Journal of Biology, Agriculture and Healthcare
ISSN 2224-3208 (Paper) ISSN 2225-093X (Online)
Vol.4, No.9, 2014

Village Chicken Production System in the Greater Accra Region, Ghana

Seth Blackie
Department of Agribusiness Management, Central Business School, Central University College
P.O. Box DS 2310, Dansoman, Accra, Ghana
Email: sethamoblackie@yahoo.com

Abstract
The study was conducted to evaluate village chicken husbandry practices and productivity in three administrative districts in the Greater Accra region. A stratified random sampling technique was used to select 110 rural households. Respondents were interviewed using a structured questionnaire. Chickens were mainly owned by women and kept under scavenging system with very minimal feed supplementation. About 50% of the respondents housed their birds. No formal disease control measures were adopted. The mean flock size was 13.4 ± 1.10 and the average annual egg production per hen was 37.2.The total number of clutches per hen per year was 3.8 ± 1.2 with an average of 9.8 ± 2.4 eggs per clutch. The hatchability recorded was 75%. High pre-weaning chick mortality was recorded. Diseases, predation and poor nutrition were the major constraints to village chicken production in the study zones. . Newcastle disease was identified as the most devastating disease. Measures for improving productivity and protection of village chickens are discussed.
Keywords: Village chickens, husbandry practices, productivity, constraints, Ghana.

1. Introduction

Village chicken production is based mainly on indigenous fowls (*Gallus domesticus*) and is common in rural households in developing countries. They play a vital role in the livelihood of rural communities and contribute significantly to their food security and income. Besides, they are used in customary rites and festivals and play an important role in pest control (FAO, 1997). Village chickens are raised extensively in small numbers and obtain most of their diet from scavenging for food and water in their immediate environment with very little capital investment in their husbandry. The production system is generally described as low-input low-output (Kitalyi, 1998) and is characterized by, poor nutrition, predation, diseases and parasite infections and low productivity (Tadelle et al, 2003). Although this production system is sustainable for the resource poor rural households, output in terms of weight gain and the number of eggs per hen per year are very low with high mortality rates (Matthewman, 1997). In Ghana, for instance, about 80 percent of village chickens are lost annually due mainly to Newcastle disease and a number of other causes (Awuni, 2002). This work was undertaken to contribute to existing knowledge on the husbandry, productivity and constraints to village chicken production in Ghana and to identify and recommend sustainable measures that rural households could adopt to improve the productivity of their flock.

2. Materials and Methods

2.1 Study Area

The study was carried out in three out of six districts in the Greater Accra Region. These were Ga West, Ga East and Damgbe West districts. The region is located in the south central part of Ghana with a coastline of about 224 km and covers an area of about 3,245 square kilometres. Temperatures in the region ranges from 20ºC to 30ºC and the annual rainfall ranges from 630mm along the coast to 1140mm in the hinterland and is characterized by a bimodal pattern of distribution. The vegetation is basically coastal savanna interspersed with shrubs and short trees (Greater Accra Regional Administration). The predominant occupation of the majority of the people in the study area is farming with free range local chickens forming an integral part of their farming system.

2.2 Sampling Procedure

A stratified random sampling technique was used for the study. Three districts with a high concentration of local chickens were purposively selected in consultation with the Agricultural Extension Agents. Twenty two villages (comprising seven from Ga East, seven from Ga West and eight from Dangbe West) and five households per village were randomly selected for the study. Overall, 110 households were involved in the survey.

2.3 Data collection

Structured questionnaire and participatory rural appraisal involving focus group discussion were used for the study. The data collected included: The educational background of respondents, livestock kept and crops grown, chicken nutrition, housing, health and management problems. Information on flock size and composition and productivity were also recorded. Indices used for measuring productivity were frequency of eggs set per year (number of clutches per year), number of eggs laid per clutch, number of eggs incubated, number of eggs

hatched, number of chicks weaned and pre-weaning chick mortality. The relative importance of the major causes of deaths and losses of village chicken in the survey area was obtained using a pre-coded questionnaire including: diseases, predators, and nutrition.

2.4 Data management and analysis

Qualitative and quantitative data were analysed using the Statistical Package for the Social Sciences. Descriptive statistics such as figures, mean, frequency and percentages were used to summarize and present the results.

