

Causes of Village Chicken (*Gallus Gallus Domesticus*) Losses and Level of Awareness of Newcastle Disease Consequence among Village Chicken Farmers in Bauchi State, North Eastern Nigeria

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Abstract: This study was conducted to determine the major causes of village chickens losses and to evaluate the level of awareness on the consequence of Newcastle disease (ND) among village poultry farmers in Bauchi State, North Eastern Nigeria. Structured questionnaire was used for interviewing farmers. Results generated from 145 total respondents to questionnaire survey revealed that most of the village chicken farmers in Bauchi State are males (85.5%) while few are females (14.5%). There was significant statistical difference ($P < 0.05$) among gender (sex) of total respondents. It was also determined that village chicken farmers in Bauchi State rear their flocks under the extensive system (70.3%) where birds are left to scavenge for food while few (6.2%) practice intensive system. This is thought to expose them to various types of diseases including ND. Among the village poultry reared by farmers in Bauchi State, village chickens (47.6%) are reported to dominate the flock poultry population while turkey (4.8%) is the least. Most village chicken farmers in Bauchi State, especially those living in remote villages provide shelter in forms of raffia baskets (44.8%) for their flock to roost at night and make nest for laying eggs, this is thought to predispose the birds to predators and harsh weather conditions, very few farmers construct modern poultry cages (3.4%) for their birds. The major cause of village chickens losses in Bauchi State is disease (75.9%) while the least is loss due automobile accidents (0.0%) as reported by farmers. The clinical signs of sickness in village poultry especially village chickens as reported by respondents include diarrhea (36.6%) and twisting of the head and neck (20.0%). These signs are consistent with those of clinical cases of ND infections in poultry. Village chickens disease is most prevalent during the dry harmattan season (77.2%) than the wet rainy season (22.8%). Village chicken farmers in Bauchi State usually take their birds to the market to sell (65.5%) during disease outbreaks in order to reduce economic loss, these no doubt amplify transmission of ND among poultry of different species in the same market place, however only few farmers attempt to treat sick birds using all sort of ethnoveterinary substances (8.3%) which at most times yield unsuccessful results. Most village chicken farmers in Bauchi State are not aware (68.3%) of the consequences of ND infection and they are deficient of sufficient idea on how to prevent and control ND outbreak by any reliable method. Few farmers that are familiar (31.7%) with ND plague call it various sort of local nomenclatures such as “*Mekere or Chutar haukar Kaji*”.

Keywords: Newcastle disease; village chicken losses; Bauchi State, North eastern Nigeria.

