

**BINDURA UNIVERSITY OF SCIENCE EDUCATION**

**FACULTY OF AGRICULTURE AND ENVIRONMENTAL SCIENCES**

**DEPARTMENT OF ANIMAL SCIENCE**

**A SURVEY ON BROILER PRODUCTION PRACTICES OF SMALL SCALE PERI- URBAN  
FARMERS IN DEMA**



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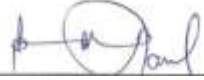
## Approval page

The undersigned hereby certify that they have read and recommended to the Bindura University of Science Education for acceptance a dissertation of a research project entitled: “A survey on broiler production practices of small scale peri- urban farmers in Dema”, submitted by Manjabire Sharmaine K (B190482A)

The thesis was submitted to the department of Animal Science, Faculty of Agriculture and Environmental Science, Bindura University of Science Education in partial fulfilment of requirements for the degree Bachelor of Science Honours degree in Animal Science

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## **Abstract**

The study focused on the broiler production practices of small scale peri-urban farmers in Zimbabwe particularly Dema area. The study aimed to establish broiler production that may impinge on the welfare of broiler birds with particular reference to housing, space allowance, nutrition's and feeding , water and protection from elements. The study also aimed at establishing prevalence of broiler poultry diseases in Dema and to establish the constrains to broiler chicken production. The results show that broiler production in the study area was dominated by women. Flock sizes averaged 86 birds (range 25-200). On average, small-scale producers had 4-6 production cycles per year with an interval of 2-3 weeks between batches. The majority of the producers (80%) raised 75 birds per cycle, with 76.7% using concentrate feeding. The average stocking density was high (15birds per m<sup>2</sup>), and the overall bird mortality recorded was 7.4%. Brooding was mainly done in rooms inside human dwellings in order to protect the young chicks from theft, cold and predation by rodents. The study indicated that stocking density have a significant effect on the broiler welfare and production. Morbidity and mortality have a negative impact on broiler production; coccidiosis and respiratory diseases have a negative impact on broiler production on small scale farmers. The study concluded that broiler production amongst small scale farmers has become a necessary survival weapon and is fundamentally changing the lifestyle of Dema local citizens. Therefore, the study recommends that farmers in Dema to implement bio-security measures and provides well-spaced and favourable conditions that cater the living conditions of broilers.

**Key Words:** broiler, production, small-scale, peri-urban, Dema

## **Dedication**

This piece of work is dedicated to my family for the support they gave me towards the degree programme and for being my inspiration at all times.

## **Acknowledgment**

First and foremost I want to thank God almighty for his divine guidance and abundant grace.

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## **List of abbreviations**

AMR- Antimicrobial resistance

GDP – Gross Domestic Product

APEC- Avian pathogenic Escherichia coli

FAO- Food and Agriculture Organization

BW- Bird welfare

ZPI- Zimbabwe poultry industry

DOC-Day old chicks

PPP- poultry production practices

BU-Broiler units

DR – disease resistant

LMAC- livestock and meat advisory company

LSZ--Livestock Specialist Zimbabwe

# CHAPTER 1

## 1.0 Introduction

The agricultural sector in Zimbabwe generates about 17% of the country's Gross Domestic Product (GDP) (O'Neill, 2022) with cattle accounting for 35-38% of the country's agriculture GDP (FAO, 2021). It is estimated that up to 60% of rural households own cattle, 70-90% have goats, and more than 80% have chickens. Poultry production and its entire value chain constitute a significant part of the Zimbabwean agricultural output contributing to economic growth. In recent years, demand for poultry meat appear to have driven growth in the poultry industry and this has seen an increase in the quantities of poultry products produced as well as the number of producers. Zimbabwe's animal husbandry industry is comprised of small-scale and large scale (commercial) production systems (Mapiye *et al* 2008). Although the small holder sector is home to the largest chunk of the country's livestock population, the productivity and contribution of smallholder livestock to the national economy is low. Disease epidemiology is poorly understood and small-scale farmers generally do not keep records, and contact with veterinarian and extension workers is poor, and many issues go unnoticed (Muchadeyi *et al.*, 2005). Broiler chickens are increasingly becoming an integral component of rural poultry production systems especially in the peri-urban centres and surrounding districts in Zimbabwe. Broilers account for up to 70% of all commercial day-old chicks produced in Zimbabwe (LMAC, 2018).

Broiler poultry production plays a significant role in the livelihoods of urban and peri-urban communities. Broilers in the peri-urban areas have a significant role in providing employment for the villagers and to supply a source of protein. In addition the broiler plays an important role in providing manure for the peri-urban residents while acting as alternatives for savings, investments and risk security (FAO, 2008). Smallholder broiler production segment is estimated at two third of all broiler meat produced in Zimbabwe (ZPA, 2021). The estimated small-scale broiler meat production from January to December 2021 was from 5 900tonnes to 10 800tonnes respectively (ZPA, 2021).

In these systems, the inputs and outputs are both low. Low chicken productivity is measured by the quantity of sold birds (Mwalusanya *et al* 2002). It is challenging to establish and implement poultry-based development programs that benefit peri-urban residents due to a lack of

understanding of rural chicken production systems (Guèye 1998; Pedersen 2002). There is a need to understand constraints that peri-urban broiler chicken producers face. Due to the various biological, social, and economic factors that influence production techniques and, as a result, productivity levels, there are numerous constraints on the production of chickens. These constraints also differ between households. (Mwalusanya *et al* 2002) For instance, the amount of feed that is readily available at the household level determines the supply of nutrients for chickens, whereas the health of the chickens is determined by the prevalence of local diseases. In most cases, the welfare of birds is impacted by limited space and there is over stocking.

### **1.1 Problem statement**

Small-scale/backyard broiler production makes significant contributions to the livelihoods of the rural people populations as well as feeding the urbanites that have no place to grow their food. Despite the importance of this sector, very little is known about the productivity of broiler chickens raised in the backyard. It is hypothesised that poor farming practices are the fundamental reason why farmers are experiencing high mortality rates.

### **1.2 Justification**

This study aims to identify sub-standard production practices impacting on smallholder broiler poultry production and productivity. Knowledge of such practices will enable development of strategies to address the problems, leading to improved smallholder broiler poultry production. Improved management techniques will lead to improved broiler chicken production leading to increased household income, poverty reduction, food security and employment creation.

### **1.3 Objectives**

The main Objective of this study is to improve bird welfare, production and productivity of peri-urban broiler chicken in Zimbabwe.

1. To evaluate peri-urban broiler chicken production system- establish broiler production practices that may impinge on the welfare of broiler birds with particular reference to housing, space allowance, nutrition and feeding, water and protection from the elements;
2. To establish the prevalence of broiler poultry diseases in the Dema area.
3. To identify constraints that broiler producers in the per-urban areas of Dema district face

## **1.4 Hypotheses**

Ho. There is a strong negative relationship between broiler production practices and bird welfare.

