

**PROVISION OF LIVESTOCK EXTENSION SERVICES IN PERI-URBAN  
AREAS: A CASE OF KITUNDA WARD, ILALA MUNICIPALITY,  
DAR-ES-SALAAM REGION.**

**BY**

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN  
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## ABSTRACT

This study was conducted to investigate factors influencing the provision of extension services to livestock keepers in Kitunda Ward; a peri-urban area in Ilala Municipality, Dar-es-salaam Region. Specifically, the study attempted to; assess private as well as the public livestock extension agents (LEAs) in the provision of Livestock Extension Service (LES) in Kitunda, examine the type of services and information, professional and technical advice provided by LEAs to the livestock keepers, identify the ways and techniques that LEAs used to disseminate LES information and, lastly, to analyze the perceptions of livestock producers about the quality of LES rendered to them by the public as compared to the private service providers. A sample of 135 respondents was obtained in this cross-sectional survey, including 30 who kept dairy cattle, 30 kept pigs, 60 kept chicken of which 30 kept broilers and 30 layers as well as 15 LEAs, both private and public. A structured, self-administered questionnaire was designed and used to collect data. The researcher quantitatively used cross tabulation, percentage and frequencies to analyse data Results. Findings were elastic and varied significantly ( $p < 0.05$ ) with sex, education and occupation of respondents. For comparison of private LEAs and public LEAs, parameter such as vaccination, treatment, postmortem, use of molasses, and livestock record across sex, education and occupation, LES rendered were mainly dominated by the private LEAs than public LEAs ( $p > 0.05$ ). Unreliable livestock extension services was a major problem reported by 64 (53.3%) of the respondents, that hindered the development of livestock production in Kitunda. Apparently, LES would improve if private LEAs, input suppliers and expert

livestock keepers were more effective, qualified and assisted with subsidised equipment.

## DECLARATION

I, BEZIA MUGYABUSO RWONGEZIBWA, do hereby declare to the senate of Sokoine University of Agriculture that this dissertation is my original work and that it has neither been submitted nor being concurrently submitted any other University.

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Msc. Candidate

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Date

The above declaration is confirmed

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Date

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All errors in this work, whether factual, analytical or residual are the sole responsibility of the author

## **DEDICATION**

To my late father Ta Benjamin Mugyabuso Byenobi and late mother ma  
Constancia Mukagoshora Batanda who laid foundation of my education



## TABLE OF CONTENTS

ABSTRACT.....	ii
DECLARATION.....	iv
COPYRIGHT.....	v
ACKNOWLEDGEMENT.....	vi
DEDICATION.....	viii
TABLE OF CONTENTS.....	ix
LIST OF TABLES.....	xiv
LIST OF FIGURES.....	xvi
LIST OF APPENDICES.....	xvi
LIST OF ABBREVIATIONS.....	xviii
CHAPTER ONE.....	1
1.0 BACKGROUND .....	1
1.1 Introduction .....	1
1.2 Characteristics of Livestock Systems.....	2
1.3 Livestock Extension Service .....	3
1.4 Characteristics of Peri -Urban Areas in Relation to Livestock Production.....	4
1.5 Agricultural Activities in Peri-urban Areas.....	7
1.6 LES in Peri-Urban Areas.....	10
1.7 Problem Statement.....	11
1.8 Problem Justification.....	12
1.9 Objective of the Study.....	13
<b>1. 9.1 Specific objective.....</b>	<b>13</b>
1.10 Research Questions .....	13
CHAPTER TWO.....	15
2.0 LITERATURE REVIEW.....	15
2.1 Overview of Extension Services.....	15
2.2 Evolution of extension service provision.....	15
2.3 Evolution of Agricultural Extension in Tanzania.....	16
2.4 An Overview on LES Delivery Approaches.....	21

<b>2.4.1 Farmer-Group Approach.....</b>	<b>22</b>
<b>2.4.2 Farmer Field School Approach (FFS).....</b>	<b>23</b>
<b>This is also a participatory approach which facilitates farmers demand for knowledge, and offers opportunity for the end users to choose, test and adapt technologies according to their needs. Through their participation in FFS, farmers develop skills that allow them to continually analyse their own situation and adapt to changing circumstances. FFS is a school without walls where groups of farmers meet periodically with facilitators during the crop or animal cycle (Davis and Place, 2003).....</b>	<b>23</b>
2.5. Provision of LES in Selected Developed Countries.....	23
2.6 Provision LES in Selected Developing Countries.....	26
2.7 Provision of LES in Tanzania.....	28
2.8 Factors Influencing Provision of Livestock Extension Services in Peri-Urban Areas in Tanzania.....	30
<b>2.8.1 Education Level .....</b>	<b>31</b>
<b>2.8.2 Communication.....</b>	<b>31</b>
<b>2.8.3 Privatization from Supply to Demand Driven Scenario .....</b>	<b>32</b>
<b>2.8.4 Type and Number of Livestock.....</b>	<b>33</b>
<b>2.8.5 Government Interventions on Animal Health.....</b>	<b>34</b>
<b>2.8.6 Land Availability.....</b>	<b>34</b>
2.9 Constraints Hampering LES in Tanzania.....	35
<b>2.9 1 Constraints at Ministry Level.....</b>	<b>35</b>
<b>2.9.2 Constrains at District Level .....</b>	<b>36</b>

<b>At a district level, livestock extension services are constrained by number of factors which include:</b>	<b>36</b>
2.9.2.1 Low Livestock Keepers Appreciation of LEAs	36
2.9.2.2 Poor Livestock Programme Planning	37
2.9.2.3 Inadequate Infrastructure in Provision of Livestock Extension Services	37
2.9.2.4 Insufficient Expertise among Livestock Extension Agents	38
2.9.2.5 Poor Funding of LES	38
<b>2.9.3 Constraints at Livestock Extension Agent Level</b>	<b>39</b>
2.9.3.1 Lack of Professional Group	39
2.9.3.2 Lack of a Spirit of Volunteerism	39
2.9.3.3 Inadequate Training and Professional Development	39
<b>2.9.4 Problems at Smallholder Livestock Keepers' Level</b>	<b>40</b>
2.9.4.1 Lack of Appropriate Technology	40
2.9.4.2 Lack of Access to Credit Services from Financial Institution	41
CHAPTER THREE	43
3.0 RESEARCH METHODOLOGY	43
3.1 Overview	43
3.2 Research Design	43
3.3 Description of the Study Area	44
<b>Source: GIS SUA, 2005</b>	<b>45</b>
3.4 Sampling Procedures	46
3.5 Data Collection Procedures	46
<b>3.5.1 Primary Data</b>	<b>46</b>
<b>3.5.2 Secondary Data</b>	<b>46</b>
3.6 Data Processing and Analysis	47
3.7. Definition of variables	47
CHAPTER FOUR	48
4.0 RESULTS AND DISCUSSION	48
4.1 Overview	48

4.2 Characteristics of Respondents and Their Livestock.....	48
<b>4.2.1 Characteristics of Respondents.....</b>	<b>48</b>
<b>4.2.2 Respondents Social Economic and Occupation Characteristics.....</b>	<b>51</b>
<b>Number.....</b>	<b>52</b>
<b>Percent.....</b>	<b>52</b>
<b>Variable .....</b>	<b>52</b>
n       52	
%      52	
<b>Income.....</b>	<b>52</b>
<b>4.2.3 Respondents' Livestock Keeping Period.....</b>	<b>52</b>
<b>4.2.4 Number and Type of Livestock Kept by Respondents at Start .....</b>	<b>54</b>
<b>4.2.5 Livestock Keepers' Problems.....</b>	<b>56</b>
<b>Number.....</b>	<b>56</b>
<b>Percent.....</b>	<b>56</b>
<b>Variable.....</b>	<b>56</b>
n       56	
%      56	
4.3 Information and Services Obtained by Livestock Keepers.....	57
<b>4.3.1 Sources of Information and Services of LES .....</b>	<b>57</b>
<b>4.3.2 Respondents Access to Information from Various Sources.....</b>	<b>59</b>
<b>4.3.3 Provision of Information and Services by Private Sector .....</b>	<b>61</b>
<b>4.3.4 Methods and Contacts LEAs used in Dissemination of Livestock</b>	
<b>Extension Service.....</b>	<b>62</b>

<b>4.3.5 Information and Services Related to Different Livestock Keeping Systems.....</b>	<b>64</b>
4.3.5.1 LEAs Information on Dairy Cattle and Pig Production.....	64
4.3.5.2 LEAs Information on Broiler and Layers Keeping.....	67
4.3.5.3 LEAs Service on Dairy Cattle and pig Production .....	69
4.3 5.4 LEAs Service on Broiler and Layers Keeping.....	70
4.4 Respondents Comparative Opinions in Regard to LES in Kitunda Ward .....	71
<b>4.4.1 Information Related to Various Livestock Managerial Practices ...</b>	<b>71</b>
4.4.1.1 Opinion of Respondents' Livestock Information Provision Based on Gender .....	71
4.4.1.2 Opinion of Respondents' Livestock Information provision Based on Education.....	75
4.4.1.3 Opinion of Respondents' Livestock Information Provision Based on Occupation .....	77
<b>4.4.2 Opinion of Respondents Based on Livestock Services.....</b>	<b>80</b>
4.4.2.1 Opinion of Respondents' Livestock Service Provision Based on Gender .....	80
4.4.2.2 Opinion of Respondents' Livestock Service Provision Based on Education .....	82
4.4.2.3 Opinion of Respondents' Livestock Service Provision Based on Occupation .....	85
CHAPTER FIVE.....	89
5.0 CONCLUSION AND RECOMMENDATIONS.....	89
5.1 Overview.....	89
5.2 Conclusion.....	90
5.3 Opinion of Respondents Towards Public and Private LEA .....	91
5.4 Recommendations .....	93
<b>5.4.1 Strengthening Livestock Extension Service Provided by Private Sector.....</b>	<b>93</b>
<b>5.4.2 Supporting Mechanisms for Livestock Information Management at the Farm Level.....</b>	<b>94</b>

<b>5.4.3 Redefine the Duties and Responsibilities of Public and Private LEAs</b>	
.....	<b>94</b>
<b>5.4.4 Design and Agree on Extension Service Models Applicable in the</b>	
<b>Tanzania Context at the Moment.....</b>	<b>95</b>
<b>5.4.5 Local Governments Should Prepare Strategic Plans Exclusively for</b>	
<b>Extension Service Provision in Peri-Urban Areas.....</b>	<b>95</b>
<b>5.4.6 Reinforce Monitoring and Control of Veterinary Drugs, Feeds and</b>	
<b>Input Supplies .....</b>	<b>96</b>
5.4.7 Identify and Categories Livestock Keepers for The Purpose of Providing Livestock Extension Services.....	96
<b>4.5.8 Purposeful Marketing of Livestock Extension Services.....</b>	<b>97</b>
<b>5.4.9 Set Aside Areas for Peri-Urban Large and Small Scale Farming ...</b>	<b>98</b>
<b>5.4.10 Strengthening Livestock Professional Bodies and Associations.....</b>	<b>98</b>
5.4.11 Further Research in Provision of Quality Extension Services.....	98
<b>REFERENCES.....</b>	<b>100</b>
<b>APPENDIX.....</b>	<b>118</b>

## LIST OF TABLES

Table 1: Issues of Sustainable Urban and Peri-urban Agriculture (UPUA).....	9
Table 2: Some Characteristics of the respondents (N = 120).....	50
Table 3: Income and occupation of respondent (N-120).....	52
Table 4: When started keeping livestock (N= 120).....	53
Table 5: Number of livestock on start (N=30).....	55
Table 6: Problem faced in keeping livestock (N =120).....	56
Table 7: Source of information and services of LES (N=120).....	58
Table 8: Respondents' opinions about other sources of information (N=120).....	60

Table 9: Provision of Information and Services by Private sector (n=120).....	62
Table 10: Respondents opinions about method and contacts that LEAs used in dissemination of information and services (n=15).....	63
Table 11: Respondents' opinions about information that LEAs provided to dairy cattle and pigs (n=60).....	65
Table 12: Respondents' opinions about information that LEAs provided to layers and broiler keepers (n=60).....	68
Table 13: Respondents' opinion about services on dairy cattle and pig production (N=60).....	69
Table 14: Respondents' opinion on broiler and layers production (n=60).....	70
Table 15: Opinion based on respondent's sex to LES information provided by public and private LEAs (N=120).....	72
Table 16: Opinion based on respondent's education level to LES information provided by public and private LEAs (N=120).....	76
Table 17: Opinion based on respondent's occupation to LES information provided by public and private LEAs (N=120).....	78
Table 18: Opinion based on respondent's sex to LES services provided by public and private LEAs (N=120).....	81
Table 19: Opinion based on respondent's level of education to LES provided by public and private LEAs (N=120).....	84
Table 20: Opinion based on respondent's occupation on LES services provided by public and private LEAs (N=120).....	87

## LIST OF FIGURES

Figure 1: Spatial Location and Land Use pattern.....	6
Figure 2: Conceptual framework of factors Constraining Provision of Livestock Extension Services in Tanzania.....	42
Figure 3: Map showing Kitunda Ward location, Ilala Municipality, Dar es Salaam Region.....	46
Figure 4: Combined livestock keeping in a single shed: dairy cattle, pigs and broilers.....	66
Figure 5: One open-sided shed with poor ventilation .....	67

## LIST OF APPENDICES



Appendix 1: Questionnaire for livestock keepers.....	118
Appendix 2: Schedule of activities.....	133
Appendix 3: .Definition of variables .....	134
Appendix 4: Estimated Livestock Population Dar-es-Salaam Region.....	135
Appendix 5: Trend Estimated Livestock population Dar es Salaam Region.....	136

## **LIST OF ABBREVIATIONS**

ABD	African Bank Development
ADAS	Agricultural Development and Advisory service
ASDP	Agriculture Sector Development Programme
AU	Urban Agriculture
BACAS	Bureau of Agricultural Consultancy and Advisory Services
CBBP	Contagious Bovine Pleural Pneumonia
CBD	Central Business District
CBO	Community Based Organization
BQ	Black Quarter
DALDO	District Agriculture and Livestock Development
DDD	District Development Director
FAO	Food and Agriculture Organization
FBTC	Farming Branch Technical Committee
FFS	Farmers Field School
FSA	Farming Systems Approach
GDP	Gross Domestic Product
IBD	Infectious Basal Disease
IFAD	International Fund for Agriculture Development
LEA	Livestock Extension Agent
LES	Livestock Extension Services
LESIG	Livestock Extension Services Implementation Guidelines
LGA	Local Government Authorities
LGRP	Local Government Reform Programme
LITI	Livestock Training Institutes
MA	Ministry of Agriculture
MAC	Ministry of Agriculture and Cooperative
MAF	Ministry of Agriculture and Food
MLD	Ministry of Livestock Development
MLDF	Ministry of Livestock Development and Fisheries
MWLD	Ministry of Water and Livestock Development
NAADS	National Agricultural Advisory Service
NAEP II	National Agricultural Extension Programme II
NALERP	National Agricultural Livestock Extension Research Programme
NARO	National Agricultural Research Organization
NGO	Non- Government Organization
NLP	National Livestock Policy
NSGR	National Strategic Grain Reserve
PADEP	Participatory Agriculture Development Project
PMA	Participatory Method Approach
PRA	Participatory Rural Approach
PUF	Peri-urban Farming



## **CHAPTER ONE**

### **1.0 BACKGROUND**

#### **1.1 Introduction**

The livestock sector plays an important role in the national economy. As a sector that avails employment opportunities among many Tanzanians, livestock keeping and production plays a substantive role in poverty reduction in Tanzania. Tanzania is endowed with abundant natural resources including 94 million hectares of arable land, forage and rangeland; a large livestock resources base (URT, 2006). About 60 million hectares of this land is covered by rangelands grazing 19.1 million cattle out of which over 605 000 are dairy cattle, 13.6 million goats and 3.6 million sheep are grazed. Furthermore, over 1.6 million pigs, 56 million poultry and 0.22 million donkeys and horses are kept in different parts of the country (MLDF, 2009). In Africa, Tanzania ranks the third in livestock population, after Ethiopia and Sudan.

Despite the enormously large number of animals in Tanzania, the contribution of the livestock sector to the national economy and nutritional requirements has been and remains relatively low. For example in 1989, when the economy was run by the Government, agriculture contributed a total of 56% Gross Domestic Product (GDP) to the national economy. Crop production accounted for 85% and the livestock sector contributed 18% of the total GDP from agriculture (UTR, 2003). In 2005, the contribution of agricultural sector to the National Gross Domestic Product (GDP) declined to 45.6%, of which, livestock contributed only 5.9%. To date, the agricultural sector contributes only 25.7% to the GDP while the livestock sector contributes only 4.6 % (MAFC, 2009; MLDF, 2009). In 2005, the Bank of Tanzania

reported that about 40% of the livestock GDP originated from beef production, 30% from dairy products and 30% from poultry as well as other small stock (MLDF, 2009). The Agricultural sector in Tanzania employs over 70% of the Tanzanians and provides food to about 95% of its population. Estimates, however, show that annual average consumption of livestock products per person is relatively low in Tanzania; 11 kg of meat, 42 litres of milk and 72 eggs (MLDF, 2009). These averages are relatively lower than those recommended by FAO; 50 kg, 200 litres of milk and 300 eggs per person per year respectively (MLDF, 2009).

## **1.2 Characteristics of Livestock Systems**

Livestock farming systems in many developing countries can be classified into three major types namely, intensive, semi- intensive and extensive system. In Tanzania, the intensive system which is characterized by zero grazing dairy cattle and hybrid chicken comprises less than 5% of the total national herd and has been receiving more emphasis in terms of investment to make it market-oriented. On the other hand, the extensive system which is highly dominated by agro pastoralists comprising about 95% of the total herd of livestock such as cattle, sheep, goat, local chicken and donkey, and has been receiving the lowest level of livestock extension services. Various factors contribute to the dismal performance of livestock sector, including poor genetic potentials of indigenous stock, diseases, climate, poor nutrition, and inefficiency of extension services (URT, 2006).

### **1.3 Livestock Extension Service**

Livestock Extension Service (LES) employs people-oriented programmes that encourage people to adopt new practices to improving their livelihoods and their communities. LES applies the sociological and anthropological principles of adoption and diffusion of new ideas, group dynamics, collective decision-making, social action process, organization leadership and social demography. LES facilitates in understanding change processes and implementation of livestock intervention programs (Chambers, 1998). Thus, an extension service is a dynamic programme; it is an education process for advising, training and informing livestock farmers concerning practical and scientific matters related to their business and influencing them to use improved techniques in their farming operations. Such operations include livestock and crop rotation, farm management, conservation and marketing (Anderson 1964, cited by Arnon, 1989).

Apparently, LES has a significant importance in livestock development. According to Kleps and Absher (1997), the main objective of LES is to help the rural and peri-urban population improve their standard of living through an increased agricultural production efficiency and increased farm income. In the case of peri-urban areas such tasks are realized through performing the following functions:

1. Informational - to provide livestock keepers with modern information related to livestock production;
2. Disseminational - application of the latest technology innovation to livestock practice;

3. Advisory - support farmers and their families in solving problems related to livestock production, as well as to improve their community resources management; and
4. Educational - supplementing and increasing the professional skills of farmers in livestock production.