1. INTRODUCTION

Village chicken production is an important agricultural activity available for most rural dwellers in Africa. Chickens are considered as one of the most important and widely distributed avian species among poultry birds. It provides rural households with scarce animal protein in the form of meat and eggs as well as being a reliable source of petty income (Kalita *et al.*, 2004; McAinsh *et al.*, 2004; Copland and Alders, 2005; Njenga, 2005). Strategic increases in the productivity of village chicken flocks will, therefore, greatly assist in poverty alleviation, improve household food security and protein intake of the rural communities and in the long term curb the massive urban migration of the youth (Alexander, 2001). Village chickens also fulfill a number of other functions for which it is difficult to assign any monetary value. Village chickens have also been reported to be used for traditional sacrifices, ceremonies, festivals in some cultures and have played an active role in pest control (Alders and Spradbrow, 2000; Alders *et al.*, 2007), hence, they contribute significantly to the livelihoods of the most vulnerable rural households in developing countries (Mack *et al.*, 2005; Nyoni and Masika, 2012). However, village chickens production is a promising sector for poverty reduction in Africa (Gueye, 2000 a and b). It has been reported that up to 70% of village chicken products in the developing countries are produced by low-income earning farmers and in a joint family-poultry managed business (Sonaiya, 2000), of which 80% are found in rural areas under the extensive management system (Alders and Spradbrow, 2001). However, village chicken production is not rated high in the mainstream of national economies because of the lack of measurable indicators of output (Alders and Spradbrow, 2001). Productivity levels of village chickens in many African countries fall far below desirable levels. Output in terms of number of eggs per hen per year and flock sizes are low with relatively high mortality rates when compared to exotic chicken production (Gondwe and Wolly, 2007; Mapiye *et al.*, 2008). Due to the low-income earning farmers attached to village chicken production in relation to other livestock, farmers often are ignorant of small changes that could enhance the quality, health and productivity of their flocks (Acavomic *et al.*, 2005; Nyoni and Masika, 2012). An extra effort in the management of poultry housing, feeding, and animal health care will increase village chicken productivity significantly (Sonaiya, 2007). Furthermore, strategic increases in the production of village chicken flocks will greatly assist in addressing the challenge of fighting poverty and malnutrition (Sonaiya, 2007; Gillespie and Flanders, 2009). Although, other poultry species which include ducks, turkeys, guinea fowl, quail, and pigeons are important in village poultry husbandry; village chickens are the most important and major poultry species (Acavomic *et al.*, 2005; Nyoni and Masika, 2012). They constitute the majority of the chicken population in Northern Nigeria and are mainly kept under extensive management system where they roam freely and scavenge for food (Usman, 2002; Musa *et al.*, 2008). Their movement is uncontrolled and they hardly receive any prophylactic treatment or vaccination against common poultry disease (Duru *et al.*, 2008; Musa *et al.*, 2008). The village chicken production system in rural areas has been ridiculed because of the low biological productivity (egg and meat) relative to the commercial exotic breeds poultry production system. Therefore, most poultry improvement programs in Nigeria in the past years were directed towards introduction of specialized or exotic breeds, crossbreeding and management intensification. The predominance of village chickens in Nigerian poultry industry is a good indicator that these species of birds deserve more attention for improved performance. Although, wide arrays of constraints hampers the development of village chickens production in rural Nigeria of which rampant contagious diseases, poor housings, minimal veterinary care, poor feeding problem both in quality and quantitative terms, predation, accidents and theft are to be considered (El-Yuguda *et al.*, 2005; Nwanta *et al.*, 2008). High losses of village chickens due to diseases pose a serious threat to food security and livelihood of many rural families (Musa *et al.*, 2008).

Newcastle disease (ND) is an acute, infectious and highly pathogenic disease of poultry (Seal *et al.*, 2000; Alexander, 2003) is reported to be one of the most important viral disease of both commercial and village chickens in most parts of the world including developing countries like Nigeria (El-Yuguda and Baba, 2002; Zeleke *et al.*, 2005; Njagi *et al.*, 2010; Aziz and Ahmed, 2010). This study was conducted to determine the major causes of village chicken losses and to evaluate the level of awareness on the consequence of Newcastle disease (ND) among village chicken farmers in Bauchi State, North Eastern Nigeria.

2. MATERIALS AND METHODS

Study area:

The study was conducted in Bauchi State. Bauchi is one of the six states that form the North East geopolitical zone of Nigeria. The state covers an area of 46,622 square kilometres and is located at latitude 10° 30' and longitude 10° 00' east.

It has a population of 4,675,465 (2006 census figures). The state is bordered by seven states, Kano and Jigawa to the north, Taraba and Plateau to the south, Gombe and Yobe to the east and Kaduna to the west. The state has twenty Local Government Areas (LGAs). Bauchi State is located between the Sudan savannah and the Sahel savannah zones. The rainfall in Bauchi State start earlier in the southern part of the state where rain is heaviest and last longer. Here the rains start in April with the highest record amount of 1300mm per annum. In contrast, the northern part of the state receives the rains late, usually around June or July, and records the highest amount of 700mm per annum. While it is humidly hot during the early part of the rainy season in the south, the hot, dry and dusty weather lingers up north. Bauchi State has 55 ethnic groups, with the Hausa, Fulani, Gerawa, Sayawa, Jarawa, Bolewa, Kare-kare, Kanuri, Fa-awa, Butawa, Warjawa, Zulawa, Badawa dominating (Harper Collins, 2009). Bauchi is an agricultural State, animal rearing and production are important in the state, particularly cattle, goats, sheep, donkeys and pigs. Poultry production is also significant. (Harper Collins, 2009). Bauchi State has a poultry population comprising 278,208 chickens, 861,491 ducks and 7,765 turkeys (Adene and Oguntade, 2006).

