Journal of Biology, Agriculture and Healthcare
ISSN 2224-3208 (Paper) ISSN 2225-093X (Online)
Vol.5, No.4, 2015

Local Chicken Management in Rural Borno State,Nigeria

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ABSTRACT
The locally adapted chickens are more readily available to resource-poor farmers and they can be productive without high disease-control inputs. Therefore, the study examined the management practices and the prospects of local chicken production in rural Borno state. The survey was carried out in two agro-ecological zones (Sahel savannah and Sudan savannah) of Borno state in Nigeria. Data were collected from 180 poultry keeping households in two seasons (cold-dry and hot-dry seasons) through interview using structured questionnaire. Descriptive statistics using means and percentage was used to analyze the data. The result showed that 82.8% of the farmers had less than 1ha of farm land and 17.2% had above 1ha of farm land. Distribution of ownership of chickens revealed that 51.3% kept 6-10 chickens, 23.8% kept 1-5 chickens, 19.5% kept 11-20 chickens and 5% kept above 20 chickens. Majority (65.8%) practice extensive system while 34.2% practice semi-intensive system. Only 2% of the farmers consult veterinary service. Chickens were mainly culled for home consumption (31.5%), trade (42.2%) and fear of disease (26.3%). 46.4% of farmers purchased their replacement stock, 24.1% of the farmers obtained theirs through inheritance or gifts, while 32.9% obtained theirs from hatched eggs. The major (55.8%) factor affecting market is the availability of substitute, 27.9% complained of unstable price while 16.3% identified sell of disease chicken as another factor affecting marketing. The study recommends proper training of the farmers on modern poultry management and they should be informed on the importance of veterinary services.
Key words: Local chicken, Management system, Rural, Sahel savannah, Sudan savannah

Introduction

Poultry, particularly chickens are the most widely kept livestock species in the world and also the most numerous (Perry et al, 2002; Moreki et al, 2010). Therefore, there is a growing interest in using poultry as a tool in poverty alleviation in villages throughout the world. FAO (2000) estimated the total meat production to be 245 million tons and about 30% there off was poultry mainly from chickens produced in the developing countries. Quite often, local poultry stocks serve as major source of animal protein to the poor since they are accessible to rural households. More than 80% of the poultry production is found in the rural households (Sonaiya et al, 1992). Poultry contributes to a large extent in the form of meat and eggs for a majority of the population in developing countries (Raji et al, 2007). More so, unlike other farm animals such as cattle, poultry in particular chickens, play an important role in the small holder system in developing countries (Weigend et al, 2004). Poultry production is therefore an effective means of transferring wealth from the high income urban consumers to the poor rural and peri-urban members of the community.

Comparative statistics by the Federal Department of Livestock in 2009 puts poultry production at over 400,000 metric tonnes in Nigeria. Fayeye and Oketoyin (2006) observed that the native chickens constitute about 80% of the poultry birds in Nigeria. Free range chicken production represents an important system for supplying the fast growing human population and providing additional income to resource-poor small farmers, especially women (Gueye, 2009). Its importance therefore cannot be over emphasized as it has become popular industry for the small scale holders that have great contribution to the economy of the country (Aboki et al, 2013). Indigenous chickens are the most commonly distributed across every corner of the tropical countries of Africa where they are kept by rural poor (Ajayi, 2010; Mengesha, 2012). Moreso, as a consequence of natural selection indigenous chickens have shown to be more disease resistant (Minga et al, 2004). Due to their development, they might be better adapted to survive under harsh conditions without proper management programs and under limited supply of resources. They are hardy, adaptive and preferred by consumers (Kitalyi, 1998). They are also known to posses' qualities such as the ability to hatch on their own, brood and scavenge for major part of their food and possess appreciated immunity from endemic diseases (Ajayi, 2010).