Ho. There are more diseases in the Dema peri-urban area.

Ho. There are no constrains to broiler production in Dema peri-urban area.

## **CHAPTER 2**

### **2.0 Literature review**

#### **2.1 Introduction**

This chapter seeks to review both theoretical and empirical arguments on broiler production practices of small-scale farmers in Zimbabwe. The first section covers literature review which includes the state of knowledge regarding the role of Agriculture, and in particular, smallholder poultry production to the household and national economy. The last section covers small holder poultry production practices which help the reader the challenges facing smallholder, in particular, peri-urban broiler poultry producers.

#### **2.2 The role of agriculture in Zimbabwe**

Zimbabwe is an agro based economy with agriculture being regarded as the foundation and anchor of its economy and it will continue being so for the foreseeable future (Sithole 2006). The country is endowed with has vast fertile land suitable for both livestock and crop production due to a good tropical climate. Currently, the agricultural sector generates only 17% of the country's GDP. (FAO, 2021; O'Neill, 2022), and there is potential to increase its contribution to economic development if the right fundamentals and production practices are adopted on a wider scale. Although agriculture's contribution to the national GDP is relatively low, the sector provides 60% of all raw materials (primary commodities) required by industry hence it's also critical for industrialization. The sector generates about 45% of the country exports, which brings in the much needed foreign currency (Sithole 2006). In addition, over 70% of the country's rural population depends on agriculture for food security, income generation and employment creation (World Bank, 2010).

#### **2.3 The importance of the poultry industry in Zimbabwe**

Poultry production and its entire value chain constitute a significant part of the Zimbabwean agricultural industry and the economy at large. In recent years, demand for poultry products, primarily chicken and its products appear to have driven growth in the poultry industry, increasing not just the quantities produced but also the number of producers.



Zimbabwe's poultry industry contributes about 5% of the country's agricultural GDP (Scoones, 2014). The industry is dominated by the smallholder sector which recorded 70% of the sales of chicks in 2014. (ZPA, 2015). According to estimates, small-scale production now dominates 65% of the broiler subsector (Sukume, 2011).

The increased demand for poultry could be due to a number of factors, including poultry meat being a healthier, more affordable, and more accessible household option compared to its substitutes such as beef, pork, chevron, or mutton. The poultry production sector has numerous backward and forward inter-linkages with other industries, so that growth in the poultry production sector has spurred growth in its supporting industries, leading to growth in the entire value chain. The growth in poultry production has increased the demand for inputs such as feed, chicks, medicines and equipment. Also, it has placed greater demand on the many supporting industries involved in the marketing, storage and transport of input and output products. At the centre of all this growth lies the farmer, who is involved in the primary production of poultry and its products

## **2.4 Poultry production in Zimbabwe**

As is characteristic of Zimbabwe's farming sector, the poultry industry is dual in nature, consisting of both large and small-scale farmers. Small-scale producers, who constitute a significant proportion of up to 75% of poultry farmers, are key to the success of this industry. This article will discuss the status of the country's small-scale poultry farmers highlighting the trends, challenges and opportunities in the poultry industry through the lens of a small-scale farmer

## **2.5 Small-scale broiler production in zimbabwe**

According to a research by (Mambondiyani, 2022), small-scale poultry farmers from the eastern side of Zimbabwe crowd every week to purchase day-old chicks, primarily broilers, from a small veterinary shop in Mutare. In spite of being negatively impacted by the COVID-19 pandemic, small-scale broiler production accounts for 73% of the nation's total broiler meat production, according to the Zimbabwe government's second crop and livestock assessment report for 2021. The abuse and overuse of antibiotics in chicken farming is the story that lies behind the

expansion of Zimbabwe's small-scale poultry farming. As a result, antimicrobial resistance has quickly increased which is endangering Zimbabwe's chicken farming industry. Many small-scale poultry farmers still use antimicrobials improperly because they have little to no information about how to treat poultry infections.

Besides the misuse of antimicrobials by small-scale poultry farmers, urban broiler production may help disadvantaged people, such as the urban poor, disabled, women, orphans, and the unemployed, in achieving socioeconomic inclusion and a fair quality of living. (Kashangura and Gororo 2016) According to their study, women predominate in urban agriculture because, in comparison to males, they are insignificant in the official job sector of the urban economy and have a crucial role in supplying food to households. The majority of urban broiler units are located at homes, thus these tasks will more easily be included into women's everyday responsibilities for their livelihood and well-being. It also revealed that because most males are employed elsewhere, broiler production was merely a minor side activity for them. When urban agriculture activities are oriented toward commercialized output, men predominate.

In his study, (Mambondiyani, 2022) noted that one of the chicken farmers in the Mutare district had recently decided to start a small-scale chicken farm to supplement low earnings from official employment. In addition, he claimed that a large number of unemployed individuals in the country, particularly women, had turned to chicken farming as a means of generating cash. Many small farmers are being forced to switch from crop farming to poultry farming at the same time due to frequent and severe droughts. Family poultry helps the households in securing their food supply, generating cash, and getting employment for women and children. A valuable supply of protein in the diet can be obtained from occasional consumption. Family poultry is one of the few opportunities for saving, investing, and risk protection for small-holder farmers in food-insecure, low-income nations. In some of these countries, family poultry accounts for approximately 90 percent of the total poultry production.

## **2.6 Characteristics of smallholder farmers**

According to (Nagayets, 2005), a smallholder farm is one that is 2 hectares or less in size and is based on the amount of land or livestock kept on the farm. The definition based on size has been criticized by (Berdegue and Fuentealba, 2011) because they claim that it does not reflect the

labour arrangement, productivity, and efficiency of the farm. Family-run farms are included in small holder agriculture, and family members often perform the majority of the labour, according to (Berdegue and Fuentealba, 2011). The two also mentioned the distinction between commercial family farmers and subsistence farmers, two categories into which smallholder farmers might be classified. On a smallholder farm, decisions are usually made with the welfare of the family before considering profit (Mudhara 2010).

Small-scale farmers are also characterized by low levels of education, restricted access to information, and insufficient managerial abilities to effectively run their farms. According to (DAFF, 2012), small-scale farmers use out-dated production techniques, which results in low yields. Another characteristic that distinguishes small size farms is the proportion of time spent on farming activities compared to non-farming activities. Small - scale farmers' households typically have limited access to facilities like power and clean water (Stats SA, 2013). Smallholder farmers are also defined as those with little academic qualifications, low incomes, and ages that often range between 45 and 54.

