

**ASSESSMENT OF SMALL-SCALE LOCAL CHICKEN KEEPERS  
KNOWLEDGE AND PRACTICES IN ENHANCING HOUSEHOLD  
LIVELIHOOD: THE CASE STUDY OF BAGAMOYO DISTRICT,  
COAST REGION, TANZANIA.**

**SALIM FARAJI NURU**

**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN  
AGRICULTURAL EDUCATION AND EXTENSION OF SOKOINE  
UNIVERSITY OF AGRICULTURE. MOROGORO, TANZANIA.**

## **ABSTRACT**

This study's main objective was to assess small-scale chicken keeper's knowledge and practices in enhancing Household livelihood in Makurunge and Fukayosi wards in Bagamoyo District, Tanzania. The objective of the study was to determine chicken keepers' knowledge on small-scale local chicken production, to identify local chicken keepers on management practices and to identify the relationship of socio-personal and socio-economic status of local chicken keeper's knowledge and practices. This study used a cross-sectional design to collect data from rural households and communities using survey approaches. While the survey component was crucial in gaining deeper, understand of the extent of knowledge and practices to chicken keepers for improving their household livelihoods. Nineties (90) household's members from five hamlets of Makurunge ward and two village from fukayosi was selected namely Mtoni, Mkwajuni, Kibaoni, Gezaulole, Kifude and Mkenge, Kidomole were interviewed and one respondent represented each household, including several key informant interviews. The study revealed that the majority of the farmers were keeping few numbers of local chicken which when sold could not earn a reasonable income to sustain the livelihood. Interviewed households reported insects, leftovers, greens, coconut cake, cereals, bran, and fruits as the major ingredient of the scavenged feed, which is generally abundant during rainy season. Based on findings from this study, it is suggest that seminars, training, provision of credit and policy recommendations should be programmed in order to enhance the benefits of local chicken keeper's livelihoods. Finally, there should be an increased investment in research and development through introduction of multi-disciplinary approach to research about the knowledge and practices for chicken keeper's livelihoods improvement.

## **DECLARATION**

I, Faraji Nuru Salim, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my original work done within the period of registration and that it has neither being submitted nor being concurrently submitted in any other institution.

---

Salim, Faraji Nuru  
(MSc. Student)

---

Date

The above declaration is confirmed by;

---

Dr. G. K. Nzalayaimisi  
(Supervisor)

---

Date

## **COPYRIGHT**

No part of this dissertation may be reproduce, stored in any retrieval system, or trasmitted in any form or by any means without prior written permission of the author or Sokoine University of Agriculture in that behalf.

## **ACKNOWLEDGEMENT**

I would like to express my sincere appreciation to individuals and members of the Department of Agricultural Extension and Community Development of Sokoine University of Agriculture that were involved directly or indirectly in this work for their support that made this study successfully completed. My earnest appreciation is to my supervisor Dr. Gabriel K. Nzalayaimisi of the Department of Agricultural Education and Community Development of Sokoine University of Agriculture for his assistance, encouragement, support, and guidance throughout my research work. It is through his guidance and constructive criticism, this work has become success.

My special thanks go to my wife Mrs Madina Pancras Ulaya for supporting and continuous encouragement and moral support throughout my studies. I extend my sincere acknowledgments to my beloved child Fatina for her love, keenness, and endurance during my studies. I thank them much indeed.

I feel privileged to thank the community of Makurunge and Fukayosi wards for their time and acceptance to participate in the interviews that enabled the success of this study. I would like to thank all extension officers , that is Mr Abel Isaya and Mwang'imba Mwang'imba for their support in identifying local chicken keepers during data collection. Finally, I thank all my colleagues MSc class, 2016-2018 cohort group for their cooperation during the program. We lived like a family, shared, discussed and constructively criticized each other for improvement of our work.

I acknowledge the cooperation given to me by all staff from District Livestock Officer in Bagamoyo, the ward Livestock Officers for their participation in this study also helped me much during my research work.

Great thanks to ALLAH for always lightening my path.

## **DEDICATION**

This dissertation is dedicated to my parents, Mr Al Khaji Nuru Salim, my mother Fatina Salim, and my wife Geradina Ulaya, my daughter Fatina Faraji Nuru for their encouraged and supported in various way while undertaking my MSc in Agricultural Education and Extension degree at Sokoine University of Agriculture.

## TABLE OF CONTENTS

<b>ABSTRACT .....</b>	<b>ii</b>
<b>DECLARATION .....</b>	<b>iii</b>
<b>COPYRIGHT .....</b>	<b>iv</b>
<b>ACKNOWLEDGEMENT .....</b>	<b>v</b>
<b>DEDICATION .....</b>	<b>vi</b>
<b>TABLE OF CONTENTS .....</b>	<b>vii</b>
<b>LIST OF TABLES .....</b>	<b>xi</b>
<b>LIST OF FIGURES .....</b>	<b>xiii</b>
<b>LIST OF APPENDICES .....</b>	<b>xiv</b>
<b>LIST OF ABBRIVIATIONS .....</b>	<b>xv</b>
<b>CHAPTER ONE .....</b>	<b>1</b>
<b>1.0 INTRODUCTION .....</b>	<b>1</b>
1.1 Background Information .....	1
1.2 Problem Statement .....	3
1.3 Justification of the Problems .....	4
1.4 Objectives of the Study .....	5
1.4.1 Overall Objective .....	5
1.4.2 Specific Objectives .....	5
1.5 Research Questions .....	5
1.6 Significance of the Study .....	6
1.7 Scope .....	6
1.8 Theoretical Framework .....	7
1.9 Conceptual Framework .....	7
<b>CHAPTER TWO .....</b>	<b>9</b>
<b>2.0 LITERATURE REVIEW .....</b>	<b>9</b>

2.1 Operational Definition of Keywords and Concepts .....	9
2.1.1 Local chicken .....	9
2.1.2 Livelihood .....	9
2.1.3 Knowledge of chicken keeper .....	9
2.1.4 Marketing of small-scale chicken production .....	11
2.1.5 Factors limiting chicken keepers to small-scale production .....	11
<b>CHAPTER THREE .....</b>	<b>13</b>
<b>3.0 METHODOLOGY .....</b>	<b>13</b>
3.1 Study Area.....	13
3.2 Research Design .....	15
3.3 Sampling Procedures .....	16
3.3.1 Purposive sampling .....	16
3.3.2 Simple random sampling.....	16
3.4 Data Collection.....	17
3.4.1 Primary data .....	17
3.4.2 Secondary data .....	17
3.4.3 Data analysis .....	18
3.4.4 Method of scoring and categorization of variable.....	18
3.4.4.1 Independent variable.....	18
3.4.4.2 Age.....	18
3.4.4.3 Sex .....	18
3.4.4.4 Education .....	19
3.4.4.5 Marital status.....	19
3.4.4.6 People involve in local chicken rearing practices.....	19
3.4.4.7 Occupation .....	20
3.4.4.8 Chicken rearing experience .....	20
3.4.5 Independent variable .....	20



3.4.5.1 Knowledge .....	20
3.4.5.2 Practices .....	21
3.5 Statistical Method Used in the Study .....	21
3.5.1 Mean .....	21
3.5.2 Standard deviation .....	22
3.5.3 Frequency and percentage .....	22
3.5.4 Co-efficient of correlation .....	23
3.5.5 Qualitative data .....	24
<b>CHAPTER FOUR .....</b>	<b>25</b>
<b>4.0 RESULTS AND DISCUSSION.....</b>	<b>25</b>
4.1 Introduction .....	25
4.2 Chicken Keepers' Knowledge on Small-scale Local Chicken Husbandry .....	26
4.2.1 Knowledge about housing of local chicken husbandry .....	26
4.2.2 Knowledge about feeding and watering of local chicken .....	27
4.2.3 Knowledge about management practices of local chicken .....	27
4.2.4 Knowledge about health and disease control of local chicken.....	27
4.2.5 Knowledge about marketing of local chicken .....	28
4.2.6 Overall knowledge of respondents on local chicken rearing practices .....	30
4.3 Management Practices of Local Chicken Rearing .....	30
4.3.1 Housing practices by local chicken keepers.....	30
4.3.2 Feeding and watering practices for local chicken .....	31
4.3.3 Management practices of local chicken .....	32
4.3.4 Health and disease control practices of local chicken .....	32
4.3.5 Marketing practices of local chicken .....	33
4.3.6 Overall management practices for local chicken keeping husbandry .....	36
4.4 Socioeconomic Characteristics of Chicken Keeper and Their Relationship with Local Chicken Rearing Practices .....	37

4.4.1 Age .....	39
4.4.2 Sex .....	40
4.4.3 Marital status .....	41
4.4.4 Education background .....	42
4.4.6 Occupation .....	44
4.4.7 Rearing experience .....	46
4.4.8 Relationship between knowledge and practices of local chicken practices .....	47
4.5 Constraints Facing Small-scale Local Chicken Keepers for their Livelihood	
Improvement .....	48
4.5.1 Unreliable market .....	48
4.5.2 Diseases outbreak .....	49
4.5.3 Theft is a big problem for chicken keepers .....	49
4.5.4 Accessibility of extension service to local chicken keeper .....	50
4.5.5 Government policy .....	51
4.6 Suggestions Given by Local Chicken Keepers to Improve Chicken Production .....	52
<b>CHAPTER FIVE .....</b>	<b>54</b>
<b>5.0 CONCLUSIONS AND RECOMMENDATIONS .....</b>	<b>54</b>
5.1 Overview .....	54
5.2 Conclusion .....	54
5.3 Recommendations .....	55
5.4 Recommendations for Further Studies .....	55
<b>REFERENCES .....</b>	<b>57</b>
<b>APPENDICES .....</b>	<b>68</b>

## LIST OF TABLES

Table 1: Distribution of Local chicken keepers involved in the study area .....	15
Table 2: Age of the respondents .....	18
Table 3: Sex of the respondents .....	18
Table 4: Education level of the respondents .....	19
Table 5: Marital status .....	19
Table 6: People involve in local chicken rearing practices .....	19
Table 7: Occupation of respondents .....	20
Table 8: Chicken rearing experience .....	20
Table 9: Knowledge of the respondents .....	21
Table 10: Practices .....	21
Table 11: Distribution of local chicken keeper according to their level of practices.....	26
Table 12: Chicken keepers' knowledge on small-scale local chicken .....	29
Table 13: Overall knowledge of local chicken rearing practices .....	30
Table 14: Management practices for local chicken keeping husbandry .....	35
Table 15: Overall Management practices of local chicken husbandry .....	36
Table 16: Relationship between Age and rearing practice of local chicken .....	40
Table 17: Relationship between sex and practice local chicken rearing.....	41
Table 18: Relationship between Marital status and Rearing practice of local chicken.....	41
Table 19: Relationship between Education and Practices on rearing chicken.....	43
Table 20: People involved in chicken rearing within household .....	44
Table 21: Relationship between occupation and Practices on rearing chicken.....	45
Table 22: Relationship between local chicken rearing experience and rearing practices of local chicken .....	47
Table 23: Relationship between knowledge and rearing practices of local chicken.....	48

Table 24: Constraints facing local chicken keepersfor their livelihood improvement.....51

Table 25: Suggestions given by local chicken keepers to improve chicken production.....52

## LIST OF FIGURES

Figure 1: Conceptual framework showing the relationship of variables source; Researcher's construction .....	8
Figure 2: Map of geographical location of study area .....	14
Figure 3: Distribution of local chicken keeper according to their level of practices .....	25
Figure 4: Relationship between Age and rearing practice of local chicken .....	39
Figure 5: Relationship between sex and practice local chicken rearing .....	40
Figure 6: Relationship between Education and Practices of rearing local chicken .....	42
Figure 7: Respondents involved in chicken rearing within household .....	43
Figure 8: Relationship between occupation and Practices of rearing local chicken production .....	44
Figure 9: Relationship between local chicken rearing experience and rearing practices of local chicken .....	46
Figure 10: Relationship between knowledge and rearing practices of local chicken .....	47

## **LIST OF APPENDICES**

Appendix 1: Interview schedule to local chicken keepers in Amkurunge and Fukayosi wards.....	68
Appendix 2: Checklist for Focus Group Discussion and Key Informants .....	75

## LIST OF ABBRIVIATIONS

AKAP	Awareness for Knowledge Adoption Productivity
CVM	Contingent Valuation Method
DP	Development Project
FAO	Food and Agricultural Organization
FAOSTATA	Food and Agriculture Organization, Statistical Databases
GDP	Gross Domestic Product
ILRI	International Livestock Research Institute
MLFD	Ministry of Livestock and Fisheries Development
NCD	Newcastle Disease
SRS	Simple Random Sampling
SSP	Small-Scale Chicken
UNH	United Nations Human Settlements Programme
URT	United Republic of Tanzania

## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 Background Information

Chicken is the largest livestock group in the world estimated to be about 23.39 billion consisting mainly of chickens, ducks and turkeys (FAO, 2012). In Africa, village chicken contributes over 70% of chicken products and 20% of animal protein intake (Chicken News, 2013). According to United Nations (2009) over 80% of human population in East Africa, live in rural areas and over 75% of the households keep indigenous chickens.

Local chicken is one of the most common types of livestock kept across the globe. It has the major role in the economy of developing countries, including an important role in poverty alleviation by means of income generation and provides household food security (FAO, 2011). It accounts for the majority of the chicken population in low and middle-income countries (LMICs) (Gerbert *et al.*, 2015).

The term “family chicken” is mainly used for systems that rely on family labour and, generally, locally available feed resources, FAO (2014) and Thieme *et al.* (2014) both describe four levels of family chicken production: small extensive scavenging (1–5 adult birds), extensive scavenging (5–50 birds), semi-intensive (50–200 birds), and small-scale intensive production (>200 broilers or >100 layers). Although this spectrum of systems viewed as a continuum, Small-Scale Chicken (SSP) farmers utilise the production system that best suits their situation and objectives (Rota *et al.*, 2014). The largest numbers of households worldwide are engaged in “village chicken” production, which encompasses the first two systems, and are comprised of mostly indigenous or sometimes crossbred species (Pym and Alders, 2009). Chickens are scavenging freely in free-ranging systems,



although supplementary feed may be given from locally available materials (Sonaiya, 2004; Thieme *et al.*, 2014). Small-scale chicken productions are commonly incorporated into mixed production systems sometimes with other livestock and crops and are a way for vulnerable households to spread risks (Alders *et al.*, 2016; Thieme *et al.*, 2014). Flocks are self-propagating, with broody hens laying 30–80 eggs per year in 2–4 clutches, and spending time between clutches to rear chicks (Mapiye *et al.*, 2008; Fotsa *et al.*, 2014).

Improved chicken production improves family nutritional outcomes by supplying high-quality protein and micronutrients (zinc, vitamin A and iron) through consumption of meat, liver and eggs (Alders *et al.*, 2004). Generation of extra incomes and religious/cultural considerations are amongst the major reasons for keeping local chicken by rural communities (Alders *et al.*, 2004). There is evidence in Malawi that investments in small-scale chicken farming generate attractive returns and contribute to poverty reduction and increased food security in regions where a large share of the population keeps some chicken birds (Jensen and Dolberg, 2003; Mack *et al.*, 2005; Pica-Ciamarra and Otte, 2010).