The survival of the local breeds is threatened by several factors of economic and social needs for example, cross breeding with exotic breeds in an uncontrolled way is in fact one of the major cause that erode genetic diversity in the developing world, although, it is considered a way of improving the productivity (Wiegend et al, 2004).

Recent effort to characterize the Nigerian indigenous chicken and improve its productivity have involved mainly its health and nutritional status, socio-economic potentials and the optimum management approaches and goal oriented increased production may give us more insight on harnessing the potentials of local chickens (Ikeobi et al, 2001). Conservation and use of indigenous animals under low level of input in the tropics are usually more productive than is the case with exotic breeds. The locally adapted animals are also readily available to resource-poor farmers and they can be productive without high disease-control inputs. The utilization and conservation of these indigenous genetic resources are of paramount (NRC, 1993). Lack of information about the management practices in the local chicken production has led to their under utilization. The existing literature gives advice on either industrial or semi-industrial production systems using exotic breeds under highly controlled conditions with little useful advice on how to rear poultry at village level. Therefore, this study is to determine the prospect of local chicken production in order to establish some basis for improvement.

Methodology

Study Area

The study was carried out in Borno state, North eastern part of Nigeria. Borno state is lying within latitude 10^0N and 14^0N longitude $11^0$30'E and 14^0 45'E. It has 27 local government areas and a population of 4,151,193 (NPC, 2006). The state has an area of 69,436km^2, which marks it the largest state in Nigeria in terms of land mass. Borno state has a climate which is hot and dry for greater part of the year although the Southern part is slightly milder. The state has two major vegetation zones viz: Sahel in the North with severe desert encroachment covering most of the Chad Basin areas and Sudan Savannah in the South which consist of scrubby vegetation interspersed with tall tree woodlands.

Data collection

Primary data were collected with the aid of structured questionnaires. Multi-stage sampling procedure was employed for selecting respondents. The first stage involved the selection of three local government areas from each of the agro-ecological zones in the state. The second stage was the selection of three villages from the selected local government areas and the third stage was the selection of 10 households in each of the selected villages. The survey was carried out in two different seasons namely hot-dry and cold-dry seasons and a total 180 respondents were interviewed. Descriptive statistics such as mean, frequencies and percentiles were used to analyze the data collected using the Statistical Package for Social Sciences (SPSS, 2006).

Result and Discussion

Socioeconomics characteristics of farmers

Table 1 described chicken production systems in Borno State. The study indicated that the keeping of chicken is widely practiced in Borno state, although more male farmers (83.6%) keep chicken than females (16.4%). This is contrary to Gueye (1998) who found that approximately 80% of the flock in a number of African countries were largely owned and controlled by women. This variation may be due to socio-cultural norms existing in the state where more men perform the major roles of ownership and possession than females in the family.

Table 1 also showed that 33.2% of the respondents fell within the age range of 14 to 30years, 47.1% fell within the age range of 31 to 45years and 19.8% were above 45years. This showed that more youth were involved in keeping poultry.

Level of education as revealed by the overall mean in Table 1 showed that 57.8% of the entire farmers could read and write while 42.2% of the farmers were illiterate. The Sahel savannah had 50.6% of its farmers illiterate while the Sudan savannah had a lower level (44.8%) of illiterate farmers. The overall mean (42.2%) of the illiterate farmers recorded is below 80% reported in a similar study by Njenga (2005) in Kenya.

Among the respondents 66.3% had less than 1ha as their average farm household. This may have partly accounted for the low number of chickens recorded per house hold as shown on Table 1. Zone distribution of ownership of chickens revealed that only 1.1% of the farmers in the Sudan savannah had chickens above 20 as compared with 8.9% of the Sahel savannah farmers. However, larger percentage of the farmers in the Sudan savannah (63.9%) keeps between 6-10 chickens compared with farmers from the Sahel Savannah (38.1%). This means that the Sahel savannah had more farmers keeping larger number of chickens per household while the Sudan savannah has more farmers keeping smaller numbers of chicken per household. This may be attributed to the fact that more farmers in the Sahel (29.9%) had farm land above 1ha of farm per household than in the Sudan (4.5%).