## **2.7 Animal welfare**

The term "animal welfare" describes the quality of life of an animal, which includes how well the animal is adjusting to his or her current situation and environment. Human-animal relationships have an impact on animal welfare, according to World Animal Protection, and it is our responsibility to ensure that all animals are treated kindly, responsibly, and with respect. The welfare of animals should come first in all human interactions with animals (Mellor, 2016) There are five freedoms that must be maintained in order to meet the physical and mental needs of the animals in our care. These five freedoms, which are widely regarded as the gold standard in animal welfare, include the freedom from hunger and thirst, discomfort, pain, injury, and disease; the freedom to express normal and natural behaviour (for instance, making accommodations for a chicken's instinct to roost); and the freedom from fear and distress...

The availability of fresh water and a diet that promotes health and vitality can satisfy the first four freedoms of animal care. The freedom from discomfort is achieved by offering a suitable environment that includes shelter and a comfortable resting place. By preventing or quickly

diagnosing and treating the animal, the freedom from pain, injury, and diseases is achieved. The freedom of animals to behave normally and naturally, as well as their freedom from fear and suffering, is satisfied by giving them enough room, suitable facilities, and other animals of their own type.

Adopting high welfare farming practices, where animals experience less stress, boost their immunity, and become disease-resistant, could drastically minimize many of the negative health effects associated with factory farming systems (WAP, 2022). It is important to make sure that all livestock producers adhere to minimal standards for the care, handling, and slaughter of farm animals. The plan is made to get rid of things like cages, confinement, barren habitats, painful operations, extreme genetics, long distance transport, and inhumane slaughter that cause the worst kinds of suffering on farm animals. These standards can be used to improve the welfare and quality of life for farm animals.

## **2.8 Constraints to broiler chicken production in urban areas**

Small-scale farmers in Africa face a variety of challenges while producing broiler chickens. The biggest challenges in Zimbabwe continue to be a lack of knowledge about chicken production, feed resource limitations, the presence of diseases (such as Newcastle, coccidiosis, and IBD), and socioeconomic limitations. Small-scale farmers in Zimbabwe also struggle with issues like a lack of capital, restrictive urban council laws, a lack of markets (Mudhara, 2010), and disease outbreaks (Gororo and Kashangura 2016). According to (Siyao 2012), access to useful information is directly related to the development of the agricultural sector. (Masuki *et al.*, 2010), states that, access to agricultural information can help small-holder farmers in increasing their capacity for output and gaining access to more organised markets. In Zimbabwe, the high cost of imported protein concentrates, soya bean, and sunflower meals is typically related to the high cost of animal feed (Hlabano, 2017).

When lending money to smallholder farmers, lenders may take into account factors such as household demographics, socioeconomic status, and farm attributes .according to (Baiyegunhi and Fraser 2014). The education level and age of a smallholder farmer are considered to be very important determinants. Credit institutions prefer to lend to farmers who are in the economically

active age group. Credit providers and insurance companies are reluctant to cooperate with smallholder farmers since they pose covariant risk due to factors including unfavourable weather conditions, moral hazard, and anti-selection.

Although smallholder farmers in South Africa were provided access to land, (Schalkwyk *et al.* 2012) contend that no title deeds were given to the same farmers for the plots of land they are farming. Due to a lack of collateral, smallholder farmers have challenges when applying for loans to improve their farms. Urban farmers also struggle with a lack of available space to grow their businesses. When asked about their future plans, respondents, according to (Babubi *et al.* 2004) and (Faranisi and Mupangwa 2011), almost all producers expressed a desire to increase their production, and more than half expressed a desire to change market trends. Findings in Zimbabwe's urban and peri-urban Marondera region revealed several minor issues, including high production costs, production theft, and a lack of land ownership. One of the challenges faced by broiler farmers in the Marondera urban region is a lack of water and feed, which is worsened by complaints from nearby residents about odours. (Kashangura and Gororo, 2016)

## **2.9 Prevalence of broiler diseases in Zimbabwe**

While keeping backyard poultry, you may encounter a variety of health issues and poultry diseases, such as respiratory and digestive problems. Although chicken diseases are far more prevalent, proper husbandry, biosecurity, and a careful response to both external and internal parasites like worms and lice may usually prevent the worst issues (Shadreck *et al.* 2016). Examples of external issues include limping, feather loss, exterior parasite infestation, frostbite, blindness, cuts, and wounds. Broiler chicken respiratory infections include infectious bronchitis, avian influenza, aspergillosis, gapeworm, and mycoplasma. Common digestive system problems include internal parasites, loss of appetite, bloating, bad breath, sweet breath, diarrhoea, or messy bottoms. Marek's disease and toxoplasmosis are skeletal, muscular, and nerve system diseases. Conditions that impact the circulatory system or major organs include acute heart failure and avian leukosis (Marangoni *et al.*, 2015)

Antibiotic resistance is a new threat that Zimbabwean poultry breeders now struggle with (Mambondiyani 2022). According to his research in the Mutare District, a small-scale poultry farmer named Bande is concerned because some of his chickens are no longer responding well to

traditional treatments. He added that many small-scale farmers in Zimbabwe are switching from crop cultivation to poultry farming as a result of the country's frequent and severe draughts, when broilers and layers could be seen crowded into small, unhygienic fowl-runs. As a result of high levels of antibiotic resistance, colibacillosis, a disease caused by avian pathogenic *Escherichia coli* (APEC), might cause huge losses in Zimbabwe's poultry industry, according to recent research. After administering sick birds the proper medications and doses in Zimbabwe's small-scale broiler farming, the recovery rate was extremely low (Mambondiyani, 2022).

According to the chicken samples she evaluated from Zimbabwe's Mashonaland Central province, Lalitha Mtetwa, a livestock expert and the founder of The Livestock Specialist Zimbabwe, recent findings suggest that the prevalence of AMR in some places is still relatively low.

## **CHAPTER 3**

### **3.0 Materials and Methods**

#### **3.1 Introduction**

This study entails a survey of broiler production practices of small-scale peri-urban farmers and their impacts on production and productivity of broilers. This chapter presents an overview of the research methodology and the chapter also highlights research instruments used in the data collection, the justification for their use and the statistical package used.

#### **3.2 Description of the study site**

The study was conducted in the Dema district of Zimbabwe located 18° 5' 0'' South, 31° 13' 0'' East. Dema is 32km South-East of Harare and about 38km from Marondera town. The area is in Natural Region (NR) III, an agro-ecological region which is characterised by low rainfall ranging from 500-700 mm per annum. The region experiences an average daily high temperature of 26°C. Rainfall is erratic but heavy when it occurs. The rainy season last for about three months, and is interrupted by a long dry season. NR III is mainly suitable for semi-intensive farming.