3. Results and discussion

3.1 Household characteristics

Majority of the respondents (71.8%) had elementary/basic education. All the households interviewed had access to farm lands. Most of the respondents cultivated maize, cassava and vegetable crops. The proportion of households engaged in the cultivation of leguminous crops was very small (Table 1). Clearly, carbohydrate crops were the main food items produced by the respondents. This implies that improvements to livestock production, particularly chickens with short life cycle and quick turn overs, would be required to complement their staple diets. All the respondents kept chickens. A few households owned sheep (25.5%) and goats (29.1%). None of the respondents kept cattle or pigs whilst the ownership of ducks was very negligible (0. 05%). In addition to farming most of the respondents engaged in trading and other off-farm employment. Thus, the respondents had multiple sources of income and food security. The birds were managed mainly by women (88%) and kept under scavenging system with very little inputs. Similar pattern of chicken ownership has been reported by Kitalyi, (1998). The system of village chicken production involving low input integrates well with crop farming and other livelihood activities of rural households as it enables farmers to diversify their resources. Muchadeyi et al. (2004) recommend that introduction of new technologies, such as feeding programmes, disease vaccination programmes and record keeping, aimed at improving village chicken production in poor rural households should be critically examined before implementation in order to sustain the balance in their livelihood activities.

Table 1 Crops grown by respondents

Crops	**Number of respondents***	**(%)***
Maize	97	88.2
Yam	12	10.9
Cassava	101	91.8
Beans	6	5.5
Groundnut	6	5.5
Vegetables	69	62.7
Potatoes	10	9.1

Source: Field data, 2006. Multiple response*

3.2 Housing

Different forms of housing structures made of mud and/wood with thatch roof were provided for the chickens by 49.1% (n= 54) of the respondents. 22.7% (n=25) allowed their birds to shelter around their houses whilst 17.3% of the respondents allowed their birds to perch on trees/roof during the night. A few (10. 9%, n=12) kept their birds in the kitchen. Lack of housing or poor housing structures for free range chickens is typical of village chicken production systems impacting negatively on the productivity of the birds (Tadelle and Ogle, 2001; Muchadeyi et al., 2005). A good chicken house is known to prevent losses of birds from predation and theft (Bell and Abdou, 1995). It also protects the birds, especially chicks, from adverse weather conditions and enables the hens to lay their eggs in specific places thus managing egg production. Report by Hall, (1986) indicates that a good housing structure could provide the birds with a favourable microclimate and keep diseases and parasites from spreading. Although all the households that provided housing for their flock reported cleaning the chicken houses, the frequency of cleaning varied. Out of the 54 respondents that housed their birds 70.4% (n=38) reported cleaning their pens more than once a week and 20.4%, n=11 cleaned once a week. A few respondents (9.3%, n=11) cleaned their pens daily. Regular cleaning and disinfection of chicken houses is known to control diseases and parasites.

3.3 Feeding

Scavenging feed was the most important feed resource available for the chickens. These included harvested remains on the fields, household wastes, vegetation, insects and other invertebrates derived from the soil. Majority of respondents (80.9%, n= 89) indicated they provided a few handful of maize and/or maize bran in the morning for their flock however this provision was irregular with birds of different sizes including chicks scrambling for the small amount of grains and bran spread on the ground. 54.5% (n=60) of households provided water for their flocks whilst the remaining 45% (n=50) did not. According to Tadelle and Ogle (1996), the amount of scavenging feed resources available and household supplementation varies from season to season and

depends on activities such as land preparation and sowing, harvesting, grain availability in the household and life cycle of insects and other invertebrates. Tadelle and colleague reported that protein supply to scavenging birds may be critical particularly during the drier months, whereas energy may be critical during the rainy season. However it is believed that the most important limiting nutrient in scavenging chickens is energy as the birds get adequate protein from scavenging insects and other invertebrates (Smith, 1992). Improving feed supplementation of scavenging chickens in general and separate feeding of chicks up to about 6 weeks of age could to improve flock size and also reduce chick mortality

3.4 Health

Focus group discussions revealed that the most important chicken health problems in the study zones were Newcastle disease, diarrhoea, fowl pox, worm infections and lice infestation. Newcastle disease was reported to be the main cause of deaths occurring in their flocks especially during the dry season. Households did not have access to veterinary assistance for their chickens. Majority of them resorted to the use of various forms of herbal mixtures in the drinking water of their birds when disease symptoms were noticed whilst a few occasionally administered human antibiotics, dewormers or pain killers to their sick birds. Lice were controlled using wood ash whilst palm oils were applied to scabs resulting from fowl pox. The seasonality and devastating effect of Newcastle disease in village chickens is well known by both the farmers and researchers. Report by Permin and Pederson, (2002) indicates that Newcastle disease alone may kill about 80% of household poultry in African and Asian countries and is one major cause of low output and low annual off-take in scavenging birds. The seasonality of disease incidence and parasite infections should be considered when implementing control measures in order to achieve effective results.

