]. Having such improved knowledge will enhance the ability of farmers to strictly implement such measures.

Therefore, the main objective of this study is to assess disease management and biosecurity measures among poultry farmers in Adamawa State, Nigeria. The study's specific objectives were to: describe the socio-economic characteristics of poultry farmers in Adamawa State; identify the prevalent poultry diseases and parasites in the study area; assess disease management and biosecurity measures being adopted in the farms; and identify the constraints limiting poultry production among the farmers in the study area.

MATERIAL AND METHODS

Adamawa State is located in North-East Nigeria, and it lies between Latitudes 70°N and 110°N and between Longitudes 11°E and 140°E. The State covers a landmass of about 38,700 km², and that the area has a tropical climate that is characterized by high temperatures and humidity as well as marked wet and dry seasons [Adamawa State Government 2016, FAO 2002]. The mean annual rainfall is between 197 mm and 700 mm along with the Southern and North-Western parts of the State. The climatic condition of the State suits poultry production [FAO and ICRISAT 2019]. Similarly, the state has a population of about 4.4 million people, which implies a huge market for the produce.

A multistage sampling technique was adopted to select respondents for the study. In the first stage, all the three senatorial zones of the State were purposively selected. In the second stage, the snowball sampling technique was used to select 113 poultry farmers from whom

primary data was collected using a semi-structured questionnaire. In analysing the data, descriptive statistics involving the use of frequencies means, and percentages were used. Similarly, a three-point Likert scale was used for the analysis. Descriptive statistics were used to describe the respondents' socio-economic characteristics, while the respondents' prevalent poultry diseases and parasites, disease management, and biosecurity, and also constraints were assessed using the Likert-scale. The three-point Likert-scale model is presented as follows;

$$\bar{x} = \frac{\sum F}{Nr}$$

where:

- \bar{x} s – mean score,
- \sum – summation,
- F – frequency of respondents,
- N – mean value,
- Nr – number of respondents to the item.

The decision rule is computed thus:

$$3 + 2 + 1 = \frac{6}{3} = 2.0$$

RESULTS AND DISCUSSION

Socioeconomic characteristics of the respondents

The respondents' socio-economic characteristics are presented in Table 1. These characteristics are key determinants in poultry production [Ja'afar-Furo and Gabdo 2010]. The result shows that 76.1% of the poultry farms are located in urban areas, while 23.9% are in rural areas. The distribution of the respondents' gender revealed that 85% were male, and 15% of the farmers were females. Based on age, 22.1% were aged 20–29 years, while 56.6%, 14.2%, and 7.1% were between the age range of 30–39 years, 40–49 years, and 50 years and above respectively. In terms of the respondents' marital status, the majority (57.5) were married, while the singles, widowed, and the divorced constituted 35.4%, 5.3%, and 1.8% respectively. In the same vein, the household size of the respondents revealed that most (53.1%) of the households have 6–10 persons, followed by those with 1–5 persons (36.3%), and those with more than 10 persons (10.6%). In terms of the respondents' educational attainment, the majority (77.9%) attended tertiary schools, while those with no formal education were 0.9%. The distribution of the respondents by farm size shows that 39.3% have less than 100 birds, 32.1% have between 100–199 birds, while 20.2%, 6.0%, and 2.4% had 200–299 birds, 300–399 birds, and those with 400 or more birds respectively. This suggests that the majority of the respondents were small-scale farmers. With respect to farming experience, 72.6% had an experience of 1–5

Table 1. Socio-economic characteristics of the respondents (n = 113)

Tabela 1. Charakterystyka społeczno-ekonomiczna respondentów (n = 113)