#### **3.3 Sampling techniques**

The sample was determined by the stratified random sampling technique. Under this technique those farmers who owned broiler chickens and were willing to participate in this study were regarded as a stratum. Next, within each stratum, simple random sampling techniques were used to select respondents. Each farmer has an equal chance of being selected to be part of the sample. Four villages, namely Chinamano, Chitate, Mutsvairo and Mushaninga were randomly selected from a total of 10 villages. A village was composed of an average of 50 households. A total of 60 households, were randomly selected from the four villages.

### **3.4 Sample size**

The target sample size consists of 60 households who are in Dema peri-urban, in Mashonaland East Province. Given the available time and resources devoted to this study, the sample size is deemed to be ideal and practical.

### **3.5 Data collection**

Data collection instrument are defined as tools employed for collecting data in order to solve the problem under investigation. Data for this study was collected using combination of complimentary tools including a semi-structured questionnaire; key informant interviews, and transect observations. The combination of tools was meant to improve the accuracy and reliability of the data collected and is a widely used technique in research (Waters, 1997).

The questionnaire consisted of structured quantitative questions which yield reliable information unlike qualitative questions which are subjective. The questionnaire (see Appendix 1) was designed to collect information on smallholder broiler chicken production including household demographics, ownership patterns, flock sizes, constraints to broiler chicken production, nutrition and feeding practices, housing and bird health management.

An interview is the interaction between the researcher and the respondents in which the researcher records the response. The use of interviews in research represents a shift from the notion of human subjects as simply manipulable and data exchanged, frequently through speech, between individuals (Kvale 1996). The diseases that affected broiler chicken, their signs and symptoms, and the steps farmers took to prevent diseases were documented. Additionally, the farmer's perceptions of the constraints to the production of chickens and the function of various gender groupings were recorded.

### **3.6 Data statistical analysis**

Responses from all questions were crosschecked to facilitate coding and processing for analysis. Cross-referencing all of the responses made it easier to code and analyse them for analysis. In quantitative research, responses are coded into categorical variables and then an analysis



technique is used. Before the questionnaires were analysed, they were checked for errors. They also provided opinions and first-hand accounts of what will actually take place in the field.

The data gathered from questionnaires were coded and entered into the computer using Statistical Package for Social Science (SPSS Version 20). It gave means, percentage, standard deviations, correlations and frequency distribution of each independent and dependent variable. Prevalence of broiler diseases was analysed using the descriptive frequency method from SPSS. The mortality rate was calculated using a formula

$$\text{Mortality rate} = \frac{\text{Number of chicken deaths}}{\text{Total number of chicken population}} \times 100$$

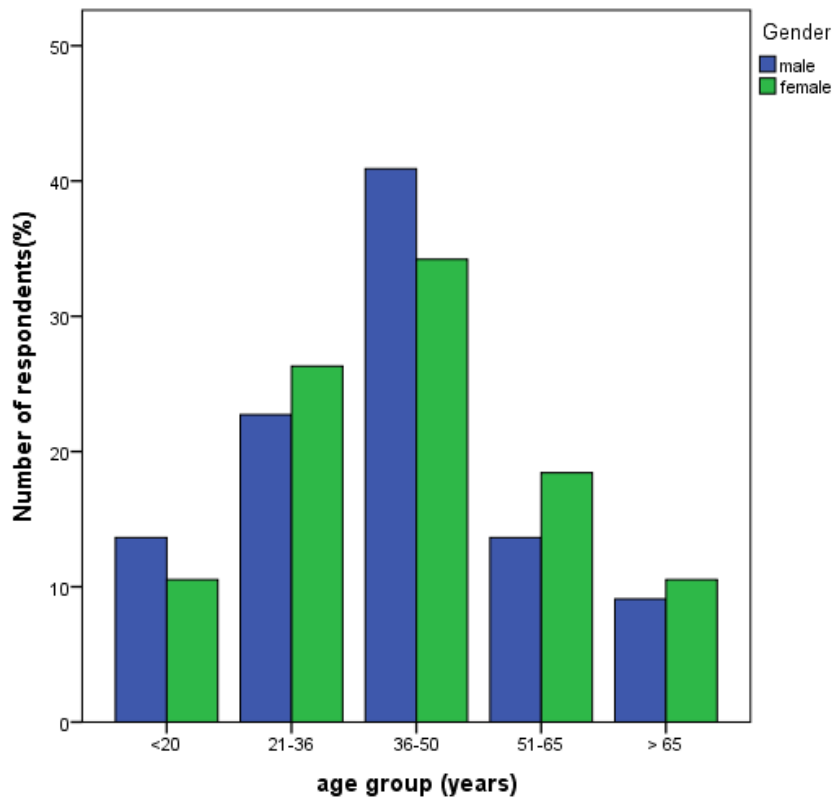
Pie charts, bar graphs and tables were used to present results. Household characteristics, management practices and participation of the different gender groups in village chicken production were analysed using the SPSS.

## CHAPTER 4

### 4.0 Results

#### 4.1. Household demography and socio-economic factors

The majority (63.3% of the respondents), were females aged between 36-50 years (Figure 1). The results also showed that most of the respondents (56.7%) were married, followed by 20.3% widowed, 16% who never got married and 7% divorcees.



**Figure 4.1: Distribution of respondents according to age**

##### 4.1.1 Educational level

The majority (60% of the respondents), had secondary level education, 28.3% had tertiary, while 6.7% did not go to school and 5% attained primary level.

**Table 4.1. Respondents educational level**

Educational level	Frequency of respondents	Percentage frequency (%)
Did not go to school	4	6.7
Primary	3	5
Secondary	36	60
Tertiary	17	28.3

**4.1.2 Livestock species kept by farmers**

31.7% of the farmers indicated that they do not keep any other livestock species besides broilers, 41.7% have roadrunners, 11.7% have goats and cattle with 3.3% having layers together with the broilers.

**Table 4.2. Other livestock species kept by broiler farmers**

Other livestock kept by broiler farmers	Respondent frequency	Respondent (%)
None	19	31.7
Roadrunner	25	41.7
Goats	7	11.7
Cattle	7	11.7
Layers	2	3.3

**4.1.3 Main reasons for keeping broilers**

The majority (98.3% of the respondents) are rearing broiler chickens mainly for sell with less than 2% rearing broilers mainly for house consumption. (54%) of the respondents ranked broiler production as their major source of income with some few respondents ranking salaries from formal employment as their main source of income.

#### 4.1.4 Start up capital

In the survey 20% of the respondents stated salaries as their start-up capital with 15% and 10% of the farmers in the area stating pensions and piece jobs as their start-up capital respectively. The majority of the respondents (70%) indicated that the piece of land they were using for broiler production was their own land and a few (18.3%) were renting the spaces. Almost (11.7%) all the respondents below the age of 20years indicated that they were using their parent's land for the production.