In Tanzania, chicken makeup over 70% of the total chicken population and supply most of the chicken meat and eggs for the domestic market, (Ministry of Livestock and Fisheries Development (MLFD, 2012). The overall standard of local chicken husbandry in Tanzania is mainly scavenging type and usually poor because of the low level of inputs. Chicken keeping system in Tanzania comprises two production systems; traditional (free-range or extensive system); and commercial production system. Free range systems provide night shelters, share the same living quarters, International Livestock Research Institute (ILRI, 2016). Local chickens tend to have lower feed efficiency, and their economic strength lies in the low cost of production when compared to the value of their outputs (King'ori *et al.*,

2003; Tadella *et al.*, 2003). In most cases, small-scale chicken keepers are reluctant to increase their level of inputs into local chicken production due to the high mortality normally encountered in their flocks (Tadelle, 1996). However, most communities lack required husbandry skills, training and opportunity effectively to improve their chicken production (Kajuna, 2012).

Evenson (1997) states that awareness is not only knowledge, but also knowledge require awareness, experience, observation, and ability to critically to evaluate data and evidence. Knowledge leads to practices, but practices is not productivity. In this case, productivity depends not only on the practices of technically sound and efficient practices, but also cost-efficient practices. Furthermore, productivity depends on the infrastructure of the community and on market institutions.

## **1.2 Problem Statement**

Keeping local chicken makes a substantial contribution to household income and food security in many countries of the developing world. It helps diversify income sources and provides quality food, energy, manure and a renewable asset in over 80 per cent of rural households. In 2006, the government approved a National Livestock Policy based on the premise that “the Livestock Industry has an important role to play in building a strong national economy and in the process, reducing inequalities among Tanzanians by increasing their incomes and employment opportunities”, United Republic of Tanzania (URT, 2006). The policy also recognizes that aside from contributing to GDP, the livestock sector has a role to play in i) ensuring food security, ii) providing households with employment, income, and a store of value and investment opportunity.

To achieve this, the government has been collaborating with the private sector in the country. For example, such collaboration efforts include an introduction of improved

species of chicken, construction of chicken houses and start-up cash for vaccinations, provision of feeds and treatment done by Heifer project in some wards of the Bagamoyo district. Despite the above efforts, chicken keeper are facing so many problem including technical awareness on chicken husbandry, diseases infestation, poor management practices, poor supervisions and continuation of the Heifa project is yet well organised and production is still low in relation to existing potential market on chicken meat and its by-products in Bagamoyo and the nearest potential market in Dar es Salaam (Eekeren *et al.*, 2009). The study therefore was seeking to assess small-scale chicken keeper's knowledge and practices in enhancing Household livelihood improvement in Bagamoyo District, Tanzania.

### **1.3 Justification of the Problems**

Local chicken has the potential contribution to family income considering the existing popularity, suitability to the local conditions, low cost of investment and quick returns. However, local chicken is not contributing to improving livelihood as expected one in many places of the Bagamoyo district. Local chicken can have a profound effect on the wellbeing of families due to low-cost interventions can directly contribute to poverty alleviation, household food security and income generation. United Republic of Tanzania (1992), the food and nutritional for Tanzania policy is to strengthen the procedures of obtaining and supply food within the household, villages and town by utilising locally produced food. Apart from that, it provides opportunities to enhance their understanding of nutrition, stock management and development of diseases. The information obtained from this research will be used by different stakeholders including policy markers, academicians, development partners, Local Government Authorities (LGAs) and Non-Government Organizations (NGOs). The findings from this study are also expected to

widen the understanding of local chicken keepers on the economic importance of local chicken production to household income and food security.

In addition, the information obtained from this study will also lay down a tool for empowering individual households through improving access and control of resources, giving credit, inform authorities on factors that hinder successful implementation of initiatives and provide capacity building for effective income poverty reduction among households involved in local chicken production. Therefore the study helps us to understand the level of chicken keepers' knowledge and practices in Bagamoyo District, Tanzania.

#### **1.4 Objectives of the Study**

##### **1.4.1 Overall Objective**

The overall objective of the study was to assess knowledge and practices of small-scale keepers in enhancing household livelihood.

##### **1.4.2 Specific Objectives**

1. To determine local chicken keepers' knowledge on small-scale local chicken production
2. To identify local chicken keeping management practices in the study area.
3. To study the relationship socioeconomic status of chicken keeper's knowledge and practices of local chicken rearing in the study area.

#### **1.5 Research Questions**

1. What is local chicken keepers' knowledge on small-scale chicken production?
2. How small-scale keepers do practices on local chicken for production?

3. What are the constraints facing local chicken keepers for their livelihood improvement?

### **1.6 Significance of the Study**

It is possible that bottlenecks without knowledge and practices hinder the productivity of local chicken. Understanding chicken husbandry is a starting point for understanding how small-scale local chicken enterprises development can contribute to household income and well-being. Chicken keepers will do well from a full engagement on small-scale local chicken production as they will be able to produce and sell chicken in an environment they understand better. Chicken keepers will get more income from keeping chicken and have better living standards. Extension agent will operate more efficiently to improve input supply, which will be able to predict the demand, and gaps that might exist. Service providers will benefit by offering a wider range of services including chicken slaughter facilities. The quality and range of chicken products will increase through increase of chicken production. Employment opportunities will emerge when the local chicken production is fully developed.

### **1.7 Scope**

The study involved local chicken keepers who belonged to chicken production enterprises based on perceived knowledge and practices, local chicken traders, Veterinary attendants and Extension officers in Makurunge and Fukayosi Wards. Chicken keepers were chosen on the assumption that they had knowledge and practices based on their local chicken enterprise. Individual chicken keepers were the major focus of the study, while Extension officers' was to corroborate data from the chicken keepers to avoid bias from one end of the local chicken enterprises. The study restricted itself to assess farmer' knowledge and practices on small-scale local chicken keeping for household livelihood in Bagamoyo

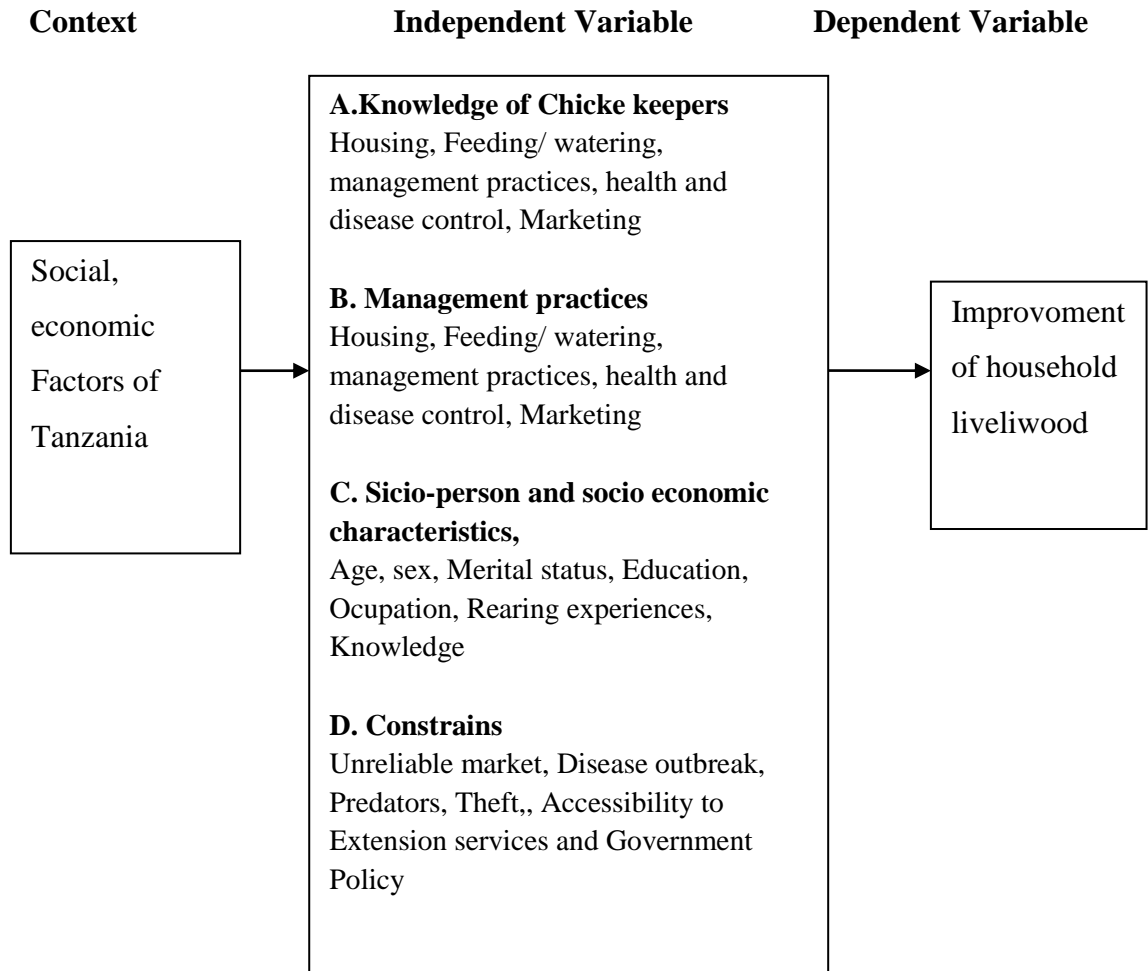
district. This was to determine chicken keepers' knowledge on small-scale local chicken production, to identify local chicken keeping management practices and to assess the contribution of small-scale chicken keeping to socio-economic livelihood improvement. The components of the local chicken production include income generation, veterinary services, marketing and constraints (Ochieng *et al.*, 2011).

### **1.8 Theoretical Framework**

This study adopted AKAP sequence, which according to Evenson (1997) was convenient to visualise that improvement on local chicken production is based on achieving its ultimate goal in terms of economic impact to the chicken keepers by providing information and educational training through the following sequence. A: Farmer awareness (sources of awareness); K: Farmer knowledge and testing of practices (through testing and experimenting); A: Farmer practices of the technology or practices; P: Changes in farmers' productivity (and behavior). A change in farmers' perception is reflected in quantities of goods produced. In turn, these can be measured as "economic surplus," which is the benefit of goods produced as a result of using a given set of inputs made available by extension activities.

### **1.9 Conceptual Framework**

Production of local chicken contributes to household's income, food security, and social economic aspect like age, sex, marital status education, access to extension services, the purpose of production and income. The above concepts base on the contribution of chicken enterprises on the small-scale chicken keeper to livelihood. This particular study assumes that small-scale local chicken production based on the application on knowledge and practices, contribute to improving the social economic household livelihood of the keepers.



**Figure 1:** Conceptual framework showing the relationship of variables

**Source;** Researcher's construction

## **CHAPTER TWO**

### **2.0 LITERATURE REVIEW**

#### **2.1 Operational Definition of Keywords and Concepts**

##### **2.1.1 Local chicken**

Local chickens are also known as village chicken. The local chicken refers to the chicken whose production is feasible at the village level where only low-cost technology is needed to improve production considerably, and thus require low investments in terms of feeding and feeds, housing, and land (Mack *et al.*, 2005). According to Gabanakgosi *et al.* (2013), local chicken is defined as a small scale chicken keeping by household using family labor and locally available feed resources. Thus, local chicken can be of utmost economic importance in food insecurity and poverty alleviation to the poorest households.

##### **2.1.2 Livelihood**

The set of capabilities, assets, and activities that furnish the means for people to meet their basic needs and support their well-being is called livelihood. The building of livelihoods reflects and seeks to fulfill both material and experiential needs. Livelihoods are not simply a localized phenomenon, but connected are by environmental, economic, political and cultural processes to wider national, regional and global arenas (Castro, 2002).

##### **2.1.3 Knowledge of chicken keeper**

Knowledge assets are key elements that facilitate knowledge creation processes. Those assets include experiential (i.e. skills and knowledge), conceptual (i.e. concepts, designs and methods), systemic (i.e. technological platforms, manuals and patents and licenses), routine (i.e. expertise in daily operations). The need to manage homegrown knowledge has demanded increasing attention; sustainable economic development depends on the



indigenous knowledge of the local communities in developing countries, such as Tanzania (Lwoga *et al.*, 2010). Effective management and use of knowledge as a competitive development resource can increase the annual rate of food production per capita to at least 4% and real economic growth rate to at least 7% without further damaging the environment (United Nations Development Programme, 2003). The knowledge, tools and experiences of-fared here is a valuable resource for chicken keepers. This inspires chicken keepersto generate new ideas by applying the one idea on knowledge on keeping chicken including treatment of chicken.

Improving knowledge for small-scale chicken keepers increases productivity through selective breeding for high yielding traits and for disease resistance. Kajuna's (2012) study found the majority of households kept chicken especially chicken in Morogoro region. There were observable differences in the frequency of application of better management tools in the households of trained children as compared to the ones not trained. Eggs storage, selection of eggs for incubation, preparation of incubation sites, feeding, housing, cleanliness, were observed to be done more carefully in households of trained children as compared to the households of the ones not trained.

Increased consumption of the product creates increased demand and thus sustains and promotes improved chickens and increases small-scale chicken production for livelihood improvement. The aim of such knowledge on chicken production is for extension officers to use their role to reach out to farmers through extension delivery services. The important task of the extension worker is to exchange and share information, knowledge and skills with the farmer, (Sanusi *et al.*, 2013). This case on local chicken keepers' knowledge and management has been successfully adopted by many organisations in order to build their competitive strength and achieve a sustainable growth pattern (Ichijo and Nonaka, 2007).

#### **2.1.4 Marketing of small-scale chicken production**

Rural chicken accounts for 80% of chicken population in Africa and they are typically kept as small flocks in free-range scavenging production systems (Jensen and Dolberg, 2003). The success of a chicken production enterprise is judged by the quantity and quality of products sold (number of chickens and eggs) and consequently, the amount of profit gained (Mapiye *et al.*, 2008). Marketing of chicken and eggs in the smallholder sector is informal and tends to be within the local communities between farming households and to some non-farming households such as clinics, schools, business centers and growth points, using cash or barter transactions (Harun and Massango, 2001; Muchadeyi *et al.*, 2008). The major components in the marketing system, include: marketing channel, distance, the season of the year, the price of egg and meat, transfer cost and marketing problems. Markets and prices of chicken products have positively enhanced poor production of chicken keeping. As most consumers with greater purchasing power live in and around cities, intensification of chicken production initiated at least in areas having a good road network in Bagamoyo district, and reduction of fishing activities along the coast areas, the market for chicken become more potential due to the need for white meat as a good source of protein.

#### **2.1.5 Factors limiting chicken keepers to small-scale production**

Chicken keepers in Tanzania are faced with many problems, including starter up capital and lack of knowledge of chicken production. The situation is worse in Tanzania because many farmers are peasants who practice subsistence farming (Kwigizile *et al.*, 2011). Poor health management resulting in high mortality rates and compromised productive performance characterize most smallholder chicken production systems in Zimbabwe (Kusina *et al.*, 2000; Pedersen, 2002). Tadelles and Ogle (2001) cited chicken diseases as the main cause of village chicken losses, reducing both numbers and productivity.

Smallholder farmers respond differently in times of disease occurrence; they do nothing, use ethnoveterinary medicine, modern (conventional) medicine or medicine originally intended for humans (Mapiye and Sibanda, 2005). High percentages of farmers do not offer health interventions to sick birds (Maphosa *et al.*, 2004). Lack of response by the farmers is attributed to lack of cash to purchase veterinary medicine and the shortage of veterinary and extension services.