Structured questionnaire survey:

A total of One hundred and forty five (145) copies of a structured questionnaire were administered to village poultry farmers within the study area. Interpreters were sought where necessary. Numerical aspects of the information were collected and analyzed.

Data analysis:

One – way Analysis of Variance (ANOVA) and simple percentage were used to determine the association of data generated from the questionnaire survey as described by Thrusfield (2005).

3. RESULTS

3.1. Questionnaire analysis:

The results of the responses of the respondents to the questionnaire survey on the gender (sex) of poultry farmers in the different Local Government Areas of Bauchi State shows that out of the 145 respondents, 124 (85.5%) respondents are males while 21 (14.5%) are female. There was extremely significant statistical difference ($p < 0.05$) noted in the response of the farmers in all the study areas (Table 1).

The results of the responses of the respondents to the questionnaire survey on the educational background of farmers in the different Local Government Areas of Bauchi State shows that out of the 145 respondents, 82 (56.6%) respondents attended non-formal Islamic school (known as *karatun sangaya or almajiri*), 25 (17.2%) respondents are Adult and non-formal education, 21 (14.5%) respondents are Primary school, 14 (9.7%) respondents are Secondary school, and 3 (2.1%) respondents are Tertiary. There was extremely significant statistical difference ($p < 0.05$) noted in the response of the farmers in all the study areas (Table 1).

The results of the responses of the respondents to the questionnaire survey on the type of birds reared by farmers in the different Local Government Areas of Bauchi State shows that out of the 145 respondents, 69 (47.6%) respondents reared Chickens, 29 (20.0%) respondents reared Guinea fowls, 18 (12.4%) respondent reared Ducks, 7 (4.8%) respondents reared Turkeys, and 22 (15.2%) respondents reared Pigeons. There was extremely significant statistical difference ($p < 0.05$) noted in the response of the farmers in all the study areas (Table 2).

The results of the responses of the respondents to the questionnaire survey on the breeds of birds reared by farmers in the different Local Government Areas of Bauchi State shows that out of the 145 respondents, 91 (62.8%) respondents keep Local breeds, 31 (21.4%) respondents keep Exotic breeds and 23 (15.9%) respondents reared Mixed breeds. There was extremely significant statistical difference ($p < 0.05$) noted in the response of the farmers in all the study areas (Table 2).

The results of the responses of the respondents to the questionnaire survey on the husbandry methods employed by poultry farmers in the different Local Government Areas of Bauchi State shows that out of the 145 respondents, 9 (6.2%) respondents practice Intensive system, 34 (23.5%) respondents practice Semi-Intensive system and 102 (70.3%) respondents practice Extensive system of management. There was extremely significant statistical difference ($p < 0.05$) noted in the response of the farmers in all the study areas (Table 2).

The results of the respondents to the questionnaire survey on the housing type in the different Local Government Areas of Bauchi State shows that out of the 145 respondents, 65 (44.8%) respondents employed Raffian basket, 17 (11.7%) respondents employed Mud hut, 5 (3.5%) respondents employed Zinc & wire cage, 10 (6.9%) respondents employed Wooding cage, and 48 (33.1%) respondents No housing (trees & roof). There was extremely significant statistical difference ($p < 0.05$) noted in the response of the farmers in all the study areas (Table 2).

The results of the responses of the respondents to the questionnaire survey on the causes of poultry losses in the different Local Government Areas of Bauchi State shows that out of the 145 respondents, 110 (75.9%) respondents loss their birds due to disease, 19 (13.1%) respondents loss their birds as a result of prey, 4 (2.8%) respondents loss their birds due to cats and dogs, 12 (8.3%) respondents loss their birds as a result of theft, and 0 (0) respondents are due to accident. There was extremely significant statistical difference ($p < 0.05$) noted in the response of the farmers in all the study areas (Table 3).