**Table 4.3. Respondents land ownerships**

Land ownership	Frequency of respondents
Personal land	42
Renting the land	11
Using parent,s land	7

## 4.2 Broiler production practices

### 4.2.1 Flock sizes

In the Dema area the flock sizes under study ranges from 25-200 birds per each household. 33.3% respondents kept 25 birds per batch with 20% having a flock size of 50 birds. The table below shows that 25% of the farmers kept a flock size of 75 birds. The results also showed that only 21.7% of the respondents kept a flock size of more than 100 birds.

**Table 4.4. Flock sizes in the Dema peri-urban area**

Number of farmers	Flock size
20	25
12	50
15	75
6	100
2	125
2	150

2	175
1	200

#### **4.2.2 Production system**

Most of the respondents with more than 25 broilers at once use the multiple batch system with a few using the all-in-all-out system. Most (91.7% of the respondents) of the broiler farmers in Dema peri-urban area use deep litter system of raising broilers and they use sawdust and wood shavings for bedding. Key informant interviews indicated that chick brooding was done in cardboard boxes inside human dwelling to prevent chilling and predation. The chicks were transferred to their final production houses after one or two weeks of age.

#### **4.2.3 Bird density**

Results shows that the majority of the respondents' (73%) stocking density was higher than the recommended 10-12birds/m<sup>2</sup>. 8% of the respondents have lower stocking density and 19% of the respondents have the recommended stocking density. The higher stocking density ranges from 11-18birds/m<sup>2</sup> and the lower stocking density ranges from 5-12birds/m<sup>2</sup>. The average stocking density was 15birds/m<sup>2</sup>. The binary logistic test was significant (p <0.05) for stocking density across the sampled households. Farmers using the cage system for rearing broilers have the highest bird density compared to those using the deep litter system.

#### **4.2.4 Source of heating**

None of the respondents do temperature checks using thermometers in their chicken houses. The farmers usually use their body temperatures to control fowl run temperatures. From the table below, 21.7% of the respondents do not have any type of heat source they use during their broiler chicken rearing besides using card boxes to prevent chilling. 66.7% indicated that they use charcoal as their main heat source and 11.7% use infrared light. Among those farmers that use infrared lights as source of heat, some indicated that they also use hot water bottles as an alternative to infrared lights. Blankets were also used to cover boxes to provide warmth to the chicks in the first week

#### 4.2.5 Nutrition and feeding

The majority (76.7%) used concentrate feeding where they bought the concentrate and mix on their own with maize mash at home. Some of the farmers fail to use the concentrate feeding system in the correct proportions. 10% of the respondents indicated that they use the 2 phase feeding while the remaining 13.3% indicated that they use the 3 phase feeding system. 25% of the respondents are using the lighting program so as to control broiler movements at night and reduce feed intake. Some of the farmers who mentioned that they use the 2 or 3 phase feeding system end up using concentrate feed from week 5 until they reach the slaughter age. To cut the high costs of feed the farmers in the area under study are also buying broiler feed from small unregistered companies at a lower cost. 3.3% of the respondents indicated that they are trying to formulate their own broiler feed using soybean, maize, fish meal and peas as a way to reduce high costs of feeds.

Results from the survey also showed that some farmers are purchasing the feed from those registered companies at a high cost as a way to maintain their broiler nutritional requirements.

**Table4.5: Broiler production practices in peri-urban area of Dema.**

Broiler Production practices	Percentage %	Statistical significance
Vaccination frequency among the farmers		.896
None	93.3	
Once	3.3	
Thrice and more	3.3	
Broiler weight measurements		.191
No weighing	98.3	
Weekly	1.7	
Frequencny of temperature checks		.780
Yes	100	
No	0	
Heat source used		.871

None	21.7	
Charcoal	66.7	
Infrared lights	11.7	
Type of houseing used		.319
Deep liiter system	91.7	
Cage system	8.3	
Presence of foot bath		.161
Yes	0.00	
No	100	
Type of feed used		.003
2 phase feed	10.0	.
Concentrates	76.7	
3 phase feed	13.3	
Fowl run stocking density		
Recommended	19	
Low	8	.001
High	73	

#### 4.2.6 Broiler morbidity and mortality rates

48 out of 60 households reported that their birds fell sick from different diseases like coccidiosis, Newcastle, ascites, respiratory diseases and many others. On average the morbidity rate among the small scale farmers in the area ranges between 1-67%. Some of the birds that fell sick recovered and some did not recover and died. 43 respondents have mortality rate which ranges between 1-10% followed by 10 respondents with 11-20%, 4 respondents with 21-30% and 3 respondents with mortality rate of above 30%. Overall the mortality rate of broiler chickens raised by small scale farmers was 7.4%.

### 4.3 Disease prevalence in Dema peri-urban area

Smallholder farmers in Dema peri-urban reported a number of poultry diseases affecting the health of their broiler birds. Coccidiosis (41.7%) was the most prevalent broiler disease reported, followed by respiratory infections (20%), Ascites (13.3%), New Castle disease (NCD) 3.3%, and lameness and skin cuts (1.7%), respectively. Farmers attributed disease outbreaks to poor ventilation, poor temperature control, poor hygiene and inadequate biosecurity measures. Coccidiosis was mainly recorded from those farmers who do not change their bedding material regularly.

**Table 4.6. The prevalence of broiler poultry diseases in Dema peri-urban area**

Diseases affecting broiler chickens	Prevalence
Coccidiosis	25
Respiratory diseases	12
Newcastle	2
Ascites	8
Lameness and skin cuts	1
None	12