The efficiency and profitability of small-scale chicken enterprises are restricted by disease outbreak, production constraints and external factors. The limitations are caused by viral diseases, notably New Castle Disease (NCD), avian fowl typhoid, avian influenza, fowlpox and gumboro disease (Bell, 2009).

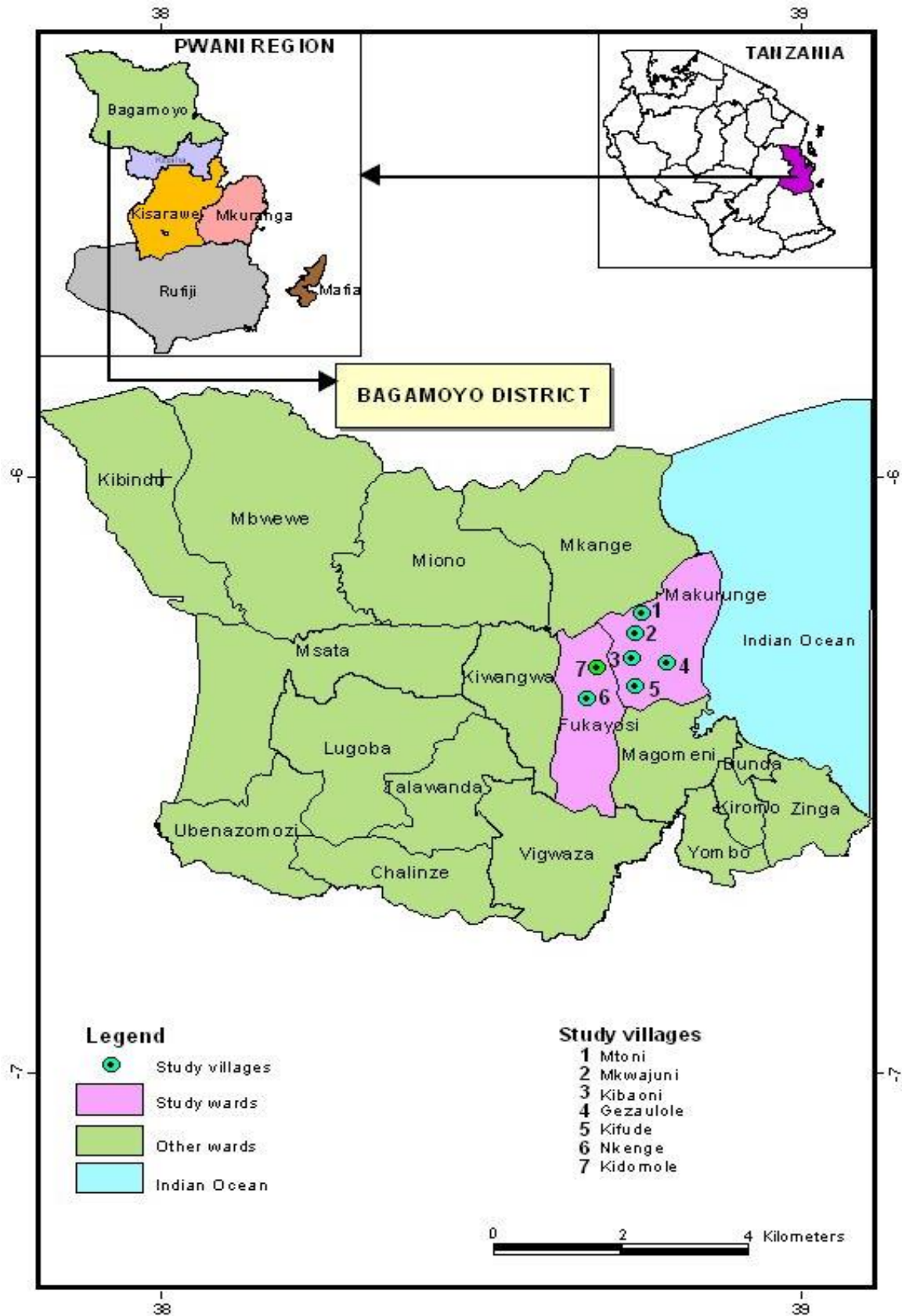
## **CHAPTER THREE**

### **3.0 METHODOLOGY**

#### **3.1 Study Area**

Bagamoyo is one among six districts of the Coast (Pwani) Region of Tanzania. Bagamoyo District situated 75 km north of Dar-es-Salaam (UNH, 2009). It is bordered to the north by the Tanga Region, to the West by the Morogoro Region, to the East by the Indian Ocean and to the South by the Kinondoni and Kibaha Districts (Bagamoyo District, 2009). Bagamoyo District lies between 37<sup>0</sup> E and 39<sup>0</sup> E Longitudes and between 6<sup>0</sup>S and 7<sup>0</sup> S Latitudes (DP, 2006; 2009). The district covers an area of 9 842 km<sup>2</sup>, where 855 km<sup>2</sup> is covered by water (Ocean and river) while the remaining part, which is 8,987 km<sup>2</sup> is occupied by dry lands (Bagamoyo District, 2009). According to the 2012 Tanzania National Census, the population of the Bagamoyo District was 311, 740. The main economic activities in Bagamoyo include smallholder farming, artisanal fishing, livestock keeping, marine culture (seaweed and prawn farming), salt production, trade, and tourism.

The area has become an important cultural, conference and tourist hub along the coast of Tanzania (<http://www.tanzania.go.tz/regions/COAST.pdf> as of March, 2013). The major source of income in Bagamoyo's coastal communities is fisheries and small-scale agriculture, which are all climate dependent. There has also been a gradual shift to alternative sources of income such as the upcoming tourism industry, new infrastructure providing new employment opportunities, and increasing socio-economic supporting NGOs. In addition, it is currently growing as a tourist town and provides a market for chicken meat and other products for food.



**Figure 2:** Map of geographical location of study area

### 3.2 Research Design

The study used a cross-sectional research design which allowed information to be gathered at one point in time. The data were collected for descriptive purposes and determining the relationship between variables under the study. The design was adopted because of its advantages in relation to budget costs and the nature of study objectives (Kothari, 2006). The cross-sectional design considered appropriate in this study as it uses survey techniques in gathering data based on the nature of the objectives (Saunders *et al.*, 2009).

#### Sampling techniques and sample size

The targeted population of the study was local chicken keepers in two wards, Fukayosi and Makurunge wards, Bagamoyo district.

**Table 1: Distribution of Local chicken keepers involved in the study area**

Wards (MakurungenadFukayosi	Population	Sample Size
Hamlets		
Mtoni	22	10
Mkwajuni	31	14
Kifude	36	16
Gezaulole	22	10
Kibaoni	22	10
Nkenge	35	16
Kidomole	32	14
<b>Total</b>	<b>200</b>	<b>90</b>

A sampling frame of 200 developed from a list of local chicken keepers provided by livestock extension officer in each ward was used. These actors in the study area were targeted because they were the people with relevant information concerning the problem under study. From the sampling frame, purposive sampling was used to select 5 hamlets

from Makurunge and 1 villages from Fukayosi where local chickens were kept. From each hamlet 90 respondents were selected to make the sample of the study. Mack *et al.* (2005) advocated that 80 to 120 respondents are adequate for most of the socio-economic researches in Sub-Sahara African households. Also, Sunder *et al.* (2007) argued that a sample of 30 households is considered to a reasonable sample size which can be used in social science studies.

### **3.3 Sampling Procedures**

Two sampling methods were used to select the respondents for this study, the methods were simple random sampling (SRS) and purposive sampling. They are detailed as follows:

#### **3.3.1 Purposive sampling**

Purposive sampling method was selected to select two wards of Makurunge and Fukayosi because was the among of wards involved in Heifer project, however, the mainly peoples of the these area were keeping chicken.

#### **3.3.2 Simple random sampling**

Simple Random sampling (SRS) methods for the member of Makurunge and Fukayosi Wards were selected. From Makurunge ward, 60 members from five hamlets were selected and 30 members from two villages from Fukayosi ward were selected from the list of the population of chicken keepers. Through rottery method, a sample size of 90 heads of household was selected for the interview.

Sample size were household chicken keeper within the wards selected by using formula (Yamane, 1967).

$$n = N / (1 + N(e)^2)$$

Where;

N = Number of household keeping local chicken = 200

e = level of precision 0.05%

so n = 90

### **3.4 Data Collection**

Three enumerators were employed to collect the primary data. The enumerators were trained before questionnaire administration for one day. Each enumerator was the fluent speaker with both English and Swahili as a national language. The person interview was conducted with selected individual households according to the schedule. Each response was carefully recorded in the space provided for the answer.

#### **3.4.1 Primary data**

Primary data were collected using questionnaires for farmers. The questionnaire comprised structured, close-ended and open-ended questions. Supplementary data were collected through direct observation and key informants and extension workers. A semi-structured questionnaire was designed for District livestock Officer and Wards Livestock officer.

#### **3.4.2 Secondary data**

Secondary data were gathered by reviewing relevant available documents that were obtained from Bagamoyo District Livestock and Fisheries Development Office (DLFDO) the documents were concerned with keepers involved in the heifer project, extension package introduced and number of extension officers engaged in the project and after phase out of the projects; Ward Livestock Extension Officer to know exactly number of chicken keepers existing in keeping chicken in the ward, challenges and its progress



### 3.4.3 Data analysis

To get easy understanding, the data were analyzed in a form of frequencies and percentages. The data then were subjected to a statistical test of co-efficient of correlation (“r” value) to ascertain the relationship between independent variable with rearing practices of local chicken

### 3.4.4 Method of scoring and categorization of variable

#### 3.4.4.1 Independent variable

In this study the following socio-personal, socio-economic characteristics of the respondent were studied.

#### 3.4.4.2 Age

Sequential age of the respondents at the time of interview was taken into consideration. The respondents were level as follows.

**Table 2: Age of the respondents**

	Age		Score
I	18 to 30 years	Younger	1
ii	Between 31 to 45 years	Middle aged	2
iii	Above 46 years	Older	3

#### 3.4.4.3 Sex

On this study, researchers and scientists in general tended to talk about people they worked with as objects of study, rather than fellow human beings.

**Table 3: Sex of the respondents**

	Sex	Score
i	Male	1
ii	Female	2

#### 3.4.4.4 Education

It refers to the level of formal education attained by the respondents. Accordingly, they were levelified as follows.

**Table 4: Education level of the respondents**

	<b>Education level</b>	<b>Score</b>
i	Non educated level	1
ii	Primary level	2
iii	Secondary level	3
iv	Collage level	4

#### 3.4.4.5 Marital status

The state of being married or not married, For this research marital status refers on official forms to ask if a person is married or single.

**Table 5: Marital status**

	<b>Marital status</b>	<b>Score</b>
i	Single	1
ii	Married	2

#### 3.4.4.6 People involve in local chicken rearing practices

This refers to those people who involve in rearing chicken within the family house.

**Table 6: People involve in local chicken rearing practices**

	<b>People involved</b>	<b>Score</b>
I	Female	1
Ii	Male	2
Iii	Both male and Female	3
Iv	Children	4
V	All family	5

#### 3.4.4.7 Occupation

It is the work done by the respondents for his livelihood. The respondents were level into following occupation level.

**Table 7: Occupation of respondents**

	<b>Occupation</b>	<b>Score</b>
I	Laborer	1
Ii	Farmer	2
Iii	Employee	3
Iv	Others	4

#### 3.4.4.8 Chicken rearing experience

It refers to the total number of years that the chicken keeper rearing chicken.

**Table 8: Chicken rearing experience**

	<b>Chicken rearing</b>	<b>Score</b>
i.	Low chicken rearing experience up to 1-3 years.	1
ii.	Medium chicken rearing experience 4 to 8 years	2
iii.	High chicken rearing experience above 9 years	3

### 3.4.5 Independent variable

#### 3.4.5.1 Knowledge

Knowledge is the body of information possessed by an individual. Here the local chicken keeper's knowledge regarding the scientific local chicken production practices was assessed. Knowledge of chicken keeper in this reseachwere measured with the help of indices developed by Pandey (1989). The scale were slightly modified according to the need of study. The categorization were made by using the formula  $\text{Mean} \pm \text{S.D.}$  into three level as.

**Table 9: Knowledge of the respondents**

<b>Knowledge</b>			<b>Score</b>
i	Low	Score up to 10	1
ii	Medium	Score Between 11 – 25	2
iii	High	Score 26 and above	3

### 3.4.5.2 Practices

Practices are the mental process through which an individual passes from first hearing about an innovation. The decision to apply an innovation/ technology and to continue to use it is called practices. (Vanden Ban and Hawkins, 1988). The extent of chicken keepers' in the present study was measured with the help of scale developed by Pandey (1989). The scale were slightly modified according to the need of the study. The categorization were made by using the formula  $\text{Mean} \pm \text{S.D.}$

**Table 10: Practices**

<b>Practices</b>			<b>Score</b>
i	Low	Score up to 10	1
ii	Medium	Score Between 11 to 20	2
iii	High	Score 21 and above	3

## 3.5 Statistical Method Used in the Study

Beside frequency, percentage, mean, standard deviation, the coefficient of correlation was worked out to see the relationship of independent variables with the local chicken rearing practices. The detail about the statistical techniques tests used given below.

### 3.5.1 Mean

Mean was calculated by summing all the individual score and dividing it by total number of respondents. The formula is:

$$\bar{X} = \frac{\sum X}{N}$$

Where;

$\bar{x}$  = Arithmetic mean

$\sum x$  = Sum of respondents score

$N$  = Total number of respondents

$\sum$  = The Greek letter word denotes “sum of”

### 3.5.2 Standard deviation

The standard deviation was calculated by taking the difference of each item in the arithmetic mean, squaring these differences, summing all square differences and dividing by the number of respondents and then extracting square root. The usual symbol of the "S. D." is the Greek letter  $\sigma$  (sigma).

Where  $\sigma$  = Standard Deviation

$$SD = \sqrt{\frac{\sum (x - \bar{x})^2}{N}}$$

Where;

$\bar{X}$  = Arithmetic mean

$X$  = Score of each respondents

$N$  = Total number of respondents

$\sum$  = The Greek letter word denotes “sum of”

### 3.5.3 Frequency and percentage

Frequency and percentage were used for making simple comparisons. To calculate the percentage, the frequency of particular level was multiplied by 100 and divided by total number of respondents in that particular level.

### 3.5.4 Co-efficient of correlation

The co-efficient of correlation between independent variables and dependant variables were calculated with the help of co-efficient of correlation with the formula given.

The data from the interview schedule and the questionnaire were organised, coded and analyzed by using the Statistic Package for Social Science (SPSS) software program. Descriptive statistics such as frequency, correlation and percentages were used to obtain the variability and to compare different means to know the proportion and distribution of the data. The correlation coefficient was used to determine the relationship between dependent and independent variables and their significance shows below.

$$r = \frac{N\sum XY - [\sum(X) \cdot \sum(Y)]}{\sqrt{N\sum x^2 - (\sum X)^2} \times \sqrt{N\sum y^2 - (\sum Y)^2}}$$

The co-efficient of correlation between independent variables and dependant variables were calculated with the help of co-efficient of correlation with the formula given under

Where,

r = co-efficient of correlation.