The results of the responses of the respondents to the questionnaire survey on the signs of sickness in village poultry in the different Local Government Areas of Bauchi State shows that out of 145 respondents, 13 (9.0%) respondents experience sudden death, 53 (36.6%) respondents noticed diarrhea, 29 (20.0%) respondents noticed twisting of head & neck, 27 (18.6%) respondents noticed vesicle, boils, nodules & swelling on the comb and wattles, and 23 (15.9%) respondents noticed paralysis of the wings and legs. There was extremely significant statistical difference ($p < 0.05$) noted in the response of the farmers in all the study areas (Table 3).

The results of the responses of the respondents to the questionnaire survey on the season of the year with high disease prevalent in the different Local Government Areas of Bauchi State shows that out of 145 respondents, 112 (77.2%) respondents noticed disease during dry harmattan season, and 33 (22.8%) respondents noticed disease during wet rainy season. There was extremely significant statistical difference ($p < 0.05$) noted in the response of the farmers in all the study areas (Table 4).

The results of the responses of the respondents to the questionnaire survey on the action taken by poultry farmers on sick birds in the different Local Government Areas of Bauchi State shows that out of the 145 respondents, 12 (8.3%) respondents treat them, 95 (65.5%) respondents sell them, 13 (9.0%) respondents give them out as gift, and 25 (17.2%). There was extremely significant statistical difference ($p < 0.05$) noted in the response of the farmers in all the study areas (Table 4).

The results of the responses of the respondents to the questionnaire survey on the Awareness on Newcastle disease existence by poultry farmers in the different Local Government Areas of Bauchi State shows that out of the 145 respondents, 99 (68.3%) respondents are Non- Awareness while 46 (31.7%) respondents are Awareness. There was very significant statistical difference ($p < 0.05$) noted in the response of the farmers in all the study areas (Table 4).

The results of the responses of the respondents to the questionnaire survey on the Frequency of poultry disease outbreak in the different Local Government Areas of Bauchi State shows that out of the 145 respondents, 14 (9.7%) respondents experience once, 28 (19.3%) respondents experience twice, and 103 (71.0%) respondents experience severally. There was extremely significant statistical difference ($p < 0.05$) noted in the response of the farmers in all the study areas (Table 4).

Table 1: Distribution of respondents' socioeconomic characteristics

	Characteristics	Frequency = 145	Percentage (%)
1	Gender		
	Male	124	85.5
	Female	21	14.5
2	Educational Level		
	Islamiyya (Almajiri)	82	56.6
	Adult & Non-Formal	25	17.2
	Primary School	21	14.5
	Secondary School	14	9.7
	Tertiary	3	2.1

Table 2: Distribution of respondents according to type of village chicken husbandry and management practice among village poultry farmers in Bauchi State

	Poultry Husbandry and Management	Frequency = 145	Percentage (%)
3	Type of village poultry Reared		
	Chicken	69	47.6
	Guinea fowl	29	20.0
	Ducks	18	12.4
	Turkey	7	4.8
	Pigeon	22	15.2
4	Breeds of Birds reared		
	Local	91	62.8
	Exotic	31	21.4
	Mixed	23	15.9
5	Husbandry methods		
	Intensive	9	6.2
	Semi-intensive	34	23.5
	Extensive	102	70.3
6	Type of poultry house		
	Raffia Basket	65	44.8
	Mud Hut	17	11.7
	Zinc & Wire Cage	5	3.4
	Wooden Cage	10	6.9
	No Housing (Trees & roof)	48	33.1

Table 3: Distribution of respondents according to major causes of losses and signs of sickness in village chickens in Bauchi State according to village poultry farmers

	Information	Frequency = 145	Percentage (%)
7	Causes of village chicken losses		
	Diseases	110	75.9
	Prey of birds	19	13.1
	Cats and dogs	4	2.8
	Theft	12	8.3
	Automobile accidents	0	0.0
8	Signs of sickness		
	Sudden Death	13	9.0
	Diarrhea	53	36.6
	Twisting of Head & Neck	29	20.0
	Vesicle, Nodules, Swelling on the Comb & Wattle	27	18.6
	Paralysis of the Wings & Legs	23	15.9