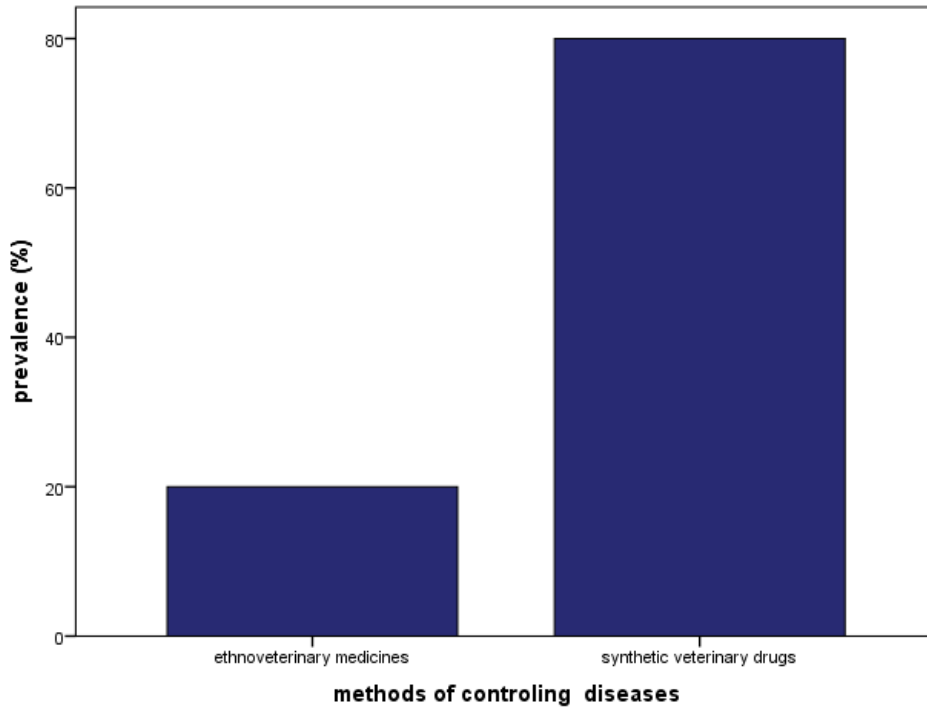
#### 4.3.1 Disease prevention practices

Small-scale broiler poultry producers in Dema Peri-urban area practices a number of disease prevention practices. The majority (80% of the respondents) uses synthetic veterinary drugs to control and treat diseases) and 20% of the farmers uses ethno veterinary medicines. Aloe Vera and chillies were the main ethno veterinary medicines used, and they were administered in bird's drinking water. 56 out of 60 respondents do not vaccinate their broiler chickens, 2 respondents vaccinate once whilst only 2 respondents vaccinate thrice and more. The few farmers who practiced vaccination as a disease prevention strategy vaccinated their birds against Newcastle disease only.

Biosecurity measures were not maintained in most of the deep litter system compared to the cage system as visitors from different places were allowed to enter the fowl runs. The results also



showed that none of the respondents have foot bath on their chicken house

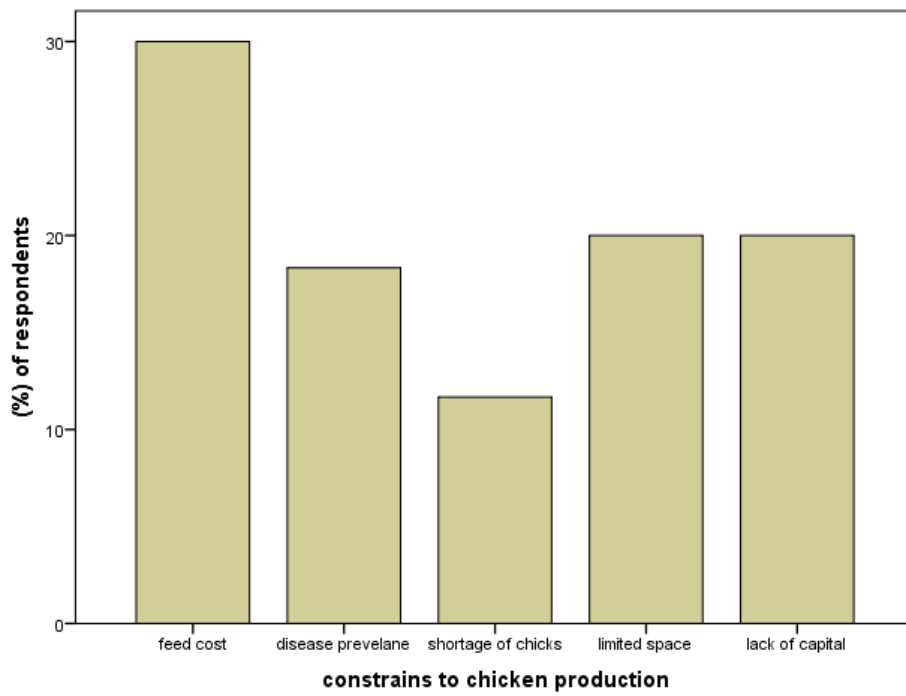


entrance

**Figure.4.2. The main methods of controlling broiler poultry diseases being used by farmers**

#### **4.4 Constraints to chicken production**

The main constraints reported by farmers were high feed cost (30% of the respondents), followed by limited space and lack of capital both with 20%, disease prevalence (18.3%) and shortage of broiler chicks (11.7%),



**Figure 4.3. Constrains to broiler chicken production**

## CHAPTER 5

### 5.0 Discussion

#### Household demography and socio-economic factors

Gender difference in broiler ownership was discovered in the survey. The data from the survey showed that women dominate more (63.3%) in the broiler farming than men (36.7%). Women were the most dominant gender in the broiler production because they are the ones that spend more time at home compared to most men who have other jobs somewhere else. These estimates are the same with those reported by (Kashangura and Gororo 2016), who estimated that women predominant in urban agriculture because they are underrepresented in the official job sector compared to men. More than half (60%) of the respondents in the survey have only secondary education with those with primary(5%) and those who did not go to school(6.7%) being the least in the survey.

Some of the broiler producers in the Dema area keep other livestock species like goats, roadrunners, cattle and layers. 41.7% of the farmers kept roadrunners, 11.7% kept cattle and 11.7% kept goats. 31.7% of the respondents indicated that they do not keep any other livestock besides broilers. Among those farmers that keep broilers and roadrunners some of the farmers use the same brooding house for brooding the chicks and the feed refusals from the broilers are given to the roadrunner chicks. Those farmers who keep cattle and goats together with broilers had a small herd of the goats and cattle.

Broiler production in the Dema area is mainly for business with less than 2% of the population under study, keeping broilers mainly for house consumption. A large number of the farmers in the area produce broilers for sell to gain income and gain employment for women and children at holidays and those who drop out of school. Findings in the current study were similar with that documented by (Seville *et al* 2011) who states that “the greatest way for an estimated 1.5 billion people worldwide to produce and trade their way out of poverty is through agriculture.

#### Broiler production practices

The present study in the Dema peri-urban area shows that there is no relationship between the gender of the broiler owner and the flock size as different flock sizes were kept by both males and females. Flock sizes range from 25-200 broilers. 33.3% of the respondents kept 25 birds per batch with 20% having a flock size of 50 birds. 25% of the farmers kept a flock size of 75 birds. The results also showed that only 21.7% of the respondents kept a flock size of more than 100 birds. The majority of the farmers who keep more than 25 birds per production cycle use the multiple batch system so as to have a continuous supply of the chickens. Most (91.7% of the respondents) of the broiler farmers in Dema peri-urban area use deep litter system of raising broilers and they use sawdust and wood shavings for bedding. Key informant interviews indicated that chick brooding was done in cardboard boxes inside human dwelling to prevent chilling and predation. The chicks were transferred to their final production houses after one or two weeks of age. 93.3% of the population does not vaccinate their broiler chickens, with only 3.3% who vaccinate thrice and more. The current findings have a slight difference from the one documented by (Kelly *et al* 1994), who reported that none of the chicken owners vaccinate their chickens, under the study, 'diseases and management of backyard chicken flocks in Chitungwiza, Zimbabwe. The vaccination difference in the two surveys is brought about by the knowledge that current farmers now have. Some small scale farmers now have the knowledge of the importance of vaccinating their chickens and easy accessibility of the vaccines compared to the last years.