X = score of independent variables

Y = score of dependant variables

M<sub>x</sub> = mean of 'x' series

M<sub>y</sub> = mean of 'y' series

n = Total number of respondents

Σ = sum of squared 'x' value

Σ = sum of squared 'y' value

### **3.5.5 Qualitative data**

Qualitative data from key informants were analyzed using contents analysis. The analysis focus on the meaning of statements given by the respondents depending on the theme of the study were then sorted and coded on th basis of their similary in meaning to give relevant and oppropriate conclusions and this was done in order to validate the information obtained from questionnaires.

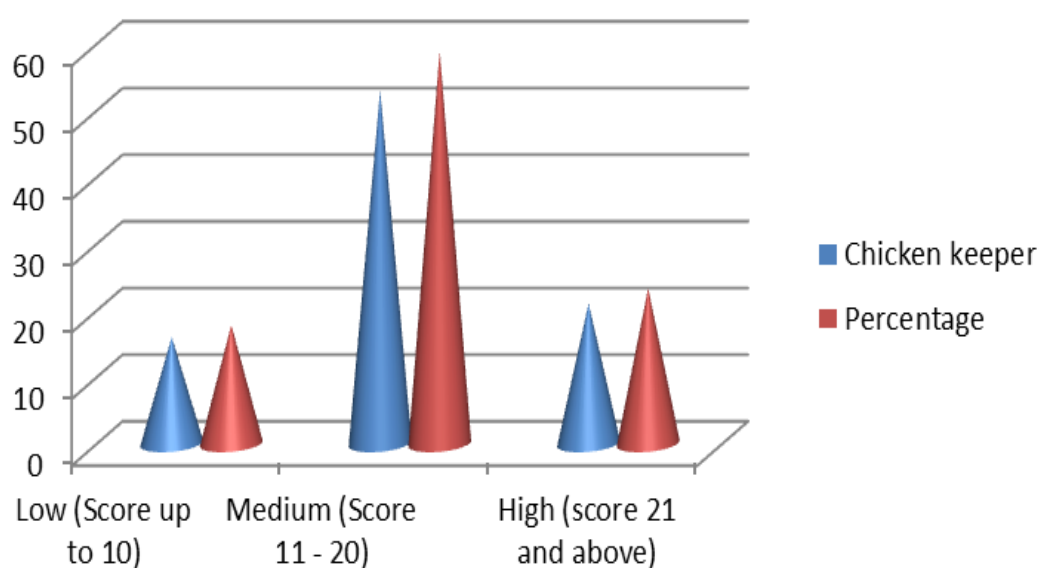
## CHAPTER FOUR

### 4.0 RESULTS AND DISCUSSION

#### 4.1 Introduction

The present research was undertaken to study, knowledge and practices of the Local chicken rearing practices by the chicken keeper and socio-personal, socio-economic characteristics.

This present chapter comprises the results of the study are presented in six sections: Section one presents distribution of Local chicken owners according to their level of production, section two presents Local chicken keepers' knowledge level on Local chicken rearing practices. While section three gives identification of local chicken keeping management practices, section four describes the socio-personal, socio-economic characteristics of Local chicken keeper and their relationship with practices of Local chicken rearing. Section five presents constraints facing local chicken keeper on Local chicken rearing in the study area.



**Figure 3:** Distribution of local chicken keeper according to their level of practices (n=90)



Result obtained from Table 11 shows that majority of the respondents (58.9%) were in medium level with respect to their level of practicing rearing chicken, followed by high level practices level, which was comprised of (23.3) respondents and (17.8) respondent were found in low level of practicing rearing chicken. It is due to medium level of knowledge, low level of management practices, education up to primary level and low annual income. Similar observations by the study conducted by Ahire *et al.* (2007) and Tadelles *et al.* (2003).

**Table 11: Distribution of local chicken keeper according to their level of practices**  
(n=90)

	<b>Respondents' level of rearing practices</b>	<b>Counts</b>	<b>Percentage</b>
i	Low (Score up to 10)	16	17.8
ii	Medium (Score 11 - 20)	53	58.9
iii	High (score 21 and above)	21	23.3

## **4.2 Chicken Keepers' Knowledge on Small-scale Local Chicken Husbandry**

### **4.2.1 Knowledge about housing of local chicken husbandry**

Study findings (Table 12) show that all the respondents (100%) reported that shelter for local chicken was needed and majority of the respondents had knowledge about the different quality of housing used for chicken keeping. The study found that housing made by cement brick roofing with corrugated iron sheets (30.0%), houses made of wooden timber with mud and roofing by dry grass (75.6%), houses made of iron sheets with less ventilation (29.7%), houses made of thatch grass (5.8%). Furthermore, the study found that the majority of the local chicken keepers (75%) knew that ventilation is essential for chicken houses for the health of the chicken. Very few respondents had knowledge about nest requirement for chicken laying. For example, only (37.5%) chicken keepers had

knowledge of the provision of perches for the chicken to sleep at night. Muheye (2007) states that lack of housing is one of the constraints of the smallholder chicken production systems in some African countries, Tanzania included.

#### **4.2.2 Knowledge about feeding and watering of local chicken**

The majority of the respondents (90.0%) reported to have little knowledge concerning the purpose of feeding local chicken; They further reported scavenging feed resource to be almost the only source of feed for local chicken. Almost more than half of the respondents (57.0%) knew about the clean water supply to their chicken. Fewer of them (11.1%) knew about daily feed supplement to be required for their chicken, the same number of them (11.1%) had knowledge about the need of balanced diet for their chicken. Feeds sources for most scavenging chickens were reported to be kitchen wastes and harvest leftovers in chicken production systems which were friendly with the environment (Bogalle, 2010).

#### **4.2.3 Knowledge about management practices of local chicken**

The result in Table 12 showed that respondents had knowledge about general management of local chicken like caring day-old chicks (35.6%), protection from predators and vermin (41.1%), the age of disposal of local chicken (11.1%) and 12.2 of the respondents had knowledge about the preservation of eggs. Respondents here understand what management meant to ensure improvement on local chicken production.

#### **4.2.4 Knowledge about health and disease control of local chicken**

Result in Table 12 shows that keepers of local chicken in the study area had good knowledge about health and disease control practices through vaccination (27.7%), control of parasites like ticks, lice, fleas, and mites. Diseases are common within the community, most respondents (83.3%) had knowledge of Newcastle disease, fowl pox (7.8%) and fowl

cholera (8.9%). Very few respondents (13.3%) had knowledge concerning regular vaccination of chicken after every three months for the sake of disease control. About 46.7% of respondents had no knowledge about regular deworming of chicken and the advantages of using various herbal drugs. Lack of knowledge among chicken keepers on modern drugs availability, inadequate resources to seek for veterinary advisory, Existence of traditional knowledge on chicken diseases management was reported by Kayanja and Lagu (2010) as the possible bottlenecks in the sub-sector regarding disease management. This implies that most local chicken keepers do not have knowledge on managing their chicken, currently experiencing losses of chicken.

#### **4.2.5 Knowledge about marketing of local chicken**

Findings on the sale of local chicken shows that chicken keepers sell their chicken at home and are not well aware of the village market and marketing prices of the eggs and chicken, they sell to local shopkeepers (13.3%) and intermediaries (7.7%) where the channels of marketing were also known to respondents. Those respondents with medium knowledge were (50.0%) and stated that they knew about the age at which chicken are to be sold at the market and egg production of chicken to be started. These findings are similar to those reported by Mlozi *et al.* (2003) that rural market channels are described as informal and poorly developed. Similarly, findings in studies in Ethiopia by Moges *et al.* (2010) reported to the findings of this study that local chickens are sold locally at nearby markets in peri-urban areas since there are no formal markets established.

**Table 12: Chicken keepers' knowledge on small-scale local chicken**

<b>Housing</b>	<b>Frequency</b>	<b>Percentages</b>
Material needed for chicken sheltering	90	100
Made of cement brick	27	30
Thatch grass	60	66.7
Made of wooden timber	68	75.6
Ventilation is essential	25	27.8
Nest requirement	27	30
Provision perches	34	37.8
<b>Feeding and watering</b>		
Availability of scavenging	90	100.0
Water availability	51	57.0
Daily Feed supplement	10	11.0
Offered balance diet	10	11.0.
<b>General management</b>		
Caring day old chicks	32	35.6
Protection of predators and vermin	37	41.1
Age of chicken disposal	10	11.1
Egg preservation	11	12.2
<b>Health control</b>		
Provision of vaccines	25	27.8
Control of parasites	23	25.5
Deworming	42	46.7
<b>Concerning disease of local chicken</b>		
a) Newcastle disease	75	83.0
b) Fowl Pox	7	7.8
c) Fowl cholera	8	8.8
Regular vaccination	12	13.3
<b>Marketing</b>		
Selling at home	90	100
local shopkeeper	12	13.3
Middlemen	7	7.7
Selling at the market place	22	24.4

#### 4.2.6 Overall knowledge of respondents on local chicken rearing practices

The overall knowledge of chicken keepers in rearing practices was found to be low (41.93%). However, knowledge levels of individual about housing was found to be (52.56%) which was highest as well as in general management (47.37%), feeding and watering (40.4%), marketing (36.63%) and knowledge level about health and disease control were recorded the least (27.68%). The medium level of knowledge about local chicken rearing practices might be due to the factors like ignorance, insufficient training, lack of assurance, medium level of education and economic status of respondents.

**Table 13: Overall knowledge of local chicken rearing practices (n=90)**

Knowledge on Rearing practices	Frequency	Percentage
Housing	47.1	52.2
Feeding and watering	39	40.4
Management practices	42.6	47.3
Disease control	25	27.6
Production and Marketing	33	36.6
Overall Knowledge	37.3	40.9

### 4.3 Management Practices of Local Chicken Rearing

#### 4.3.1 Housing practices by local chicken keepers

Results in Table 14 shows that respondents (13.3%) of the village chicken owners provide only night shelter to their chickens whereas (27.8%) respondents provided separate chicken houses made of the locally available material, wooden material, mud, tin, wire covering with dry grass. Only 10 % of respondents kept their chickens near their dwellings and the remaining 49 % of respondents said chickens share the same houses with owners with the reason of protecting them against thieves. Another study by Mengesha *et al.* (2011) in Jammu district, South Wollo reported that chicken owners share the same room and provided separate chicken house, respectively.

When the respondents were asked on why they did not build good houses for their chicken; they responded that there was lack of attention to local chicken (34.6%), lack of construction materials (25%), lack of knowledge and awareness (19.6%) and shortage of labour and time (5.4%), were some of the major reasons mentioned by local chicken owners for not preparing a separate house for local chicken keeping. These findings are in line with those by Melkamu and Andarge (2013) who found that chicken was confined within the family house during night time and released for scavenging early in the morning.

#### **4.3.2 Feeding and watering practices for local chicken**

The major feeds and feeding practices of chickens in the study area reported by the respondents were scavenging (100%) and consideration (16.6%) which were supplemented with grains where maize bran and household scraps are the major supplementary feeds offered. The amount of each feed depended on seasons of the year based on the quantity and availability of the resources at the household level. The study further found that (97.2 %) of the respondents, homegrown supplementary feed materials were offered at random to all classes of chicken on bare ground. About 16.6% respondents offered supplementary feeds once per day. Home leftover feed amounted to (94.4%) of the feeds for local chicken in the study area.

Despite variations in the source of water and frequency of watering, the study found that not all of the respondents provided water for their chickens although some did it. This means that there is lack of knowledge on practising water supply for few respondents as one aspect of their concern to their chickens' management. When respondents were asked about the source of water within their areas for chickens to drink, they mentioned shallow wells (100%), taps (6.7%), tanks (4.76%) borehole water (35.5%), and free range (100%).

In Makurunge hamlets, the sources of water included boreholes, rainwater, shallow wells, and taps. In Fukayosivillage the water sources for the chicken were from the boreholes, rain, and shallow wells. Respondents of the current study also provided responses which concurred with findings in GommaWereda in Ethiopia which argued that scavenging consists of insect, grass, enset (*Ensete ventricosum*), kitchen wastes, and harvest leftovers to indicate that the village chicken production system is friendly with the environment (Bogalle, 2010).

#### **4.3.3 Management practices of local chicken**

Data from the survey indicate that (39.9%) respondents were using types of equipment made by local materials for feeding and drinking. About (11.1%) of respondents were having special equipment for feeding and drinking and the rest left the chicken for scavenging. This equipment was used for given supplement feeds. A quarter (26.7%) of respondents provided nest for eggs laying with dry bedding materials (soft grasses) and kept in the corner of house especially in the kitchen, (100%) respondents brooded chicks naturally and 7.8% used semi-intensive system to allow chicken not to go farther and protect them against predators and theft (Table 13). The findings are inline with the study by Bukwelles (2015). To control theft problem, local chicken shelters should be built in close proximity to the residential houses to allow for quick action if an invasion occurs.

#### **4.3.4 Health and disease control practices of local chicken**

When respondents were asked about the advantages of using various herbal drugs, of all respondents (100%) were using the herbal drug. Findings on Table 4 show that (30.0 %) of the farmers reported full recovery of the flock, (43.3%) reported partial recovery resulted, (18.8%) believed that some birds survived and (7.7%) showed symptomatic recovery. Respondents further reported that experience was determined by their choice to use

traditional medicine in managing similar conditions and evidence of past recovery, chicken types kept, capital levels and scale of chickens as was reported in the study conducted by Kayanja and Lagu (2010). Lack of knowledge among chicken keepers on modern drugs availability, inadequate resources to seek for veterinary advisory, and existence of traditional knowledge on chicken diseases management were found to be the possible bottlenecks in the sub-sector regarding disease management.

#### **4.3.5 Marketing practices of local chicken**

All respondent (100%) found in the study area were keeping the chicken for fulfilling their livelihood. Result in Table 14 show that a quarter of the respondents (27.7%), were selling their chicken through the open market, The majority of them (60.0%) were selling their chicken at home whereby the sellers of chicken in local markets purchased and took the chicken to their markets. Only a few of them (12.2%) sold the chicken from home as well as in the open market, farmers further reported that they benefitted more when they sold their chicken at home and an open market. When asked about the challenges they encounter in the marketing of their chicken, respondents cited unstable prices, low prices, seasonality in demand, poor infrastructure and availability of substitutes among others.

Findings also reveal seasonality to be the biggest challenge to the marketing of chicken. They argued that during calendar days such as Easter and Christmas, the demand for chicken is very high, while during the off-season, the demand is very low and offered prices are very low. Also, results of the study in Table 4 revealed that majority (74.4%) of the respondents sold their eggs in informal market while only (25.5%) used a formal market to sell their products. Chicken are marketed varies from household to household, depending on the local breed and the feeding rate. Some of the respondents when they want to sell their chicken few weeks or month, they supplement their Chicken very well



with local feeding made of maize bran with other additive material in trying to establish the market for chicken and eggs. This implies that local chicken keepers do not benefit much from keeping the local chicken. This could be ascribed by lack of understanding on the marketing channels. These findings concur what Moges *et al.* (2010) strongly argue that village chicken producers in Ethiopia sold their live chicken and eggs in their locality and urban markets directly to consumers or traders (collectors) and marketing channels were informal and poorly developed.