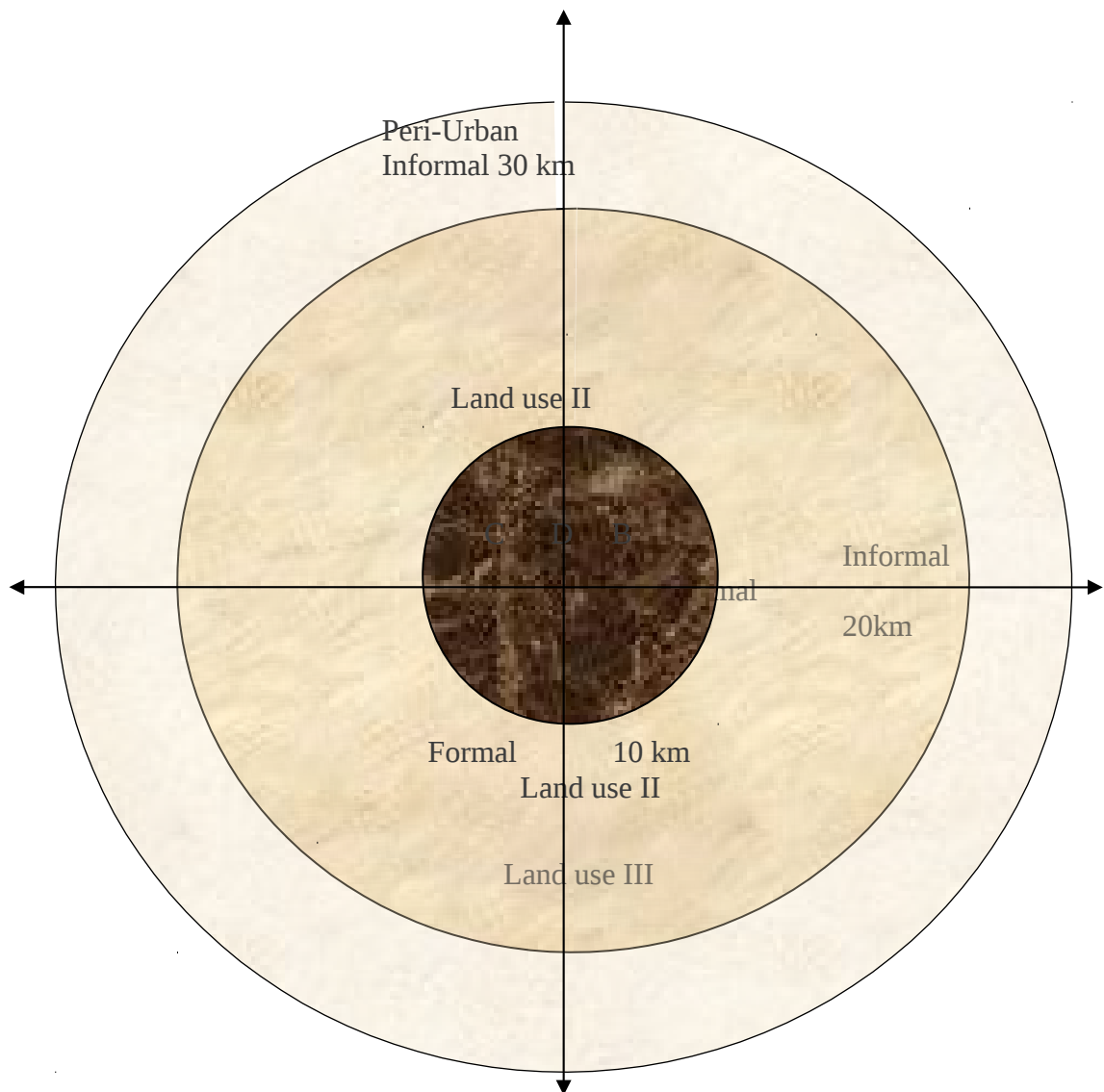
#### **1.4 Characteristics of Peri -Urban Areas in Relation to Livestock Production**

Peri-urban farming (PUF) includes activities within or on the fringe of a town or city that use natural, physical, and human resources to grow, process, and distribute food and non-food agricultural (crop and livestock) products for both, local urban markets and export (UNDP, 1996). According to spatial location and land use pattern, a peri-urban area falls several kilometres outside the urban centres Thunen (1826) cited by Barlowe, (1999). The area is normally characterised by informal activities on unplanned land acquired either through purchase, customary tenure, or occupied without anybody's permission, or allocated by village authorities. Different theories and models have been developed to explain spatial location and land use patterns in different urban areas. The models tend to explain land use intensity, combination of uses, land values, markets, production costs in relation to land and yield per acre. After making a set of assumptions, Barlowe (1999) developed a model to explain land uses pattern.

According to Barlowe and Gregory (1999, 2005) there exists different land uses and intensity, from the city centre, starting with Central Business District (CBD), up to peri-urban areas joining the peri-urban spine (Fig. 1). The spatial location and land



use pattern tend to manifest concentration of commercial activities and business operations in the inner urban centre, referred to as CBD. The area abuts to other commercial cum residential uses, marked with heavy and light industries, then similar land uses in land use II but with low intensity. The area then joins the peri-urban area, within a range of 30 to 40 km. The peri-urban area usually is not provided with good infrastructure, it has less land values compared to the land uses mentioned earlier. Land values tend to fall towards areas outside the urban centres. The following Fig. 1 attempts to present the scenario explained in the pattern.



**Key:**



CBD: Central Business District



Land Use II Office, commercial and residential



Land Use III Industrial, Residential, Commercial



Peri-Urban Fringe: Mixed uses: Agricultural, etc

**Source: Land Resources Economics (1999)**

**Figure 1: Spatial Location and Land Use pattern**

Based on the above scenario, characteristics of livestock systems in cities and towns differ from one country to another. For example, in Dar-es-Salaam, peri-urban livestock zones exhibit both urban and rural characteristics; over the CBD between the high-density, urban city centre (within a radius of 20 km) and the low-density, rural areas beyond 40 to 50 km radius. In other places in the world, such as Mexico City, the peri-urban livestock system is located in an urban conglomerate that lies about 2000 m above sea level, covering an area of 1400 km<sup>2</sup> and has a population of 22 million people. Peri-urban Damascus (Syrian Arab Republic) is defined as the area surrounding Damascus within 30 to 50 km (Mougeot, 1998).

### **1.5 Agricultural Activities in Peri-urban Areas**

Peri-urban farming (PUF) is practiced in towns and cities in most developing countries, particularly where the majority of urban dwellers depend indirectly on agriculture for their livelihoods, through employment, transportation, retailing, and processing. It is estimated that 40% of urban population in Africa is involved in urban agriculture (UA) which combines crop and livestock production systems (Brook and Davila, 2000).

The rise of PUF is partly accelerated by urbanization in which a considerably large number of people from rural areas migrate to urban areas. Rural-urban migration is a serious issue in developing countries. Previous studies by (Mwamfupe and Kivelia, 2001; Gregory, 2005) indicated that urbanization is associated with remarkable increase of peri-urban dwellers in un-surveyed areas. Gregory (2005) reported that, due to the rapid growth of the world cities, the United Nations (UN) envisages that

between 1995 and 2025 the number of people living in urban areas will nearly double from 2.8 to 5.3 billion and that 90% will be in developing countries. Hence, the sustainable production of livestock, processing and distribution of animal products in and around cities and towns through PUF will undoubtedly continue to contribute to the production of safe, affordable, and reliable food supply for the urban population, provide income and employment to a large number of the poor urban dwellers, especially women (Mwamfupe and Kivelia, 2001). Such demands will continue to require rigorous involvement of various stakeholders to put in place favourable environment for livestock extension service and to disseminate required technologies to PUF. PUF, however, poses a relatively serious challenge to urban development since such farmers do not let away their land for such developments. Smit *et al.* (1996) summarises salient issues related to sustainable urban and peri-urban agriculture (UPUA) as shown in Table 1.

**Table 1: Issues of Sustainable Urban and Peri-urban Agriculture (UPUA)**

<b>Issue</b>	<b>Household level</b>	<b>Institutional level</b>	<b>Policy level</b>
Production, processing and Marketing (both food and nonfood agricultural products)	Farmer understanding of urban markets, and selection of farm and non-farm enterprises. Competent enterprise management.	1. Institutes to develop and monitor standards for agricultural practices and food quality. 2. Public private sector collaboration for inputs supply and marketing infrastructures.  3. Technologies to reduce seasonality of supply  4. Enable small enterprise integration with emerging food chain structures	1. UPUA in urban planning and, appropriate price, trade, and land policies.  2. Policies for improving farmer access to information
Livelihoods	Targeted technologies to improve the livelihood of urban poor	1. Recognition of the role UPUA in economic crises.  2. Strengthening the backward and forward linkages between rural and urban agriculture	Food and trade policies to reduce the impact of high food prices
Environment, health, and equality	1. Adoption of sustainable practices.  2. Monitoring pesticides residues	1. Create awareness about fresh, hygienic and, quality food, and adoption food quality and safety standards.  2. Institutional arrangements to manage environment and social externalities of UPUA (e.g heavy metal and microbial contamination of the environment and food).  3. Regulating use of city wastes	1. Policies to encourage people to keep the city clean.  2. Awareness of environmental perspectives of consumers.  3. Appropriate labour policies

**Source: Agriculture Investment Source book [<http://www.worldbank.org>] site**

**visited on 20/4/2009**

### **1.6 LES in Peri-Urban Areas**

In developing countries, the importance of LES is widely acknowledged; particularly in peri-urban areas where majority of livestock keepers keep livestock as a source of income and employment. LES is commonly seen as a private good, implying that private LEAs provide services or advices in exchange for a fee (Oladele and Obuh, 2008). In Dar- es-Salaam region, LES is important as PUF involves resource-poor livestock keepers who own small land parcels and use small scale production systems characterized by high proportion of perishable products (especially milk, table eggs, chicken meat and pork), common diseases and disease outbreaks. These livestock farmers have low technical- know-how on livestock keeping practices and use various intensity of uncoordinated inputs with regard to feeding diversity (commercial), feeding supplements and use of veterinary drugs (Anh *et al.*, 2007).

Since livestock production is done commercially in Peri-urban areas, LES plays a vital role to ensure that appropriate technical information and services are provided efficiently and effectively to livestock keepers. In Dar es Salaam, provision of LES in urban and peri-urban areas is done by two types of agents: public agents and private agents. Public extension agents are coordinated by three municipalities' agricultural and livestock offices, namely Ilala, Kinondoni and Temeke as well as the government (public) managed research centre: the Veterinary Investigation Centre (VIC). The private extension service is practiced by private veterinary centres, input suppliers, professional and paraprofessional vendor, expert farmers and hatchery companies scattered across the city. Livestock keepers have options of

requesting extension services from either of the two LES service providers (public or private).

### **1.7 Problem Statement**

LES in peri-urban areas is done by two types of agents as explained above. These are public livestock extension agents, researchers and public veterinary clinics. Others are private veterinary clinics, input suppliers and private professionals and paraprofessionals, hatchery companies as well as expert livestock keepers. Currently LES in peri-urban areas in Tanzania especially in Dar es Salaam is not holistic in nature and mainly appears as a veterinary-oriented service (Mngulwi *et al.*, 2004). Most of those involved in LES provide extension services regularly either on treating livestock or supplying inputs whereas the right role of the extension service is realized through performing four functions, namely the informational, dissemination, advisory and educational (Kleps and Absher, 1997).

Livestock keepers need technical information and services about managerial practices in livestock keeping, which should be conveyed to them by a trained expert in animal health and production. Others are expert livestock keepers who have ability to disseminate latest technology, as well as livestock extensionists who understand the problems inherent in extension. The extensionist exploits the sociological and philosophical knowledge of extension to solve livestock keepers' problems. According to Mattee *et al.* (1997) with the emergence of the private service after privatization of extension services in Tanzania, LES has been perceived as a failure of the public extension services due to excessive bureaucracy and

inefficiency, poor formulation and/or implementation of extension programmes, poor staff working condition and weak linkage with other relevant institutions. There have been some complaints from rural, urban, peri-urban livestock producers and other stakeholders with respect to the quality of LES rendered to them (Isinika, 2000). Livestock keepers also have charged livestock extensionists that their services are provided in discriminatively, in that, LEAs are said to offer their visits selectively to livestock keepers who are able to pay for the services rendered (Roling, 1989; Mattee and Rutatora, 2000). At the moment, process of provision of LES in Tanzania appears to be inefficient. This makes it necessary to assess the quality of services rendered by LEAs especially in the peri-urban areas.

### **1.8 Problem Justification**

With the current increase of commercial livestock keepers in peri-urban areas and the increase of livestock extension providers in many towns and cities in Tanzania, quality extension services to the livestock keepers remains both challenging and of a great demand. LES is currently constrained by factors inherent in four levels of management, including the ministry level, district level, extension agent level and livestock keepers' level. The current situation has also been acknowledged in the National Livestock Policy (NLP) in which, it has been stated that LES is constrained by (i) weak collaboration amongst stakeholders (ii) insufficient expertise and (iii) inadequate infrastructure and facilities (URT, 2006). To determine the best way to design the appropriate institutional structure to meet these constraints, there is need to investigate salient factors that influence provision of extension services and to identify relative efficacy of various extension provision mechanisms. This study, for



that case, aimed at evaluating the provision of livestock extension services rendered in peri-urban areas in Dar es Salaam, and to highlight the quality of service and information provided by the LEA and how they were perceived by livestock producers. The results of this study are envisaged to provide some useful researched information which can be used by policy makers, administrators, and the actors in the agricultural programme for formulating new strategies to overcome the situation.

### **1.9 Objective of the Study**

The general objective of the study was to investigate factors influencing the provision of livestock extension services to livestock keepers in peri-urban areas.

#### **1. 9.1 Specific objective**

1. To assess the role of the private as well as the public sector in the provision of extension services in Kitunda Ward, Ilala Municipality in the Dar-es-salaam City.
2. To examine the type of information, professional and technical advice provided by LEAs to the livestock keepers in Kitunda Ward.
3. To identify the ways and techniques that LEAs use in dissemination of LES information to the targeted livestock keepers.
4. To analyze the perceptions of livestock producers about the quality of LES rendered to them by the public as compared to the private service providers.

#### **1.10 Research Questions**

This study was guided by the following research questions:

1. Who provides the most LES to peri-urban livestock keepers?

2. What type of information do the livestock extension agents (LEAs) give to livestock keepers and farmers in peri-urban areas?
3. Which ways do the LEAs use to provide livestock information to the livestock keepers in peri-urban areas?
4. How do the livestock keepers perceive the quality of services that public LEAs provide as compared to those of the private LEAs?

## CHAPTER TWO

### 2.0 LITERATURE REVIEW

#### 2.1 Overview of Extension Services

#### 2.2 Evolution of extension service provision

The design of agricultural and livestock extension service (LES) in developing countries has been the subject of heated debates. Guided by these debates, LES has undergone several transformations in the past few decades (Anderson, 2006). An evolution of public agricultural cum LES arrived at worldwide turning point in the 1980s. The public sector was severely attacked in 1980s in industrialized, middle income and developing countries, by politicians and economists who raised concern over the cost and financing of public sector extension services (Birner and Anderson, 2007). The public sector was criticized for not doing enough, not doing well and for not doing what is relevant. It was also criticized for being ineffective, inefficient and for pursuing programme that foster equity (Birner *et. al.*, 2006).

Transformation of extension services delivery experienced major turn when the developing countries decided to decentralize their extension services including the LES. The mid 1990s experienced this major turning point when many developing countries decentralized their LES as well as other related services with the expectation that the services would be closer to the client, and thus become more relevant. Budgetary constraints also played a role in reaching the decision (Anderson, 2007). According to Smith (1997) there are three main reasons which guided governments to decentralize agricultural extension services: (i) a desire (or demand) to roll back the role of the state due to central government failure or

complexity of local issues; (ii) inability of the state to continue to finance a whole range of services; (iii) a view that democracy is best served through devolved functions with enhanced participation at local level.

With these changes, there has been a worldwide re-organization of the extension services, which have now evolved to include four broad forms of extension: (i) Public delivery and public finance which essentially comprises the traditional government agricultural extension, that is constrained by inadequate funding; (ii) Public delivery and private finance in which the government staff is contracted by private agencies to deliver extension services; (iii) Private delivery and private finance whereby commercial entities provide their suppliers with the extension services required to improve their technical efficiency. This delivery mode is prevalent in commodity out-grower schemes and highly commercialized high-value agriculture; and (iv) Private delivery and public finance which entails the outsourcing of responsibility for extension delivery to private sector providers such as NGOs (Nambiro *et al.*, 2005).

### **2.3 Evolution of Agricultural Extension in Tanzania**

In Tanzania, the agricultural and LES evolution has a long history that, to a great extent, bears external influences. Today, it is guided by a mixed approach from both educational and non-educational orientations, while Western extension practice adopts an educational philosophy (Mattee and Rutatora, 2000). During the colonial era, agricultural extension service in Tanzania was aimed at boosting agricultural production so as to provide raw materials for the expansion of the industrial sector in

the metropolitan countries. Thus, in order to increase production, by-laws and regulations regarding increase of acreage of various crops and use of recommended practices were introduced (Keregero, 1987). Having been introduced and enforced by the colonial administration without involving the local people, this approach was perceived negatively by the local people. In most cases, local farmers were ignored by the colonial government and were viewed as just objects serving their interests.

According to Lupaga *et al.* (1989), agricultural extension during the colonial period started with what was known as the “balanced utilization approach”. This came after the colonial government realized the need to prevent famine and maintain soil fertility in the country. Eventually, this created a negative attitude, among farmers, toward the government official extension staff who were executing these regulations. According to BACAS (1997) this was a top down approach which was enforced by the law and coercion rather than persuasion. Due to poor results, the balanced utilization approach was abandoned and the “focal point approach” was introduced. This approach which concentrated on high agriculture potential and progressive farmers focused initially on early adopters, usually the rich, more educated farmers with large farms and those with greater ability of following recommended extension services, and not the average farmer (Mattee and Rutatora, 2000). This approach, consequently, created mistrust, jealousy and antagonistic relationship between the expert farmers and the average or poor ones since the latter who were denied opportunity of these important extension services even though they comprised the majority of the resource (Kauzeni, 1989). Eventually, the focal point approach was ultimately also resisted by the local people.

After independence in 1961, use of excessive force and disproportionate by-laws was abandoned and the government adopted the educational and persuasive approaches to the services. From these changes, transformation and improvement approaches were established. The transformation approach aimed at modernizing agriculture through planned village settlement schemes, while the improvement approach aimed at improving traditional agriculture through extension services by encouraging cooperative production in the villages (Rutatora and Mattee, 2001). By mid-sixties, however, failures of the two approaches were apparent. Thus, from 1967 as a result of Arusha Declaration, the Tanzania Five Years Development Plan (1967-1972) adopted the frontal approach to development through the application of Ujamaa (socialist) ideological principles. According to Rutatora and Mattee (2001) the use of extension services reinforced the development of farmer's negative attitude towards the extension staff. This is because, during accelerated movement of farmers in the villages, extension staffs often used the process of selection, demarcation of villages land areas and even physically moving the farmer.

In 1972, the government introduced the decentralization policy which then transferred the administration of extension services from the Ministry of Agriculture (MA) to the Prime Minister's Office through the Regional Development Directors (RDDs) and District Development Directors (DDD). Following this decentralization, a number of extension officers were re-assigned with some administrative posts. The decentralization, unfortunately, resulted in loss of control of all the regional and district Agricultural staff by the parent Ministry of Agriculture (MA) (Rutatora, *et al.*, 1999; Isinika, 2000). In 1978, crop market

parastatals were established to replace some activities of the dissolved cooperative unions. These parastatals, including the Tanzania Cotton Authority (TCA), the Sisal Authority (SA), the Tobacco Authority of Tanzania (TAT) and the Coffee Authority of Tanzania (CAT), instituted separate extension services which were crop specific under a respective parastatal. These authorities were also involved in provision of relevant agro- input and marketing services. The latter were transformed into authority bodies whereby the extension services were offered under the commodity (specialist) approach. The approach was useful in terms of technology transfer but left out issues of important public interest as well as target groups (Mattee and Rutatora, 2000).

In 1983, the government centralized extension sector after addressing the observed shortfalls of decentralization. With effective from 1988, the Government launched the National Agricultural and Livestock Extension Rehabilitation Project (NALERP) based on the training and visit (T & V) system, as an approach to improve agricultural extension services. The basic features of the T & V system included: professionalism, single line of command, concentration of efforts, time bound trends, field and farmer orientation, regular and continuous training, and linkage with research (Rutatora and Mattee, 2001). In this system, extension agents would meet with a small group of “contact” farmers who were expected to disseminate agricultural information to other members in communities and report back the farmers’ opinions (Rutatora and Mattee, 2001).

At its conclusion in 1996, NALERP reported to have achieved its goals, including that of increasing agricultural output given the number of farmers covered by the extension staff, increasing farmers' awareness of specific technical advice and increasing rates of their adoption (MAC, 2000). However, during the implementation of NALERP, it was apparent that agricultural extension was more of a supply than demand-driven service, and issues of relevance, cost effectiveness, ownership and sustainability were not adequately covered (BACAS, 1997). Together with NALERP, other extension projects like Sasakawa Global 2000 (SG. 2000), Southern Highland Extension and Rural Financial Service Project (SHERFSP) was implemented in 16 regions and their respective several districts (Mattee and Rutatora, 2000). SG 2000 was provided with credit for inputs, and then charged to develop positive attitude toward the extension service and staff.