Management practices of farmers in Borno State

Table 2 showed that the overall average of 65.8% of the farmers surveyed practiced the extensive chicken management system while 34.2% practice the semi-intensive chicken management system. This means that most of the chickens fend for themselves. Hassen (2007) reported that, at the beginning of the planting season, the free roaming of chickens for scavenging was restricted to certain areas or they are confined in order to prevent scavenging for newly planted seeds. Even though the farmers practice extensive system, almost all farmers provide some form of overnight shelter for their chickens either in an open space in the kitchen (12.9%), in the main house (19.2%), with hand woven baskets (38.8%), or in shades purposely made for chickens (22.3%). Farmers may have chosen these housing materials because these are the most abundant and affordable housing materials based on the ecological zones. In Botswana, 35.8% of the indigenous chicken farmers provide housing of some kind (Badubi *et al*. 2006).

Majority (76%) of the farmers in this study fed their chickens by throwing the feed on the ground while 24.0% of the farmers supply feed in containers. Similar observation was made by Hassen (2007) though she reported a lower percentage (3.74%) for farmers that fed their chickens with containers. However, McAinsh *et al*. (2004) observed that half of the farmers he interviewed about traditional chicken production in Zimbabwe used feeders or containers to feed their chickens. Similarly an overall mean of 88.9% of the farmers surveyed in this study provided water to their flock at least once a day. This is contrary to a report in south-eastern Nigeria that claimed that 87.5% of respondents do not make specific watering provisions for their poultry but expect them to locate sources of water in brooks and succulent wild fruits which inextricably abound (Opeku *et al*., 2003). This may be applicable in the south where rainy season lasts for about 7 – 10 months of the year, but not in Borno State where the rainy season lasts for just 3 - 5months and dry season abounds. Hence, there is need to provide additional water for flock in the Sahel savannah.

The survey also showed that 39.1% of the houses cleaned their chickens' houses once a day, while 42.6% of the owners cleaned it twice a day. From the table famers in the Sudan savannah observed stricter sanitation measures than those in the Sahel savannah and there is better productivity in terms of chicks per hatch and chicks surviving to adulthood as a result (Table 4). The higher level of literate farmers in the Sudan Savannah zone might have been the reason for the better performance of their birds in the zone, as the tendency for good management practice is high among the literate farmers.

In case of diseases, survey showed that most (41.9%) of the farmers consumed the chicken, 31.6% would not intervene while only 2% consult the veterinary service. Only the farmers in the Sudan Savannah consult the veterinary service and they were few (4%).

Culling and Replacement of Chickens

As shown on Table 3, farmers in the survey areas have certain criteria and strategies of disposal and culling birds any time of the year. Chickens were mainly culled for home consumption (31.5%), trade (42.2%) and fear of disease (26.3%). The factors considered in culling according to response from this survey include poor productivity (33.9%), old age (41.4%) and lack of capacity to manage large number of birds (20.7%). Similar trends were reported in the western middle belt of Nigeria by Atteh (1990), who reported that village fowls were kept for income (11%), consumption (28%), income and consumption (45%), ceremonies (3%), income and ceremonies (3%). In Keita region of Niger, 47%, 38% and 16% of the chickens reared were used for home consumption, trade and gifts respectively (Bell and Abdou, 1995). A study done in the central part of Ethiopia has shown that 26.6% of the birds were reared to be sold, while 25% were used for sacrifice or healing, 20.3% for replacement and 19.5% for home consumption (Tadelle and Ogbe, 2001.From the results of this study it was discovered that most farmers (46.4%) purchased their replacement stock, 24.1% of the farmers obtained theirs through inheritance or gifts, while 32.9% obtained theirs from hatched eggs (Table 3).