**Table 14: Management practices for local chicken keeping husbandry (n=90)**

<b>Implimentation of (LC) rearing practices</b>	<b>Frequency</b>	<b>Percentages</b>
<b>Housing</b>		
Share the same house with the human being	44	48.9
Leaving in a separate house	25	27.8
Provisio of night shelter	12	13.3
Keeping near their dwelling	9	10.0
<b>No need of the House</b>		
Lack of attention on chicken	25	27.8
lack of construction materials	12	13.3
lack of knowledge and awareness	44	48.9
Shortage of labor and time	9	10.0
<b>Feeding</b>		
Availability of water	90	100.0
Provision of water	66	73.3
<b>Feeding</b>		
Once per day	15	16.7
Anytime wish to do	86	94.4
<b>Type of feeding System</b>		
Scavenging feed resources	90	100.0
Provisiona of ddition feed	15	16.6
Home supplement	90	100
Offering special feed per day	15	16.6
<b>Management practices</b>		
Local equipment (feeder and Drinker)	35	38.9
Special feeding equipment	10	11.1
Made perches for resting at night	24	26.7
Provides nest for laying eggs	14	15.6
Natural brooding	90	100.0
<b>Health management</b>		
Vaccination	8	8.8
Traditional treatment	47	52.2
Modern treatment	10	11.1
Control movement	19	21.1
Nontraditional or modern treatment	6	6.6
<b>Herb medicinal treatment</b>		
Use of herb drugs	90	100.0
Full recovery	27	30.0
Partially recovery	39	43.3
Some chicken survival	17	18.8
Symptomatic recovery	7	7.7
<b>Marketing</b>		
Purposeful for chicken	90	100.0
Selling chicken at home	54	60.0
Selling chicken through open market	25	27.7
Selling from home as well as in open market	11	12.2
Informal market(egg selling)	67	74.4
Formal market(egg selling)	23	25.5

#### 4.3.6 Overall management practices for local chicken keeping husbandry

The overall management practices were presented in Table 15. Data revealed that overall management practices were (39.1%) however, practice wise they showed that feeding and watering (51.8%) were highly practised followed by marketing (50.0%), general management (38.5%), disease control (30.0%), and housing (25.0%). This result indicates that there was poor housing, lack of practical skills among chicken keepers on modern drugs, i.e use of vaccines. Though there was a big challenge in marketing due to the availability of scavenging feed and the need for chicken and chicken by-product within the market, those few chickens were highly demanded during the season of festivals. Availability of scavenging feed resources plays a critical role in the small-scale local chicken production such that cereal and grain and their by-product, were the most important scavenging feed resources during the dry season, whereas during wet season availability of forage leaves, flower, seeds, garden vegetable, insect and worms were the most scavenging feed resources. However, availability of the scavenging feed resources varies with season's condition, farming activities and the area available for scavenging. As it was reported by Gemechu and Amene (2015), free-range chicken production system offers many people the opportunity to improve their lives.

**Table 15: Overall Management practices of local chicken husbandry (n=90)**

Management practices	Frequencies	Percentages %
Housing	22.5	25
Feeding	46.7	51.8
Management practices	34.6	38.5
Health management	27	30.0
Marketing	45	50.0
<b>Overall</b>	<b>35.16</b>	<b>39.1</b>

#### **4.4 Socioeconomic Characteristics of Chicken Keeper and Their Relationship with Local Chicken Rearing Practices**

This part concerned to the socio-person and socio-economic characteristics variables i.e. age, sex, Marital status education, occupation, chicken rearing experience, and knowledge included in this study as an independent variables.

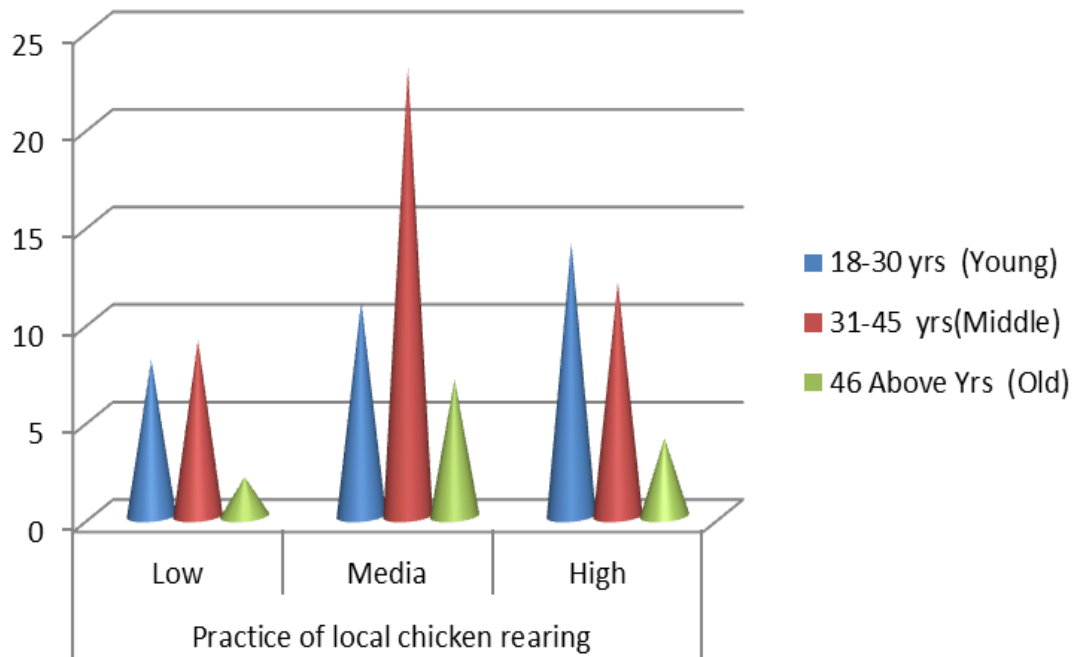
The characteristics of the respondents included age, sex, education level, marital status, the experience of work on the farm and main occupations of household heads. The household characteristics of interviewed local chicken keepers households in two Makurunge and Fukayosi wards were presented in different tables. Accordingly, from the 90 interviewed village chicken keepers, the study reveals that more than half of the respondents were women (54.4%) and (45.6%) of the respondents were man. This implies that women were the majority engaging in chicken keeping compared to men in the study area. Nature of chicken management was mentioned to be the likely reasons for women to engage mostly in chicken keeping than men in the study area. This indicates that the age of the majority of the respondents ranged between 31-45 years old (46.7%) of the population; this implies that the majority of the respondents were in the productive age and energetic people. Aged farmers have long years of experience and skills in using traditional knowledge on local chicken keeping which promote local species with low output (Fallbeck, 2016). The findings by Olujenyo (2008) established that chicken keeper with advanced age has great experiences and skills of keeping the chicken.

Regarding education level of respondents, (7.8%) were illiterate, (56.9%) had secondary education and (7.8%) had college level. This implies that the majority of the respondents who engaged in chicken keeping in the study area had primary education and above.

The study by Oyeyinka *et al.* (2011) revealed that level of education has positive significance on knowledge and practices in chicken keeping since it is very possible for an educated person to read and properly apply the acquired knowledge and skills into practices as compared to non-educated person. regarding people involved in caring for local chicken; findings of the study indicate that (38.9%) of adult females were the ones who exhausted more time to take care of local chicken compared to adult males (12.2%) involving themselves in caring local chicken. Adult female and adult male accounted for (20%) and (17.8%) of children who did it after schooling and all family (11.1%) were involved. This finding implies that small-scale local chicken production in the study area is mostly managed by the females as was also found by FAO (2014).

The result of the study indicated that (71.1%) of the respondents who were engaged in chicken keeping were married, and singles were slightly above the quarter of respondents, (28.9%). Wondmeneh *et al.* (2015) argue that married couples tend to share experience of technologies and therefore their engagement in chicken keeping is conceived to be highly meaningful of livelihood to sustain their families particularly for married and living together families. The majority of the respondents (68.9%) were found to be keeping local chicken as their main occupation. Very few of them (31.1%) were found having other activities as their major source of income. Chicken keeping and other activities to the respondents were dominant to local chicken production because they were sources of valuable inputs such as feeds and cash that were required in chicken production, as the chicken keepers were mainly engaged in other agricultural activities than being civil servants (7.8%) and fishing (13.3%), (Table 11). These findings are similar to those reported by Sanyang (2012) that agriculture is the main employer for most of peri-urban population in Tanzania.

#### 4.4.1 Age



**Figure 4:** Relationship between age and rearing practice of local chicken (n=90)

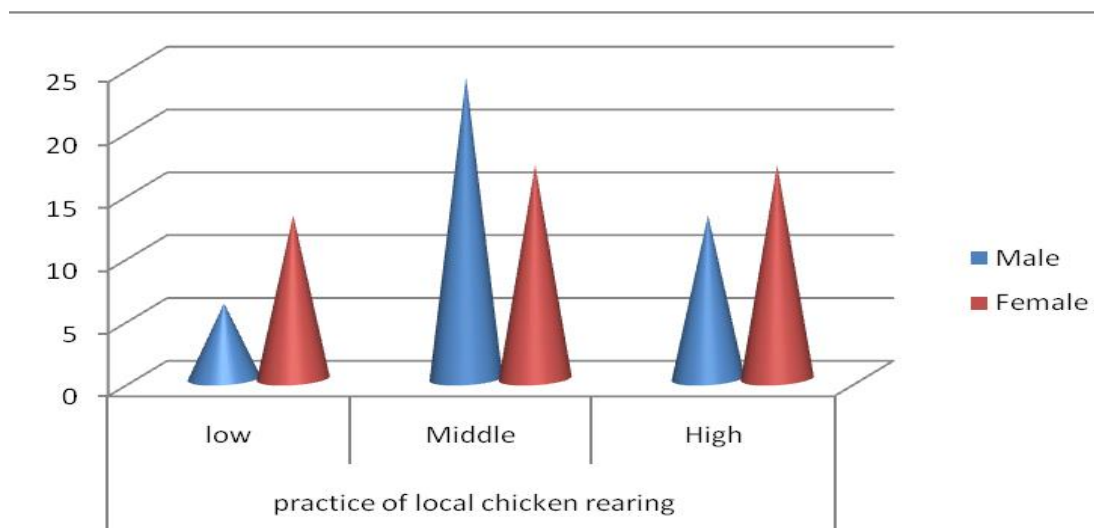
Practices level of local chicken keeper in this study reveals that, age ranged from 18-30 years young were 30.0% and middle 31-45 years were (46.7%) and above 61 were old, (8.9%). This indicates that the age that respondent appear in between 31-45 is above 46.7% of the population, this reveal that there is significant higher productive age and energetic people with interest and accumulated skills and experiences in chicken rearing. More aged farmers have long years of experience and skills by using traditional knowledge on chicken rearing that promote local species with low output (Olujenyo, 2008).

**Table 16: Relationship between Age and rearing practice of local chicken (n=90)**

Age of respondents	Practice of local chicken rearing			Total No	Correlation Coefficient“r”
	Low	Media	High		
18-30 years (Yang)	8(10.0)	11(12.2)	14(15.5)	33(36.6)	0.634
31-45 yeas (Middle)	9(10.0)	23(25.5)	12(13.3)	44(48.8)	
46-and above Year	2(2.2)	7(7.8)	4(4.4)	13(14.4)	
<b>Total</b>	<b>19(21.1)</b>	<b>41(45.6)</b>	<b>30(33.3)</b>	<b>90(100)</b>	

Note: numbers in brackets are percentage and those outside are frequencies

#### 4.4.2 Sex

**Figure 5: Relationship between sex and practice local chicken rearing (n=90)**

Regarding the level of sex of respondents, as presented in Table 17, it was revealed that more than half of the respondents were women (54.4%) and (45.6%) of the respondent were male. This implies that female were majority engaging in practicing chicken rearing compared to men in the study area. Nature of chicken management were mentioned to be the likely reasons for women to engage mostly in chicken rearing than men in the study area.

**Table 17: Relationship between sex and practice local chicken rearing (n=90)**

Sex of respondents	Practice of local chicken rearing			Total	Correlation Coefficient“r”
	low	Middle	High		
Male	6(6.7)	24(26.6)	13(14.4)	43(47.8)	0.698
Female	13(14.4)	17(18.9)	17(18.9)	47(52.2)	
<b>Total</b>	<b>19(21.1)</b>	<b>41(45.6)</b>	<b>30(33.3)</b>	<b>90(100)</b>	

**note:** numbers in brackets are percentage and those outside are frequencies

#### 4.4.3 Marital status

The results on Table 18 shows that majority (71.1%) of the respondent who were engaged in chicken rearing were married, followed by respondent who are single (28.9%). On the other hand Wondmeneh *et al.* (2015) argues that married couples tend to share experience of technologies. Therefore their engagement in chicken rearing conceived to be highly meaningful of livelihood to sustain their families particularly for married and living together families, as the income earned from chicken rearing spur the family income and other nutritional requirements.

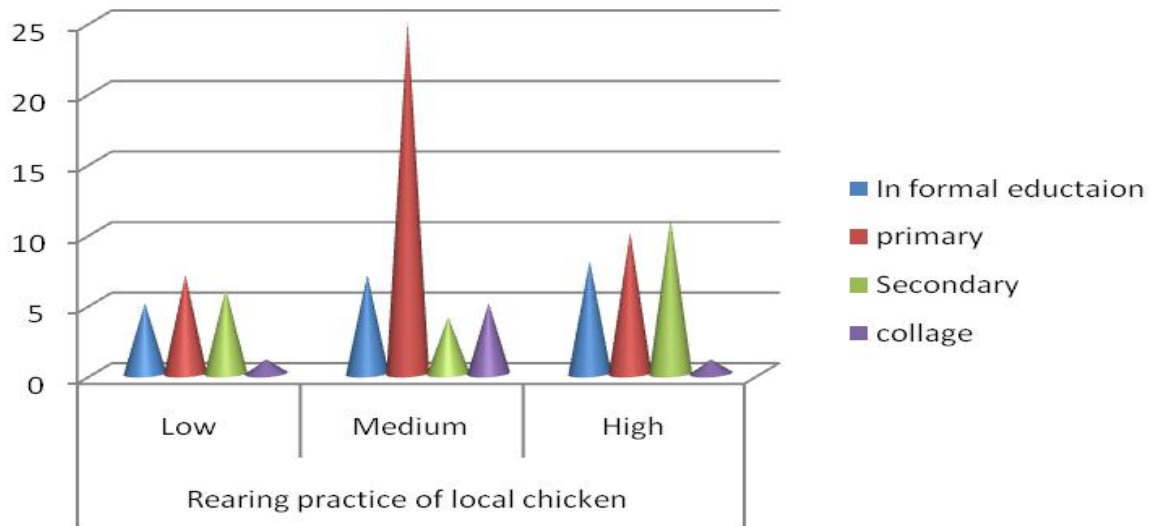
**Table 18: Relationship between Marital status and Rearing practice of local chicken**

Marital status	Rearing practice of local chicken			Total	Correlation Coefficient“r”
	Low	Medium	High		
Married	10(11.1)	34(37.8)	20(22.2)	64(71.1)	0.580
Single	9(10.0)	7(6.8)	10(11.1)	26(28.90)	
<b>Total</b>	<b>19(21.1)</b>	<b>41(45.6)</b>	<b>30(33.3)</b>	<b>90(100)</b>	