In 1996, NALERP was succeeded by the National Agricultural Extension Project phase II (NAEP II) with the main objective of continuing to improve delivery of extension services to farmers for increased income and productivity, improving its relevance, sustainability and cost effectiveness (ABD, 2004). NAEP II was envisaged to follow the essential elements of the T&V while using participatory approaches. The Mid Term Review of the NAEP II which was undertaken by the Ministry of Agriculture and Cooperative (MAC) in collaboration with the World Bank in 1999, showed that its impact was disappointing (MAC, 2000). The limited impact was due to unfavourable weather, high prices of inputs, decentralization of extension services, weak research-extension-farmer linkage, poor credit facilities, and restructuring of MAC that led to staff transfer. Besides this, BACAS (1997)



revealed that even with the modified T & V system, the focus of extension services was on the transfer of technology rather than extension education. At the same time, the T & V system did not lend itself very well to the organizational empowerment of the farmers. Hence, the two major projects, namely NAEP II and SHERFSP (the credit component), were employed (Rutatora and Mattee, 2001).

During the operationalization of NERP II, the government focused more on the pluralistic approach to extension services which were more participatory (demand driven), farmer owned and cost effective (ABD, 2004). NAEP II in collaboration with FAO embarked on alternative extension approach that would help the farmers and pastoralists develop their own skills for acquiring and analyzing information, adopting technologies that would address their specific need while allowing farmers to choose correct practices from different options (MAC, 2000). This alternative extension service adopted the “Farmers Field School” (FFS) approach which was then being practiced and extended in several other countries in Latin America and Africa, as evidenced in Kenya, Uganda, Zimbabwe, Malawi, Mozambique, Ghana, Nigeria, Burkina Faso, Ivory Coast, Mali, South Africa and Zambia (Davice and Place, 2003).

#### **2.4 An Overview on LES Delivery Approaches**

Extension delivery approaches that have been used in developed and developing countries have rapidly been changing in the world because of various circumstances. Delivery of LES to livestock keepers in developing countries, including Tanzania, shows that the services were not yet very effective. Training and Visit (T&V)

system became a major model for providing and managing agricultural and livestock extension services in 1980/90 period (Purcell and Anderson, 1997; Anderson *et al.*, 2006). Failure of T&V in late 1990s, brought deterioration of the then existing extension system, even though a variety of new approaches to providing and financing extension emerged (Sulaiman, 2003). With rapidly growing population, environmental degradation, political instability, economic failure and the declining budget, re-thinking of the way livestock technology is delivered to livestock keepers became necessary. Madukwe (2006) suggests two participatory to LES delivery.

#### **2.4.1 Farmer-Group Approach**

This approach is aimed to replace an age-old practice of farmer contact on the one-to-one basis, which is expensive and unsustainable means of reaching the farmers with agricultural technology. Thus farmer-to-farmer extension was amplified by farmer groups approach. In this approach, farmers interact with one another towards achieving a common goal and farmers support each other to learn and adopt appropriate technologies. According to Conroy (2003) benefits of the farmer group approach include: (i) making agricultural extension services more client-driven and efficient; (ii) strengthening farmers' bargaining power with traders; (iii) reducing transaction costs for input supplies and output buyers; (iv) economies of scale e.g. from bulking up in output marketing or storage facilitating savings and access to credit; and (v) reducing public-sector extension costs.

#### **2.4.2 Farmer Field School Approach (FFS)**

This is also a participatory approach which facilitates farmers demand for knowledge, and offers opportunity for the end users to choose, test and adapt technologies according to their needs. Through their participation in FFS, farmers develop skills that allow them to continually analyse their own situation and adapt to changing circumstances. FFS is a school without walls where groups of farmers meet periodically with facilitators during the crop or animal cycle (Davis and Place, 2003).

#### **2.5. Provision of LES in Selected Developed Countries**

Provision of extension services in developed countries varies considerably from one country to another, despite the common elements which guide livestock keeping. Of these elements, education level of livestock keepers is the most important factor in developing countries as it facilitates smooth provision of LES. According to Fletcher (1986), a relatively higher education level of livestock keepers is valuable; most farmers in developing countries however, have a basic level of education. Some livestock keepers continue with their professional education at diploma and certificate courses at local agriculture high schools or polytechnic colleges, while others (livestock keepers) have obtained a university degree. In most of the advanced countries, extension is provided privately, thus, the functions of agricultural extension services were left to the private sector: commodity enterprises or industry agencies, often with some government financial subsidy (Garforth, 2002). In other cases, non-governmental organizations (NGOs) have been used to supplement public sector extension services, especially in the area of rural

development by private technology transfer, contracting for private agricultural extension, agro-clinic and agribusiness, voucher system and small farmer organisation (Chapman and Tripp, 2003). According to Garforth (2002) provision of LES in United Kingdom is dominated by the private sector, which includes commercial firm and private consultant. Agricultural Development and Advisory service (ADAS) prepare advisory programme at national, regional and local levels. The private company are involved in research and development by providing business and technical advice in agriculture, horticulture and food processing, laboratory services. Other areas include environmental impact assessment, marketing and market research, rural planning, and risk assessment throughout the food supply chain. The precise nature of the service, and of the information or advice which is provided, is tailored to suit the needs of the individual client (Garforth, 2002).

In Scotland, provision of agricultural advice is the responsibility of the three agricultural colleges with independent bodies financed by government through the research and education branch of department of agriculture. Advisory services and specialists are based in areas situated strategically throughout the country. They are responsible for recruitment, in-service training and promotion (Garforth, 2002). In 1990, the Netherlands privatized approximately one-half of its public extension services by transferring field extension personnel, with initial government financial support to farmer associations. The elements of the extension services responsible for linking research and the privatized extension services, policy preparation, implementation, and promotion and regulatory tasks remained under the guidance of

the ministry of agriculture. For example various provisions of extension service include the voucher system used in intensive high input farming and the dairy farmer platform used in intensive dairy farming (Proost and Duijsings, 2002). Provision of extension is so called “commodity-based extension” in which regional specialisation in arable cropping, dairy farming, mixed farming, intensive animal husbandry and horticultures determines the type of extension rendered. Extension service for each commodity is provided to a group of 20-30 farmers through field extension worker who is specialized in the commodity served by their respective centres. Livestock keepers pay fee for extension service rendered to them, which was formerly free of charge. In France and Norway, agricultural extension has been provided by private extension representatives, where costs are partially subsidized by the government (Rivera and Alex, 2004).

In Israel, the duty of LES is to help farmers advance by introducing them to more knowledge and better agro-technologies. The most important production requirement for export crops and livestock products is quality which, in turn, requires high production standards. Extension services support is provided by the government via the Ministry of Agriculture and by the private sector through companies selling agro-chemical inputs, including pesticides, fertilizers, machinery and auxiliary tools. In Israel, the Farming Branch Technical Committees (FBTCs) are headed by an extension Officer, within the framework of the Ministry, who coordinates all aspects of research, extension and other technical activities. Israeli farmers, who are highly skilled (a large number of them even have an academic

background), make extensive use of capital and orient their largely mechanized production towards both the domestic and export markets (Katzir, 2004).

## **2.6 Provision LES in Selected Developing Countries**

Recent reforms in the delivery and financing of extension services in developing countries have addressed issues of efficiency and effectiveness, but there is concern on the issue of reducing access for resource poor households to agricultural support services. Emergence of the NGO sector and private LEAs, have led to little improvement in provision of agricultural extension and, in some cases, may have reduced access by resource poor households to support services, and therefore, to sustainable livelihoods (Mack and Fernandez-Baca, 2004). In Chile, extension work is undertaken by private consultants, i.e Private Technology Transfer Consultants” that is selected on a competitive basis with funds provided through the National Institute for Agricultural and Livestock Development. Extension service started by providing agricultural production advice and it is now involved in the provision of different types of technical and professional services, including commercial, financial, farm management, post harvest, value adding and legal advice; (Mack and Fernandez-Baca, 2004).

In India, several approaches emerged for agricultural extension advisory after T&V phased out in 1990. These approaches included decentralization; contracting; group extension; provision of extension by para-extension workers; producer cooperatives; or farmer-based organizations; the establishment of agro-clinics by private entrepreneurs with initial government support; public-private partnerships in

financing and providing extension; and the establishment of Internet-based extension through village kiosks (e-Choupals) set up by the private sector (Birner and Anderson, 2006). Thereafter, India established the National Policy Framework for Agricultural Extension in 2000 that played an important role in promoting green revolution technologies. It also developed to serve as the basis for the central government's support to the states as the major responsibility for agriculture, including agricultural extension. Currently, Birner and Anderson, (2006) found that farmers assessing information on modern technology from various sources including progressive farmer, government demonstration plot, study tour, Para-technician/private agency/NGO, Participation in training, Credit agency, Village fair, Output buyers/ food processor, Primary cooperative society, extension worker, newspaper, television, Radio and input dealer.

Uganda has advanced further in cost recovery in extension services. In 2002 Uganda established the National Agricultural Advisory Services (NAADS) programme as the basis of reforms to the agricultural extension system in Uganda. The National Agricultural Advisory Services (NAADS), a component of the Participatory Method Approach (PMA), was put in place by an Act of Parliament in April 2001 with five sub-components (1) Advisory and Information Services to farmers (2) Technology development and Linkage with Markets (3) Quality Assurance Regulations and Technical Auditing (4) Private Sector Institutional Development and (5) Programme Management and Monitoring. Service providers included small groups of advisers, private companies and individuals. The aim of NAADS is to develop a demand-

driven, client-oriented and farmer-led agricultural service delivery system, particularly targeting the poor and women (Semana, 2002; Nahdy, 2002).

Currently, many developing countries adopt the FFS approach as the appropriate method for implementation of green revolution technologies. This approach has been extended to several countries in Latin America and Africa as evidenced in Tanzania, Kenya, Uganda, Zimbabwe, Malawi, Mozambique, Ghana, Nigeria, Burkina Faso, Ivory Coast, Mali, South Africa and Zambia (Davis and Place, 2003). According to Davice and Place (2003), Malaysia continues to maintain specialized livestock extension service which is both adequately funded and staffed with well trained as well as qualified officers. Other studies by Simptom and Owen (2002), Davice and Place (2003) and Madukwe (2006) show that, delivery of agricultural extension services to farmers in developing countries would be achieved through the FFS method. It is a participatory method of technology development and dissemination based on adult learning principles and experimental learning. It reflects the four elements of experiential learning cycle, namely: concrete experience, observation and reflection, generalization and abstract conceptualization, and active experimentation (FAO, 2001).

## **2.7 Provision of LES in Tanzania**

Currently, Tanzania is advocating participatory methodologies in delivering its LES. Participatory as a methodology involves exchange and sharing of knowledge and experiences among local communities with facilitation of outsiders with a view to examining the situation and identifying priority problems (Van de Berg, 2004).



There are several acronyms of participatory approaches such as Rapid Rural Appraisal (RRA), Participatory Rural Approach (PRA), Rapid Appraisal of Agriculture Knowledge Systems (RAAKS), Farming Systems Approach (FSA), Farmer Field School (FFS) and Sokoine Extension Project (SEP) (source). These are all related because they involve the stakeholders in the planning process. In most cases, Participatory Planning has been adopted as the appropriate approach to deliver extension packages. Indeed projects on board such as “Participatory Agriculture Development Project” (PADEP) and the “Agriculture Sector Development Programme” (ASDP) are using participatory methods to determine the farmers’ needs (Mngulwi *et al.*, 2004).

Until mid 1990s, provision of LES used to be the responsibility of the central government. With structural and economic changes, the central government currently remains responsible for livestock policy formulation, guidelines and technical backstopping (MLDF, 2008). Responsibilities of provision of LES to the farmers are basically undertaken by Local Government Authority (LGAs) and the private sectors (MLDF, 2008). By introducing Local Government Reform Programme (LGRP), LES moves towards new extension paradigm that embraces decentralization, participation, outsourcing (contracting) and cost sharing/recovery mechanism, with the goal of reducing the government bureaucracy and public expenditure on extension. These changes have shifted gradually from conventional public extension service as a supply driven to the farmer-demand-driven extension services. Adhering to the new extension paradigm, LES is led to institutional pluralism in extension services whereby various stakeholders play vital roles. LES

providers are Community Based Organizations (CBOs), farmers associations, self-help groups, Non-Governmental Organizations (NGOs), input agrochemical suppliers or dealers, para-extension workers, veterinary clinic centres, agribusiness companies, cooperative sector for commercial crops and animal products and information technology and mass media. These services are particularly available in urban and peri-urban areas and in some of rural areas where intensive and semi intensive production is practiced.

In rural and peri-urban areas, LES is provided through individual contact, farm visit, as well as participatory approach such as FFS and group contact. Currently FFS has been adopted in the regions of Morogoro, Iringa, Dodoma, Kagera, Kigoma, Arusha, Mbeya and Ruvuma (Niyegila, 2007). LGAs have primary responsibility for ensuring that extension services are adequately provided to smallholder farmers to whom a majority of extension services provision for smallholder continues to be financed by central or local government. Currently, however, there is an increasing private sector involvement in delivery of extension service to complement public extension providers (Frii-Hanssen *et al.*, 2004; Niyegila, 2007).

## **2.8 Factors Influencing Provision of Livestock Extension Services in Peri-Urban Areas in Tanzania**

Different factors influence provision of livestock extension services in peri-urban areas in Tanzania. These include education levels of livestock keepers, availability of market, input supply, income levels, category of farmers, land availability, number of livestock, type of extension services, communication as well as

government interventions in animal husbandry. The next section discusses each of these factors.

### **2.8.1 Education Level**

Education is knowledge, skills, comprehension and experiences acquired by an individual through informal and formal training, practice as well as through knowledge acquisition. Different people have different types and levels of education. Education levels that livestock keepers have in peri-urban areas have an impact in provision of extension services. People in peri-urban areas can be grouped in the categories according to their education level attained formally or non-formally. However, majority of people in peri-urban areas who are involved in agricultural production have formal education. A study done in three municipalities (Ilala, Kinondoni and Temeke) in the City of Dar-es-Salaam, found that half of farmers who undertook urban agriculture have post- primary education, whereas, two third of the livestock keepers in Nairobi in Kenya were reported to have received formal education (Ayaga *et al.*, 2004; Mlozi, 2005).

### **2.8.2 Communication**

New rapid development in communications and information technology has revolutionized people's capacity to share knowledge widely, quickly and cheaply. Almost all peri-urban areas in developing countries have an opportunity of using written materials, radio and/or television programmes, cellular phone technologies, and computer systems or internet to transfer, disseminate and share knowledge (Birner and Anderson, 2007). Peri-urban areas are accessible almost throughout the

year, and farmers are not widely scattered, which simplify interaction for provision of LES by using simple transport means e.g. motor cycle and bicycles. Mass media are additional catalysts which now enable focal extensionists to access additional information. In Tanzania, radio and television programmes are currently being used to provide extension information through *Ukulima wa kisasa* (modern farming) and Participatory Agricultural Development Programme (PADEP) (MLDF, 2008). In Kenya, Gauntam (2000) found that urban and peri-urban farmers have advantages of exploiting low cost communication methods such as radio, demonstrations, printed media, and partnership with civil society and private sectors. With such advantages, communication and information sharing in peri-urban areas continues to expand fast and is now more flexible, transparent as well as immediate, with fewer constraints (Klep and Absher, 2000).

### **2.8.3 Privatization from Supply to Demand Driven Scenario**

This phenomenon encourages those involved to become more cost conscious and to simultaneously ensure provision of information that livestock keepers need (Birner and Anderson, 2007). Since the privatisation of extension services, LES changed from being supply driven towards demand driven. This situation led in emerging of other service providers such as international and national NGOs, input suppliers, private veterinary clinic and private paraprofessionals, all of which are now more recognized particularly in peri-urban (MLDF, 2008). However, in Tanzania, input suppliers are centers or shops which deal in selling and supplying livestock medications and supplies veterinary drugs, vitamins and minerals, premixes, disinfectants, acaricides, animal feeds and feed ingredients. Input suppliers also help

provide relevant information on how to use veterinary medication, homemade rations and feed supplements using different type of feed ingredients, for lessening feed deficiencies. Input suppliers also influence the LES (Mngulwi, 2004).

#### **2.8.4 Type and Number of Livestock**

Type and number of livestock kept in urban and peri-urban areas have profound influence in provision of extension services in those areas. Livestock kept in urban and peri-urban areas include mainly improved breeds of dairy cattle, pigs, dairy goats and commercial chickens. These livestock are mostly kept under zero-grazing and requiring an intensive system of management and require high priority use of extension services. A report by Mosha (1991) shows that both livestock numbers and size of the cultivated area in the urban and peri-urban areas of Dar-es-Salaam grew steadily between 1985 and 1989 as follows: chickens from 510 789 to 793 441, pigs from 8601 to 15 658, goats from 2617 to 6218, and dairy cattle from 4200 to 8517. At the end of 1993, Mlozi (1996) reported that the three municipal district councils (Kinondoni, Ilala, Temeke) in the Dar es Salaam region had 18 286 crossbred dairy cattle, 1.2 million exotic laying hens and 0.6 million broiler chicken 131 891 local fowls, 37 327 ducks, 27 327 pigs, and 40 930 goats. The data on livestock population estimates collected in 2009 show that the three Municipals (Temeke, Kinondoni and Ilala) in Dar es Salaam region has increased livestock production. See Appendix (5).

### **2.8.5 Government Interventions on Animal Health**

Interventions and concentration of the government extension services on animal health, particularly to diseases of economic importance creates an opportunity for private LEAs, veterinary and para-veterinary practitioners to provide treatment-based services to urban and peri-urban livestock keepers. The government of Tanzania has effective control and surveillance programmes for diseases such as Anthrax, Black Quarter (BQ), Contagious Bovine Pleural Pneumonia (CBBP) and Rift Valley Fever (RVF) (Malewas, 2004). Similarly, other information on animal health and animal husbandry are easily available at private LEAs and input suppliers. These include: (1) Genetic improvement of livestock breeds and advice on cross-breeding and use of AI; (2) animal husbandry, house construction, yarding, hygiene, routine care, seasonal management calendars and appropriate recording methods; (3) cultivation of fodder crops, selection of food crops for optimum stover and straw production and use of tree fodders; (4) Rationing systems, use of concentrates and other supplements, in intensive systems and strategically in extensive systems; (5) Hygienic collection, storage and processing of milk and; (6) Marketing of livestock and livestock products (Morton and Matthewman, 1996; MLDF, 2008).

### **2.8.6 Land Availability**

Livestock farming activities require extensive areas where livestock can be kept and attended to. Modern animal production and management becomes effective when practiced in properly designed housing, provided with adequate facilities as well as accessibility by stakeholders. According to spatial location and land use patterns,

land availability in the peri-urban areas of Tanzania is characterized by unplanned settlements as well as informal areas (Lupala, 2003). Land value and rates in urban areas are higher than in peri-urban precincts attracting low income bracket towards the peri-urban areas. This, however, does not mean that affluent groups are not found in peri-urban areas. On the contrary, the UN –HABITAT has indicated that even the rich acquire and develop lands in peri-urban and unplanned areas (UN Habitat, 2002).

## **2.9 Constraints Hampering LES in Tanzania**

Since independence, various agricultural and livestock projects such as IFAD, NALERP, SHERFSP and NAEP II have been implemented geared towards strengthening extension services through provision of physical infrastructure and logistic support, staff training within the country and abroad and training of livestock keepers. Despite these supports, Tanzania has been unable to improve the provision of extension services efficiently and effectively, while, more people are involved in livestock keeping activities in rural and peri-urban areas (Isinika 2000; Rutatora and Mattee, 2001; Mlozi, 2003 and Mngulwi, 2004). Factors and constraints hampering provision of LES in Tanzania have been observed to occur at five different levels (Mlozi, 2003). These include the ministry, district, extension agents themselves and smallholder farmer levels

### **2.9 1 Constraints at Ministry Level**

As stated in the National Livestock Policy of 2006, Livestock extension service is constrained by weak collaboration amongst stakeholders, insufficient expertise,

weak research-training-extension-farmer linkage and inadequate infrastructure and facilities. Other constraints, as observed by Mngulwi *et al.* (2004), were inadequate entrepreneurial skills among extension officers, shortages of work gears for extension officers, weak supervision of extension services and weak linkage between extension agents, livestock keepers, researchers and market system. Others include lack of access to credit facilities, weak group/cooperative movement for livestock keepers, inadequate knowledge and skills to increase shelf life of the animal products and lack of sustainable programmes of LGAs to develop livestock keepers. Until recently, the private sector has not yet taken a proportionate share in offering livestock extension services. Overdependence on donor funding, livestock keepers' resistance to change and inappropriate LES approaches of service delivery to livestock keepers are yet another set of factors hampering LES.