Table 4: Distribution of respondents according to season of disease prevalence, action taken on sick birds and level of awareness on Newcastle disease consequences according to village poultry farmers in Bauchi State

Information	Frequency = 145	Percentage (%)
9 Season of disease prevalence		
Dry Harmattan Season	112	77.2
Wet Raining Season	33	22.8
10 Action taken on sick birds		
Treat them	12	8.3
Sell them	95	65.5
Give them out as gift	13	9.0
Slaughter them	25	17.2
11 Awareness of Newcastle disease consequence		
Aware	46	31.7
Non-Aware	99	68.3
12 Frequency Disease outbreaks		
Once	14	9.7
Twice	28	19.3
Severally	103	71.0

4. DISCUSSION

The results of the questionnaire survey of this research reveals that majority of the village chicken farmers in Bauchi State are men (Males), this was indicated by 85.5% of the respondents. Agbamu, (2014) have also reported that 70% of the poultry farmers in Delta State are men. Although women and children may be fully involved in assisting men in feeding, watering and cleaning the poultry houses as reported by Riise *et al.* (2004) and Fisseha *et al.* (2010). But men are usually dominant as decision makers of the household to purchase replacement stock, shelter constructions and buy drugs to treat sick birds, as also observed by Yakubu, (2010) and Mapiye *et al.* (2005).

The findings of this study also reveal low level of literacy among village chicken farmers in Bauchi State. 88.3% village chicken farmers and respondents' educational backgrounds are within the Non-eastern education (*karatun sangaya or almajiri*), adult and non-formal and primary school education categories in Bauchi State. Indeed, this can be part of the major constraint that may hinder specialized production of village chickens in a significant commercial level in Bauchi State as it is indicated by low level of western civilization among the village poultry farmers in the study area. Salum *et al.* (2002) and Conroy *et al.* (2005) have also reported illiteracy or lack of adequate western education and civilization among small holder poultry farmers in developing countries as among the constraints towards successful poultry production. In contrast, Agbamu, (2014) reported that majority of village chicken farmers in Delta State are educated.

The findings of this study indicated that most village poultry flocks is dominated by village chickens as compared to guinea fowls, local ducks of pigeon. Most household within the study area rears varying numbers of village poultry, but village chickens outnumbered the total village poultry population per household in Bauchi State. This portray the fact that village chickens account for most of the poultry population in Nigeria (Adene and Oguntade, 2006; Duru *et al.* 2008; Nnadi and George, 2010).

Most of the village chicken farmers in Bauchi State rear local breeds of chickens as indicated by 62.2% of the questionnaire respondents. The fact that local breeds chickens are very easy to keep and do not require sophisticated production system to manage makes local breeds poultry business affordable by almost every village poultry farmer in Bauchi State. This result agrees with similar findings by Pedersen *et al.* (2002) that village chickens dwell and adapt well in a traditional system due to free feed resources in surrounding environment and household leftover. Village chickens also preserved the ability to incubate and brood naturally.

Most village chicken farmers in Bauchi State rear their flocks under the extensive management system, where the birds are allowed to roam freely around the surroundings scavenging for food in the form of insects, kitchen leftover and grain in the environment. This is indicated by 70.3% of the total respondents. This information is in line with similar reports by Salman *et al.* (2007) that the extensive system accounts for the vast majority of village poultry production in Nigeria. This method of extensive system husbandry practices no doubt brings free scavenging chickens to close proximity to infectious agents and diseases such as ND through which they get infections.