Note: numbers in brackets are percentage and those outside are frequencies



#### 4.4.4 Education background



**Figure 6:** Relationship between Education and Practices of rearing local chicken (n=90)

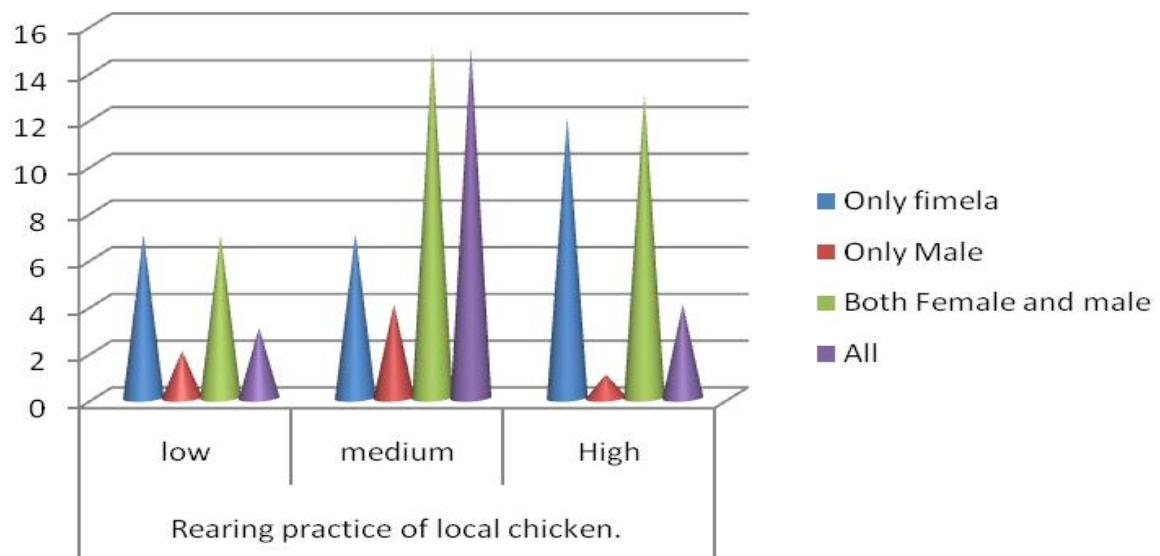
Education is usually believed to have the outcome on widening the mental perspective of a person and thereby prepares him to be receptive to new ideas. Findings in this study wind up that only (7.8%) were non-educated, (56.9%) had primary education, (25.6%) had secondary education and (7.8%) had collage education out of 90 respondent interviewed. This implies that the majority of the respondents engaged in chicken rearing in the study area were having less modern knowledge on chicken rearing and management practices. Table 19 revealed that there was a positive and highly significant relationship between education and practices level of local chicken rearing. The study by Hall and Khan (2003) reveal that level of education has positive significant on knowledge and practices in chicken rearing since it is very possible for an educated personnel to read and properly apply the acquired knowledge and skills into practices as compared to non-educated personnel.

**Table 19: Relationship between Education and Practices on rearing chicken (n=90)**

Education	Rearing practice of local chicken			Total	Correlation Coefficient“r”
	Low	Medium	High		
Informal education	5(5.6)	7(7.8)	8(8.9)	20(22.2)	0.920
primary education	7(7.8)	25(27.8)	10(11.1)	42(46.7)	
Secondary education	6(6.7)	4(4.4)	11(12.2)	21(23.3)	
collage education	1(1.1)	5(5.6)	1(1.1)	7(7.8)	
<b>Total</b>	<b>19(21.1)</b>	<b>41(45.6)</b>	<b>30(33.3)</b>	<b>90(100)</b>	

**Note:** numbers in brackets are percentage and those outside are frequencies

#### 4.4.5 People involved in chicken rearing within household n=90

**Figure 7: Respondents involved in chicken rearing within household (n=90)**

Findings of the study indicate that (38.9%) of adult females were the ones who exhausted more time to take care of local chicken compared to (12.2%) adult males who spent little time, while adult female and adult male accounted for (20%) and 17.8% of Children they did it after schooling. This significantly, reflected to the fact that small scale local chicken production is mostly managed by females (FAO, 2014). Also (Halima, 2007) also reported that rural women in North-West Ethiopia are more responsible for chicken rearing in both

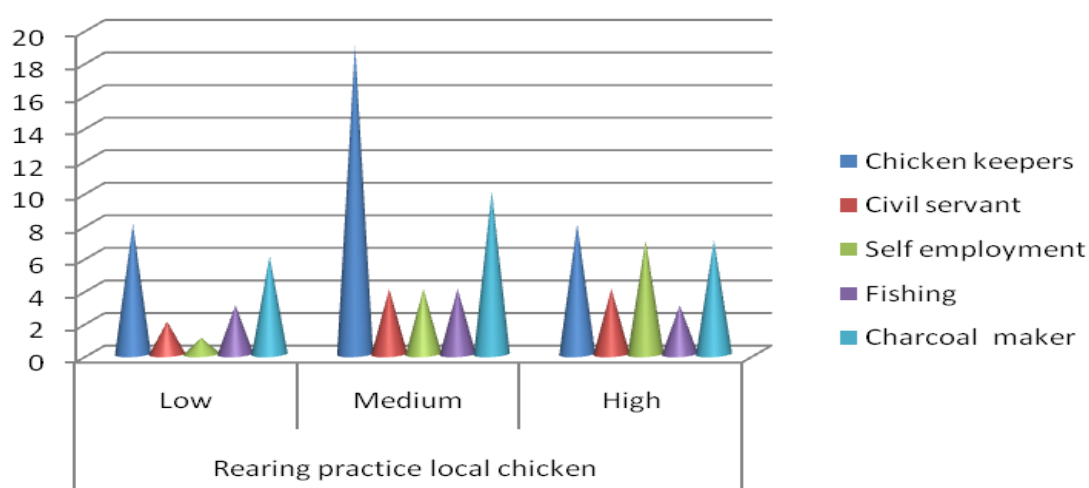
male and female headed households as women dedicate that they dedicate their time in chicken keeping for their livelihood improvement.

**Table 20: People involved in chicken rearing within household (n=90)**

People involved in rearing chicken	Rearing practice of local chicken			Total	Correlation Coefficient“r”
	Low	Medium	High		
Only female	7(7.8)	7(7.8)	12(13.3)	26(28.9)	0.554
Only Male	2(2.2)	4(4.4)	1(1.1)	7(7.8)	
Both Female and male	7(7.8)	15(16.7)	13(14.4)	35(38.9)	
All	3(3.3)	15(16.7)	4(4.4)	22(24.4)	
<b>Total</b>	<b>19(21.1)</b>	<b>41(45.6)</b>	<b>30(33.3)</b>	<b>90</b>	

**Note: numbers in brackets are percentage and those outside are frequencies**

#### 4.4.6 Occupation



**Figure 8: Relationship between occupation and practices of rearing local chicken production (n=90)**

The majority of the respondents (68.9%) were found to be rearing local chicken as their main occupation. Very few of them (31.1%) were found having other activities as their

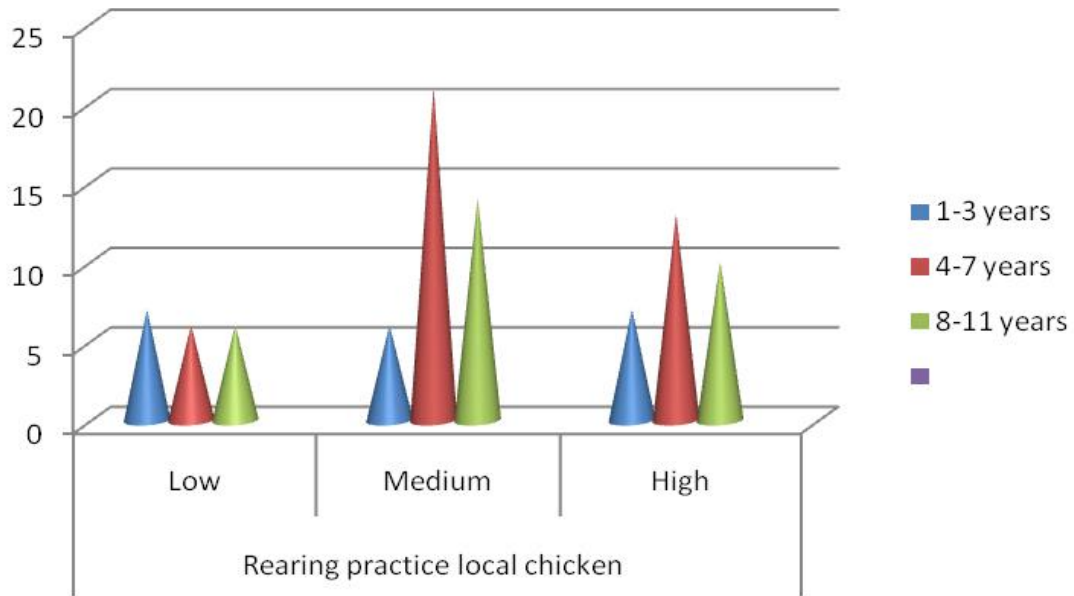
major source of income. Chicken rearing and other activities to the respondents were dominant to local chicken production because they were sources of valuable inputs such as feeds and cash that were required in chicken production, as the chicken keepers were mainly engaged in other agricultural activities than being civil servants (7.8%) and fishing (13.3%), (Table 21). The study discovered that large number of chicken keeper and others are involved in local chicken rearing practices which suggest that they rear chicken as a subsidiary occupation to support their family. These findings are similar to those reported by Sanyang (2012) that agriculture is the main employer for most of peri-urban population in Tanzania. Also in Makurunge and Fukayosi wards, respondents said that, “sometimes we keep chicken as a supportive livestock to fulfill our need when they get stacked with issues concerned with money or spiritual issues.

**Table 21: Relationship between occupation and Practices on rearing chicken ( n=90)**

Occupation	Rearing practice local chicken			Total	Correlation Coefficient“r”
	Low	Medium	High		
Chicken keepers	8(8.9)	19(21.1)	8(8.9)	35(38.8)	0.702
Civil servant	2(2.2)	4 (4.4)	4(4.4)	10(11.1)	
Self employment	1(1.1)	4(4.4)	7(7.8)	12(13.3)	
Fishing	3(3.3)	4(4.4)	3(3.3)	10(11.1)	
Charcoal maker	6(6.7)	10(11.1)	7(7.8)	23(25.6)	
<b>Total</b>	<b>20(22.2)</b>	<b>41(45.6)</b>	<b>29(32.2)</b>	<b>90(100)</b>	

**Note: numbers in brackets are percentage and those outside are frequencies**

#### 4.4.7 Rearing Experience



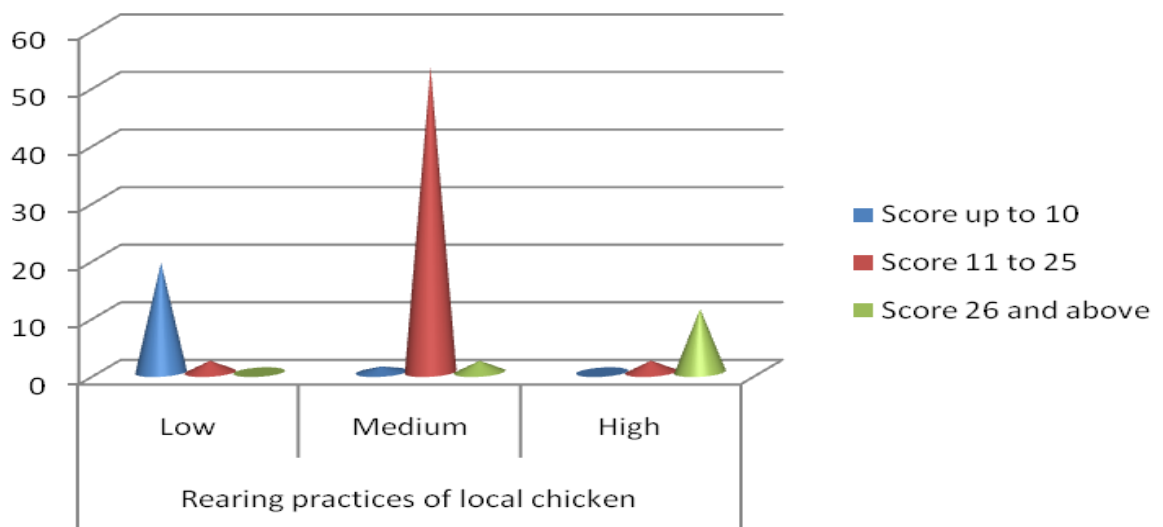
**Figure 9:** Relationship between local chicken rearing experience and rearing practices of local chicken

Research findings in Table 22 indicate that there is positive relationship between local chicken rearing experience and practices. Data shows that majority (45.6%) of respondents had medium chicken rearing experience followed by (33.3%) of respondents high and (21.1%) of respondents had low chicken rearing experience. Chicken keeper having medium, high and low level of chicken rearing experience had medium level of local chicken practices. This finding is disparity with the findings of Nimje and Ahire *et al.* (2007).

**Table 22: Relationship between local chicken rearing experience and rearing practices of local chicken**

Rearing Experience	Rearing practice local chicken			Total	Correlation Coefficient“r”
	Low	Medium	High		
1-3 years	7(7.8)	6(6.7)	7(7.8)	20(22)	0.655
4-7 years	6(6.7)	21(23.3)	13(14.4)	40(44)	
8-11 years	6(6.7)	14(15.6)	10(11.1)	30(33)	
<b>Total</b>	<b>19(21.1)</b>	<b>41(45.6)</b>	<b>30(33.3)</b>	<b>90(100)</b>	

**Note: numbers in brackets are percentage and those outside are frequencies**



**Figure 10: Relationship between knowledge and rearing practices of local chicken (n=90)**

#### 4.4.8 Relationship between knowledge and practices of local chicken practices

The findings of the study reveal that the majority of the respondents (63.3%) had a medium level of knowledge followed by low level (22.2%) and high level (14.44%) of knowledge. The knowledge of the local chicken keepers was positive and significantly correlated with the performance of local chicken rearing practices. The data revealed that there was decrease in a trend of performance level from a high knowledge level to low knowledge level. Respondents with high, medium and low knowledge level had high,

medium and low-performance levels respectively. The high level of knowledge was attributed to the level of education, good socioeconomic status and good contact with information sources. Research into Use Programme responded to the request for knowledge on chicken husbandry by deploying household caretakers to provide on-farm chicken husbandry skills training. RIU Tanzania (2011) findings showed that resources and technical knowledge allow households to undertake a range of baseline interventions to improve chicken performance (Daphne, 2013).

**Table 23: Relationship between knowledge and rearing practices of local chicken**  
(n=90)

Knowledge	Rearing practices of local chicken			Total No	Correlation coefficient “r”
	Low	Medium	High		
Score up to 10	19(21.11)	01(01.11)	00(00.00)	20(22.22)	<b>0.897</b>
Score 11 to 25	02(02.22)	53(58.88)	02(02.22)	57(63.33)	
Score 26 and above	00(00.00)	02(2.22)	11(12.22)	13(14.44)	
<b>Total</b>	<b>21(23.33)</b>	<b>56(62.22)</b>	<b>13(14.44)</b>	<b>90(100)</b>	

**Note: numbers in brackets are percentage and those outside are frequencies**

## **4.5 Constraints Facing Small-scale Local Chicken Keepers for their Livelihood**

### **Improvement**

#### **4.5.1 Unreliable market**

The study found that all chicken keepers did not get the same price which prevailed in the urban market. This has been reported by the local chicken keeper in the study area to be their major constraints. They also did not get their desirable prices. For example, they sold

for very low prices to the villagers and there was no reliable buyer who could buy regularly at real prices.