Variable – Zmienna	Frequency – Częstość	Percentage – Procent
Farm Location – Położenie farmy		
Rural – Wiejskie	27	23.9
Urban – Miejskie	86	76.1
Gender – Płeć		
Female – Żeńska	17	15.0
Male – Męska	96	85.0
Age, years – Wiek, lata		
20–29	25	22.1
30–39	64	56.6
40–49	16	14.2
50 and above – 50 i więcej	8	7.1
Marital Status – Stan cywilny		
Divorced – Rozwiedziony	2	1.8
Married – Żonaty	65	57.5
Single – Samotny	40	35.4
Widowed – Owdowiały	6	5.3
Household Size – Wielkość gospodarstwa domowego		
1–5	41	36.3
6–10	60	53.1
More than 10 – Więcej niż 10	12	10.6
Level of Educational – Poziom wykształcenia		
No formal education – Brak formalnego wykształcenia	1	0.9
Primary – Podstawowe	6	5.3
Secondary school – Szkoła średnia	18	15.9
Tertiary level – Szkoła wyższa	88	77.9
Farm Size (Number of Birds) – Wielkość gospodarstwa (liczba ptaków)		
< 100	44	39.3
100–199	36	32.1
200–299	23	20.2
300–399	7	6.0
400–499	3	2.4
Farming Experience – Doświadczenie rolnicze		
1–5	82	72.6
6–10	26	23.0
> 10	5	4.4

Source: Field Survey (2020)

Table 2. Prevalent poultry diseases and parasites in the study area (n = 113)

Tabela 2. Najczęściej spotykane choroby i pasożyty drobiu na badanym obszarze (n = 113)

Variable – Zmienna	Mean – Średnia	Standard Deviation Odchylenie standardowe
Diseases – Choroby		
Salmonellosis – Salmonelloza	2.89	0.411
Gumboro – Choroba Gumboro	2.34	0.368
Newcastle Disease – Choroba Newcastle	2.66	0.493
Coccidiosis – Kokcydioza	2.72	0.383
Chronic Respiratory Disease – Przewlekła choroba układu oddechowego	1.17	0.625
Ectoparasites – Pasożyty zewnętrzne		
Lice – Wszy	2.84	0.411
Ticks – Kleszcze	2.12	0.439
Mite – Roztocza	2.04	0.368
Flea – Pchły	2.76	0.602
Other Related Issues – Inne powiązane problemy		
Malnutrition – Niedożywienie	0.32	0.602
Cannibalism – Kanibalizm	0.79	0.432

Source: Field survey (2020)

Table 3. Disease management and biosecurity measures (n = 113)

Tabela 3. Zwalczanie chorób i środki bezpieczeństwa biologicznego (n = 113)

Variable – Zmienna	Mean – Średnia	Standard Deviation Odchylenie standardowe
Regular change of litter material – Regularna zmiana materiału ściółkowego	2.79	0.41
Regular washing of feeders and drinkers – Regularne mycie karmideł i poidel	2.84	0.37
Proper brooding of birds – Właściwy odchów piskląt	1.66	0.49
Regular cleaning of the house and surroundings – Regularne sprzątanie domu i otoczenia	2.82	0.38
Proper stocking of birds (by age and species) – Właściwa obsada ptaków (według wieku i gatunku)	2.12	0.53
Minimising water spillage – Minimalizacja rozlewania wody	2.32	0.60
Daily inspection of flocks – Codzienna kontrola stada	1.91	0.62
Adherence to the vaccination schedule – Przestrzeganie harmonogramu szczepień	2.71	0.43
Regular Change of drinking water – Regularna wymiana wody pitnej	2.84	0.36
Provision of adequate ventilation – Zapewnienie odpowiedniej wentylacji	1.67	0.49
Regular administration of drugs during treatment of diseases – Regularne podawanie leków podczas leczenia	2.16	0.42
Reporting of a disease outbreak – Zgłoszenie ogniska choroby	2.02	0.56
Isolating and quarantining sick birds – Izolowanie i poddawanie kwarantannie chorych ptaków	2.41	0.58
Provision of foot-dip with disinfectant at the entrance of the house – Zapewnienie kąpieli stóp ze środkiem dezynfekującym przy wejściu do domu	1.43	0.69
Wearing of protective cloth/hand gloves – Noszenie odzieży ochronnej i rękawic ochronnych	1.48	0.64
Distance between farm and potential disease transmission threats – Odległość między gospodarstwem a potencjalnymi zagrożeniami przenoszenia chorób	1.55	0.57
Regular fumigation of poultry house and equipment – Regularna fumigacja kurnika i wyposażenia	2.01	0.64
Restraining of visitors into the farm – Ograniczenie wstępu obcych osób	1.56	0.56
Proper control of rodents and other migrating birds – Właściwa walka z gryzoniami i ograniczenie populacji ptaków wędrownych	1.61	0.50
Provision of adequate feeding and drinking troughs – Zapewnienie odpowiednich karmideł i poidel	2.43	0.63
Provision of adequate floor spacing to minimize overcrowding – Zapewnienie odpowiedniej przestrzeni, w celu zminimalizowania stłoczenia	2.22	0.69
Debeaking of birds to reduce injury and cannibalism – Obcinanie dziobów w celu zminimalizowania obrażeń i kanibalizmu	1.43	0.53