## **2.9.2 Constrains at District Level**

At a district level, livestock extension services are constrained by number of factors which include:

### **2.9.2.1 Low Livestock Keepers Appreciation of LEAs**

Some of the problems associated with LES include poorly appreciated and perceived by key district administrators. It has been established that district administrators insist on seeing physical results from the LEAs within a short time; increase of milk yield per cow, increased egg production and increased number of livestock keepers without appreciation the complexity of the LES in general (Mlozi, 2003). LES, however, is rather more complex. As an education process of helping smallholder



farmers change their knowledge, skill, attitude and perceptions about extension profession in Tanzania, it requires a relatively longer periods before visible outcomes are realised, which goes contrary to many administrators' expectations. In addition to low appreciation of livestock extension, district administrators further assign extension workers multiple duties to perform, other than livestock technical advice. Other duties include levy collection, health campaign, assisting in supply of inputs (seeds, fertilizer, and breeding stock) and administering or supervising credit services. This situation undoubtedly affects the quality of LEAs performance as extension workers.

#### **2.9.2.2 Poor Livestock Programme Planning**

Objectives in national policies regarding livestock development are prepared without adequate research and planning. Some objectives are derived from centralized autocracies and have little regard for variance in agro-climatic conditions, farming systems and socio-political dimensions, let alone the requirements of the actual producer (Mlozi, 2003).

#### **2.9.2.3 Inadequate Infrastructure in Provision of Livestock Extension Services**

Facilities that include farmers' training centres, technological equipment, demonstration farms, processing centres, poor accessibility to farming areas, electricity and water supplies, road, communication network and other essential facilities are still inadequate in Tanzania. Some of these infrastructures are also not available to LES offices. This situation adversely affects the provision of quality LES.

#### **2.9.2.4 Insufficient Expertise among Livestock Extension Agents**

The number of trained, qualified and experienced LEAs is quite limited in developing countries. In developed countries, the ratio of extension workers to farmers lies between 1:350 and 1:1000, whereas most developing countries are lucky if they have a ratio of 1:5000 farm families (Birner *et al.*, 2006). Lupatu (1999) reported that that underemployment in Tanzania was largely exacerbated the government decision to retrench some employees, which aimed to reduce government cost yet improve efficiency and effectiveness of work. Similarly, Malawi has faced the same problems when it decided to freeze staff recruitment since 1995. According to Dima, (2002) Malawi ended up with considerable numbers of vacancies resulting from retirement as well as deaths of front-line extension staffs. This has, by far, worsened the already unsatisfactory extension agents' number. Underemployment may lead to high ratio of LEA to livestock keepers to be attended. For example in study area (Kitunda ward) one extension worker present in the ward attends about 4,500 farmers

#### **2.9.2.5 Poor Funding of LES**

Prior to decentralization of extension services, the central government and donors were the main financiers of agricultural extension programmes. With the decentralization of extension services, it was expected that local authorities would allocate funds from their own sources to cover the costs of extension services (Rutatora and Mattee, 2001). However, other studies done by (MAC, 2000; Isinika, 2000) found that the amount of revenue collected by councils mainly from crop and livestock levies were enough to meet the many development activities including

extension services. Despite all that, local authorities have been allocating, to extension services, very negligible financing. Through this constraint, donors continue to finance LES through the ASDP and ASDS programmes (MLDF, 2008).

### **2.9.3 Constraints at Livestock Extension Agent Level**

#### **2.9.3.1 Lack of Professional Group**

LES lack a professional association like Tanzania Veterinary Association (TVA) and Tanzania Society Animal Production (TSAP), which appear to affect their ability to discuss extension issues and demand their rights.

#### **2.9.3.2 Lack of a Spirit of Volunteerism**

Volunteerism is the ability of LEAs to devote extra time, resources and energy to initiate programmes that help livestock keepers change their attitude and perceptions about livestock production (Mlozi, 2003). Lack of volunteerism of public LEAs is partly due to lack of motivation through training, workshops, seminar, accommodation and transport. Public LEAs are perceived as fragmented, poorly trained, and responsible to more than one authority, have little contacts with research services and tend to work more with wealthier than low income farmers (Purcell, 1993).

#### **2.9.3.3 Inadequate Training and Professional Development**

The basic qualification of the general extension worker varies from holders of a university degree, a college diploma from agricultural and livestock institute (MATI and LITI) to agricultural high school graduates and secondary school leavers. Partly,

this is due to the fact that these institutions lack the necessary expertise and facilities required to provide adequate practical experience. The consequence is that the majority of agriculturalists have had little exposure to animal husbandry. There is clearly a need for strengthening both research and educational institutions and, equally important, their links with the extension service (Mack and Fernandez-Baca, 2004).

#### **2.9.4 Problems at Smallholder Livestock Keepers' Level**

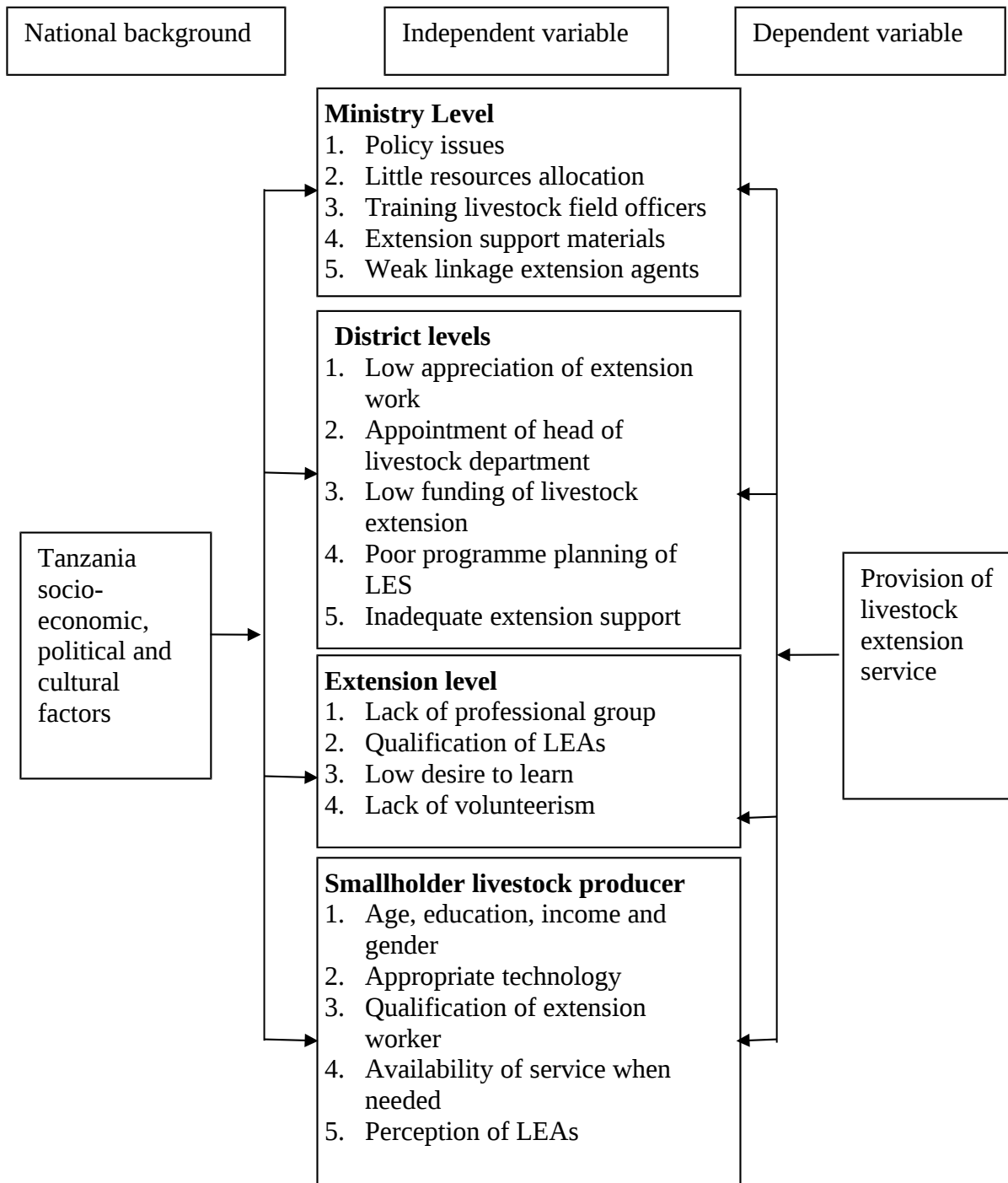
Age, income, gender, and education are regarded as socio-economic constraints that affect innovations. Rogers (2003) asserts that, in most cases, illiterate farmers are laggards to adopting new innovations. The probability of older people possessing more resources such as land is high compared to younger ones, which is a prerequisite resource influencing livestock keepers' adoption of innovations. In the peri-urban areas, livestock keepers are generally poor and cannot easily acquire land.

##### **2.9.4.1 Lack of Appropriate Technology**

Shortage of appropriate technology is one of the major constraints to livestock development. Despite the ample technologies developed in local research centres, livestock keepers conceive them as unsustainable (Mngulwi *et al.*, 2004). A lot of money has been used to promote these technologies but the results have shown little impact on livestock keeping.

#### **2.9.4.2 Lack of Access to Credit Services from Financial Institution**

Livestock production is a costly investment. It is not easy for most livestock farmers to make enough savings to finance good capital investments (Tesda, 1999). The livestock keepers therefore, have to be assisted to secure credit for their investment. The government has created an environment in which the financial sector gives loans to various sectors but the farmers are comparatively disadvantaged due to stringent conditions imposed on borrowers by the financial institutions. FAO, (2000) indicated that, in many developing countries; farmers are likely to lack sufficient capital or credit to pay for private services.



**Figure 2: Conceptual framework of factors Constraining Provision of Livestock Extension Services in Tanzania**

## **CHAPTER THREE**

### **3.0 RESEARCH METHODOLOGY**

#### **3.1 Overview**

This chapter discusses the research strategies, procedures and methods employed in this study. It describes the research design, sampling techniques used, nature of the sample and the population involved, the methods of data collection and relevant instruments used, as well as the approach to data collection and analysis.

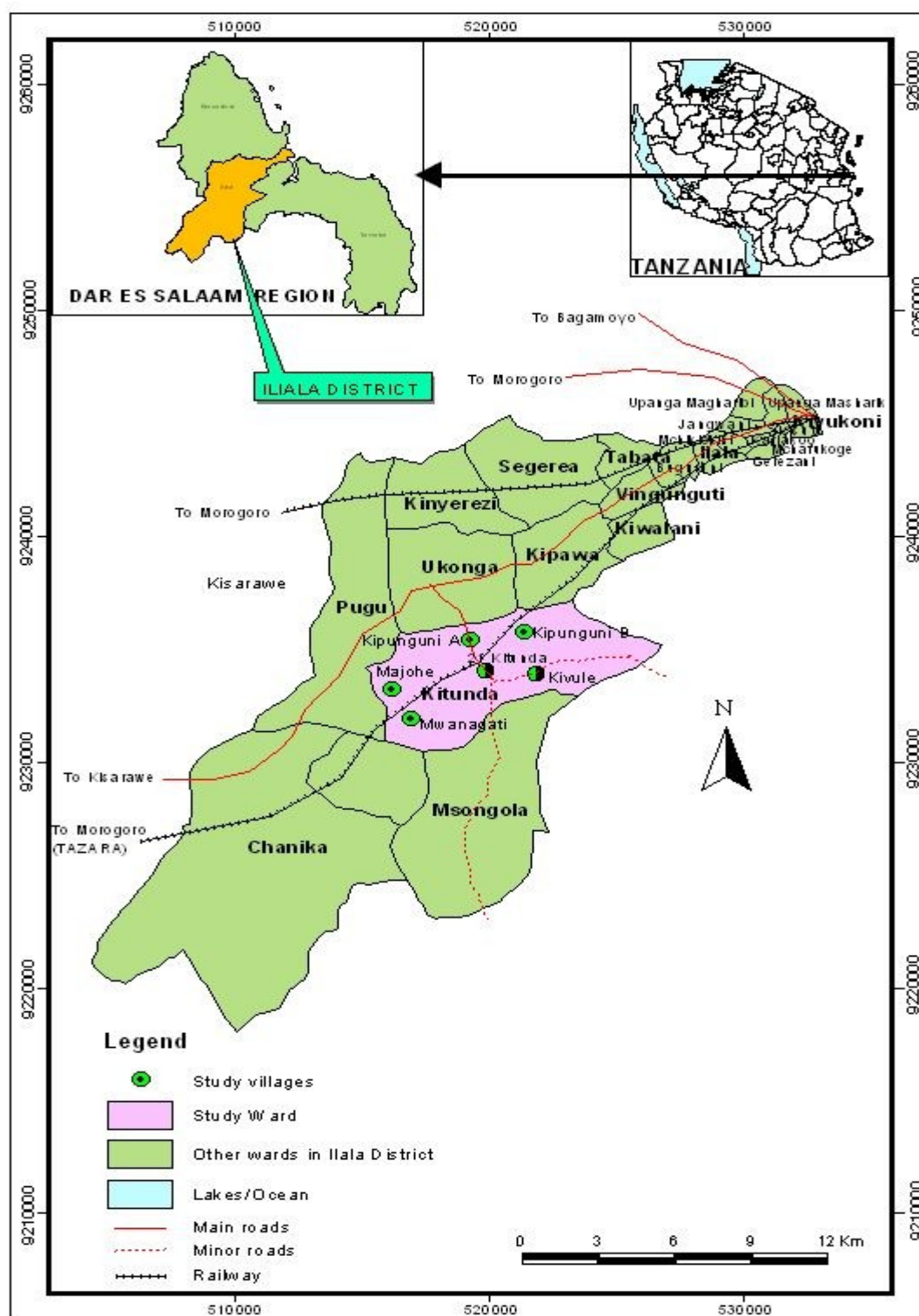
#### **3.2 Research Design**

This study adopted the quantitative type of research. As an overall approach guiding the direction of this study, the survey design guided the conceptual development and information gathering for this research. The survey design of research was used in this study in order to generalise a sample of livestock keepers in a peri-urban area so that to make inferences about some characteristics, opinions, attitudes, or behaviour of the population, in this case, of livestock keepers in peri-urban areas (Creswell, 2003). This design, which is based on the quantitative approach, was particularly selected because of two major reasons. Firstly, it was used because of the economy of the design. With this approach, it was cheaper, convenient yet efficient way of obtaining salient information relating to livestock keeping from the peri-urban farmers. Secondly, the approach was found to fit best in terms of rapid turnaround in data collection (Babbie, 1990; Fowler, 1998).

### **3.3 Description of the Study Area**

Kitunda is one of the 22 administratively wards of Ilala Municipality and located in Ukonga Division, Dar-es Salaam region. The ward is located about 20 km southwest of the Dar es Salaam city centre (Fig.3). Kitunda comprises of a population of about 41 000 people; with 11 000 households, and with an average size of 4.6% persons per household (Ilala Municipal Council, 2008). The area falls in unplanned areas and it has a total area of 150 km<sup>2</sup>, compared to 1,393 km<sup>2</sup> of Dar es Salaam Region with a population density of 1793 persons per km<sup>2</sup>. Most of the unplanned settlements range from 300 m<sup>2</sup> to 600 m<sup>2</sup> though there are also larger plots in the area. In 2009 Kitunda had 4320 farmers of which, about 75% are livestock keepers and others vegetable growers. Total livestock kept in the area were estimated to be 1082 dairy cattle, 580 200 layers, 650 pigs, 120 turkeys and 900 ducks (Kitunda Ward Office, 2008). Despite this, the ward had only one agricultural and livestock extension agent serving the ward at the inception of the study.





Source: GIS SUA, 2005

**Figure 3: Map showing Kitunda Ward location, Ilala Municipality, Dar es Salaam Region**

### **3.4 Sampling Procedures**

Interviewing schedule was designed for 120 livestock keepers including 30 dairy keepers, 30 layers keepers, 30 broiler chicken and 30 pig keepers. A total of five public and ten private LEAs as well as ward officials were interviewed. Five stakeholders were purposely identified as key informants. The stakeholders fall outside the above specific categories and were meant to provide their opinions and views on various aspects including services rendered to livestock keepers.

### **3.5 Data Collection Procedures**

#### **3.5.1 Primary Data**

Primary data were obtained through self administered questionnaires to the sampled respondents among livestock keepers. Data collected was on general household aspects, employment, type of livestock kept, market and sources of extension information and services, their opinions, perceptions and their attitudes towards LES. Field observations were made on the status of premises used by livestock producers, quality and standard of equipments, sources of inputs including veterinary medications, feeds and premixes. Other things observed were record keeping, knowledge and skills possessed by farmers and private LEAs. A checklist of items to be noted was drawn and constituted a guide for subsequent compilation and analysis.

#### **3.5.2 Secondary Data**

Secondary data were collected from various reports kept by the ward, district and regional offices as well as report kept at the Ministry level. Other secondary data was obtained from maps (spatial data), books, ward and district profiles, journals, previous research and studies undertaken in Kitunda by preceding researchers. Reviews of the National Livestock Policy (NLP), MLDF medium- strategic plans, Livestock Extension Services Implementation Guidelines (LESIG) and Sokoine national Agricultural Library (SNAL) was useful in obtaining secondary data.

### **3.6 Data Processing and Analysis**

Data collected from the various sources was organized, coded, processed and analyzed using the Statistical Package for Social Science (SPSS) 11 computer programme. Descriptive statistical analysis and chi-square were performed to yield frequencies, percentage and chi-squares for comparing the statistical significance differences of information and services provided by private and public LEAs. Also, statistical significance differences were analyzed to input suppliers based on information provided to livestock keepers (Babbie, 1990).

### **3.7. Definition of variables**

Operational definitions of variable are as shown in Appendix 3.

## **CHAPTER FOUR**

### **4.0 RESULTS AND DISCUSSION**

#### **4.1 Overview**

Presenting the findings of this study, this chapter is divided into four sections. The chapter includes sections on respondents and their livestock, information and services and respondents' opinions on LESs in Kitunda.

#### **4.2 Characteristics of Respondents and Their Livestock**

##### **4.2.1 Characteristics of Respondents**

Respondents in this study lived and conducted their livestock keeping activities such as dairy cattle, pigs and improved chicken (layers and broiler) in Kitunda ward, a peri-urban area outside the City of Dar es Salaam. The respondents' characteristic information such as those that influenced their perception of livestock extension services, including that on gender, age, marital status, and education level, have been summarised in Table 2.

Out of 120 respondents interviewed, 84 (70%) were females, while 36 (30%) were males. This indicates that females were more engaged in livestock production than males in the ward. The proportion of women work force involvement in livestock activities in the ward seemed to be more than the average of 57%, as previously described by Tesha (1999) in Dar es Salaam Region.

Other studies showed that females were more involved in livestock keeping such as dairy cattle, pigs, layers and broilers. For example, Dima *et al.* (2002) also reported that women constituted about half of the urban farmers in Windhoek (54%) and Oshakati (58%). McAinsh *et al.* (2004) indicated that females were involved in AU, especially in vegetable growing and livestock keeping thus playing a multiple role of achieving development policy goals of food security and nutrition, job opportunities and poverty alleviation. In Bangladesh, over 70% of landless rural women are involved in poultry activities and income generation from eggs and chicken (McAinsh *et al.*, 2004; Gueye, 2000)

Age of respondents influences livestock keeping in urban, peri-urban and rural areas at large. Respondents' age ranged from 18 to 75 years (Table 2). About 72 (60.0%) of the respondents were 36-55 years old, 37 (30.8%) between 56-75 years old, and lastly, nine (9.2 %) were 18-35 years of age. The age structure implied that the active group in livestock keeping ranged between 36 to 55 years old, the age group that constitutes respondents who are mostly responsible for family development. This situation was also reported by Madara (1998), Mdemu (2000) and Niyegila, (2007) who observed that, the age group which is much involved in agriculture production is the middle age class (31-50 years old). Younger respondents of the age group 18-35, accounted only a small fraction of 11 (9.2%) of all the respondents. Majority of the respondents, 90 (75%) were married and 19 (15.8%) were widowed. Only about six (5%) and five (4.1%) of the respondents were single and separated, respectively.