#### **4.5.2 Diseases outbreak**

Diseases outbreak was reported to be the major constraint to the chicken productivity by many respondents. This was reported by (96.7%) reported to be facing with various diseases including Newcastle disease, (8%) fowl pox and (2%) infectious coryza. This lowered the prices of chickens in the markets hence lowering the gross margins. Farmers got higher profit margins during religion ceremony (Holy Ramadan, Christmas day, Easter day and EID days). During these seasons, chicken keepers sold fewer chickens to them hence creating a high demand that increased market prices. This resulted from massive deaths of local chicken due to Newcastle disease attack during the rainyseason and that of Pox and Coryza during the dry season. This study is similar to that of Yosefe *et al.* (2016) who reported that a high incidence of chicken diseases, mainly Newcastle Disease (NCD), is the major and economically important constraint for local chicken's production system.

Predators were listed in conjunction with diseases as the major cause of chicken's death. It has been reported by all respondents (90) that predators known as wild cats, squirrels, dogs and birds of prey causes losses, especially in young chickens. Chicken keepers also complain that, predator favours condition for disease transmission especially during the rainy season because there was no boundary on rearing scavenging chicken. Under village chicken production system, the prevalence of diseases, predators and lack of proper healthcare, were reported to be the major constraint of chicken production (Moges *et al.*, 2010; Dinka *et al.*, 2010).

#### **4.5.3 Theft is a big problem for chicken keepers**

Findings from researches done in Makurunge and Fukayosi wards indicate that theft is another constraint for small-scale local chicken production. Human beings also represent



another important predator for local chickens. Therefore, (61.1%) of respondents had problems with theft, on the other hand (38.9%) of the respondents did not have any troubles at all. According to Bukwelles (2015), in order to control the theft problem, the local chicken shelters should be built in close proximity to the residential houses to allow for quick action if an invasion occurs. Keeping dogs at home also helps to stop thieves who would steal chickens. Under village chicken production system, prevalence of diseases, predators, lack of proper health care, poor feeding and poor marketing information were reported to be the major constraint of chicken production (Moges *et al.*, 2010).

#### **4.5.4 Accessibility of extension service to local chicken keeper**

Findings on the accessibility of extension services to local chicken keeper shows that extension services influence performance of production for individual chicken keepers (Table 24). Only (28.9) of correspondents reported to have had access services from extension services/ agent or other subordinate while the majority of them (71.1%) were not visited. Availability of extension service has been found in different studies to be provide advise on better control of diseases, timely routine practices such as feeding, vaccination, worms control and to guard against other vices. Kazimoto (2013) study revealed that challenges regarding the extension services in Tanzania included inadequate extensions officers at farmers' level and lack of adequate resources to facilitate them in operations, notably transport facilities such as motor cycles and bicycles. Thus, Extension workers fails to extend technology transfer and resources requirement to transform the livestock sector from subsistence to commercial. Msoffe *et al.* (2018) disclose that there are few extension agents compared to farmers that lead to very limited access to extension advice. This is contrary to the aim of agricultural extension services, which assist farmers to identify and analyse their production problems and to become aware of the opportunities for improvement (Leeurwis, 2004).

#### 4.5.5 Government policy

Results on government policy to support farmers to improve livelihood by keeping local chicken reveal that there is a need for the government to support farmers were only (36.7%) respondent, training (17.8%) and credit and subsidies (45.5%). This implies that there was poor extension service being provided to farmers in the study area since there was little extension services and disease control program to form multidisciplinary approach. This problems has been also explained by FAO (2014) and United Republic of Tanzania (2006). Despite such policies, challenges remain in promoting and educating chicken farmers and stakeholders on the implications of these policies, which aim at driving the growth for the livestock subsector in the country as also found by Jerevazio (2014).

**Table 24: Constraints facing local chicken keepers for their livelihood improvement**  
(n=90)

Parameters	Frequency	Percentages
Unreliable market	90	100
<b>Disease outbreaks</b>		
Newcastle Diseases	69	76.7
Fowl pox	11	12.2
Infectious coryza	8	7.8
External parasites	2	3.3
<b>Theft</b>		
Had problems with theft	55	61.1
<b>Extension services</b>		
Lack of extension workers	64	71.1
<b>Government policy</b>		
Credit and subsidies	41	45.5
Government supports	33	36.7
Need for training	16	17.8

#### 4.6 Suggestions Given by Local Chicken Keepers to Improve Chicken Production

Chicken keepers had given a suggestion that if the government would give local chicken keepers subsidies for sustainability of chicken production, they would even do better for improving their livelihood through chicken production. They suggest, that farmers be supported on ways of improving local chicken production (Table 25). Respondents suggested that the government should provide chicken keepers free vaccines, training programmes on local chicken keeping, on management practices and provide high breed cocks to improve local breed and render grants or affordable credits to chicken keepers. Based on their suggestions provided by respondents, significant strategies for improving local chicken production need to be undertaken by the appropriate government bodies for the benefit of the farmers.

**Table 25: Suggestions given by local chicken keepers to improve chicken production**  
(n=90)

<b>Respondents</b>	<b>Frequency</b>	<b>Percentage</b>
Govt. to provide vaccines against critical diseases for free or at subsidy cost	90	100.0
Govt. to provide training program for chicken keeping management practices	85	94.5
Govt. to provide high breed cocks to improve local breed.	79	87.8
Govt. to provide us grants or affordable credits	75	83.3

Veterinary and progress service providers need to think of chicken production systems as a continuous spectrum, recognise and make provision for different inputs needed for those at each stage of development. Collaborations with internationally operating chicken breeding companies are also required. Recurrent selection within the indigenous populations could facilitate conservation of the adapted indigenous genetic resources, which are at risk of

facing competition from the indiscriminate dissemination of the exotic breeds into villages. Improved birds in the nucleus flock could also be used alternatively in crossbreeding where they are crossed with exotic sires to produce crossbred hens and cocks to be distributed to villages.

## **CHAPTER FIVE**

### **5.0 CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Overview**

The overall objectives of the study restricted itself to assess farmer' knowledge, and practices on small-scale local chicken keeping for household livelihood in Bagamoyo district. This was to determine chicken keepers' knowledge on small-scale local chicken production, to identify local chicken keeping management practices and to assess contribution of small-scale chicken keeping to socio-economic livelihood improvement. Therefore, this chapter based on the major findings of the study provides the conclusions and recommendations for addressing the challenges and areas for further studies. The components of the local chicken production include income generation, veterinary services, marketing and constraints.

#### **5.2 Conclusion**

On the basis of the important findings of the study, the following conclusion are drawn and presented here that small-scale Local chicken rearing form an important role in increasing socio-economic status of household livelihood in Bagamoyo district.

The majority of the farmers were keeping few numbers of local chicken which when sold could not earn a reasonable income to sustain the livelihood. insects, Leftovers, greens, coconut cake, cereals, bran, and fruits used as the major ingredients of the scavenged feed, were the main feeds that local chicken keeper fed their chicken.

Theft, outbreak of disease such as fowl pox, New castle and infection coryza, inadequate extension services and unfavourable government policy were the main constraints facing

Local chicken keeper in the study area. Finally it can also be concluded that small-scale Local chicken rearing can form an important part of the integrated farming system. Hence improving livelihoods for the poor rural community.

### **5.3 Recommendations**

Based on the major findings of the study, the following are the recommendations drawn towards improving local chicken production and productivity at the household level in the study area:

- i. Bagamoyo District Livestock officer should conduct seminars and training to chicken keepers in order to gain knowledge on chicken keeping, production and marketing. In Bagamoyo District, Extension workers should make effort to increase visits to local chicken keepers for the purpose of helping them on management practice, chicken production, marketing and improving their livelihood through keeping local chicken at their respective households.
- ii. The study recommends that significant efforts should be put by the Local Government Authority (LGAs) in stimulating production. The training should focus on sensitization on developing local chicken keeping as a business.
- iii. Provision of credit facilities should be given to chicken keepers for enhancement of inputs, access to more profitable markets and training of farmers are the major interventions for enhancing the contribution of free-range chicken production to farmers' livelihoods

### **5.4 Recommendations for Further Studies**

This study was limited only in Bagamoyo District and not in another district, which could have helped to generalise the findings for the all districts in the Coast region. Therefore,

future study should encompass other districts to help generalize the findings for the benefit of the whole region.

## REFERENCES

- Ahire, M. C., Birari, D. and Kamble, D. K. (2007). Adoption of poultry management practices in Sholapur, India, *The Asian J. of Animal Science* 2(1&2): 55-58.
- Alders, R. G. (2004). Small scale chicken systems are important in food-insecure resource-poor areas. The Food and Agriculture Organisation of the United Nations (FAO) document and USD108 in regions with access to the cold chain. [<https://www.sciencedirect.com/science>] site visited on 12/7/2018.
- Alders, R., Queenan, K., Maulaga, W., Lumbwe, H., Rukambile, E., Zulu, E., Bagnol, B. and Jonathan Rushton, J. (2016). An appraisal of the indigenous chicken market in Tanzania and Zambia. Are the markets ready for improved outputs from village production systems? [<http://www.lrrd.org/lrrd28/10/cont2810.htm>] site visited on 12/07/2018.
- Bagamoyo District (2009). The Bagamoyo District Profile. Bagamoyo District, Tanzania. [[http://mirror.unhabitat.org/pmss/\(X\(1\)S\(dbxdikr0mztsb2trwxj0n0oq\)\)/getElectronicVersion.aspx?nr=2725&alt=1](http://mirror.unhabitat.org/pmss/(X(1)S(dbxdikr0mztsb2trwxj0n0oq))/getElectronicVersion.aspx?nr=2725&alt=1)] site visited on 12/05/2018.
- Bell, D. C. (2009). The governance of public affairs. Editorial Office: University of Detroit Mercy, 4001 West McNichols Rd., Detroit, M. I. 48221-3038. *Journal of Family Theory and Review* 10(2): 321-326.
- Bogalle, W. (2010). Prevalence and predictors of undernutrition among infants aged six and twelve months in Butajira, Ethiopia: The P-MaMiE Birth Cohort. *BMC Public Health* 10: 27.



- Bukwelles, M. S. (2015). Socio-economic Importance of Local Chicken Production in Peri-urban Areas of Kinondoni District, Tanzania. Dissertation for Award Degree of Master of Arts in Rural Development of Sokoine University of Agriculture. Morogoro, Tanzania. 96pp.
- Castro, L. (2002). Impact of Small Entrepreneurship on Sustainable Livelihood Assets of Rural Poor Women in Bangladesh. *Entrepreneurship and Regional Development* 1: 339-356.
- Chicken News, (2013). Benefit from Dairy and Chicken Farming Case of Kilosa and Bagamoyo district, Tanzania. [[www.fao.org/fileadmin/user\\_upload/ivc/PDF/SFVC/Tanzania\\_White\\_Meat.pdf](http://www.fao.org/fileadmin/user_upload/ivc/PDF/SFVC/Tanzania_White_Meat.pdf)] site visited on 12/06/2018.
- Daphne, C. (2013). High Rates of Contamination of Chicken Meat Products with Drug-Resistant *Campylobacter* in Metro Manila, Philippines. *European Journal of Experimental Biology* 3(4): 66-70.
- Dinka, H, Dwo, F., Chala, R. and Leta, S. (2010). Major Constraints and Health Management of Village Chicken Production in Rift Valley of Oromia, Ethiopia. *Global Veterinaria* 9(5): 529-533.
- Eekeren, N. V., Maas, A., Saatkamp, H. W. and Verschuur, M. (2009). *Agrodok 4 Small-Scale Chicken Production*. Digigrafi, Wageningen, The Netherlands. 91pp.
- Evenson, G. (1997). *Maize Revolutions in Sub-Saharan Africa*. Policy Research Working Paper 5659. 34pp.

- Fallbeck, M. K. (2016). *Chicken Skills for Improving Rural Livelihoods: A Manual for Teaching Chicken Skills to Primary and Secondary Students*. USA. 164pp.
- FAO (2011). *Food Insecurity in the World*. How does international price volatility affect domestic economies and food security? Rome. 55pp.
- FAO (2012). *FAOSTAT database collections*. Food and Agriculture Organisation of the United Nations. URL: [<http://faostat.fao.org>] site visited on 01/08/2018.
- FAO (2013). Chicken Sector Mozambique. FAO Animal Production and Health Livestock Country Reviews. No. 5. Rome. [[www.fao.org/docrep/018/i3487e/i3487e.pdf](http://www.fao.org/docrep/018/i3487e/i3487e.pdf)] site visited on 01/08/2018.
- FAO (2014). *FAO Animal Production and Health*. Livestock Country Reviews. Ghana. 91pp.
- Fotsa, J., Sørensen, P. and Pym, R. A. (2014). Breeding and reproduction. In: *Decision Tools For Family Chicken Development*. FAO Animal Production and Health Guidelines No. 16. Rome, Italy. pp. 18-25.
- Gabanakgosi, K., Moreki, J. C., Tsopito, C. M. and Nsoso, S. J. (2013). Impact of family chickens on the livelihoods of people living with HIV/AIDS in four villages in Botswana. *Journal of World's Chicken Research* 3(2): 43-45.
- Gemechu, T. and Amene, T. (2015). Review on Production, husbandry of free ranging Chicken production system in Ethiopia. *International Journal of Science Research Articles Vol. 4* (04): 1-15.

- Gerbert, P., Opiyo, C. and Steinfeld, H. (2015). Chicken production and the environment – a review. 28pp.
- Harun, M. and Massango, F. A. (2001). Village chicken production in Mozambique: Farming systems and ethno veterinary knowledge in Angonia and Tsangano Districts, Tete Province. In: Alders, R. G. and Spradbrow, P. B. (eds). *Proceedings* No. 103, ACIAR, Canberra, Australia. pp 76-79.
- Ichijo, K. and Nonaka, I. (2007). Introduction: knowledge as competitive advantage in the age of increasing globalization. In: *Knowledge Creation and Management; New Challenges for Managers* (Ichijo, K. and Nonaka, I. Eds), Oxford University Press, New York. pp 3–10.
- ILRI (2016). International Livestock Research Institute. Livestock research and food security in Kenya, Africa: In Iowan's view. Land Degradation and Development. [[https://www.researchgate.net/profile/Francesco\\_Fava](https://www.researchgate.net/profile/Francesco_Fava)] site visited on 10/07/2018.
- Jensen, H. A. and Dolberg, F. (2003). A conceptual framework for using chicken as a tool in poverty alleviation. *Livestock Research for Rural Development*, 15 (5). [<http://www.lrrd.org/lrrd15/5/jens155.htm>] site visited on 10 June 2018.
- Jerevazio, S. (2014). Assessment of the Contributions of Indigenous Chicken Production to Farmers Livelihoods in Lwengo Sub County, Lwengo District. A Degree for Award of Bachelor of Science in Agriculture Degree of Uganda Martyrs University Nkozi. 51pp.