3.5 Flock size and structure

The flock size and composition found in this study are shown in Table 2. The average flock size of 13.4 observed compares with average flock sizes reported elsewhere in Ghana and some countries in sub-Saharan Africa as follows: 10 and 88 in Ga rural district and West Mamprusi District (Ghana) respectively (Dankwa et al., 2000); 28.7 in the Accra plains, (Aboe et al., 2006); 13 in Ethiopia (Gueye, 1997); 17 in Zimbabwe (Muchadeyi et al., 2004) and 18.8 in Sudan (Khalafalla et al 2000). Reports from various studies indicate that socio-economic and agro-ecological factors as well as management practices have a significant influence on flock sizes owned by rural households. For instance sex of household head has been reported to influence the average flock size with female-headed households having larger flocks (Muchadeyi et al., 2004). Generally, larger flock sizes are likely to be found in households with better standard of living than their poorer counterparts and those with larger families (Aboe et al., 2006). Flock size and structure may vary from season to season depending on feed availability, disease and predators (Awuni, 2000; Tadelle and Ogle, 2001; Muchadeyi et al., 2004).

The flock composition in this study shows that chicks form the highest proportion followed by hens and pullets with cocks and cockerels forming the smallest proportion of the flock (Table 2). The hen to cock ratio of 5:1 reported in this study is similar to that reported by Khalafalla et al, 2000) but differs considerably from the ratio of 1:1.3 reported by Dankwa et al. (2003) whilst Awuni (2002) reported an average ratio 3:1. The high proportion of chicks observed in this study is similar to those reported in other studies in developing countries (Mwalusanya et al, 2001).

Table 2 Flock size and composition

Flock statistics	**Mean±SE**
Flock size	13.4± 1.10
Chicks	6.1± 0.81
Hens	2.6± 0.34
Cocks	0.8± 0.19
Pullets	3.9± 0.67
Cockerels	0.8± 0.29
Hen to cock ratio	4.9± 0.13

Source: Field data, 2006

3.6 Productivity of Village Chickens

Table 3 shows the production and reproductive performance of local chickens in the study zones. The average number of clutches per hen per year of 3.8 ± 1.2 SE and the number of eggs laid per clutch of 9.8 ± 2.4 SE found in this survey were similar to that reported in other studies. For instance the average number of clutches per hen per year and the average number of eggs laid per clutch respectively were given as 4.5 and 10.87 in Sudan (Wilson, 1979), 3.2 and 11 in Gambia (Kitalyi, 1998), 3.7 and 10.1 in the West Mamprusi district of Ghana (Dankwa et al., 2000). Nearly all the eggs were reported to have been incubated in this study. The mean hatchability recorded was similar to that reported by Aboe et al. (2006), close to the 79% recorded by Awuni (2002) in the forest zone of Ghana but varies considerably from the 90% reported by Dankwa and colleagues and 82% recorded by Kusina et al (2000) in Zimbabwe. A high rate of pre-weaning chick mortality (44.6 %). was

observed in this study. High chick mortality is characteristic of scavenging indigenous chickens due to predation and diseases resulting from virtually no veterinary intervention (Tadell and Ogle, 2001), poor nutrition mainly during the dry seasons when scavenging feed resources are scarce, and adverse weather conditions such as exposure of chicks to intense rainfall, heat and cold (Kitalyi, 1998). The average number of eggs laid per hen per year of 37.2 observed in the study is comparable to that found by Awuni, (2002).

Table 3 Reproductive Performance

Performance indicators	***Mean ±SE***
Clutches per hen per year	3.8 ± 1.2
Number of eggs laid per clutch	9.8 ± 2.4
Number of eggs incubated	8.3. ± 0.46
Number of eggs hatched	6.5 ± 1.1
Hatchability (%)	75.4 ± 5.9
Number of chicks weaned	3.7 ± 1.8
Pre- weaning chick mortality (%)	44.6% ±0.78

Source: Field data, 2006

The small flock sizes and low productivity of village chickens have been attributed to the high pre-weaning chick mortality, long reproductive cycle (laying, hatching, taking care of chicks and resting) of 92 ±19 days (Missohou et al., 2002), poor husbandry practices and the high tendency of local hens to become broody after laying a little over 10 eggs; and egg losses due to lack of laying nest in many households, (Tadelle and Ogle, 2001).