**Table 2: Some Characteristics of the respondents (N = 120)**

<b>Variable</b>	<b>Number n</b>	<b>Percent %</b>
<b>Sex</b>		
Male	36	30.0
Female	84	70.0
<b>Age</b>		
18yrs-35yrs	11	9.2
36yrs-55yrs	72	60.0
55yrs-75yrs	37	30.8
<b>Marital status</b>		
Single	6	5.0
Married	90	75.0
Widowed	19	15.8
Separated	5	4.1
<b>Education level attained</b>		
adult education	16	13.3
Primary education	40	33.3
Secondary education	35	29.1
Tertiary education	29	24.2

The study results in Table 2 shows that of the 120 respondents, about 40 (33.3%) and 35 (29.2%) reported that, had completed primary education and secondary respectively. Others, 29 (24.2%) and 16 (13.3%) had completed tertiary education and adult education, respectively. All respondents had some education, ranging from primary, secondary and tertiary education. In total, about 64 respondents (53.3%) had their education level either at secondary or tertiary education. Supported also by Rogers (2003) who suggested that more educated farmers had more contact with extension agents than farmers with less education, it was established that this more educated group of respondents had more access to facilitative interaction. It is also anticipated that the extents to which farmers are educated influence their adoption of

agricultural innovations. Suriya (1987) cited by Chamber *et al.* (1998) observed that education plays an important role in extension services as it manipulates interaction between LEAs and livestock keepers.

#### **4.2.2 Respondents Social Economic and Occupation Characteristics**

Respondents' social economic characteristics and occupation are indicated in Table 3. Study findings showed that, of the 120 respondents, 44 (37.7%) had their annual incomes derived from livestock ranging between Tshs 3 000 001– 4 000 000, while 40 (33.3%) had income ranging from Tshs 2 000 001–3 000 000. Few, 25 (20.8%) had incomes from livestock exceeding Tshs 4 000 000; six (5.0%) had income between Tshs1 000 001-2 000 000 and five (4.1%) had incomes ranging between Tshs 500 000-1 000 000. It is expected that income of respondents facilitated adoption of new technology. Farmers with high income will tended to give a positive altitude or responses to practicing new technology or adopting new approaches. A similar trend was suggested by (Bwana, 1996).

Table 3 also shows occupations of respondents. Category 1, as summarised in Table 3, shows occupations of respondents which included, apart from livestock keeping, activities such as operating retail shops, cultivating vegetables, operating kiosks and welding, small restaurants “*mama lishe*”. Such activities helped the livestock keepers earn an extra income to sustain their livelihood. This category was comprised of 47 (39.2%) of all respondents. This finding is similar to that previously found by Mlozi (2005) who reported that many respondents who keep livestock in urban and peri-urban areas also have small shops in which they sell variety of

consumer and non-consumer goods whilst their main motivation for keeping livestock in peri-urban areas were to generate extra incomes and for food.

**Table 3: Income and occupation of respondent (N-120)**

<b>Variable</b>	<b>Number n</b>	<b>Percent %</b>
<b>Income</b>		
Up to Tsh 500 000	0	0.0
Tsh 500 000-100 000 000	5	4.1
TSh100 000 001-200 000 000	6	5.0
Tsh 200 000 001-300 000 000	40	33.3
Tsh300 000 001-400 000 000	44	36.7
>400 000 001	25	20.8
<b>Occupation</b>		
Livestock only	28	23.3
Both livestock and employment	45	37.5
Livestock and others	47	39.2

Category 2 were those keeping livestock and having formal employment and these constituted 45 (37.5%) of all the respondents. Kusiluka, *et al.* (2006) found that, in coastal zone, the proportional dependence on dairy enterprises as the main source of income was relatively small. This situation can be generalized to other zones where smallholder dairy activities are practiced, particularly in urban and peri-urban areas. Category 3 was comprised of about 28 (23.3%) respondents who kept livestock only as a source of livelihood. These were mostly made up of respondents with adult education 16 (13.3%).

#### **4.2.3 Respondents' Livestock Keeping Period**



Table 4 shows the time period (in years) for which different livestock keepers have been in this business. Of the 120 respondents, 41 (34%) reported to have started keeping livestock between 1996–2000, followed by 36 (30%) respondents who started keeping between 2001–2005. Further, of the all respondents, very few, 20 (16.7%) and 14 (11.7%) indicated that, they had started keeping livestock between 1991-1995 and 2006, respectively. During the study it was difficult to indicate the actual year and numbers of livestock keepers in Kitunda as the majority of them were involved in keeping improved chicken. Several factors affected consistency in keeping improved chicken in peri-urban areas. One of the factors was time at disposal or culling which was not corresponding with the availability of DOC and market of the produce (Table, 6)

**Table 4: When started keeping livestock (N= 120)**

<b>Variable</b>	<b>Number n</b>	<b>Percent %</b>
<Year 1990	9	7.5
Year 1991-1995	20	16.7
Year 1996-2000	41	34.0
Year 2001-2005	36	30.0
>Year 2006	14	11.7

Other factor reported by key informants were, high incidence of diseases outbreaks in peri-urban areas, high cost of veterinary treatments, unqualified LEAs, particularly the private ones nick-named charlatans (“*vishoka*”) and insufficient number of public LEAs. Mack and Fernandez-Baca (2004) and Kusiluka *et al.*

(2006) reported that in urban and peri-urban areas, animal diseases are usually considered as important production constraints in livestock production

#### **4.2.4 Number and Type of Livestock Kept by Respondents at Start**

The types and numbers of livestock kept by farmers at the onset of this activity are depicted in Table 5. About thirty 30 respondents responded to this study metrics. Almost half of the respondents, 16 (53.3%) and 15 (50%) indicated that they kept layers and broiler chicken ranging from 301-500. For those who started on dairy cattle production, all respondents indicated that they kept between 1-3 dairy cows, while for pigs production, half the respondents, 15 (50.0%), indicated that, they kept between 2-6 pigs. Only very few, two (6.7%) respondents were able to start with 701-1000 layers and broilers. Livestock keepers who afforded large number of livestock were mostly those in high income bracket. In most cases, low income livestock keepers started with a small number of livestock but, as they gain experience and capital, they increased livestock numbers. As the farmers gain more knowledge and expertise in livestock farming systems, they slowly adopt and adapt to better livestock keeping technologies to their specific needs and circumstances. Chambers (1998) observed that as farmers gain experience, they are usually more able to accommodate changes.

**Table 5: Number of livestock on start (N=30)**

<b>Variable</b>	<b>Number n</b>	<b>Percent %</b>
<b>Broiler</b>		
100-300	4	13.3
301-500	15	50.0
501-700	9	30.0
701-1000	2	6.7
>1000	-	-
<b>Layers</b>		
100-300	13	43.3
301-500	16	53.3
501-700	1	3.3
> 1000	-	-
<b>Dairy cattle</b>		
1-2 cow	30	100.0
3-6 cow	-	-
>6 cow	-	-
<b>Pig</b>		
1-3	8	26.7
3-6	15	50.0
>6	7	23.3

According to Simptom and Owen (2002) the right approach for technology transfer needs to be developed and tested with and by livestock keepers. Livestock keeping in urban/peri-urban areas requires high initial capital to acquire land, build animal houses, install electricity and water supply, disposal of manure and acquire sufficient LES. Normally agricultural and livestock enterprises are regarded as uncertain enterprises, consequently, todote small farmers cannot easily secure loans from financial institutions (FAO, 2000). This therefore, makes it difficult for most

livestock keepers to progress as it is an expensive and risky enterprise, which requires intensive LES, inputs supply and proper marketing.

#### 4.2.5 Livestock Keepers' Problems

Findings from this study Table 6 shows that, of the 120 respondents, about half, 64 (53.3%) indicated that provision of LES was a major problem. Few respondents, 21 (17.5%) and 16 (13.3%), indicated that the presence of diseases and lack of quality animal feeds and drugs hindered their livestock development. Other studies by Mpiri and Wactorsson (1997), Madsen *et al.* (2004) and Komwhangila (2005) indicated that availability of quality and quantity of animal feed was a big problem in the intensive system. Observations done in the study area found that, there was a wide range of different poultry feeds at input suppliers produced by different companies and their quality was unknown and un-standardized. Further, of the 120 respondents, nine (7.5%) reported difficulty securing consistent markets and eight (6.7%) reported high cost of veterinary medications. Table 6 summarises the main problem experienced by livestock keepers in Kitunda peri-urban area in Dar es Salaam.

**Table 6: Problem faced in keeping livestock (N =120)**

Variable	Number n	Percent %
Unreliable LES	64	53.3
Inconsistent/lack of market	9	7.5
Lack of quality feed and vet drugs	16	13.3
Epidemic diseases	21	17.5
High cost of vet drugs	8	6.7

### **4.3 Information and Services Obtained by Livestock Keepers**

In this study information was regarded as both an advisory and an educational process in dissemination of innovations to livestock keepers whereas, service in this study was regarded as “practice” as veterinary related activities associated with the diagnosis, treatment, administering to, prescribing for, operations on, manipulations of appliance or any apparatus or appliance for any disease, pain, deformity, defect, injury, wound or physical or any mental condition of an animal or for prevention of, or to test for presence of any disease in animals. This service is offered by qualified Veterinary surgeons or by paraprofessional and paraprofessional assistant who are in this case any person that has been awarded a diploma or a certificate in animal health recognized by the Veterinary Council of Tanzania (MLDF, 2003). In this case service was referred to as a practice that an extension agent performed at the farm. It was observed that livestock keepers made contacts with LEAs for treatment related services, castration dehorning/disbudding, post-mortem, heat detection, pregnancy diagnosis and artificial insemination.

#### **4.3.1 Sources of Information and Services of LES**

All 120 respondents involved in this study were asked to indicate the sources of livestock information needed for better management of their livestock and their response is shown in Table 7. About 51 (42.5%) respondents indicated that input suppliers were their main source of information. Other 24 (20%) got the information from expert farmers and 16 (13.4%) from both public and private LEAs. Few, 14 (11.7%) and 13 (10.3%) indicated that they got the information from public LEAs and private LEAs respectively.

**Table 7: Source of information and services of LES (N=120)**

Source of LES	Information		Service	
	n	%	n	%
Public extension agents	14	11.7	20	16.7
Private extension agents	13	10.3	69	57.5
Expert farmer	24	20.0	5	4.7
Input suppliers	51	42.5	-	-
Both private and public LEAs	16	13.3	15	12.5
Others-	2	1.7	11	9.7

Of the 120 respondents, 69 (57.5%) reported that they received services from private LEAs, 20 (16.7%) received service from public LEAs and 15 (15.5%) reported to have received from both public and private LEAs. Only about five others (4.7%) reported that they received services from expert farmers. None of the services was provided by input suppliers. This situation may be associated with the size of the ward as well as inadequate public LEAs services in animal health which were observed in Kitunda ward. Also similar situation reported elsewhere (Mantovani, 2000, Nandy, 2002 and Helm, 2006), was generally poor, possibly due to an apparently inadequate number of expert veterinary professionals.

According to the Ward Agricultural Extension Office (WAEO) in Kitunda ward, about 10 input suppliers shops or centres were available in Kitunda ward, and were mostly engaged in providing information related to livestock production through selling veterinary products (WAEO, personal communication, 2009). Based on this information, it was apparent that input providers in Kitunda ward provide most of the livestock information in the area. The role of expert farmers in the provision of information to livestock keepers in Kitunda cannot be overlooked. Expert farmers provided most needed services where there was a shortage of extension agents, poor

service accessibility, poor extension support and big ratio of extension officers to farmers (Birner and Anderson, 2006). This was highly evident in the present study.

#### **4.3.2 Respondents Access to Information from Various Sources**

Findings from this study, as presented in Table 8, indicated that all of the respondents in this study reported that private LEAs were their first source of information, 70 (58.3%) of them ranked information as good whereas 50 (41.6%) ranked it as poor. Expert farmers were ranked second 81 (67.5%), whereas 67 (55.8%) ranked information as good and 14 (11.6%) ranked it poor. Others, ranked 34 (24.4%) leaflet, 23 (16.2%) television and 17 (14.2%) radio as third, fourth and fifth sources of information, respectively and had ranked information as good. Additional information that respondents mentioned were public LEAs 16 (13.3%), agricultural fairs 15 (12.5%) and training five (4.76%). Quite a few livestock keepers assessed information from radio and television as indicated in Table 8, however, television and radio if are properly employed, would provide some most needed information related to urban and peri-urban livestock keeping. The table summarises sources of information that livestock keepers used in Kitunda ward when the study was taken.

**Table 8: Respondents' opinions about other sources of information (N=120)**

Source	Total Access		Good		Poor		No Access	
	n	%	n	%	n	%	n	%
Public LEA	16	13.3	16	13.3	-	-	104	86.7
Private LEA	120	100	70	58.3	50	41.6	-	-
Training institution	-	-	-	-	-	-	-	-
Research centre	-	-	-	-	-	-	-	-
Farmers association	-	-	-	-	-	-	-	-
Agricultural show	15	12.5	13	10.3	2	1.7	105	87.5
Video/cinema	-	-	-	-	-	-	-	-
Television	23	19.2	21	17.5	2	1.7	97	80.8
Radio	17	14.2	15	12.5	2	1.7	109	90.8
Newspaper	-	-	-	-	-	-	-	-
Leaflet	36	30	35	18.6	1	0.8	79	65.8
Participation in training	5	4.7	5	4.7	-	-	115	95.8
Farmers' study tour	-	-	-	-	-	-	-	-
Expert farmer	81	67.5	67	55.8	14	0.8	39	32.5
Credit agency	-	-	-	-	-	-	-	-
Feed formulation company/dealers	-	-	-	-	-	-	-	-
NGOs and CBOs	-	-	-	-	-	-	-	-
Government demonstration	-	-	-	-	-	-	-	-
Brochures	-	-	-	-	-	-	-	-

Livestock Extension Service Implementation Guideline (LESIG) states that, the source of livestock extension recommendations will essentially base on research findings verified under livestock farmers' management conditions as well as up-to-date research information obtained by livestock keepers through various sources such as training, study tours, exchange visits and field days. Others sources include research, newsletters and journals, input suppliers, Annual Livestock Experts' Meetings, Livestock Research Institutes/Centres, Ward Agricultural Resource Centres, agricultural shows and exhibitions as well as the internet (MLDF, 2008). However, in Table 8, out of all 19 sources of information displays in Table 8, only 8 sources were identified to provide information to livestock keepers in Kitunda.



Findings in this study further show that most of the respondents, 115 (95.5%), had not participated in training, as a source of information. About 109 (90.8%) never used the radio, 105 (87.5%) never attended agricultural fairs whereas 104 (86.7 %) had never met with public LEAs. It is quite probable that similar situation existed in the rest of Dar es Salaam region. In addition, this picture is likely to be even worse in many of the urban and peri-urban livestock keeping areas in the rest of the country taking into consideration that this study was taken in Dar es Salaam region which is a cosmopolitan area with, supposedly, better access of livestock information and other services than the rest of the country. Other developing countries like India report that farmers had a wide range of extension information sources, including progressive farmers, input dealers, radio, televisions, and newspapers. Others are extension worker primary cooperative society output buyers/food processors government demonstration village fairs credit agencies and participation in training (Birner and Anderson, 2007).

#### **4.3.3 Provision of Information and Services by Private Sector**

Based on responses from 120 interviewees, 73 (60.3%) reported that they got information from input suppliers, 21 (17.5%) from veterinary clinics and 12 (10.0%) from private paraprofessionals. Furthermore, eight (6.7%) reported that they receive LES from chick importers and chick dealers, and six (5.0%) from hatchery company. The following Table 9 summarises various information sources provided by the private sector.

**Table 9: Provision of Information and Services by Private sector (n=120)**

<b>Source</b>	<b>Information</b>		<b>Service</b>	
	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>
Vet. clinic canters	21	17.5	38	31.7
Private. paraprofessionals	12	10.0	74	61.7
Input suppliers	73	60.3	3	2.5
Hatchery Company	6	5.0	0	0.0
Others' -chick importers	8	6.7	5	4.7

Data, as presented in Table 9, shows that, 74 (61.7%) of the respondents received services of livestock keeping from private paraprofessional LEAs while 38(31.7%) received similar services from veterinary clinic centres. Few, five (4.7%) received LES from others, including chick importers and three (2.5%) from input suppliers. It was clear that in respect to LES, private LEAs played a vital role compared to public LEAs. Primary objective of establishing there practices were to provide animal health and extension services in animal husbandry to the underserved rural, urban and peri-urban livestock keepers (Wamaheri, 2004)

#### **4.3.4 Methods and Contacts LEAs used in Dissemination of Livestock Extension Service**

Table 10 displays extension methods that are used to disseminate livestock information and services to livestock keepers in the study area. Methods that were used by LEAs to disseminate livestock extension services varied considerably. They included the individual method, group method, demonstration plots, farm visits and Farmer Field School (FFS). All the 15 public and private LEAs respondents involved in this study informed that they normally used the individual method to provide LES to livestock keepers. This farmer-to-farmer individual approach,

however, seemed to be a relatively expensive and unsustainable means of reaching out to all farmers (Madukwe, 2006).

Data further revealed that, of the 15 LEA respondents, six (40%) indicated they used group methods to provide information and services to livestock keepers. In extension, group method is viewed as of critical importance, in that, livestock keepers get an opportunity to interact and share experiences among themselves. Conroy (2003) states that, farmers' group should be encouraged since they are client-driven, efficient and reduce public-sector extension costs. According to Livestock LESIG, Village Extension Officers (VEO) have a key role in facilitating and supporting livestock keepers' group formation, farmer networking and assisting groups and farmers' networks to develop service proposals and plans (MLDF, 2008).

**Table 10: Respondents opinions about method and contacts that LEAs used in dissemination of information and services (n=15)**

Statement	Mostly used		Moderately used	
	n	%	n	%
Method	15			

Individual method	6	100	-	-
Group method	-	40.0	9	60.0
Demonstration plot		-	-	-
Farm visits	4	26.6	11	73.3
<b>FFS</b>	-	-	-	-
Contact				
Schedule visits and monitoring	4	26.6	11	73.3
Emergency calls	15	100	-	-
During vaccination campaign	15	100	-	-

Furthermore, methods such as demonstration plot and FFS were not mentioned by all respondents as a means used to provide livestock information and services in the ward. Demonstration plots as a participatory approach are important in extension as they provide information through learning by doing. In Tanzania, FSS approach and demonstration plots have been implemented in some regions (Niyegila, 2007). It was further noted that all the 15 interviewed LEAs indicated that they all used emergency calls while only four (26.6%) used scheduled visits in disseminating information and services to livestock keepers.

#### **4.3.5 Information and Services Related to Different Livestock Keeping Systems**

##### **4.3.5.1 LEAs Information on Dairy Cattle and Pig Production**

Table 11 shows some of managerial practices that LEAs provide to dairy cattle and pig keepers in Kitunda ward. Public LEAs were mostly involved in the provision of information related to livestock health activities such as campaigns on vaccinations

against diseases with economic importance. Of the 60 respondents who participated in this study, 50 (83.3%) indicated that they had received information about livestock vaccination from public LEAs and only 10 (16.7%) indicated that they had the same information from private LEAs.

In respect to livestock treatment, findings have shown that private LEAs dominated the service. Notably, 34 (56.7%) of the respondents indicated that, they had received information on tick-borne control from private LEAs as opposed to nine (15.0%) who got the same from the public LEAs. This was the same in respect to acquisition of information related to external and internal parasite control as well as selection of the foundation stock to start the livestock enterprise. Furthermore, both private and public LEAs were also reported to provide other managerial practices, including record keeping, dairy and pig house design, management of lactating cows, saw, fatteners and preparation of homemade feed ration (Table 11).

**Table 11: Respondents' opinions about information that LEAs provided to dairy cattle and pigs (n=60)**

Information	Public LEAs		Private LEAs	
	n	%	n	%
Record keeping	16	26.7	25	41.2
Vaccinations – FMD, Anthrax etc	50	83.3	10	16.7
Control tick borne diseases	9	15.0	34	56.7
Control external and internal parasites	18	30.0	37	61.7

Management of lactating cow, saw,	9	15.0	21	35.0
Selection of foundation stock	8	13.3	13	21.7
Dairy/pig houses & design	5	8.3	8	13.3
Basic requirements for starting livestock	8	13.3	10	16.7
Home made ration	6	10.0	20	33.3

It was also observed that few respondents, eight (13.3%) and five (8.5%) reported to have had information on dairy and pig house design from both, private and public LEAs, respectively. With respect to this, MAF (2003) found that there has not been a standard for livestock shade design in Tanzania; livestock keepers have been modifying various designs to suit their own individual circumstances, while using building material they can easily obtained (Fig.4).



**Figure 4: Combined livestock keeping in a single shed: dairy cattle, pigs and broilers.**

It was observed that some livestock keepers in Kitunda ward integrated livestock system in a single shed or in a small confined area. This is not recommended as it complicates disease controls (Helm, 2006).