The study shows that bird density has a significant ( $p < 0.05$ ) effect on the welfare of the broilers. The current findings on the significance of bird density to broiler welfare are different from those recorded by (Kashangura and Gororo, 2016) who stated that bird density has no significant effect in the Marondera area. The current study shows that bird density in the fowl runs was poor as many farmers overcrowd their fowl runs. Farmers in the area overcrowded their broilers in small fowl runs because of the shortage of land as most of their broilers were kept in human dwellings. Overcrowding of broilers was done to have a large number of broilers at a time with limited space. The average bird density recorded was 15birds/m<sup>2</sup>. High bird density of 11-18birds/m<sup>2</sup> was recorded from those farmers that usually use the cage system and those that do broiler production inside their dwellings. Low bird density (5-12birds/m<sup>2</sup>) was also recorded from those farmers that usually own small plots and they are failing to produce a large number of broiler

due to lack of capital and shortage of markets. With overcrowding some birds develop leg limping and they would compete for a small feeding space in the fowl runs.

Charcoal and well are the main source of heat and water respectively. The wells were dug in the farmer's compounds and most of them use metal tins to fetch the water from the wells. All respondents from the survey none of them indicated that they do temperature checks using thermometers in their fowl runs. The farmers usually use their body temperatures to control fowl run temperature. Among the respondents 21.7% do not have any type of heat source they use during their broiler chicken rearing besides using card boxes to prevent chilling. 66.7% indicated that they use charcoal as their main heat source and 11.7% use infrared light. Among those farmers that use infrared lights as source of heat, some indicated that they also use hot water bottles as an alternative to infrared lights. The plastic hot water bottles would be placed in corners inside the boxes of fowl runs as the farmers believe that the bottles will emit heat and prevent the chicks from chilling. Blankets were also used to cover boxes to provide warmth to the chicks in the first week

From the survey the results showed that nutrition have a greater impact on the production and productivity of the broilers. Farmers in the Dema area are facing high feed costs and shortage of feed. Because of the high feed costs, farmers are opting to use concentrate feeding more than the 2 and 3 phase feeding. The feeding system used by most (76.7%) farmers was concentrate feeding. 13.3% of the farmers use 3 phase feeding system with 10% using 2 phase feeding system for their broiler chickens. The concentrates were purchased from feed shops whilst the maize mash used to mix with concentrates was bought from local mills and some farmers go with their own maize for milling. Because of high costs of feeds some (3.3%) of the farmers have adopted some survival strategies for their broilers by formulating their own feed at home using maize, soybean and fish meal. Also some farmers have created and adopted a feeding timetable and some indicated that they are still purchasing the feed at a high cost. Some of the farmers are left with no option but to absorb input price increases, leaving them more vulnerable, less productive and less profitable. These findings are similar to the one documented by (Ndlovu, 2022).

### **Disease prevalence in Dema peri-urban area**

Quite a number (48) of farmers in the area under study indicated that their broiler chickens were affected by different diseases like coccidiosis, Newcastle, respiratory diseases and ascites. Among those diseases, coccidiosis was the most prevalent broiler disease in Dema area with 41.7% and it was associated with poor bedding and taking too long to change bedding in the fowl runs. Respiratory diseases were the second most prevalence with 20%. These respiratory diseases were mainly caused by poor ventilation and overcrowding. Ascites was mainly caused by sudden temperature fluctuations and poor ventilation during the brooding time. Many of the farmers were not aware of ascites but they only explain the signs and symptoms of the disease. Newcastle was the second from last on the prevalence of the broiler diseases with 3.3%. The recorded average mortality rate in small scale broiler production was 7.4%. These estimates were lower than those reported in a survey in Botswana which estimated 9.15% mortality rate. The recorded mortality rate under the current study was also lower than those reported by (Kelly *et al*, 1994), who recorded a 25% mean mortality in the Chitungwiza area. Broiler mortality was mainly caused by overcrowding in the fowl runs. Most farmers have limited land but they need to produce a large number of broilers per batch. Besides the effects of poor stocking density, diseases and poor management in the first week also play a major role in chicken mortalities in the area. Chick predation by cats and rodents was also a major cause of high first week mortality.

There are two types of medications used by the respondents to treat the diseases (ethno veterinary drugs and synthetic drugs). Those who use synthetic drugs like, stress pack, sulfadimidine, virukill aliseryl ws, and many others, purchase the drugs from a local feed and vet shop. About 20% of the population uses ethno veterinary drugs like aloe Vera and chillies to treat diseases.

### **Constrains to chicken production**

The respondents in the survey mention some of the challenges they face in the broiler industry. The majority of the respondents mention shortage of markets, shortage of broiler chicks, poor animal health and shortage of land as their major challenge.

### **Shortage of markets**

The majority of the respondents mention shortage of markets as their major constrain to chicken production. Most of the producers in the Dema area target local residents as their market which leads to a stiff competition among the producers. There is high competition in marketing the

broilers, so farmers have to work extra hard to market their broiler chickens. A very small number of respondents indicate that their target markets were butcheries in the Harare CBD, but those producers are complaining about high transportation cost. The current findings of shortage of markets are similar to what was documented by (Sonaiya, 2007) on low demands means low production by farmers.

### **Shortage of broiler chicks**

The other constrain to chicken production in the Dema peri-urban area was the shortage of broiler day old chicks from the suppliers. Some of the producers are forced to purchase the chicks from Harare CDB or from Chitungwiza town. The local suppliers of chicks sometimes give limited numbers of chicks to the producers which limit them to produce a large number. Some of the producers were forced to purchase poor quality chicks from unregistered companies because of shortages from registered companies. The poor quality chicks were associated with high mortality rates and slower growth rates. These findings in the Dema area were similar to that documented by (Ndlovu, 2022).

### **Poor poultry health**

Backyard poultry producers in the area face a number of health issues and poultry diseases, including coccidiosis, Newcastle, respiratory and other digestive problems. Chicken infections are more common in backyard poultry production because most of the producers do not implement biosecurity measures on their chicken houses and they allow unnecessary visits on their production sites. Poor poultry health leads to high mortalities and high cost of purchasing veterinary drugs which leads to production losses and after the losses some of the farmers will not be able to continue with production. Current findings on poor poultry health are similar to those documented by (Gororo and Kashangura, 2016) in the Marondera peri-urban area.