Source: Field survey (2020)

Table 4. Distribution of respondents' poultry production constraints (n = 113)

Tabela 4. Rozkład respondentów wg ograniczeń w produkcji drobiu (n = 113)

Variable – Zmienna	Mean Średnia	Standard Deviation Odchylenie standardowe
Inadequate capital and/or credit – Niewystarczający kapitał i/lub kredyt	2.74	0.49
Poor breeder stock and Day-Old Chicks – Słabe stado rozplodowe i jednodniowe pisklęta	2.66	0.93
The high cost of feed – Wysoki koszt paszy	2.82	0.33
Poor nutritional standards of feeds – Uboga wartość żywieniowa pasz	2.12	0.50
Availability of drugs and vaccines – Dostępność leków i szczepionek	2.32	0.62
The high cost of drugs and vaccines – Wysoki koszt leków i szczepionek	2.79	0.42
Extreme weather condition – Ekstremalne warunki pogodowe	2.84	0.38
Low market demand – Niski popyt na rynku	2.69	0.44
Inadequate extension or advisory services – Niewystarczające usługi doradcze	2.50	0.57
High incidence of diseases – Wysoka zachorowalność	2.46	0.68
Poor policy and political will by the government – Nieudolna polityka i brak woli politycznej rządu	2.43	0.39
The high cost of veterinary services – Wysoki koszt usług weterynaryjnych	2.48	0.64
Insecurity due to theft – Niebezpieczeństwo kradzieży	2.55	0.57

Source: Field survey (2020)

years, while those with 6–10 years, and above 10 years were 23% and 4.4% respectively.

Prevalent poultry diseases and parasites in the study area

The respondents' view on the prevalent poultry diseases and ectoparasites is presented in Table 2. The finding of the study revealed that Salmonellosis ($X = 2.89$), Coccidiosis ($X = 2.72$), Newcastle Disease ($X = 2.66$), and Gumboro ($X = 2.34$) were the most common diseases in the area. In terms of the ectoparasites, lice ($X = 2.84$), flea ($X = 2.76$), ticks ($X = 2.12$), and mites ($X = 2.04$) were the most prominent. Findings of this study lends credence to submission of Garba et al. [2010] who revealed that various diseases affect poultry production in the study area, and this can go a long way in limiting farmers' gains. Similarly, the presence of parasites has a huge health implication on the poultry birds. As opined by Odenu et al. [2016], ectoparasites are generally considered as the primary cause of poor health conditions, growth retardations and decrease in production in local chickens in Nigeria.

Disease management and biosecurity measures

The various disease management and biosecurity measures being undertaken by the farmers are presented in Table 3. The study revealed that the majority of the farmers change litter regularly ($X = 2.79$), wash drinkers and feeders at regular intervals ($X = 2.84$), and also clean the surroundings of the poultry house ($X = 2.82$). Other practices include proper stocking of birds ($X = 2.12$), minimizing water spillage ($X = 2.32$), adherence to vaccination schedule ($X = 2.71$), regular Change of drinking water ($X = 2.84$), and administration of drugs during treatment of diseases ($X = 2.16$). Similarly, the study indicated that reporting of a disease outbreak ($X = 2.02$), quarantining sick birds ($X = 2.41$), fumigation of poultry house, and equipment before restocking ($X = 2.01$), and the provision of adequate feeding and drinking troughs ($X = 2.43$) were common practices among the farmers. However, some major disease management and biosecurity measures are not strictly undertaken in the area by the farmers. These practices include proper brooding of birds, Daily inspection of flocks, Provision of adequate ventilation, and the provision of foot dip and protective cloth/hand gloves. Others include restraining visitors and the control of rodents, provision of adequate spacing for the birds, and debeaking of birds to reduce injuries and cannibalism. The inability of farmers to adhere to all the necessary biosecurity measures makes these farms vulnerable to diseases, which greatly can affect the profit margin of the farmers. Findings of this study also agrees with the submission of FAO [2008] where it was reported that bi-

osecurity is still very weak among poultry farmers and there is need for improvement at all levels in Nigeria.