#### 4.3.5.2 LEAs Information on Broiler and Layers Keeping

Table 12 shows some of managerial practices that LEAs provide to layers and broiler keepers in Kitunda ward. For better production, chickens require good management in respect to nutrition and diseases control. Poultry keepers should be aware of the basic managerial practices in order to maintain healthy flocks.



**Figure 5: One open-sided shed with poor ventilation**

Some of the improved chicken information related to managerial practices was sourced from private LEAs. Of the 60 respondents, slightly over half, 38 (63.3%) reported to have received information related to vaccination from private LEAs, while, few five (8.3%) said that they received from public LEAs. Further, half the respondents, 36 (60.0%) mentioned that they had obtained information on feed supplement from public LEAs, whereas, few 15 (25%) reported to have received

similar information from public LEAs. and parasite control 30 (50.0%) of the respondents compared to eight (20%) of the respondents, they received from private LEAs and public LEAs, respectively.

**Table 12: Respondents' opinions about information that LEAs provided to layers and broiler keepers (n=60)**

Information	Public LEAs		private LEAs	
	n	%	n	%
Vaccination against NCD, IBD etc	5	8.3	38	63.3
Feed supplements	15	25.0	36	60.0
Feed supplements	12	20.0	16	26.7
Ventilation in poultry houses	10	13.3	20	33.3
Control internal & external parasites	8	20.0	30	50.0
Biosecurity in poultry farm	4	6.7	5	8.3
Stocking density of broiler and layers	17	28.3	19	31.7
Importance of poultry records	9	15.0	24	40.0
Importance of light and sanitation	15	25.0	12	20.0

Furthermore, Table 12 also shows that, of the 60 respondents, 24 (40%) and 20 (33.3%) mentioned to receive information about poultry records and proper ventilation in poultry houses from private LEA, respectively, while nine (15%) and 10 (13.3%) reported to have received respective information from public LEAs (Fig, 5 and 6) In addition, only 19 (3.7%) of the respondents received information related to stocking density from private LEA, whereas, 17 (18.3%) received from public LEAs.

This situation can be generalized to the most of poultry keepers in Dar es Salaam region. During the study, it was also observed that most livestock keepers and LEAs were not aware of biosecurity, as only very few respondents, five (5.8%) and four



(6.7%), reported to have received related information from private and public LEAs respectively. Biosecurity is important in poultry management to prevent transmission of infectious diseases, parasites and pests. Pathogens, for example, can get into a poultry flock through multiple sources including people, vehicles and equipment. Pathogens can, thus, be transported to great distances in a short period of time. Most common pathogens in poultry production are those coming through pests, feed, water or air (Helm, 2006).

#### **4.3.5.3 LEAs Service on Dairy Cattle and pig Production**

Table 13 displays services that private and public LEAs provided to livestock keepers on cattle and pig keeping. Of the 60 respondents, most, 55 (91.7%) indicated that they had the public LEAs vaccinate their livestock and only eight (13.3%) mentioned to have received the same service from private LEAs. Similarly, most, 53 (88.3%) of respondents mentioned to have their piglets receive iron injection from private LEAs while, nearly half, 35 (58.3%) had the same service from public LEAs.

**Table 13: Respondents' opinion about services on dairy cattle and pig production (N=60)**

Service	Public LEAs		Private LEAs	
	n	%	n	%
Treatment of animals	18	30.0	41	68.3
Vaccinations	55	91.7	8	13.3

Iron injection to the piglets	35	58.3	53	88.3
Artificial insemination % PD	13	21.7	21	35.0
Management: castration, &dehorning	10	16.7	36	60.0
Handling of pig	6	10.0	12	20.0
Heat detection & time of mating	16	26.8	38	63.3
Postmortem.	24	40.0	43	71.7

Post-mortem was yet another service that many livestock keepers obtained. It was learned, in this study, that many, 43 (71.7%) of the respondents obtained post-mortem service from private LEAs, whereas, 24 (40%) reported that they got the same service from public LEAs. Other respondents, 41 (68.3%) had had private service on livestock treatment, while 18 (30. %) reported similar service from public LEAs. Generally, when compared to public LEAs, it was evident that private LEAs were more active in the provision of LES on cattle and pig farming in Kitunda ward.

#### **4.3 5.4 LEAs Service on Broiler and Layers Keeping**

This study revealed different respondent's opinion regarding extension services offered by LEAs on broiler and layers production. Of the 60 respondents, 29 (48.3%) reported to have received debeaking services, 27 (45.5%) post-mortem and 20 (33.3%) treatment and vaccinations services from the public LEAs. Private LEAs were reported to dominate in the provision of the similar services to respondents (Table 14). Likewise, in relation to broiler and layers production, the private LEAs were rated higher than their public counterparts in terms of service provision.

**Table 14: Respondents' opinion on broiler and layers production (n=60)**

	Public LEA	Private LEA
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Service	n	%	n	%
Construction of brooder	6	10.0	8	13.3
Postmortem.	27	45.5	45	75.0
Treatment and vaccination	20	33.3	53	88.3
Preparation of room for next batch	4	6.7	13	21.7
Home made ration	5	8.3	26	43.3
Debeaking	29	48.3	41	68.3
Bad and good layer	9	15.0	16	26.8

#### **4.4 Respondents Comparative Opinions in Regard to LES in Kitunda Ward**

The aim of this section is to offer a description of a comparison between identified variables and managerial practices that public and private LEAs provided to the respondents. Such managerial practices were transferred to the respondents in form of either information or services.

##### **4.4.1 Information Related to Various Livestock Managerial Practices**

##### **4.4.1.1 Opinion of Respondents' Livestock Information Provision Based on**

##### **Gender**

Table 15 shows the opinion of respondents based on their gender about the information related to livestock managerial practices as given by public and private LEAs. Of the 120 respondents involved in this study metrics, 84 (70%) were females and 36 (30%) males. The private LEAs were reported to dominate in the provision of livestock information related to vaccinations, types of feeds/feed supplement, ventilation in livestock houses and importance of livestock record when compared to public LEAs. The provision of vaccination information by either private or public LEAs was, however, higher for male than female groups at

$p < 0.005$  and  $p < 0.009$ , respectively. The private LEAs, however, were reported to provide information related to feeds/feed supplement at  $p < 0.028$  and importance of livestock records at  $p < 0.022$  to more females than males, whereas, information related to ventilation in livestock houses were more provided to males than females at ( $P < 0.033$ ). No significant differences were observed in the provision of information to other parameters such as of feeds/feed supplement, ventilation in livestock houses, importance of livestock record and biosecurity in livestock farm between male and female groups, by public LEAs.

**Table 15: Opinion based on respondent's sex to LES information provided by public and private LEAs (N=120)**

Males	Females	Average	Df	Level
(n=36)	(n=84)			

<b>Information</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>		
<b>Public LEAs</b>								
Vaccination	22	61.1	28	33.3	25	25	1	0.005*
Feed supplement	9	25.0	15	17.9	12	12	1	0.370
Shed design	12	33.3	23	27.4	18	30.0	1	0.511
Ventilation	5	13.9	20	23.4	12	18.7	1	0.220
Biosecurity	4	11.1	7	8.3	6	9.7	1	0.433
Livestock record	2	5.6	9	10.7	6	8.2	1	0.303
<b>Total average</b>	<b>8</b>	<b>22.8</b>	<b>17</b>	<b>20.2</b>	<b>13</b>	<b>21.2</b>		
<b>Private LEAs</b>								
Vaccination	31	86.1	52	61.9	41	69.2	1	0.009*
Feed supplement	14	38.9	51	60.7	33	49.8	1	0.028*
Shed design	14	38.9	20	23.8	17	31.4	1	0.074
Ventilation	26	72.2	43	51.3	35	61.8	1	0.033*
Biosecurity	5	13.9	19	22.6	12	18.3	1	0.201
Livestock record	5	13.9	29	34.5	15	24.2	1	0.022*
<b>Total average</b>	<b>17</b>	<b>49.8</b>	<b>35</b>	<b>41.3</b>	<b>26</b>	<b>43.6</b>		

\*Significant at 0.05

The observed high involvement of private LEAs in the provision of vaccination information in Kitunda ward was probably associated with vaccination related to poultry keeping which is an activity usually done by private LEAs and input suppliers in many places in Tanzania (Malewas *et al.*, 2004). However NLP and dedicated the vaccination services to large animals and pets to public LEAs (URT, 2006; MLDF, 2008).

It was further observed that private LEAs provided information related to feeds/feed supplement to more female 51 (60.7%) than males 14 (38.9). similarly, information related to the importance of livestock record was given to more females 29 (34. 5%) than males 5 (13.9%) This situation also appeared in the parameter of importance of livestock records (Table 15). Generally, based on gender of respondents, respondents who received information from private LEAs were 35 (41.3%) females and 15 (49.8%) males. On average, more females than men received the services from private LEAs.

The corresponding averages based on information provided by public LEAs to various respondents in each gender were 18 (22.8%) females and 17 (20.2%) males. This was not surprising as females were more involved in livestock keeping especially in poultry production. This condition was also observed in Uganda by (Okot, 2001). Women play a pivotal role in maintaining their families' livelihood. Income generated by women from livestock keeping helps them sustain the families. It was also observed that LEAs provided information related to ventilation in livestock houses to more males than females. This was possibly due to the fact that, in most livestock practices, this activity is dominated by men than women. This situation was also observed by Pangani (2007), who thus suggested that female farmers were more concerned with the sex of the field extension officers when receiving agricultural information than were male farmers.

#### **4.4.1.2 Opinion of Respondents' Livestock Information provision Based on Education**

This Table 16 presents the study findings on the opinion of respondents based on education level on information related to various managerial practices by public and private LEAs. Based on education level, of the 120 respondents involved in this study, 40 (24.2%) reported to have attained primary education, 35 (29.4%) secondary education, 29 (24.2%) tertiary education and 16 (0.1%) adult education. A significant difference was observed in the provision of information about livestock vaccination across education spectrum by both private at  $p < 0.021$  and public LEAs at  $p < 0.025$  being more to those with adult education (93.8% private, 75% public), primary education (91.4% public, 77% public) and to lesser extent to those with secondary education (68.6% private, 45.7% public) and tertiary education (55.2% public, 55.0% private).

**Table 16: Opinion based on respondent's education level to LES information provided by public and private LEAs (N=120)**

Information	Adult education (n=16)		Primary education (n=40)		Secondary education (n=35)		Tertiary education (n=29)		average		D f	Sig
	n	%	n	%	n	%	n	%	n	%		
Public LEAs												
										63.		0.021
Vaccination	12	75.0	31	77.5	16	45.7	16	55.2	18	4	3	*
Shed design	5	31.3	11	27.5	7	20.0	12	41.4	8	30 20.	3	0.307
Feed supplement	1	6.3	12	30.0	10	28.6	5	17.2	6	5 18.	3	0.192
Ventilation	1	6.3	11	27.5	5	14.3	7	24.1	5	0 15.	3	0.415
Livestock record	3	18.8	6	15.0	3	8.6	5	17.2	4	9	3	0.699
Biosecurity	0	0.0	5	12.5	2	5.7	4	13.8	3	8.0	3	0.335
Total average percent	4	22.9	11	26.9	7	20.3	7	24.9	7	23. 7		
Private LEAs												
										81.		0.035
Ventilation	14	87.5	37	92.5	28	80.0	19	65.5	26	4 25.	3	* 0.025
Vaccination	15	93.8	32	91.4	24	68.6	16	55.2	21	0	3	*
Feed supplement	11	68.8	31	77.5	17	48.6	20	69.0	19	6.0 34.	3	0.065
Shed design	5	31.3	18	45.0	11	31.4	9	31.0	10	6	3	0.533
Livestock record	7	43.8	8	20.0	7	20.0	7	24.1	7	9.9 10.	3	0.255
Biosecurity	0	0.0	5	12.5	2	5.7	4	13.8	2	0	3	0.333
Total average percent	9	53.5	22	54.2	16	46.9	13	43.7	15	9.7		

\*Significant at 0.05

In respect to other study parameters investigated, such as information on livestock shed design, feeding/feed supplement, ventilation in livestock and biosecurity in livestock farm houses offered by public and private LEAs, there was no significant differences ( $P>0.05$ ) which was observed across all 4 education levels. However,



data, as presented in Table 16, showed that, on average, the private LEAs provided information to more respondents than did the public LEAs almost on all the parameters above. Notably, respondents who received information from private LEAs had different education levels, where, 22 (54.9%) with primary education, 9 (53.3%) with adult education, 13 (47.0%) with tertiary education and 16 (46.7%) with secondary education. The corresponding averages based on information provided by public LEAs included 11 (26.9%) with primary education, four (22.9%) with adult education, seven (24.9%) with tertiary educations and seven (20.0%) with secondary level. The reason behind this was equivocal, but it may possibly be related to the fact that respondents who were fairly well educated could better integrate their knowledge into practices than others. Similarly, study by Pangani (2007) found that, education encouraged an individual in the development activities and easy adoption of new extension approaches.

#### **4.4.1.3 Opinion of Respondents' Livestock Information Provision Based on Occupation**

Occupation of the respondents in this study (Table 17) varied considerably. After all of the 120 respondents were interviewed, three categories of occupations were identified and used for analysis. These included; 28 (23.3%) of those keeping livestock as the sole activity to sustaining their livelihood, 45 (37.5%) kept livestock and had official employment and 47 (39.1%) kept livestock and involved themselves in other private activities including shops, growing vegetables, and running small industries. The trends of opinions of the respondents to information regarding various managerial practices shown in Table 19 below show that private LEAs

provided more information than public LEAs irrespective of the respondent's occupation statuses. In respect to all parameters which were investigated, including vaccination, information on livestock shed design, feeding/feed supplement, ventilation in livestock houses and biosecurity in livestock farm houses, which offered by public LEAs, there was no significant differences ( $P>0.05$ ) which was observed across all the three occupation categories of investigation. For private LEAs, significant differences ( $P<0.05$ ) were only observed in three parameters which included information on livestock shed design at  $p<0.028$  which was more provided to respondents who kept livestock but also had formal employments 23 (51.1%), those who kept livestock and had private activities 14 (32.3%) and lastly, respondents who kept livestock only six (21.4%); This situation was probably influenced by varied income levels of respondents.

**Table 17: Opinion based on respondent's occupation to LES information provided by public and private LEAs (N=120)**

Information	Livestock				Livestock		Respondent.		Df	Sig level
	Livestock		and		and others		average			
	keeping only		employment		activities					
	(n=28)		(n=45)		(n=47)					
	n	%	n	%	n	%	n	%		
<b>Public LEAs</b>										
Vaccination	10	35.7	24	53.3	15	31.9	16	40.3	2	0.133
Feed supplement	9	32.1	11	24.4	8	17.0	9	24.5	2	0.318
Shed design	8	28.6	11	24.4	16	34.0	12	29.0	2	0.597
Ventilation	6	21.4	8	17.8	11	23.4	8	20.9	2	0.799
Biosecurity	3	10.7	4	8.9	9	19.1	5	12.9	2	0.277
Livestock record	3	10.7	8	17.8	6	12.8	6	13.7	2	0.659
<b>Total average</b>	<b>6</b>	<b>21.4</b>	<b>10</b>	<b>22.2</b>	<b>10</b>	<b>22.3</b>	<b>9</b>	<b>21.9</b>		
<b>Private LEAs</b>										
Vaccination	21	75.0	38	84.4	28	59.6	29	72.9	2	0.062
Feed supplement	19	67.9	16	35.6	31	65.9	22	56.5	2	0.002*
Shed design	6	21.4	23	51.1	14	32.5	14	35.0	2	0.028*
Ventilation	14	39.3	20	44.4	15	29.8	16	37.8	2	0.463
Biosecurity	4	14.3	7	15.6	12	25.5	8	18.5	2	0.361
Livestock record	22	78.6	23	51.1	24	51.1	23	60.2	2	0.021*
<b>Total average</b>	<b>14</b>	<b>50.0</b>	<b>21</b>	<b>46.9</b>	<b>20</b>	<b>42.5</b>	<b>18</b>	<b>46.5</b>		

\*Significant at 0.05

Second, information on feeding/feed supplement at  $p < 0.002$  was more provided to 19 (67.9%) of those who kept livestock only, to 31 (68.9%) of those who keep livestock and have private activities and least to 16 (35.6%) of those who kept livestock but had official employment. Lastly, information on keeping livestock records  $p < 0.021$  was provided more 22 (78.6%) respondents who keep livestock only than to the other two occupations who had almost the same average of 51%.

Notably, on average, respondents who received information from public LEAs included six (21.4%) who kept livestock only, 10 (22.2%) who kept livestock but also had official employments and 10 (22.3%) who kept livestock but also had other private activities. The corresponding averages based on information provided by private LEAs to various respondents with different occupation statuses were 14 (50.0%) keeping livestock only, 21 (46.9%) keeping livestock with official employment and 20 (42.5%) keeping livestock with other private activities. Apparently, respondents who depended on livestock only required more information on feed and feed supplement so as to maintain production and productivity as a sole means of sustaining their livelihood. Looking at a wider situation for keeping improved chicken in peri-urban areas, major sources of feeds are available at commercial feed processors. Lack of quality feed and veterinary drugs, as shown in Table 8, influenced this group to seek more information on how supplement available feed with available ingredients such as vitamins, minerals, CSC cereals, fish meal, blood and bone meal as well as information on feed formulation (Madsen *et al.*, 2004; Komwhangila, 2005).

#### **4.4.2 Opinion of Respondents Based on Livestock Services**

##### **4.4.2.1 Opinion of Respondents' Livestock Service Provision Based on Gender**

Summarised in Table 18, are gender based opinions of respondents on their about the information related to livestock managerial practices provided by public and private LEAs. Of the 120 respondents involved in this study metrics, 84 (70%) were females and 36 (30%) males. The private LEAs were reported to dominate in the provision of livestock services related to treatment, vaccinations, post-mortem, preparation room for DOC, piglets and calves, homemade rations and use of molasses and urea in animal feed, compared to public LEAs. Again, results in this study shows that private LEAs provided services on livestock treatment to more respondents, however, services were more to males 23 (88.9%) than to females 56 (35.6%) respondents at a significant difference  $p < 0.029$ . Similarly, post-mortem was also provide to more male respondents 27 (75%) than to female 41 (48.8%) at significant difference  $p < 0.015$ . Lastly, service on the use of molasses with animal feed, 16 (43.3%) males were more served than females 16 (19%) at  $p < 0.001$ . Nevertheless, no significant differences were observed in the provision of services in other parameters such as vaccination, homemade ration and preparation of rooms for DOC, piglets and calve ( $p > 0.05$ ). In respect to public LEAs, all parameters which were investigated, including treatment of livestock, vaccinations of livestock, post-mortem, preparation room for DOC, piglets and calves, homemade ration and use of molasses in animal feed offered by public LEAs, there was no significant differences ( $P > 0.05$ ) which was observed across gender.

**Table 18: Opinion based on respondent's sex to LES services provided by public and private LEAs (N=120)**

	Male		Female		Respondent		Df	Sig
	Respondent		Responden		Average			Level
	t							
	(n=38)		(n=84)					
Service	n	%	n	%	n	%		
<b>Public LEAs</b>								
Treatment	11	30.6	15	17.9	13	24.2	1	0.122
Vaccinations	26	72.2	41	48.8	33	60.5	1	0.018*
Post-mortem	26	72.2	38	45.6	32	58.6	1	0.007*
Prepare for DOC, piglets	4	11.1	6	7.1	5	9.1	1	0.347
Homemade ration	4	11.1	7	8.3	5	9.7	1	0.692
Use of molasses	6	16.7	8	9.5	7	8.2	1	0.207
<b>Total average percent</b>	<b>10</b>	<b>18.5</b>	<b>17</b>	<b>14.6</b>	<b>13</b>	<b>16.5</b>		
<b>Private LEAs</b>								
Treatment	32	88.9	59	70.2	45	79.5	1	0.029*
vaccinations	14	38.9	21	25.0	17	21.9	1	0.095
Post-mortem	27	75.0	41	48.8	34	61.9	1	0.015*
Prepare for DOC, piglets,	10	27.8	29	34.5	19	31.1	1	0.470
Homemade ration	12	33.3	18	21.4	15	27.3	1	0.126
Use of molasses	18	50.0	16	19.0	17	34.5	1	0.001*
<b>Total average percent</b>	<b>16</b>	<b>43.3</b>	<b>26</b>	<b>31.1</b>	<b>22</b>	<b>39.2</b>		

\*Significant at 0.05

On average, respondents who received livestock services from private LEAs were 16 (43.3%) males and 26 (31.1%) females. The corresponding average based on livestock services provided by public LEAs to various respondents in each gender were 17 (14.6%) females and 10 (18.5%) males. The observed high involvement of private LEAs in the provision of vaccination service in Kitunda ward was probably associated with vaccination related to poultry keeping which is an activity usually

done by private LEAs and input suppliers in many other places of Tanzania (Malewas *et al.*, 2004). NLP and LESIG, however, dedicated vaccination service to large animals and pets to public LEAs (URT, 2006; MLDF, 2008). It was also observed that private LEAs provided service related to livestock treatments, post-mortem and use of molasses in animal feed to more males than female. This situation appeared in the parameter of importance of livestock records (Table 18). This was not surprising as females were more involved in livestock keeping especially in poultry in the area. It was also observed that LEAs provided information related to ventilation in livestock houses more to males than females. This was also not surprising as in most livestock practices; this activity is dominated by men than women. The following table summarises the respondents the study findings that show noticeable findings based on each gender.