Fertility and hatchability of local hens

Table 4 revealed that the number of clutch per hen per year for majority (74.1%) of the farmers was three (3); the hens lay between 11 - 15 eggs per clutch. About 76.6% of the entire farmers surveyed in this study responded that 6 - 10 chicks survived to adulthood (Table 4); higher percentage of farmers reported this in the Sudan Savannah (83.1%) than in the Sahel savannah (70%). This could be because some farmers in the Sudan savannah consult veterinary experts while no farmer in the Sahel savannah consulted veterinary experts as shown in Table 2. More so, the service given to the farmers were not supported with laboratory investigations, making the identification of the real causes and type of diseases that lead to chicken death difficult.

Marketing

Table 5 reported that majority (55.8%) of the farmers identified the availability of substitute as the major factor affecting marketing of local chickens, 27.9% complained of unstable price while 16.3% identified sells of disease chicken as another factor affecting marketing. The price of live chicken is affected by plumage, colour, size, age, sex, market site and the health status of the birds. Normally, the average prices of medium size male cock chicken ranged from ₦800 to ₦1,000 (US$5.5 to 6.8) while that of the female chicken ranged from ₦600 to ₦800 (US$4.1 to 5.5). In Nigeria, the market price of indigenous male birds (US$4.08 – 5.10) was two to three times higher than for females (US$1.62 – 2.04) (Sonaiya and Olori, 1999). It is evident that the values reported by these authors are quite lower than the values found in this study. Factors responsible for this may be high demand for local chickens in the market as there is a general belief that the local chicken is more palatable than the exotic chicken. Inflation might have also played a vital role in the prevailing prices of chicken in the market.

Conclusion

The research findings showed that majority of the farmers were male of youthful age. They had less than 1ha of farmland where they kept few chickens. The research also revealed that the farmers practiced the extensive management system though, provision were made to shelter the chickens at night to protect them from prey and harsh weather. Chickens were mainly culled for sell and consumption, fear of disease was another reason for Cullen. The chickens had an average of 3 clutches per year they laid 11 to 15 eggs per clutch out of which 6 to 10 chicks survive to adulthood. Mortality rate was high in the Sahel savannah than Sudan savannah. The research also indicated the availability of substitute as the major factor affecting marketing of local chickens and prices. Price of medium size cock ranged from $5.5 to $6.8, while that of hen ranged from $4.1 to $5.5. Therefore, farmers should be informed about modern way of poultry management and should also be trained on improved method of poultry production in our rural areas.

Table 1: Distribution of socio-economic characteristics of farmers in Borno State

	Local Government Areas						Agro-ecological Zones		
	Sahel Savannah			Sudan savannah					
Parameters (%)	Gubio	Marte	Mobbar	Chibok	Gwoza	Kwaya Kusar	Mean	Sahel	Sudan
Sex									
Male	86.7	87.5	73.7	83.3	75.0	95.5	83.62	82.6	84.6
Female	13.3	12.5	26.3	16.7	25.0	4.5	16.4	17.4	15.4
Age (of farmers)	13.3	16.7	78.9	10.0	16.7	63.6	33.2	36.3	30.1
14-30	73.3	75.0	21.1	43.3	33.3	36.4	47.1	56.5	47.4
31-45	13.3	8.3	-	46.7	50.0	-	19.8	7.2	-
45 and above									
Education level	53.3	45.8	52.6	36.6	33.3	31.5	47.2	50.6	33.8
Illiterate	46.7	54.2	47.4	63.4	66.6	68.5	57.8	49.4	66.2
Literate									
Mean Land Size	70.0	66.7	73.7	100	100	86.4	82.8	70.1	95.5
Less than 1 ha	30.0	33.3	26.3	-	-	13.6	17.2	29.9	4.5
Above 1 ha									
Ownership of Poultry	6.7	25.0	37.0	3.3	50	-	23.8	22.9	17.8
1-5	43.3	41.0	31.6	60.0	50	81.8	51.3	38.6	63.9
6-10	23.3	33.3	10.5	33.3	-	18.2	19.5	22.4	17.2
11-20	26.7	-	-	3.3	-	-	5.0	16.1	1.1
21 and above									