According to the reports generated from the questionnaire survey in this present study, most village chicken farmers in Bauchi State made efforts to provide shelter in the form of raffia baskets, mud huts roofed with thatched / grasses for the birds to roost at night and also intended to protect their flocks from adverse weather conditions (rain, cold), theft and night predators (wild cats, dogs, snakes). Very few farmers neglect their poultry flocks to find shelter and roost on top of trees and roofs of the house within the compound. This is a common habit of village chicken farmers dwelling in rural settlements of Bauchi State. This report agrees with similar findings by Yakubu, (2010) from a similar survey in Nassarawa State and Khallafalla *et al.* (2008) in Sudan. The result of this study reveals that disease is the major cause of village chickens losses in Bauchi State. This is indicated by 75.9% of the total respondents in the study area. This finding confirms to that of Yakubu, (2010) who recorded 74.4% responses in Nassarawa State. Although, there was no confirmatory diagnostic laboratory test conducted for any of the listed poultry diseases, but most of the clinical signs indicated described by the respondents to the questionnaire survey are consistent with those of Newcastle disease in sick chickens. The clinical signs of ND in village chickens as reported by Bhaiyat *et al.* (1994), Chansiripomchai and Sasipreyayan, (2006) and Roy and Chamham, (2007) includes diarrhea, twisting of the neck and paralysis of the wing and legs. Musa *et al.* (2009) also confirmed that these are the major clinical signs seen in village chickens suffering from ND. The result of this study supports similar finding of El-Yuguda and Baba (2004), El-Yuguda *et al.* (2005) and El-Yuguda *et al.* (2009) who reported that Newcastle disease is the predominant poultry disease in North Eastern Nigeria which have caused mortality of a large number of village chickens in outbreaks of the disease annually.

The result of this present study revealed that village chicken diseases are most commonly encountered during the dry cold harmattan period of the year as reported by 77.2% of the total respondents. This response supports similar finding by Musa *et al.* (2009) who reported 86.6% prevalence of village chicken disease during the harmattan season in Plateau State which shares borders with Bauchi State. Cold weather has been reported to be associated with ND outbreaks in Nigeria (Sai'du *et al.*, 2006). Sai'du *et al.* (2006) have also reported that the cold harmattan weather generates stress which amplifies Newcastle disease in sick birds. Sadiq *et al.* (2011) in a ten year retrospective study reported high prevalence of poultry diseases particularly ND between the months of November, December and January.

The results of this study reveal that most village chicken farmers take their birds to the market to sell during the face of outbreaks of poultry disease in order to reduce losses to mortality. This action of selling clinically sick or apparently healthy birds which may have close contact with other birds in the same market place will no doubt ease contact of poultry from different areas at local open air markets, when they are taken back to various localities can undoubtedly facilitate the rapid spread and persistence of ND among village poultry in Bauchi State. This report is in concurrence with the reports by Tedesse *et al.* (2005).

Majority of the village poultry farmers in Bauchi state reported lower level of awareness to the consequence of Newcastle disease infection among village chickens in their locality. They described the poultry plaque which usually wipes their village chicken flocks annually with several kinds of native nomenclatures such as "Mekere, Chutar haukar kaji and Mai guduma". These names attributed to the nature of ND severity and the mortality rate it causes in village chicken flock during outbreaks of the infection. This portrays the fact most village poultry farmers in the study area have little or no access to any veterinary clinic or worker. This finding agrees with similar report by Salihu *et al.* (2012). This type of devastated mortality rate caused by ND is reported to occur annually year-in-year-out in Bauchi State with pockets of outbreaks as reported by 71.0% of the total respondents. This is in concurrence with report by Musa *et al.* (2009) and Nwankiti *et al.* (2010). In conclusion, the present study identified various major constraints such as diseases and predators (birds of prey, cats and dogs) as the causes of losses of village chickens in Bauchi State. More so, low level of western education, lack of proper husbandry / management and lack of awareness of the consequence of Newcastle disease outbreaks hamper the improvement of village chicken productions in Bauchi State. Replacement of village chickens by exotic chicken breeds in urban areas is also a major threat in eroding and dilution of the indigenous genetic resources. Insufficient veterinary attention and a knowledge gap among smallholder village poultry farmers also restrict village

chicken production. Therefore, there is a need to design and implement poultry diseases awareness campaign especially that of Newcastle disease and enlightenment programme among rural poultry farmers living in remote areas of Bauchi State in order to educate village poultry farmers, curb poultry diseases, conserve and improve the village chickens production as well as to advance poultry production and productivity in the region.

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