Poultry production constraints

The distribution of constraints affecting the poultry farmers is presented in Table 4. Foremost among these constraints affecting the farmers were; extreme weather conditions ($X = 2.84$), high cost of feed and other inputs ($X = 2.82$), inadequate capital and/or credit ($X = 2.74$), and poor breeder stock and Day-Old Chicks ($X = 2.66$). Other challenges include low market demand, Inadequate extension or advisory services, high incidence of diseases, poor policy and political will by the government, high cost of veterinary services, and insecurity due to theft. The interplay of these challenges can substantially limit the potentials of farmers to maximise gains from the poultry farm. Findings of this study are in line with those of Jongur et al. [2009] and Ja'afar-Furo and Gabdo [2010] who also indicated that lack of extension services, inadequate market for stock ready for sale, lack of support from the government, high cost of feeds, high cost of medication and occurrence of diseases as key challenges to poultry farmers in Adamawa State.

CONCLUSION

This study has revealed that poultry farmers in Adamawa State adopt various measures to manage diseases in the farms. However, these management/biosecurity measures are not strictly adhered to leading to incidences of disease spread on the farm. Hence, the need for more awareness of biosecurity and disease management measures among poultry farmers in the area, to enable maximise gains from the venture. Based on the findings of the study, the following recommendations were made:

1. There is a need for the government and other development partners to engage the services of more agricultural extension agents that will assist in educating poultry farmers on disease management and biosecurity measures on the farm.
2. Similarly, awareness of disease management and biosecurity measures on the farm can be created using electronic and print media outlets in the area.
3. The government and other actors in the agricultural sector should assist farmers by easing their access to credit facilities which can enable them to adopt a wide range of disease management and biosecurity measures on the farm.

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OCENA SYSTEMU ZARZĄDZANIA CHOROBIAMI I ŚRODKÓW BEZPIECZEŃSTWA BIOLOGICZNEGO STOSOWANYCH PRZEZ HODOWCÓW DROBIU W STANIE ADAMAWA W NIGERII

STRESZCZENIE

W pracy oceniono system zarządzania chorobami oraz środki bezpieczeństwa biologicznego stosowane przez hodowców drobiu w stanie Adamawa w Nigerii. W szczególności zidentyfikowano rozpowszechnione choroby drobiu i pasożyty na badanym obszarze, oceniono system zwalczania chorób i stosowane środki bezpieczeństwa biologicznego, a także zidentyfikowano czynniki ograniczające skalę produkcji drobiu wśród rolników. Dane od 113 hodowców drobiu zbierano za pomocą ustrukturyzowanego kwestionariusza, przy czym zastosowano technikę wielostopniowego próbkowania. Zebrane dane analizowano za pomocą statystyk opisowych i czterostopniowej skali Likera. Wyniki wskazują, że salmonelloza, kokcydioza i choroba Newcastle były najczęstszymi chorobami na tym obszarze. Podobnie regularna zmiana ściółki, konsekwentne mycie poidel i karmideł, a także czyszczenie otoczenia kurnika były powszechnymi środkami bezpieczeństwa biologicznego na badanym obszarze. Do głównych problemów dotyczących rolników należały ekstremalne warunki pogodowe, wysokie koszty paszy i innych materiałów oraz niewystarczające zasoby kapitału i/ lub zbyt niski poziom kredytowania. Kluczowym zaleceniem jest potrzeba zatrudnienia na tym obszarze większej liczby agentów zajmujących się rozwojem rolnictwa.

Słowa kluczowe: hodowcy drobiu, system zwalczania chorób, bioasekuracja, stan Adamawa