Table 2: Chicken management systems in Borno State

	Local Government Areas. Sahel savannah South savannah.						Agro-ecological zones.		
Parameters (%)	Gubio	Marte	Mobbar	Chibok	Gwoza	Kwaya Kusar	Mean	Sahel	Sudan
Chicken Management systems	73.3	79.2	42.1	70.0	66.7	63.6	65.8	14.8	66.8
Extensive	26.7	20.8	57.9	30.0	33.5	36.4	34.2	35.1	33.2
Semi-intensive									
Chicken Feeding									
Supply feed in containers	30.	-	42.1	10.0	-	27.3	18.2	24.0	12.4
Throw on the ground	70.0	100.00	57.9	90.0	100.0	72.7	81.8	76.0	87.6
Types of overnight shelter	16.7	20.8	5.3	13.3	16.7	4.5	12.9	14.3	11.5
In the kitchen	3.3	-	21	56.7	41.7	13.6	19.2	1.1	37.3
Perch in the main house	56.7	62.5	68.4	10.0	25.7	13.6	38.8	62.5	16.4
Hand-woven baskets	6.7	16.7	5.3	20.0	16.7	68.6	22.3	8.6	35.1
House purposely made for chickens	16.7	-	-	-	-	-	2.8	5.6	-
I don't know									
Cleaning of shelter									
Once per day	33,.3	37.5	63.2	20.0	16.7	63.6	39.1	44.7	33.4
Twice	43.3	41.7	26.3	66.7	58.3	18.2	42.6	37.1	47.7
When it's dirty	23.3	20.8	10.5	13.3	25.0	18.2	18.5	8.2	18.8
Provision of water to chickens	83.3	100.0	89.5	96.7	100.0	63.6	88.9	90.9	87.7
Yes	16.7	-	10.5	3.3	-	36.4	11.1	9.1	13.2
No									
Types of watering can									
Plastic	13.3	2.1	5.3	3.3	31.6	27.8	13.9	6.9	20.9
Clay	50.0	56.2	63.1	36.7	38.3	44.9	48.1	56.5	40.0
Any container	36.7	47.4	31.6	60.0	30.1	27.3	37.9	36.7	39.1
Frequency of clearing the watering can	33.3	37.5	63.2	20.0	16.7	63.6	39.1	44.7	33.4
Once per day	43.3	41.7	26.3	66.7	58.3	18.2	42.4	37.1	47.7
Twice	23.3	20.8	10.5	13.3	25.0	18.2	18.5	18.2	20.6
When it gets dirty									
Measures taken on diseased chickens	-	-	15.8	14.1	8.3	9.1	7.9	5.3	10.5
Treated by owner	53.3	42.5	42.1	40.0	41.7	31.8	41.9	46.0	37.8
Consume immediately	20.0	16.7	10.1	18.6	15.0	19.5	16.7	15.6	17.7
Sold immediately	0-	-	-	-	-	12.0	2.0	-	4.0
Consulted veterinary expert	26.7	40.8	32.0	27.3	35.0	27.6	31.6	33.2	30.0
No intervention									