#### **4.4.2.2 Opinion of Respondents' Livestock Service Provision Based on**

##### **Education**

Respondents' opinions based on education level, with regard to information various managerial practices by public and private LEAs varied considerably. In Table 19, of 120 respondents involved in this study, 40 (24.2%) reported to have attained primary education, 35 (29.4%) secondary education, 29 (24.2%) tertiary education and 16 (0.1%) had adult education. Parameters investigated in the study included livestock treatment, vaccinations, post-mortem, preparation room for DOC, piglets and calves, homemade ration and use of molasses in animal feed. Based on education level, private LEAs and public LEAs seemed to equally dominate livestock services related post-mortem. A significant difference was observed in the

provision of services on post-mortem across education spectrum by both private  $p<0.008$  and public LEAs  $p<0.023$ . The trend on private LEAs shows that most services offered to the respondents with regard to their education were as follows; with tertiary education 20 (76%), with secondary education 25 (71.4%), with primary education 24 (60% ) and the lowest was with adult education six (37.3%). The corresponding averages based on service provided by public LEAs to various respondents with different education levels were those with tertiary education nine (34.6%), with secondary education 23 (65.7%), with primary education 21 (52.2% ) and adult education 11 (68.3%). Moreover, data show that there was no statistically significant differences ( $p>0.05$ ) for the rest of the parameters to both public and private (Table 19).

**Table 19: Opinion based on respondent's level of education to LES provided by public and private LEAs (N=120)**

Service	Adult education (n=16)		Primary education (n=40)		Secondary education (n=35)		Tertiary education (n=29)		average		Df	Sig
	n	%	n	%	n	%	n	%	n	%		
Public LEAs												
Treatment						34.		26.		32.		
vaccinations	7	43.8	10	25	12	3	7	9	9	5	3	0.441
						37.		50.		42.		
Postmortem	7	43.8	16	40	13	1	13	0	12	7	3	0.928
				52.		65.		34.		55.		0.023
Prepare for DOC,	11	68.3	21	5	23	7	9	6	16	2	3	*
piglets, calves				12.		11.						
Home made ration	1	6.3	5	5	4	4	0	0.0	2	7.5	3	0.096
				10.		11.						
Use of molasses	1	6.3	4	0	4	4	2	7.6	3	8.8	3	0.898
		6.3.		10.		17.		11.		11.		
	1	0	4	0	6	1	3	5	3	2	3	0.622
Total average				20.		23.		19.		21.		
	4	25.7	8	0	8	7	5	2	6	5	3	
Private LEAs												
Treatment				57.		74.		88.		73.		
vaccinations	12	75.0	13	5	26	0	23	5	18	5	3	0.198
				17.		28.		50.		31.		
Postmortem	5	31.3	7	5	10	6	13	0	8	8	3	1.106
				60.		71.		76.		61.		
Prepare for DOC,	6	37.3	24	0	25	4	20	9	18	4	3	0.108
				27.		22.		46.		36.		
piglets, calves	8	50.0	11	5	8	9	12	2	9	0	3	0.151
Home made ration				30.		34.		23.		21.		0.009
Use of molasses	0	0.0	12	3	12	3	6	1	79	9	3	*
				27.		40.		30.		33.		
	6	37.5	11	5	14	0	8	8	93	3	3	0.603
Total average				32.		39.		44.				
	6	36.7	13	5	13	8	12	5	26			

\*Significant at 0.05

Based on the education level, respondents who received information from public LEAs included four (22.9%) with adult education, eight (20.0%) with primary education, eight (23.7%) with secondary and five (19.2%) with tertiary education.



The corresponding averages based on information provided by private LEAs to various respondents with different education levels are six (36.7%) with adult education, 13 (32.5%) with primary education, 13 (39.8%) with secondary education and 12 (44.5%) with tertiary education. To some instance, the situation observed was inconvenient since all livestock require, at some point, services such as vaccination and treatment, regardless farmers' education levels. Mlozi, (2005) found that post primary education levels influenced capacity of livestock keeper to find relevant information for making right decisions on their farms and helped them build up capacity to perform their role on the information provided by LEAs

#### **4.4.2.3 Opinion of Respondents' Livestock Service Provision Based on**

##### **Occupation**

Respondents' opinions on livestock services related to various managerial practices by public and private LEAs were relatively influenced by their occupations. Based on Table 20, of the total of 120 respondents, three categories of occupations were identified and used for analysis. These included those keeping livestock as the sole activity to sustain their livelihood, 28 (23.3%), those keeping livestock but also had official employments 45 (37.5%) and those who kept livestock and involved themselves in other private activities, including shops, growing vegetables, and small industries (47 (39.1%). The trends of the opinions of respondents to livestock services related to various managerial practices, as shown in Table 20, indicate that private LEAs provided more information than public LEAs irrespective of the respondent's occupation statuses.

In respect to all the parameters investigated, which included livestock treatments, vaccinations of livestock, post-mortem, preparation room for DOC, piglets and calves, homemade ration and use of molasses in animal feed. The public LEAs were found to dominate livestock services related to post-mortem and livestock vaccinations. Findings from this study indicated statistically significant differences in two parameters including vaccination of livestock at  $p < 0.037$  which was more provided to respondents who kept livestock only 20 (71.4%), respondents who kept livestock but also had official employments 22 (48.9%), and lastly, those who kept livestock and had private activities 19 (41.3%). Another service was post-mortem at  $p < 0.002$ , which was more provided to 19 (69.9%) respondents who kept livestock only, 28 (60.9%) respondents who kept livestock and had private activities and lastly, 24 (53.3%) respondents who kept livestock but had official employments. On other hand there was no significant difference ( $P > 0.05$ ) which was observed across all the three occupation categories of investigation.

**Table 20: Opinion based on respondent's occupation on LES services provided by public and private LEAs (N=120)**

Service	Livestock keeping only		Livestock employment		Livestock and others activities		Respond. average		Df	Sig level
	(n=28)		(n=45)		(n=47)		n	%		
	n	%	n	%	n	%				
<b>Public LEAs</b>										
Treatment	8	28.6	8	17.7	10	21.7	9	32.5	2	0.527
Vaccinations	20	71.4	22	48.9		41.3	12	42.7	2	0.037*
Postmortem	19	67.9	24	53.3	28	60.9	16	55.2	2	0.002*
Prepare for DOC, piglets	4	14.3	1	2.2	5	10.6	2	7.5	2	0.148
Home made ration	3	10.7	5	11.1	3	6.4	8	8.8	2	0.697
Use of molasses	4	14.3	6	13.3	4	8.3	3	11.2	2	0.688
<b>Total average</b>	<b>8</b>	<b>26.6</b>	<b>10</b>	<b>22</b>	<b>9</b>	<b>20.3</b>	<b>6</b>	<b>21.5</b>		
<b>Private LEAs</b>										
Treatment	24	85.7	33	73.3	43	91.5	18	73.5	2	0.042*
Vaccinations	4	14.3	18	40.0	13	27.7	8	31.8	2	0.061
Postmortem	23	82.1	38	84.4	28	59.6	18	61.4	2	0.032*
Prepare for room DOC, piglets	7	25.0	15	33.3	17	36.2	9	36.6	2	0.629
Home made ration	8	28.6	13	28.9	8	17.2	7	21.9	2	0.494
Use of molasses	10	35.7	13	28.9	11	23.4	9	33.3	2	0.517
<b>Total average</b>	<b>11</b>	<b>40</b>	<b>19</b>	<b>41.3</b>	<b>17</b>	<b>35.8</b>	<b>26</b>	<b>38.2</b>		

Significant at 0.05

For private LEAs, significant differences were only observed one parameter which involved services related to livestock post-mortem at  $p < 0.032$ , services on treatment

of animals at  $<0.042$ , which was more provided to respondents who kept livestock and had private activities 43 (91.5%), those who kept livestock only 24 (85.7%), and least, to those who kept livestock but also had official employments 33 (73.7%). It was further noted that there was no significant differences ( $P>0.05$ ) which were observed across all the three occupation categories of investigation.

Data, as presented in Table 20, still indicated noticeable findings based on occupation status of respondents. On average, respondents who received information from private LEAs included 19 (41.3%) who kept livestock but had official employments, who kept livestock only 11 (40%) and those who kept livestock but had other private activities 17 (35.8%). The corresponding averages based on services provided by public LEAs to various respondents with different occupation statuses were 10 (22%), respondents who kept livestock with other private activities 10 (22%) and who kept livestock only, three (10.7%).

## CHAPTER FIVE

### 5.0 **CONCLUSION AND RECOMMENDATIONS**

#### 5.1 **Overview**

This chapter presents the conclusion and recommendations on the study findings. The general objective of the research was to investigate factors that influenced the provision of livestock extension services in peri-urban areas. Specifically, the study intended to examine the role of the public as well as the private sector in the provision of livestock extension services in Kitunda ward, a peri-urban area in Ilala Municipal, in Dar es Salaam Region, to examine the type of information, professional and technical advice provided by LEAs to the livestock producers in peri-urban areas, to identify the ways and techniques that LEAs used in dissemination of LES information to the targeted livestock producers and to analyze the perceptions of livestock producers about the quality of LES rendered to them by the public as compared to the private sector.

The study employed the cross-sectional survey design, whereby, data were collected at a single point in time from a sample of selected respondents from a large population of smallholders involved in livestock production. In this study, questionnaire was the main technique used for data collection. Data were analyzed using the Statistical Packages for Social Sciences (SPSS) 11.5 computer programme in which descriptive statistical analyses were performed to yield frequencies and percentages. Cross tabulation and chi-square tests of significance were also

performed to identify the relationship of the studied variables and the magnitude of association.

## **5.2 Conclusion**

The study in Kitunda peri-urban area of the metropolitan city of Dar-es Salaam has brought to light a number of issues in extension services which need to be addressed. The problems included incomplete information and services provided by public and private extension agents. These result into poor and ineffective services rendered to the livestock keepers, despite the fact that Tanzania has been a recipient of international aid and other donor funding for agricultural transformations. As observed in comparisons indicated in Table 15 to Table 20, findings from this study indicated that private LEAs had more contacts with respondents compared to public LEAs. For example, over half, 69 (57.5%) mentioned that they had obtained information about ventilation in livestock sheds from private LEAs, while 25 (20.8%) reported to have obtained it from public LEAs. Most information about feeding/ feed supplements was also received from private LEAs, as reported by 65 (54.2%) respondents. Few respondents 24 (20.0%) indicated to have received similar information from the public LEAs. Potentially, economical production of livestock, control of external and internal parasites was deemed crucial by all livestock keepers.

Furthermore, many respondents reported to have had more contacts form private LEAs than public LEAs on services related to, for example, vaccination, whereby, 99 (82.5%) respondents attended by private LEAs, whereas, 73 (60.5%) reported to have obtained the service from the public LEAs. Regarding post-mortem services,

most of the respondents 89 (74.2%) indicated to have received it from private LEAs. On similar services, close to half the respondents, 64 (53.3%) received it from public LEAs. On average, private LEAs had a more extended reach out to the livestock keepers on wide range of services and information. The following section provides some practical solutions to reduce the problems, if not solving it altogether. Apparently, the suggested solution may by far make the LES efficient and effective to the stakeholders.

### **5.3 Opinion of Respondents Towards Public and Private LEA**

The study was focused on, among other things, the reactions, perceptions and opinions that respondents had on the livestock extension services rendered by public LEAs. A general observation was that public LEAs provided services to fewer respondents than did the private LEAs. In specific cases, information based on feed and feed supplement, only about nine male respondents (25%) and 15 (17.9%) female respondents mentioned that, they had received information from public LEAs. Similarly, only 51 (60.7%) female respondents and 14 (38.9%) male respondents reported to have received the service from private LEAs.

Findings further indicate that, based on education levels of the respondents, a large number of livestock keepers had received information from private LEAs. For example, on average, respondents who received information from private LEAs varied considerably with their education levels, whereas, 22 (54.9%) had primary education, 9 (53.3%) adult education, 13 (47.0%) with tertiary education and 16 (46.7%) with secondary education. The corresponding averages based on

information provided by public LEAs included 11 (26.9%) with primary education, 4 (22.9%) with adult education, 7 (24.9%) with tertiary educations and 7 (20.0%) with secondary

Findings of this study has shown that LES tend to be more demand driven than supply driven, hence calling for more competitive, efficient and effective services that are usually associated with expansion and established private sector. Generally, private LEAs provided services to more respondents compared to public LEAs and they offered both information and services to all categories of livestock keepers regardless to their sex, education or occupation. Further observation specifically revealed that most respondents depended on private LEAs for veterinary rather than animal husbandry issues (Table 13, 14, 15, and 16). With regards to unreliability of LES (Table8), quality of service and information were observed to be substandard due to pluralism of extension providers. As a result, private LEAs rendered substandard services (largely due to lack of professionals) and inadequate public LEAs, but above all, the private sector dealing with LES lacked professional capacity (hence the rise for *charlatans*).



## **5.4 Recommendations**

### **5.4.1 Strengthening Livestock Extension Service Provided by Private Sector**

The study in Kitunda peri-urban farming area showed that the livestock extension services provided by private LEAs exceeded by far those by public LEAs. This is a positive start, and to make it more effective, the private sector needs to be strengthened, reinforced as well as being motivated, provided with incentives in provision of the services. Government and public institutions should avail subsidized field equipment, facilitate efficient flow of information to the private extensionists, disseminate research findings in simplified versions to farmers in peri-urban areas through provision of brochures with livestock information, updating livestock keepers on new vital animal farming and production technology available in their respective areas and involving them in programmed training, seminars, workshops as well as role models visits in extension work. This should be associated with capacity building and provision of continuing education in extension issues. This can be done through expansion and establishment of more livestock keepers' training centres in the districts and to ward levels.

Certainly, it is crucial that the private LEAs should be qualified up-to-standard and properly registered by their professional bodies or work under registered experts so they can render quality services. Expansion of the private sector in rendering extension service can be disastrous and threatening public health if it does not match with appropriate professionalism and international standards.

#### **5.4.2 Supporting Mechanisms for Livestock Information Management at the Farm Level**

This study has revealed that livestock record keeping and management at livestock keepers level leaves a lot to be desired. There are no deliberate and concerted efforts to keep required records. In order to keep track of ancestors, production levels, animal health issues, costs/revenues, breeding issues and problems encountered in livestock keeping, there is great need for the Local Governments to develop strategies to enhance record keeping at farm level. Livestock keepers should be trained on how best to keep daily records as a useful tool for the livestock keeper and researchers at large. Funds have to be set aside by the government in order to provide training and facilities for efficient livestock information at the farm level that will subsequently lead to the creation of a reliable national livestock database.

#### **5.4.3 Redefine the Duties and Responsibilities of Public and Private LEAs**

The study has shown that both the public and private served livestock keepers. While performing other livestock extension services, the government thrust and strategic focus has been on campaigns and vaccinations, research and dissemination on new technologies besides formulation of livestock policy, guidelines and technical backstopping. In this case the government has virtually left the rest of extension services to the private; in which case neither sector has performed superbly in providing the needed services. It is therefore strongly recommended that there should be a clear cut division of labour, whereby the private LEAs would purposely concentrate on veterinary drug supplies, delivery of chicks and treatment. There should be close interaction and communication among the two sectors for

efficient and effective livestock extension services. Private LEAs would thus concentrate on technology dissemination among livestock keepers during livestock extension services, thus improving the quality of services being rendered to the livestock keepers.

#### **5.4.4 Design and Agree on Extension Service Models Applicable in the Tanzania Context at the Moment**

The study has shown that there have been various models of livestock extension services across the world. It is also known that there is no single or specific model that can fit the whole country. In any case, it is important for the Ministry of Livestock Development and Fisheries to develop and adopt a model that sounds appropriate at the material time in Tanzania and apply it in peri-urban areas. There are Field Farmer School, Training and Visits, Farmer Group Method, Farmer Field School and other participatory approaches etc. Such models may apply differently in various parts in Tanzania. Lacks of a model leads to haphazard in rendering of services.

#### **5.4.5 Local Governments Should Prepare Strategic Plans Exclusively for Extension Service Provision in Peri-Urban Areas**

Local governments need to develop their own short, medium nor long-term strategic plans for executing extension services per se in the regions/districts and among livestock keeping peri-urban areas. The strategic plan redefines the mission, sets out the objectives, makes reviews of the situational analysis, outlines strength, weaknesses, opportunities and challenges (SWOC) and finally identifies the specific

target to be accomplished as per timeframe. It is recommended that each region and district, finally a ward, should develop its own strategic plan with a focus on livestock extension services. Strategic plans provide a guide and direction of any organization in management and performance. Lack of direction is a menace and chaos in rendering of quality services.

#### **5.4.6 Reinforce Monitoring and Control of Veterinary Drugs, Feeds and Input Supplies**

This study revealed that the livestock keepers verified that input suppliers played a big role in provision of information and services to them. Input and suppliers can motivate or de-motivate livestock keepers such that they continue or abandon the business. The government should institute strong conditions before establishments of input and supply centres, with corresponding control measures for monitoring quality versus substandard or fake drugs and inputs. This will help in reducing complaints from a number of livestock keepers regarding the veterinary drugs supplied to them, for their livestock, which have proved ineffective and sometimes fatal.

#### **5.4.7 Identify and Categories Livestock Keepers for The Purpose of Providing Livestock Extension Services**

It has been learnt in the study that Kitunda is a prominent area for livestock keeping with most livestock keepers categorized as solely of the occupation. It is recommended that there should be deliberate efforts by the Local Government to categorize livestock keepers according to their occupation, especially those engaged

in livestock keeping only, as they are always available at their residences, hence easily accessible for training. Secondly, the local government may consider attending and serving the livestock keepers according to the intensity of their operations: large, medium, small scale and progressive livestock keepers. Livestock extension services may be rendered purposely according to the level of livestock farming intensity and expansion. Livestock keepers in Tanzania differ in terms of types and numbers of livestock associated with intensity and quality of keeping them. In this case, categorisation of livestock keepers facilitates needs assessment in terms of equipment, training, general management and logistics in provision of extension services to the respective groups. This again results in realisation of more revenue for the livestock keepers and subsequent contribution to the GDP of the country.

#### **4.5.8 Purposeful Marketing of Livestock Extension Services**

Livestock keeping is just like any other business, whereby revenue, costs and income projections are important ingredients to keep a livestock keepers in business. In order to attract customers, it is important to have many, competent and registered veterinary drug suppliers who abide by the veterinary discipline, brochures on their offices, profiles etc. It should be easy for livestock keepers to locate them for immediate services. It sounds strange to market extension services, but in the world of competition, service providers should struggle and aim for quality services. Livestock keepers will always tend to consult and use effective information and services from their service providers.

#### **5.4.9 Set Aside Areas for Peri-Urban Large and Small Scale Farming**

It has been projected by the UN-HABITAT that by the year 2025 the urban population will be approx 5.3bn. Tanzania will not be spared of the urban and peri-urban expansion challenges. This suggests almost proportionate increase in peri-urban population. In order to strategically position itself well to serve the envisaged population, it is recommended that the government should set aside adequate land in its peri-urban areas to cater for the use. Urban areas will continue for a long time depending on peri-urban agriculture and livestock keeping. Studies and further research should be undertaken to know implication of such a strategy.

#### **5.4.10 Strengthening Livestock Professional Bodies and Associations**

Livestock extension officers in collaboration with the government should strive to strengthen existing regulatory bodies, voluntary associations and organizations, Tanzania Society of Agricultural Education and Extension (TSAEE) in a bid to ensure high standard agricultural and livestock extension services. Such bodies not only monitor and control the quality of professional services rendered by the livestock experts; they are also concerned with professional ethics, performance standards and quality control of its registered members. Strengthening such statutory and voluntary bodies will lead to quality services as it is in other professions like construction, medical and engineering.