- Kajuna, F. F. (2012). Report prepared during the assignment as Associate Chicken Adviser for the IFAD funded FAO project “Smallholder Chicken Development” (GCP/INT/197/IFA). 57pp. [[www.fao.org/3/a-aq624e.pdf](http://www.fao.org/3/a-aq624e.pdf)] site visited on 12 June 2018.
- Kayanja, F. I. B. and Lagu, C. (2010). Medicinal plant extracts widely used in the control of Newcastle disease (NCD) and helminthosis among village chickens of South Western Uganda. *Livestock Research for Rural Development* 22(11): 2-18.
- Kazimoto, P. (2013). Analysis of Conflict Management and Leadership for Organisational Change. *International Journal of Research in Social Sciences* 3(1): 16-25.
- King’ori, A. M., J. K. Tuitoek, H. K. Muiruri and Wachira, A. M. (2003). Protein requirement of growing indigenous chicken during the 14-21 week growing period. *S. Afr. J. Animal Science* 33: 78-82.
- Kothari, C. R. (2006). *Research Methodology: Methods and Techniques*. 2<sup>nd</sup> revised edition. New age international publisher limited. Former principal, college of commerce, India. 414pp.
- 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*. pp 148-155.
- Kwigizile, E., Chilongola, J. and Msuya, J. (2011). The impact of road accessibility of rural villages on recognition of poverty reduction opportunities. *African Journal of Marketing Management* 3(2): 22-31.

- Leeurwis, C. (2004). *Communication for Rural Innovation Rethinking Agricultural Extension* 3<sup>rd</sup> Edition. Blackwell Science. British. 426pp.
- Lwoga, E. T., Ngulube, P. and Stilwell, C. (2010). Understanding indigenous knowledge: Bridging the knowledge gap through a knowledge creation model for agricultural development.
- Mack, N., Woodsong, C., Macqueen, K. M., Guest, G. and Namey, E. (2005). *Qualitative Research Methods: A Data Collector's Field Guide*. Research Triangle Park, NC: Family Health International. 137pp.
- Maphosa, T., Kusina, J. F., Kusina, N. T., Makuza, S. and Sibanda, S. (2004). A monitoring study comparing production of village chickens between communal (Nharira) and small-scale commercial (Lancashire) farming areas in Zimbabwe. *Livestock Res. Rural Dev.* 16(7): 1-12. [<http://www.cipav.org.co/lrrd/lrrd16/7/maph16048.htm>] site visited on 28/10/2005.
- Mapiye, C. and Sibanda, S. (2005). Constraints and opportunities of village chicken production systems in the smallholder sector of Rushinga District of Zimbabwe. *Livestock Res. Rural Dev.* 17 (10):12-31. [<http://www.cipav.org.co/lrrd/lrrd17/10/mapi17115.htm>] site visited on 04/11/2005.
- Mapiye, C., Mwale, M. Mupangwa, J. F., Chimonyo, M., Foti, R. and Mutenje, M. J. (2008). A Research Review of Village Chicken Production Constraints and Opportunities in Zimbabwe. *Asian-Aust. J. Anim. Sci.* Vol. 21, No. 11 : 1680 – 1688.

- Melkamu, B. and Andarge, Z. (2013). Performanceevaluation of local chicken at nebsie SarMidirworeda, EasternGojam, Ethiopia. *Unique Research Journals* 1(2): 006-010.
- Mengesha, M.,Gelila, T. G., Meseret, Y. and Teddy, A. A. (2011). Assessment of village chicken production system andevaluation of the productive and reproductiveperformance of local chicken ecotype in Bure district,North west Ethiopia. *African Journal of Chicken Farming* 4(6): 149-158.
- MLFD (2012). Livestock Data Innovation in Africa. Routine livestock data collection in Tanzania. [[http://www.fao.org/ag/againfo/resources/newsletter/docs/LDIA\\_Brief\\_2011\\_02.pdf](http://www.fao.org/ag/againfo/resources/newsletter/docs/LDIA_Brief_2011_02.pdf)] site visited on 12/06/2018.
- Mlozi, M. R. S., Kakengi, A. V. M., Minga, U. M., Mtambo, A. M. and Olsen, J. E. (2003). Marketing of free - range local chickens in Morogoro and Kilosa urban markets, Tanzania. *Livestock Research for Rural Development* 15(2): 2-13. [<http://www.cipav.org.co/lrrd/lrrd15/2/mloz152.ht>] site visited on 12/07/2018.
- Mlozi, M. R. S., Lupala, A., Chenyambuga, S. W., Liwenga, E. and Msogoyal, T. (2013). Knowledge assessment on the effects of climate change due to keeping livestock in urban and periurban areas of Dar es Salaam, Tanzania. *International NGO Journal* Vol. 8(1): 1-12. from [<http://www.academicjournals.org/INGOJ> DOI: 10.5897/INGOJ12.021 ISSN 1993–8225] site visited on 15 November 2017.

- Moges, F., Tegegne, A. and Dessie, T. (2010). ILRI (International Livestock Research Institute) Indigenous chicken production and marketing systems in Ethiopia: Characteristics and opportunities for market-oriented development. Working Paper No. 24. Addis Ababa, Ethiopia. 56pp.
- Msoffe, P. L., Ramadhani, S., Mollel, E. L., Mtambo, M. M. A., Kassuku, A. A. (2018). Prevalence of gastrointestinal helminthes in free-range ducks in Morogoro Municipality, Tanzania. *Livest Res Rural Dev.* 19(4): 1-5.
- Muchadeyi, F. C., Eding, H., Simianer, H., Wollny, C. B., Groeneveld, E. and Weigend, S. (2008). Mitochondrial DNA D-loop sequences suggest a Southeast Asian and Indian origin of Zimbabwean village chickens. *Animal Genetics* 39: 615–622.
- Muheye, G. (2007). Political Priority for Abortion Law Reform in Malawi. Transnational and National Influences. 23pp.
- Ochieng, J., Owuor, G. and Bebe, B. O. (2011). Management practices and challenges in smallholder indigenous chicken production in Western Kenya. *Journal of Agriculture and Rural Development in the Tropics and Subtropics* Vol. 114 No. 1 (2013): 51–58.
- Olojenyo, F. O. (2008). The determinants of agricultural production and profitability in Akoko Land, Ondo- State, Nigeria. *Journal of social Sciences* 4(1): 37 – 41.
- Oyeyinka, R. A., Raheem, W. K., Ayanda, I. F. and Abiona, B. G. (2011). Chicken farmers' awareness and knowledge of improved production practices in Afijio, local government area, Oyo State, Nigeria.

- Pedersen, C. V. (2002). Production of semi-scavenging chickens in Zimbabwe. Ph.D Thesis for Award Degree of Doctorate at Royal Veterinary and Agricultural University, Copenhagen, Denmark. 92pp.
- Pica-Ciamarra, U. and Otte, J. (2010). Chicken, food security and poverty in India: looking beyond the farm-gate. *World's Chicken Science Journal* 66: 309-320.
- Pym and Alders (2009). *Exploring Translation Theories*. London and New York: Routledge. 75pp.
- RIU Tanzania (2011). Sharing lessons to enable innovation in agriculture. Lessons and case stories from RIU Tanzania. 50pp. [<https://assets.publishing.service.gov.uk/media/57a08aec40f0b652dd0009a8/riu11tz-lessons-complete.pdf>] site visited on 12/07/2018.
- Rota, A., Thieme, O., De' Besi, G. and Gilchrist, P. (2014). Designing successful projects. In: *Decision Tools For Family Chicken Development*. FAO Animal Production and Health Guidelines No. 16. Rome, Italy. pp. 63-80.
- Sanusi, R. A., Ndagi, I. and Shittu, T. R. (2013). *Evaluation of Cell Phone Business in Nigeria: A Paradox of Gains and Losses*, Communications of the IIMA: 13(3). Available at: [<http://scholarworks.lib.csusb.edu/ciima/vol13/iss3/4>] site visited on 19/08/2017.
- Sanyang, S. E. (2012). Agro-Enterprise department to support women groups in chicken production and market: A case study of Central River Region of the Gambia. *Modern Economy* 3: 891 – 906.



- Saunders, M., Lewis, P. and Thornhill, A. (2009). *Research Methods for Business Students* (5<sup>th</sup> ed.). Edinburgh Gate: Pearson Education Limited. 45pp.
- Sonaiya, E. B. and Swan, S. E. J. (2004). *Food and Agriculture Organisation of the United Nations*. Small-scale Chicken Production, Roma. *World's Poult. Sci. J.*, 60(04): 12-30. 523-535, 10.1079/WPS200435.
- Tadelle , D., Kijora, C. and Peters, K. J. (2003). Indigenous Chicken Ecotypes in Ethiopia: Growth and Feed Utilisation Potentials. *International Journal of Chicken Science* 2: 144-152.
- Tadelle, D. and Ogle, B. (2001). Village chicken production system in the Central Highlands of Ethiopia. *Trop. Anim. Health Prod.* 33: 521-537.
- Tadelle, D. (1996). Studies on village chicken production systems in the central highlands of Ethiopia. Thesis for Award of M.Sc Degree at Swedish University of Agricultural Sciences. 70 pp.
- Thieme, O., Sonaiya, F., Rota, A., Guèye, F., Dolberg, F. and Alders, R. (2014). Defining family chicken production systems and their contribution to livelihoods. In: *Decision tools for family chicken development*. FAO Animal Production and Health Guidelines No. 16. Rome, Italy. pp. 3-8.
- UNH (2009). Profile of Current Coastal Tourism in Bagamoyo. District, Tanzania and Opportunities for Development of Ecotourism. [[http://www.crc.uri.edu/download/ProfileofBagamoyo\\_TourismReport.pdf](http://www.crc.uri.edu/download/ProfileofBagamoyo_TourismReport.pdf)] site visited on 12/05/2018.

- United Nations (2009). *Tanzania: Bagamoyo Urban Sector Profile*. United Nations Human Settlements Program. Regional and Technical Cooperation Division. 36pp.
- United Nations Development Programme (2003). *Human Development Report 2003. Millennium Development Goals. A Compact among Nations to End Human Poverty*. 88pp.
- United Republic of Tanzania, (1992). *The Food and Nutritional Policy for Tanzania*. 28pp.
- United Republic of Tanzania, (2006). *National Livestock Policy in Tanzania*. Ministry of Agriculture and Livestock Development. 55pp.
- Wondmeneh, E., Van der Waaij, E. H., Udo, H. M. J., Tadelle, D. and Van Arendonk, J. A. M. (2015). Village chicken production system: Perception of farmers and simulation of impacts of interventions. *African Journal of Agricultural Research* 11(24): 2075-2081.
- Yamane, T. (1967). *Statistics, An Introductory Analysis*, 2<sup>nd</sup> Ed., New York: Harper and Row. [<https://www.tarleton.edu/academicassessment/documents/Samplesize.pdf>] site visited on 10/06/2018.
- Yosefe, K., Abate, Z., Tarekegn, K., Fisseh, D., Tesfaye, D., Gizaw, H., Mengste, F., Habtegiyorgis, D., Gebreselase, T. and Cherinet, R. (2016). Chicken Production, Management and Marketing System at Selected Districts of Kafa and Benchmaji Zone, South West Ethiopia: *Journal of Biology, Agriculture and Healthcare* [www.iiste.org ISSN 2224-3208 (Paper) ISSN 2225-093X] site visited on 27/07/2018.

**APPENDICES****Appendix 1: Interview schedule to local chicken keepers in Amkurunge and  
Fukayosi wards**

Sl. No. \_\_\_\_\_

1. Name of chicken keeper \_\_\_\_\_

2. Village \_\_\_\_\_ Wards \_\_\_\_\_ District \_\_\_\_\_

3. Age

- a) 18-30
- b) 31-45
- c) 46-60
- d) Above 61

4. Sex

- a) Male
- b) Female

5. Marital status

- a) Single
- b) Married

6. Educational level

- a) Informal Education
- b) Primary education

c) Secondary education

d) Collage education

7. Main occupation

a) Chicken keepers

b) Civil servant

c) Fishing

d) Other activities (specify:.....?)

8. Household involvement

a) Only Female

b) Only Male

c) Children

d) Both Male and Female

e) All family

9. Experience on chicken keeping husbandry

a) What types of rearing system do you use for keeping the local chicken? Tick the appropriate one (s)

a) Free range

b) Indoor

c) Semi intensive

d) intensive

e) Others (specify).....

b) How long do you have experience with keeping the local chicken? (Answer in number of years)

- a) 1-3 years
- b) 4-8 years
- c) 9-12 years
- d) Above 13 years

B: Knowledge on implementation of chicken husbandry practices

Tick Yes or No

i) Housing

Need for housing of chicken	Yes/ No	Yes/ No
Made by cement brick with iron corrugated sheet		
Made by thatch grass		
Housing made by wooden timber and mad		
House ventilation		
Nest requirement		
Provision perches		

ii) Feeding and Watering

	Yes	Yes
Scavenging feed		
Water availability		
Special Feed supplement		
Balanced diet		

## iii) General management

	Yes	/No
Caring day old chicks		
Control of predators and vermin		
Age of chicken disposal		
Egg preservation		

## iv) Health and disease control

	Yes	Yes
Provision of vaccines		
Control of parasites, De worming		

## v) Understanding common diseases within the community

	Yes	No
Newcastle disease (NCD)		
Fowl pox		
Fowl cholera		
Regular vaccination		

## vi) Production and marketing

	Yes	No
Selling at home		
local shopkeeper		
Middlemen		
Selling at market place		

## C. Management practices for local chicken keeping husbandry

## Housing

i) Where do you keep your chickens? (Tick according to answers)

Share the same house with human being	
Leaving in separate house	
Provided night shelter	
Keeping near their dwelling	

ii) Why don't you have good house for your chicken? (Tick according to answers)

No need of the House	
Lack of attention of chicken	
lack of construction materials	
lack of knowledge and awareness	
Shortage of labor and time	

iii) Where do you get water for your chicken?(Tick according to answer)

Shallow water	
Bore water	
Tap water	
Free range	

iv) Is there any feed supplement that are used for feeding your chickens? (Tick according to answer)

Once per day	
Anytime wish to do	

v) What type of feeder do you use to feed your flock?

(Tick acc..to answer)

Scavenging feed resources	
Scavenging with supplementary feeding	
Home supplement	
Offering special feed per day	

vi) What most activities involved in carrying out general management related chicken husbandry? (Tick acco..)

Local equipment (feeder and Drinker)	
Special feeding equipment's	
Made perches for resting at night	
Provides nest for laying eggs	
Natural brooding	

vii) How do you control disease in your flocks? (Tick acco..)

Vaccination	
Traditional treatment	
Modern treatment	
Control movement	
Nontraditional or modern treatment	



viii) Are you satisfied with the current use of herb drug? (Tick ..)

Use of herb drugs	
Full recovery	
Partially recovery	
Some chicken survival	
Symptomatic recovery	

E. Constraints facing local chicken keepers

i) What are the constraints facing the local chicken keeping? (Tick appropriate answer)

Unreliable market	
Disease outbreaks	
Newcastle Diseases	
Fowl pox	
Infectious coryza	
External parasites	

***THANK YOU FOR YOUR COOPERATION***

**Appendix 2: Checklist for Focus Group Discussion and Key Informants****A: Income of smallholder farmers from local chicken keeping.**

- Enough
- Not enough

**B: Management systems used for raising the local chickens**

- Free range
- Semi-intensive
- Indoor
- Types of chicken kept
- Accessibility to extension services
- Accessibility to credit and inputs
- Constraints and other problems facing local chicken keeping activities.

***THANK YOU FOR YOUR COOPERATION***