Table 3: Culling and replacement of chickens in Borno State

	Local Government Areas								
	Sahel savannah			Sudan savannah			Agro-ecological zones		
	Gubio	Marte	Mobbar	Chibok	Gwoza	Kwaya Kusar	Mean	Sahel	Sudan
Purpose of culling and selection	36.7	16.7	31.6	30.0	33.3	40.9	31.5	28.3	34.7
Consumption	40.0	45.8	52.6	36.7	41.7	36.4	42.2	46.1	38.3
Trade	23.3	37.5	15.8	33.3	25.0	22.7	26.3	25.5	24.7
Fear of disease									
Reasons for culling chickens	33.3	29.2	26.3	36.7	41.7	36.4	33.9	29.6	38.3
Poor productivity	16.7	25.0	10.5	33.3	25.0	13.6	41.4	17.4	24.0
Old age	16.7	8.3	31.6	30.0	2.0	36.4	14.7	18.9	30.5
Sickness	33.3	37.5	31.6	0	8.3	13.6	20.7	34.1	7.5
Reduction in flock size									
Source of replacement stock	50.0	95.8	52.6	33.3	25.0	31.8	46.4	66.1	26.7
Purchased	23.4	-	15.8	30.0	33.3	31.8	24.1	13.1	28.4
Inherited/gift	26.6	4.2	31.6	36.7	41.6	36.4	32.9	20.8	44.9
Hatched									

Table 4: Fertility and hatchability of local hens in Borno State

	Local Government Areas								
	Sahel savannah			Sudan savannah			Agro-ecological Zone		
	Gubio	Marte	Mobbar	Chibok	Gwoza	Kwaya Kusar	Mean	Sahel	Sudan
Number of clutch per hen per year (%)	11.0	12.5	20.4	10.0	-	-	9.0	14.6	3.3
Two	70.0	80.5	68.4	73.3	75.0	77.3	74.1	73.0	75.2
Three	19.0	7.0	11.2	16.7	25.0	22.7	16.9	12.4	21.5
Four									
Number of eggs laid per clutch	13.3	4.2	-	-	-	27.3	7.5	5.8	9.1
5-10	73.3	87.5	89.5	83.3	91.7	50.0	79.2	83.4	75.0
11-15	13.3	8.3	10.5	16.7	8.3	22.7	13.3	10.7	15.9
Above 16									
Number of chicks per hatch	76.7	8.3	21.1	13.3	10.0	4.5	22.3	35.4	9.3
4-10	16.6	91.7	78.9	80.0	86.7	90.9	62.1	63.2	79.9
11-15	6.7	-	-	6.6	3.3	4.5	3.5	2.2	4.5
Above 15									
Number of chicks surviving adulthood	20.0	29.2	5.3	-	-	-	9.1	18.2	-
1-5	63.3	62.5	84.2	76.7	100	72.7	76.6	70	83.1
6-10	16.7	8.3	10.5	23.3	-	27.3	14.4	11.8	16.8
Above 11									

Table 5: Marketing of live chickens in Borno State

Parameters (%)	Local Government Areas . Sahel savannah . Sudan savannah . Gubio	Marte	Mobbar	Chibok	Gwoza	Kwaya Kusar	. Agro-ecological Zone. . Mean	Sahel	Sudan
Factors affecting chicken Marketing	20.5	-	5.3	15.3	100	26.4	27.9	8.6	47.2
Unstable price	62.0	87.5	48.3	72.7	-	63.6	55.8	66.2	45.4
Availability of substitute	16.7	12.5	46.4	12,.0	-	10.0	16.3	25.2	7.3
Sales of diseased chickens									
Selling price of medium size chicken									
Male chicken (₦)	10.00	-	4.0	20	16.7	-	15.8	19.4	12.2
500-700 ($3.45-4.83)	78.5	8.3	49.5	55.7	67.3	100	73.8	60.1	74.3
800-1000 (5.52-6.9)	11.5	91.7	10.5	25.3	13.0	-	8.3	3.8	12.8
Above 1000 ($6.9)									
Female chicken (₦)									
300-500 ($2.1-3.45)	60.7	4.2	21.1	3.4	15.6	4.5	18.3	28.7	7.8
600-800 ($4.14-5.52)	39.3	95.8	57.9	33.3	50.0	81.8	59.7	64.3	55.0
Above 800 ($5.52)	-	-	22.0	63.3	34.4	13.6	22.2	24	87.1

(1 USD = ₦145)

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