3.7 Causes of chicken mortality and losses

Free range chicken production in the survey area was characterized by high mortality. The main reasons for the loss of village chickens were disease, predation and other causes such poor nutrition and theft. Respondents were asked to rank the three most important reasons for the death of their birds using a pre-coded questionnaire. The result of the ranking is summarized in table 4. Overall respondents perceived diseases and predation as the most important constraints to local chicken production with diseases ranking first. Poor nutrition ranked third in importance. Most of the mortalities of rural chickens due diseases and predation were reported to occur during the dry season. As indicated earlier, Newcastle disease is considered as one of the major constraints to village chicken production in Africa and Asian countries. In Ghana, formal disease control for local chicken flocks is almost entirely neglected. For instance Dankwa et al (2000) reported that only 14% of the farmers they interviewed had regular vaccination against Newcastle disease**.** Lack of veterinary interventions for controlling Newcastle disease in village chickens could be attributed to the problem of confining the birds for vaccination, cold chain/refrigeration requirement for the conventional vaccines and the short duration required for the birds to consume the diluted vaccines.

Table 4 Causes of death and losses of chicken

	Diseases		**Predation**		**Poor nutrition**	
	Frequency	%	Frequency	%	Frequency	%
Very important	95	86.4	87	81.5	63	57.3
Important	9	8.2	18	16.4	44	40.0
Less important	6	5.5	5	4.5	3	2.7
Total	110	100	110	100	110	100

Source: Field data, 2006

Thermostable vaccines against Newcastle disease are now available to control disease outbreaks in scavenging chickens. The use of these vaccines coupled with improved supplementary feeding and housing and control of other diseases and parasites could lead to significant improvement in village chicken production (Aboe et al., 2006)

4. **Conclusion**

Village chickens form an integral part of the farming system of rural household in the survey districts. The production system was characterized by minimal inputs, in terms of labour, feeding, housing and health care. The birds depended mainly on scavenging feed resources available in their immediate environment. The average flock size and productivity was generally low with high mortalities occurring among chicks prior to weaning. Diseases, predators, and inadequate nutrition particularly during the dry season were found to be the major causes of high mortality and low productivity in village chickens in the survey.

5. Recommendations

The following recommendations could be considered for improving the productivity and protection of village chickens:

- Pre-weaning chick losses through diseases, predation and harsh environmental conditions can be reduced by rearing chicks in confinement up to at least 8 weeks before allowing them to run on range. During this period of confinement commercial chick feed will be required to improve growth and development of chicks.
- Early weaning of chick will reduce the long reproductive cycle and increase the number of clutches per year as well as the number of eggs produced per hen per year.
- The high prevalence of Newcastle in the survey districts can be controlled effectively with the use of thermostable ND1-2 vaccine administered via the eye drop route. A vaccine regime every quarter of the year will ensure that newly hatched chicks are protected against the sporadic outbreaks of the disease through out the year (Awuni et al, 2006)
- Farmers should be encouraged to use vaccines available for controlling fowl pox for commercial birds.
- Sulphur based insecto-acaricides could be used to control ectoparasites which are a big threat to the survival of rural chickens especially incubating hens (Awuni et al, 2006).
- Small improvement in feed supplementation has been found to increase significantly the number of eggs laid per hen per year (Smith, 1990**)** and improved growth rate of village chickens.
- Provision of proper chicken houses will be required to protect the birds from predation and theft.

References

Aboe, P.A.T., Boa-Amponsem, K., Okantah, S.A., Butler, E.A., Dorward, P.T., Bryant, M.J., (2006). Free-range village chickens on the Accra plains, Ghana: Their husbandry, and productivity. *Tropical Animal Health and Production, 38: 235-248*

Awuni, J.A. (2002). Strategies for the improvement of rural chicken production in Ghana. In: *Characteristics and Parameters in Family Poultry Production in Africa*. (IAEA, Vienna).

Awuni, J.A., Coleman, T.K., Sedor, V.B. (2006). Comprehensive approach to the improvement of rural poultry production in Ghana In *Improving Farmyard Poultry Production in Africa: Interventions and their Economic Assessment*. FAO/IAEA. Vienna, 2006: 84-89.