### **Lack of capital**

Shortage of start-up capital was one of the major constraints to chicken production in the poultry industry in Dema peri-urban area. Most of the producers wished to expand their business but because of shortage of enough capital they are constrained from venturing into large scale poultry farming.

### **Poor nutrition**

High feed cost from local feed supplier's limits production in backyard poultry producers. In the process of finding more affordable feed, the producers would purchase poor quality feed from unregistered companies with poor nutrients which lead them to take too long to market their broilers. Poor quality water given to the broilers was also a constrain to chicken production. Their main sources of water were boreholes and wells (sometimes unprotected) with poor nutrients and will aid to poor animal health.

### **Shortage of land**

The survey also indicated that shortage of land was also a constrain to broiler production in the peri-urban area of Dema. Most of the farmers in the area house their broiler chickens inside human dwellings. The fowl runs were small and the carrying capacities were exceeded. Shortage of land limits production as the farmers do not have enough area to build their fowl runs. Some of the broilers are seen overcrowded in the fowl runs leading to a negative animal welfare.



## **CHAPTER 6**

### **6.0 Conclusion and recommendation**

#### **6.1 Conclusion**

This study found that, in the peri-urban area of Dema women dominate more in broiler production than men and those respondents with only secondary education were the most dominant. The broiler production units were small and they were mainly placed inside or very close to human dwellings. The survey showed that most of the farmers use the deep litter system for their broiler production. Production was mainly for income generations through selling of the broilers with a very small fraction producing broilers for family consumption. Coccidiosis was the major disease affecting the producers in the area with Newcastle being the least. Wells and boreholes were the major source of water in the area with the majority using charcoal as a source of heat. The broiler units were characterised by multiple batch systems and the broiler management was relatively poor as compared to commercial broiler rearing.

Major constraints for the expansion of the industry in Dema were limited land, stock theft, and no access to formal markets and shortage of day old chicks from the suppliers. A large number uses synthetic drugs to treat diseases with none of the respondents taking weight measurements. Broiler mortality rate was 7.4%. Mortality was mainly caused by poor stocking density and diseases.

#### **6.2 Recommendations**

A recommendation for proper use and correct use of the stocking density in the fowl runs to maintain proper animal welfare in the peri-urban area of Dema. For disease control and prevention, farmers are recommended to have foot baths on their chicken entrances and to impose biosecurity measures (controlled entry and exit by outsiders) and to change their bedding

materials regularly. Broiler producers who are located in wetlands are recommended to build their fowl runs on high levels to prevent moisture from entering the fowl runs.

In broiler marketing farmers must not rely on the local residents only but to start contract farming to help them market their products to registered markets and to cut individual transport cost to the markets. The study also recommends that government should create formal broiler chicken markets in the local area or near the Dema area.

## CHAPTER 7

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# CHAPTER 8

## Annex 1: Household questionnaire

### RESEARCH QUESTIONNIRE

My name is Sharmaine K Manjabire, a final year student at Bindura University of Science and Education and I am studying BSc Animal Science (Hons). I am carrying out a survey on how to improve the production and productivity of small scale broiler poultry in the Dema area in Mashonaland East. The questions used in this document will only be used for this study and all the information gathered in this document will be treated with confidentiality. I Sharmaine K Manjabire will be held accountable for any misuse of information written by the farmers. My aim in this study is to ensure that small scale farmers in Dema acquire the necessary knowledge and skills on the good production practices to maximize their profits and reduce the spread of diseases in the area.

Date of interview \_ / \_ / \_

Name of

farm.....

### SECTION1: DEMOGRAPHIC INFORMATION

Gender

Male	Female
------	--------

Age

20 and below	21-35yrs	36-50yrs	51-65yrs	Over 65yrs
--------------	----------	----------	----------	------------

Marital status

Single	Married
--------	---------

Level of education

Did not go to school	Primary	Secondary	Tertiary
----------------------	---------	-----------	----------

**SECTION 2: FLOCK SIZES**

1. How many broiler chickens do you keep per batch?  
.....
2. How many broiler chickens do you keep per production cycle?  
.....
3. What other sources of income do you have?  
.....  
.....
4. Where did you get the capital to start the broiler production and how much?  
.....  
.....
5. Where is your fowl run located?  
.....
6. What are the main reasons for keeping broilers?

Business	House use
----------	-----------

7. Which other animals do you keep besides broiler chickens? (please tick)

None	Roadrunner	Cattle	Goats	Layers	Any other (specify)
------	------------	--------	-------	--------	---------------------

**SECTION 3: BROILER MANAGEMENT**

8. What time do you collect your day old chicks?

1. Morning	2. Afternoon	3. Evening
------------	--------------	------------

9. How early do you prepare the brooder before chicks arrive?

2 days before	1 day before	On the same day	After chick arrival
---------------	--------------	-----------------	---------------------

10. Which type of housing system do you use? (please tick correct answer)

Deep litter system	Cage system
--------------------	-------------

11. What do you use for bedding in the chicken houses?

- i. ....
- ii. ....
- iii. ....
- iv. ....

12. How big is your fowl run?.....M<sup>2</sup>

13. What do you use as a heat source?

- i. ....
- ii. ....
- iii. ....
- iv. ....

14. What do you use as a source of light?

- i. ....
- ii. ....
- iii. ....
- iv. ....

15. Do you vaccinate your broilers, if yes how many times?

.....  
.....



16. Do you take daily or weekly weights on your flock? (Yes or NO).....

17. What type of feed do you use? (please tick correct answer)

i. 2 phase feed	ii. 3 phase feed	i. concentrates
-----------------	------------------	-----------------

18. What sources of water do you use?

i. Council water	ii. Well	iii. River	iv. Dam	v. Borehole
------------------	----------	------------	---------	-------------

19. Do you do temperature checks in your chicken houses?

- i. Yes.....    ii. No.....

20. How often do you change bedding?.....

#### SECTION4: ANIMAL HEALTH

21. Do you have foot bath on chicken houses entrance

- i. Yes .....    ii. No.....

22. What diseases are affecting your chickens?

- i. ....  
 ii. ....  
 iii. ....  
 iv. ....

23. What methods do you use to control and treat the diseases? (please tick correct answer)

Use of ethno veterinary	Use of synthetic veterinary drugs
-------------------------	-----------------------------------

24. What are the main causes of your broiler mortality?

- i).....

- ii).....
- iii).....
- iv).....
- v).....

25. What percentage mortality do you record?.....%

26. At what stage do you experience high mortality rates?

1-2weeks	2-3weeks	3-4weeks	4-5weeks	5-6weeks
----------	----------	----------	----------	----------

27. What are other challenges you face in broiler production?

- i. ....
- ii. ....
- iii. ....
- iv. ....

28. Where do you get your advice from?

i. No one	ii. Agritex	iii. Friends	iv. Large scale farmer
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**END OF QUESTIONNAIRE**