#### **5.4.11 Further Research in Provision of Quality Extension Services**

It also recommended that more research in the provision of quality extension services in other peri-urban areas in Tanzania should be undertaken. This will make

a blend of researches that will finally lead to changes or improvement of national policy in the issues of livestock extension services. The studies may reveal something different from the observations made in the study or confirm the same findings.

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## APPENDIX

### Appendix 1: Questionnaire for livestock keepers

#### TITLE: PROVISION OF LIVESTOCK EXTENSION SERVICES IN PERI- URBAN AREAS. A CASE STUDY OF KITUNDA WARD, ILALA DISTRICT, DAR-ES-SALAAM REGION

#### SECTION A: Information on Livestock Producers Socio-Economic

##### Characteristics

1. Respondents' number.....
2. Household head
  1. Father ☐ 2. Mother ☐ 3. Son or daughter ☐
3. Age:
  1. 18yrs-35yrs ☐ 2. 36yrs-55yrs ☐ 3. 55yrs-75yrs ☐
  4. More than 75 ☐
4. Sex:
  1. Male ☐ 2. Female ☐
5. Marital status:
  1. Single ☐ 2. Married ☐ 3. Widowed ☐ 4. Separated ☐
6. Education level attained
  7. Adult education ☐
  8. Primary education ☐
  9. Secondary school education ☐
  10. Tertiary education ☐
7. Occupation of respondent
  1. Farming (livestock keeping) ☐
  2. Official employment ☐
  3. Both farming and official employed ☐
  4. Others (specify).....

8. What are the sources of income for your household? ( Tshs are indicated below)

1. Farming (livestock keeping) .....
2. Official employment .....
3. Off-farm income generating activities (specify) .....
4. Casual labour and other informal activities .....

1. Tsh <500 000

2. Tsh 500 001 - 1 000 000

3. Tsh 1 000 001 - 2 000 000

4. Tsh 2 000 001 – 3 000 000

5. Tsh 3 000 001 – 4 000 000

6 Tsh < 4 000 0001

9. What type of livestock and for how long have you been keeping? (Indicate appropriate by the ticking in the box below.

	Number of livestock held	Since when started keeping	Number of animals on start	Number held (2008)
Dairy cattle				
Layers				
Broilers				
Dairy goat				
Pigs				
Ducks				
Other (specify)				

10. Which livestock enterprise do you prefer to keep? .....

Give reasons for your preference .....

.....

11. What are the sources of your livestock?

S/N	TYPE OF LIVESTOCK	SOURCE	
		Farm/Ranch	Friend
1	Dairy cattle		
	Pig		
		Local Hatchery	Importation
2	Layers		
3	Broilers		
5	Local chicken		

12. What problems do you face in keeping livestock?

- 1 Unreliable extension livestock service
- 2 Inconsistent markets for products
- 3 Lack of quality feeds
4. Epidemic diseases
4. Costly veterinary drugs
5. Others (specify)

13. Are you a member of any livestock keepers/group or association?

Yes..... No.....

If yes specify it .....

### SECTION B: Specific Information on Provision of Extension Services

14. 14. Since June 2007 to June 2008, how often have you received livestock extension services for your enterprises?

1. Once in a month ☐
2. Once every three months ☐
3. Once in six months ☐
4. Very often ☐

16. Since June 2007 to June 2008, which source did you get the livestock extension services and information? (tick

LEAs	INFORMATION	SERVICE
Public extension agents		
Private extension agents		
Expert farmers		
Input suppliers		
All the above		
Others (specify).....		

17. Since June 2007 to June 2008, which type of private sector did you use to obtain information and services on livestock keeping? Rank them in order of importance

LEAs	INFORMATION	SERVICE
Veterinary clinic centers		
Private paraprofessional's vender		
Input dealers and agrochemical suppliers		
Feed processors		
Hatchery Company		
All the above		

18. In your opinion, who initiates the contacts with LEAs?

- a. Livestock extension agent (LEA) ☐
- b. Yourself ☐
- c. Both LEA and farmer ☐

19. Of the various LEAs, who is likely to attend you when you need livestock extension services/information?

TYPE OF LEAs	INFORMATIO N	SERVICE
LEA from public offices		
LEA from public veterinary clinic center		
LEA from private veterinary clinic center		
LEA from input suppliers		

Others (specify)		
------------------	--	--

20. Since June, 2007 to June, 2008 do you obtain information on livestock keeping from the following sources. Rank them 1= Good; 2=Satisfactory; 3= Poor

S/N	Source of livestock information	Yes	No	Good	satisfactory	Poor
1	Public Livestock extension agent					
2	Private livestock extension agent					
3	Training institutes					
4	Research centres					
5	Farmers cooperative/association					
6	Agricultural shows					
7	Video/cinema					
8	Television					
9	Radio					
10	News paper					
11	leaflets					
12	Participation in training					
13	Farmers' study tour					
14	Progressive farmers					
15	Credit agency					
16	Feed formulation company/dealers					
17	NGOs and CBOs					
18	Government demonstration					
19	Brochures					

### SECTION C: Opinion of respondents on provision of livestock information and services

The purpose of this section is to get respondents' views about information and services that public and private LEAs provided. Please read each statement carefully and tick only one word/phrase in the column that best reflects your opinion; and rank them for 1=Strongly agree; 2=Agree; 3=Moderately agree 4=Disagree; 5=Strongly disagree respectively.

#### 26. Respondents' opinion about information that public LEAs provide.

S/N	Information statement	Strongly agree	Agree	Moderately agree	Disagree	Strongly disagree
	<b>Information on dairy cattle keeping</b>					
1	LEAs explained on how to select breeds of dairy cattle to					

	keep					
2	LEAs explained the importance of keeping dairy cattle records					
3	LEAs explained the importance of vaccinations against FMD, Anthrax, Lumpy skin, ECF etc					
4	LEAs explained on how to control tick borne diseases					
5	LEAs explained on milking and milk hygiene and diseases transmitted through milk					
6	LEAs gave me with information on management of lactating cow feeding, sign parturition and time of mating					
7	LEAs provided me with information on selection of foundation and replacement stock					
8	LEAs provided me with information on dairy housing, different designs of dairy cattle					
9	LEAs explained on how to detect heat and time of mating					
10	LEAs provided information through individual, groups, FFS, farm visit .demonstrations methods, etc					
	<b>Information on poultry production</b>					
1	LEAs explained the importance of vaccinations against NCD, IBD (Gomboro), Fowl pox, typhoid, etc.					
2	LEAs explained on feed supplements, feeding of layers, broilers, and local chicken etc					
3	LEAs explained on different construction designs of layers and broilers houses					
4	LEAs explained the importance of ventilation in poultry houses					
5	LEAs gave me with information on how to control internal and external parasites					
6	LEAs explained the importance biosecurity in poultry farm					
7	LEAs gave me information on stocking density of layers and broiler					

8	LEAs explained the importance of light, air, adequate water, sanitation and quality and quantity of feed in poultry production					
9	LEAs explained to me about importance of keeping poultry records					
10	LEAs provided information through individual, groups, FFS, farm visit .demonstrations etc					
	<b>Information on pig production</b>					
1	LEAs LEAs explained the importance of vaccinations against FMD, Anthrax, African swine fever etc					
2	LEAs gave me with information on external and internal parasites control					
3	LEAs explained the importance of pig records					
4	LEAs explained on how to detect heat and time of mating					
5	LEAs provided me with information on feeding, lactating, weaners, fatteners, etc					
6	LEAs gave me information on a construction designs and types of pig houses					
7	LEAs provided me with information on the importance of iron injection to piglets					
8	LEAs gave me information on stocking density of different classes of pigs					
9	LEAs gave me information on basic requirements for starting a pig farm unit					
10	LEAs provided information through individual, groups, FFS, farm visit demonstrations methods, etc					

**27. Respondents' opinion about information that private LEAs provided.**

S/N	Information statement	Strongly agree	Agree	Modera tely agree	Disagree	Strongly disagree
	<b>Information on dairy cattle keeping</b>					



1	LEAs explained on how to select breeds of dairy cattle to keep					
2	LEAs explained the importance of keeping dairy cattle records					
3	LEAs explained the importance of vaccinations against FMD, Anthrax, Lumpy skin, ECF etc					
4	LEAs explained on how to control tick borne diseases					
5	LEAs explained on milking and milk hygiene and diseases transmitted through milk					
6	LEAs gave me with information on management of lactating cow feeding, sign parturition and time of mating					
7	LEAs provided me with information on selection of foundation and replacement stock					
8	LEAs provided me with information on dairy housing, different designs of dairy cattle					
9	LEAs explained on how to detect heat and time of mating					
10	LEAs provided information through individual, groups, FFS, farm visit .demonstrations methods, etc					
	<b>Information on poultry production</b>					
1	LEAs explained the importance of vaccinations against NCD, IBD (Gomboro), Fowl pox, typhoid, etc.					
2	LEAs explained on feed supplements, feeding of layers, broilers, and local chicken etc					
3	LEAs explained on different construction designs of layers and broilers houses					
4	LEAs explained the importance of ventilation in poultry houses					
5	LEAs gave me with information on how to control internal and external parasites					
6	LEAs explained the importance biosecurity in poultry farm					
7	LEAs gave me information on stocking density of layers and					

	broiler					
8	LEAs explained the importance of light, air, adequate water, sanitation and quality and quantity of feed in poultry production					
9	LEAs explained to me about importance of keeping poultry records					
10	LEAs provided information through individual, groups, FFS, farm visit .demonstrations methods etc					
	<b>Information on pig production</b>					
1	LEAs explained the importance of vaccinations against FMD, Anthrax, African swine fever etc					
2	LEAs gave me with information on external and internal parasites control					
3	LEAs explained the importance of pig records					
4	LEAs explained on how to detect heat and time of mating					
5	LEAs provided me with information on feeding, lactating, weaners, fatteners, etc					
6	LEAs gave me information on a construction designs and types of pig houses					
7	LEAs provided me with information on the importance of iron injection to piglets					
8	LEAs gave me information on stocking density of different classes of pigs					
9	LEAs gave me information on basic requirements for starting a pig farm unit					
10	LEAs provided information through individual, groups, FFS, farm visit .demonstrations methods,etc					

**28. Respondents opinion about services that public LEAs provided.**

	<b>Service on dairy cattle keeping</b>					
1	LEAs performed artificial insemination and pregnancy diagnosis					

2	LEAs did vaccination against FMD, Anthrax, Lumpy skin, ECF etc					
3	LEAs did treatment, castration and dehorning					
4	LEAs performed hand milking and milk hygiene					
5	LEAs showed me a chart which explain heat detection, time of insemination/mating /pregnancy diagnosis					
6	LEAs did selection of replacement stock					
7	LEAs treated dried grass with molasses					
8	LEAs performed home ration formulation					
9	LEAs conducted training on milk processing eg yoghurt					
10	LEAs performed services through individual, groups, FFS, farm visit demonstrations methods etc					
	<b>Services on poultry production</b>					
1	LEAs constructed a brooder for day old chicks (DOC)					
2	LEAs administered vaccines to poultry					
3	LEAs did postmortem					
4	LEAs disinfected room for receiving day old chick					
5	LEAs formulated home ration for local chicken					
6	LEAs did debeaking to layers					
7	LEAs examined good and bad layers					
8	LEAs determined stocking density for different category of chicken					
9	LEAs determined age and weight at marketing					
10	LEAs perfumed exercise on good and bad layers					
	<b>Services on pig production</b>					
1	LEAs did treatment, castration and teeth clipping					
2	LEAs performed heat detection and time of mating					
3	LEAs did selection of replacement stock					
4	LEAs injected iron injection to the piglets					
5	LEAs fed piglets with creep					

	feeding					
6	LEAs provided me a service of handling and transportations of pigs					
7	LEAs performed service on handling and transportations of pig					
8	LEAs showed types of pig records					
9	LEAs drew a plan a pig house lay out and equipments					
10	LEAs determined stocking density for different classes of pig					

**29 .Respondents opinion about services that private LEAs provided.**

	<b>Service on dairy cattle keeping</b>					
1	LEAs performed artificial insemination and pregnancy diagnosis					
2	LEAs did vaccination against FMD, Anthrax, Lumpy skin, ECF etc					
3	LEAs did treatment, castration and dehorning					
4	LEAs performed hand milking					
5	LEAs showed me a chart which explain heat detection, time of insemination/mating /pregnancy diagnosis					
6	LEAs did selection of replacement stock					
7	LEAs treated dried grass with molasses					
8	LEAs performed home ration formulation					
9	LEAs conducted training on milk processing eg yoghurt					
10	LEAs performed services through individual, groups, FFS, farm visit demonstrations methods etc					
	<b>Services on poultry production</b>					
1	LEAs constructed a brooder for day old chicks					
2	LEAs administered vaccines to poultry					
3	LEAs did postmortem					
4	LEAs disinfected room for receiving day old chick					
5	LEAs formulated home ration for local chicken					

6	LEAs did debeaking to layers					
7	LEAs examined good and bad layers					
8	LEAs determined stocking density for different category of chicken					
9	LEAs determined age and weight at marketing					
10	LEAs performed exercise on good and bad layer					
	<b>Services on pig production</b>					
1	LEAs did treatment, castration and teeth clipping					
2	LEAs performed heat detection and time of mating					
3	LEAs did selection of replacement stock					
4	LEAs performed iron injection to the piglets					
5	LEAs fed piglets with creep feeding					
6	LEAs provided me a service of handling and transportations of pigs					
7	LEAs performed exercise on handling and transportations of pig					
8	LEAs showed types of pig records					
9	LEAs drew a plan a pig house lay out and equipments					
10	LEAs determined stocking density for different classes of pig					

In your opinion, what do you think should be done to improve the role of private sector in provision of livestock extension services? (Explain)

.....

### Questionnaire for professionals (LEAs)

#### SECTION D: Information on Private and Public Livestock Extension Agent

1. Respondent number.....

2. Age:

1. 18-35yrs ☐

2. 36-50yrs ☐

3. 51-60yrs ☐

3. Sex:1. Male ☐ 2. Female ☐

4. Marital status:

1. Single ☐ 2. Married ☐ 3. Widowed ☐ 4. ☐ 5. Separated ☐

5. What is the highest professional level that you attained?

1. Certificate ☐ 2. Diploma ☐ 3. Degree ☐ 4. Others (specify) ☐

6. In which year did you start working in this ward.....?

7. Is your training based on

1. Crop ☐ 2. Livestock ☐ 3. Both crop and livestock ☐ 4. Other ☐

(specify)

8. In your opinion by analysis, who initiates the contact process between you and ☐ farmer?

1. Farmer ☐

2. You (LEA) ☐

3. Both farmer and LEAs as per agreed schedule ☐

9 How satisfied are you with the work as a LEA?

1. Very much satisfied ☐ 2. Just satisfied ☐ 3. Unsatisfied ☐ 4. Quite unsatisfactory ☐

If your answer is unsatisfied and quite unsatisfied give reasons.....

.....

10 How do you rank the following extension methods you use to deliver livestock information (rank mostly used, moderate used, least used)

Approaches/methods	Mostly used	Moderate used	Least used
--------------------	-------------	---------------	------------

Individual method  
 Group method  
 Demonstration plot  
 Farm visit  
 Field Farmer School  
 Others (specify)

11. What ways do you use to contact livestock farmers? (Rank: 1.mostly used. 2. Moderate used 3. Least used)

WAYS	RANKING
Scheduled visits and monitoring	
Emergence calls to attend livestock	
During vaccination campaign	
Training on livestock keeping techniques	
Dissemination of research findings	
Implementation of new, improved and modern techniques	
Livestock data management	
Marketing	

### SECTION E: Desire to Learn for Livestock Extension Agent

The purpose of this section is to get information on what extent livestock extension agents desire to learn.

When did you graduate.....,with.....  
 certificate/diploma/degree

12. When did you last go to a research centers/stations, university or training institutes to learn new information on livestock? (State the year)

1. Research station.....2. University      3. Training institutes (LITI).....

13. How often do you read books, papers, newsletters and bulletins about livestock innovations? Indicate frequency: 1.bi-monthly, 2.every month, 3.once in a week

1.Book ☐      2. Pape☐      3.Newsletters ☐ ☐  
 4.Bulletins

14. Do you access livestock information from .Library or Internet? Indicate as appropriate 1.YES and 2. NO

1. Library ☐ 2. Internet ☐

### **Checklist for extension worker**

Checklist questions prepared for officers (public, private LEAs and government officers)

1. What are the problems that you face in the implementation of livestock extension services?
2. What indicator of your work do regard as an achievement?
3. What are the challenges do you face in the process of providing livestock extension services?
4. How do you overcome those challenges?
4. What are the limitations in providing livestock extension services?
5. In your opinion, how can the limitations be defeated?
6. From your experience, do you think that livestock extension services have been fully owned by the local government authority?
7. Do you think that the provision of livestock extension services provided by private LEAs poses a problem to you?
8. What the collaboration between private and private LEAs is there?
9. What limitations do you face with such collaboration?
10. What is the role of private LEAs?
11. What is the role of public LEAs?
12. What are the problems that you encounter under the local government authority when providing information and services to farmers?
13. Do you think that involvement of the private sector in livestock extension services is worthwhile thing?
14. On your opinion, are you satisfied with the services that the private sector offer
15. Is there collaboration between public sector and private sector in provisioning of livestock extension services?

**THANK YOU FOR YOUR ATTENTION**



## Appendix 2: Schedule of activities

[illegible]

Pilot study(questionnaire pre-testing)																			
Data collection																			
Data processing and analysis																			
Dissertation writing																			
Dissertation submission																			

### Appendix 3: .Definition of variables

<b>Variable</b>	<b>Operational definition.</b>
Information	Advisory and educational process in dissemination technologies
Service	Practice that LEAs performed at the farm
Extension	On-farm visits, demonstration and training.
Adoption	Stage in which technology is selected for use
Approach	A way of doing things with somebody or something, a way of doing or thinking about something such as a problem or a table.
Perception	A belief or understand LEAs.
Innovation	Introduction of new technology.
Per-urban	Area connected to urban areas.

#### **Appendix 4: Estimated Livestock Population Dar-es-Salaam Region**

<b>Total Region</b>	<b>Estimated Livestock Population Dar-Es Salaam</b>							
	Cattle	Pigs	Layers	Broilers	Local chicken	Goat	Sheep	Others
Temeke	12799	3020	406707	216219	158000	2737	1064	4144
Kinondoni	20350	6353	319290	186570 0	174263	9692	2163	28
Ilala	9053	4270	634868	230913	195000	2588	136	7706
<b>Total</b>	<b>42202</b>	<b>13643</b>	<b>136086</b> 5	<b>231283</b> 3	<b>527263</b>	<b>15017</b>	<b>3363</b>	<b>11878</b>

#### Appendix 5: Trend Estimated Livestock population Dar es Salaam Region

	<b>Years</b>					
	2003	2004	2005	2006	2007	2008
<b>Temeke</b> Improved dairy cattle	2530	2825	3000	4144	4120	6497

Kinondoni	Indigenous cattle					6302
	Goat	2462	2584	2614	3015	2737
	Sheep	842	1052	1421	1064	1064
	Pigs	1712	1015	2000	2720	3020
	Layers	75568	120909	139045	250281	406707
	Broilers	42787	53484	72203	99640	216219
	Camel				77	80
	Turkey				425	650
	Ducks				1560	2050
	Guinea Fowl				620	670
	Horse				20	25
	Donkey				15	17
	Water buffalo				10	12
	Rabbit					640
	Local Chicken					158000
	<b>Total</b>					<b>804690</b>
	Improved dairy cattle	18500	17820	19600	19860	20350
	Goat	8958	8958	8958	9270	9692
	Sheep	1957	1957	1957	2100	2163
	Pigs	5730	5730	5890	5700	6353
	Broiler	1854960	1876023	1956784	1867900	1865700
	Layers	266040	377508	286700	356700	319290
	Donkey	20	24	24	29	28
	Local chicken					174263
	<b>Total</b>					<b>2397839</b>
Ilala	Improved dairy cattle	6637	7069	7500	7988	9053
	Goat	2037	2139	2241	2353	2588
	Sheep	124	130	136	143	136
	Pigs	2696	2965	3235	3559	4270
	Layers	294734	338944	393175	456083	634868
	Broilers	79654	97178	115642	148021	230913
	Local chicken					195000
	Duck and geese					7144
	Turkey					205
	Guinea Fowl					357
	<b>Total</b>					<b>1084534</b>
	<b>Grand total</b>					<b>4287063</b>