Bell, J.G. and Abdou, I. (1995). Dynamics of village poultry production in the Keita region of Niger. *Niger Journal of Animal Production*, 22: 141-144.

Dankwa, D., Nelson, F.S., Mzamo, K.B., Oddoye, E.O.K., (2000). A survey of rural poultry management in the West Mamprusi district and the Ga rural district of Ghana. *Ghana Journal of Agricultural Science*, 33, 71-**77**

Food and Agricultural Organization, *Guidelines for the inclusion of improved household poultry production. Diversification component of the special programme for food security*, FAO, Rome (1997) 76 pp.

Greater Accra Regional Administration, Ghana

Gueye, E.F. (1997) Diseases in Village Chickens: *Control through Ethno-Veterinary Medicine.* ILEIA *Newsletter*, 13 (2): 20-21

Hall, H.T.B. (1986). *Diseases and Parasites of Livestock in the Tropics*. 2nd Edition Intermediate Tropical Agricultural Series. Longman Scientific and Technical England. United Kingdom

Khalafalla, A. I. Awad, S. & Hass, W. (2000). Village Poultry Production in the Sudan. Department of Microbiology, Faculty of Veterinary Science, University of Khartoum, Khartoum, North Sudan.

Kitalyi, A. J. (1998). Village Chicken Production Systems in Rural Africa, *FAO Animal Health and Production Paper* 142, Rome. P.76.

Kusina J. Kusina N.T. and Mhlanga J. (2000). A Survey on Village Chicken Losses: Causes and Solutions as perceived by farmers in communal area of Zimbabwe.

Matthewman, R. W. (1977). A Survey of Small Livestock Production at Village Level in Derived Savannah and Lowland Forest Zones of Southwest Nigeria, Department of Agriculture and Horticulture, University of Reading, Study No. 24, 40-41

Missohou, A., Dieye, P. N. and Taliki, E. (2002). Rural Poultry Production and Productivity in Senegal. *Livestock Research for Development*. 14 (2). 2005

Muchadeyi, F.C., Sibanda, S., Kusina, N.T. Kusina, J.F. & Makuza, S.M., (2004). The village chicken production system in Rushinga District of Zimbabwe. *Livestock Research for Rural Development*, 16 (6)

Muchadeyi, F.C., Sibanda, S., Kusina, N.T. Kusina, J.F. & Makuza, S.M., (2005). Village chicken flock dynamics and contribution of chickens to household livelihoods in a smallholder farming area in Zimbabwe. *Tropical Animal Health and Production*, 37, 333-344

Mwalusanya, N.A., Katule, A.M., Mutayoba, S.K., Mtambo, M.M.A., Olsen, J.E. and Minga, U.M., (2001). Productivity of Local chickens under village management conditions. *Tropical Animal Health and Production*, 34, 405-416

Permin, A. and Pederson, G. (2002). The need for a holistic view on disease problems in free-range chickens. In: *Characteristics and Parameters in Family Poultry Production in Africa*. (IAEA, Vienna)

Smith, A.J. (1990). Poultry. *Tropical Agriculturist Series*, CTA, Macmillan, London
Smith, A.J. (1992). Integration of poultry production into the agricultural systems. In *The Tropical Agriculturalist Poultry*. CTA Macmillan pp. 179- 191
Tadelle, D. and Ogle, B. (1996). A Survey of Village Poultry Production in the Central Highlands of Ethiopia. Part 1 of M.Sc. Thesis. Swedish University of Agricultural Sciences, Department of Animal Nutrition and Management
Tadelle, D. and Ogle, B. (2001). Village poultry production system in the central highlands of Ethiopia. *Tropical Animal Health and Production*, 33: 521-537
Tadelle, D., Million T., Alemu. Y., Peters. K.J. (2003). Village chicken production systems in Ethiopia: Use patterns and performance valuation and chicken products and socio-economic functions of chicken. *Livestock Research for Rural Development* (15): 1
Wilson R.T. (1979). Studies on the Livestock of Southern Darfur, Sudan. V11. Production of Poultry under Simulated Traditional Conditions. *Tropical Animal Health and Production*. 11: 143-150

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:
http://www.iiste.org

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: http://www.iiste.org/journals/ All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: http://www.iiste.org/book/

Recent conferences: http://www.iiste.org/conference/

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar