INSTITUTIONAL CHALLENGES IN MANAGING URBAN LIVESTOCK KEEPING IN TANZANIA: A CASE OF BYLAWS IN DODOMA CITY AND MOROGORO MUNICIPAL COUNCIL

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A THESIS SUBMITTED IN FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY (GEOGRAPHY) OF THE OPEN UNIVERSITY OF TANZANIA

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CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by The Open University of Tanzania a Thesis entitled: **"Institutional Challenges in Managing Urban Livestock Keeping in Tanzania: A Case of Bylaws in Dodoma City and Morogoro Municipal Council"**, in fulfilment of the requirements for the Degree of Doctor of Philosophy (Geography) of The Open University of Tanzania.

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Date

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DECLARATION

I, **Rehema Tiberio Mdendemi**, do hereby declare to the Senate of the Open University of Tanzania that this thesis for the degree of Doctor of Philosophy (Geography) is my

own original work and it has not been submitted and will not be presented to any other university or any other institution of higher learning for a similar award.

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Signature

……

Date

DEDICATION

This thesis is dedicated to my father the late Ernest Lumuliko Kavavila and my mother Atwanukye Kihupi, who, under very difficult economic situation, saw the importance of educating their last born girl. To my husband Tiberio, and my daughters - Praise and

Glory who tirelessly prayed and encouraged me to continue even when the odds against success seemed high.

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ABSTRACT

Urban livestock keeping in Tanzania is an important livelihood activity of urban dwellers, but its management poses a formidable challenge. Although there are urban livestock keeping bylaws, they are not effectively enforced leading to environmental pollution and conflict. This study was conducted in Dodoma City Council and Morogoro Municipal Council to assess the challenges of institutional framework for addressing urban livestock keeping in Tanzania with reference to bylaws. Purposive and probability sampling in the selection of study wards and respondents were used. A Theoretical framework was based on Institutional Theory. The study assessed people's awareness of bylaws, use of bylaws in resolving conflict, livestock keeping systems, effects of urban livestock keeping on the environment and, staff regulative capacity in enforcing bylaws for sustainable urban livestock keeping. The findings have shown that there is low awareness of bylaws; awareness has strong association with extension visits, number of extension staff, education level, age, and gender; bylaws are not effectively used for conflict resolution because of inadequate community participation; urban livestock keepers practiced inappropriate livestock keeping systems and, extension staffs are generally ineffective. The study recommends: first, to strengthen institutional coordination; second, to institute a participatory development committee; and third, to make urban livestock keeping part and parcel of LGAs' land use-plans.

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LIST OF ABBREVIATIONS AND ACRONOMYS

AU	African Union
CBO	Community Based Organization
CDA	Capital Development Authority
DFID	Department for International Development
DMC	Dodoma Municipal Council
DMLO	Dodoma Municipal Livestock Officer
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
GFRAS	Global Forum for Rural Advisory Services
GMU	George Mason University
IRDP	Institute of Rural Development Planning
MEO	*Mtaa* Executive Officer
LGA	Local Government Authority
LDO	Livestock Development Officer
MLDO	Municipal Livestock Development Officer
MMLO	Morogoro Municipal Livestock Office
NGO	Non Governmental Organization
PORALG	President's Office, Regional Administration and Local Government
SUA	Sokoine University of Agriculture
SWOT	Strengths, Weaknesses, Opportunities, Threats
UDPs	Urban Development Planners
ULK	Urban Livestock Keeping
VEO	Village Executive Officer

URT	United Republic of Tanzania
WACOT	Western African Cotton Company
WDC	Ward Development Committee
WEO	Ward Executive Officer

CHAPTER ONE

INTRODUCTION

1.1 Background to the Research Problem

It is believed that urban livestock keeping is one of the oldest and worldwide phenomena that have historically characterized development of cities (Thys et al. 2006). Urban agriculture is estimated to engage more than 800 million urban dwellers worldwide (FAO, 2007). In developing countries, urban livestock keeping is important in addressing food security, income and employment to urban livestock keepers (Scierre and Hoek, 2001).In Latin American countries 50% of urban dwellers are engaged in urban agriculture while in Africa, about 40% of urban dwellers are engaged in some sort of agricultural activities. More than 35% of urban dwellers in sub-Saharan Africa are involved in urban agriculture (Prain and Smith, 2010; Beall and Fox, 2007).

According to the descriptive analysis of the 2009 Tanzania National Panel Survey,23% of all urban households are involved in livestock production which contributes to 14% of their income (Covarrubias et al. 2012). The Dodoma City report (2015) showed that 960 households were engaged in urban livestock keeping, while the 2017 Morogoro Municipal Livestock report shows that there were 1,721 households that were involved in livestock keeping.

Despite its old age, urban livestock keeping and urban farming in general, has remained without official status in many countries (Schiere et al. 2006). It is only recently that it has started to attract special attention amongst development practitioners such as donors, researchers and development organisations aiming to support its management

for efficient contribution to poverty alleviation efforts and urban food security (Ayaga et al. 2005).

Urban livestock keeping is, however, associated with negative effects such as environmental pollution; invasion and damage of gardens, fences, lawns and ornamental plants, andspread of diseases making it generally undesirable activity under urban realities (Mlozi *et al.* 2012; Gaynor, 2007; Fuller, 2003). In view of its negative environmental consequences, some urban authorities prohibit keeping of certain animal types that are considered to pose significant risk to health and nuisance (Butler, 2012).

It is now clear that sustainable urban livestock keeping in developing countries cannot be achieved if there is no strong institutional framework for its management and control (FAO, 2008: Silard, 2011; Wapwera, *et al.* 2015). Such institutions are expected to support and regulate urban livestock keeping as one of livelihood strategies within the Global Sustainable Development Goals 1, 2, 3, 12 and 13 that require countries to end poverty in all its forms everywhere; end hunger, achieve food security and improved nutrition, ensure healthy lives and well-being for all at all ages and, ensure sustainable consumption and production patterns respectively.

Currently, there is sufficient knowledge of the constraints related to production, marketing, service provision, research and technology transfer; policy and institutional considerations underlying these constraints as far as urban livestock keeping is concerned although, there are still limited efforts taken to address the same (AU, 2004). Subsequently, there have been specific guidance on urban livestock keeping but has often been violated. According to FAO (Steinfeld, et al., 2006), livestock activities have

generally been of significant environmental impact causing serious problems such as land degradation, global warming and climate changes, air and water pollution, water shortage and loss of biodiversity. The environmental pollution related to urban livestock keeping namely; damage of gardens, fences, lawns and ornamental plants; bad odour; noise; dust; waste heaps with consequent spread of diseases and conflict (Mlozi *et al.*, 2012; Gaynor, 2007; Fuller, 2003) call for efficient control mechanism to address them. Adinna, (2003) has observed that one significant aspect of pollution impact is the disturbance of social harmony and a situation of unfriendly relationships among the people, which often result in serious misunderstanding, politics of suspicion, acrimony, and even direct quarrels, within communities when there is limited action to prevent careless handling of environmental pollutants.

The significance of bylaws as subsidiary laws that are enacted by the local governments to maintain consistency through reduction of disputes and conflict triggered by environmental pollution remains paramount (Nkonya, *et al.,* 2008; Alinon, K. and Kalinganire, A. 2008). Bylaws are key tools in development administration, and most municipal councils establish them to guide urban livestock keeping.

In many developing countries, there is generally non-compliance to environmental regulation for various reasons such as weak enforcement, diversity of farming systems, lack of awareness and unwillingness (FAO, 2006, Ijaiya and Joseph, 2014). In Zimbabwe, it was found that poor implementation of environmental legislation was attributed to inadequate environmental education, lack of environmental awareness programmes, inconsistency in implementing environmental legislation, weak

coordination of all stakeholders, unwillingness of communities to co-operate and lack of political will by political office bearers (Mukwindidza, 2008).

Implementation of municipal bylaws has equally fallen short of expectations in many developing countries. Studies have found that to a large extent, most of these bylaws are not implemented (Shetty *et al.,* 2017; Mwajombe, 2012). The reasons given for not enforcing the bylaws have been varied, including lack of well defined responsibilities for their enforcement and inadequate local participation in their preparation (Ajayi. O.C. 1 and Kwesiga F. 2003; Nkonya, et al., 2008).

The need for effective institutional framework and adequate capacity for proper management of the livestock sector in Tanzania is echoed in the Tanzania Livestock Development Programme (URT, 2011) and Tanzania National Livestock Policy (URT, 2006). In these official documents, the roles and responsibilities of various stakeholders are clearly stated, but issues related to institutional framework and capacity for effective implementation of the policy remain pending.

Mlozi (2003) observes that although municipal councils in Tanzania have bylaws, those bylaws are not only incomprehensive, but are also rarely implemented. This study was conducted with a view to assess the institutional challenges of urban livestock keeping with a focus on bylaws in Dodoma City and Morogoro Municipal Council.

1.2 Statement of the Research Problem

According to FAO (2006), livestock production is one of the major causes of the world's most pressing environmental problems, including global warming, land degradation, air and water pollution, and loss of biodiversity. Such environmental problems particularly

in urban areas often lead to conflicts (Lupala and Lupala, 2003; Mlozi et al., 2012). Consequently, there are bylaws regulating both crop cultivation and livestock keeping in all Tanzanian towns and municipalities (Mwajombe, 2012).

The institutional theory postulates that when certain processes including bylaws, rules, norms, and routines, become established as authoritative guidelines for social behavior there will be harmonious living (Scott, 2001). This entails that in order to survive; organizations must conform to those bylaws, rules, norms, and routines prevailing in the environment (Scott, 1995). From this theoretical point of view, therefore, it was expected that urban livestock keeping communities, would conform to the existing bylaws on urban livestock keeping. Such conformity could avoid conflict among communities and keep environment free from pollution.

While there are by-laws on urban livestock keeping; environmental pollution, damage of structures, nuisance, social conflict and health hazards related to urban livestock keeping remain inadequately addressed (Steinfeld et al., 2006; Smit et al, 2001). According to FAO (2006), livestock production is one of the major causes of the world's most pressing environmental problems, including global warming, land degradation, air and water pollution, and loss of biodiversity. The environmental, healthy, nuisance and destructive consequences of urban livestock keeping often lead to conflicts (Lupala and Lupala, 2003; Mlozi *et al.*, 2012).

Despite the fact that Dodoma City and Morogoro municipality recognize and acknowledge the presence of urban livestock keeping of broad types of animals, and have bylaws to control and regulate it, these bylaws are practically not adhered to by the majority of urban farmers (Mwajombe, 2012).

There has been limited information as to why the bylaws on urban livestock keeping are not adequately implemented. This study assessed the impending challenges related to the implementation of bylaws, in addressing environmental pollution and social conflict caused by urban livestock keeping in Dodoma City and Morogoro Municipality.

1.3 Justification of the Study

This study aimed at contributing to the body of knowledge in the existing literature by providing empirical findings on the institutional challenges in managing ULK in Tanzania; informing policy makers on which type of livestock causes what type of environmental pollution and conflict and, exploring the main determinants of awareness of bylaws as driving factors for attention in designing policies on ULK.

1.4 Research Objectives

1.4.1 General Objective

The general objective of this study was to assess the institutional challenges of urban livestock keeping in Tanzania.

1.4.2 Specific Objectives

The specific objectives were to:

(i) Examine community awareness on existingbylaws that help to control environmental pollution resulting from urban livestock keeping in the study areas;

(ii) Examine how by-laws coupled with urban livestock management help to resolve conflicts resulting from urban livestock keeping in the study areas.

(iii) Identify the urban livestock keeping systems practiced by livestock keepersin the study areas;

(iv) Examine the effects of livestock keeping on the environment in the study areas.

1.5 Research Questions

The following specific research questions were used to guide the study:

(i) How is the community in the study areas aware of bylaws on urban livestock keeping?

(ii) How are bylaws coupled with urban livestock management resolving conflicts resulting from urban livestock keeping in the study areas?

(iii) Which urban livestock keeping systems are practiced by livestock keepersin the study areas?

(iv) What are the environmental effects of urban livestock keeping in the study areas?

1.6 Significance of the Study

The study on institutional challenges for urban livestock keeping sought to assess how bylaws were applied by livestock keepers to ensure environmental quality in a bid to achieve food security and poverty reduction in a sustainable manner. The basic argument was that with relevant supportive bylaws, coupled with proper enforcement, a sustainable urban livestock keeping for poverty eradication in line with the Global agenda on Sustainable Development Goals could be achieved.

The findings from this study provide additional knowledge on the current literature on urban livestock keeping in terms of challenges confronted in the use of bylaws for its sustainable management. Special to this study is the disaggregation of the

environmental effects of urban livestock keeping by identifying which type of livestock is likely to cause what type of environmental pollution and their relevant measures.

The findings of this study are also useful to local government authorities and collaborating partners in deploying effective mechanisms that can ensure urban livestock-based livelihoods are carried out with minimal environmental pollution through compliance with the existing bylaws. Based on the identified challenges of the urban livestock keeping, urban authorities are in a better position to come up with more relevant measures for improved preparation and implementation of bylaws on urban livestock keeping. Local leaders and extension officers will find this study enlightening on key considerations for ensuring effective enforcement of bylaws on urban livestock keeping.

1.7 Scope of the Study

In assessing the current institutional challenges for urban livestock keeping, an examination on how the formal and informal policies, laws, regulations and bylaws are implemented by various actors to prevent environmental pollution and social conflicts could have been imperative. This study, however, focused on one city (Dodoma) and one municipality (Morogoro); as well as one component of institutions namely, the bylaws. An attempt was made to examine the extent to which respondents were familiar with the bylaws, how the bylaws helped them to resolve conflicts arising from urban livestock keeping, how the local leaders and staff (namely, livestock officers, environmental officers, health staff and urban planners) were enforcing the bylaws and, the nature of livestock keeping systems used by livestock keepers (considered in terms

of zero grazing, semi–free range and the free range system) and their implications on environmental pollution.

The choice of only two urban centres and one variable of study (bylaws) cannot be claimed as representative of the urban livestock keeping circumstances found in urbanized areas of Tanzania. Each of the urban centres has its own unique characteristics, and each of the institutional categories can generate different results. Nevertheless, in view of the exploratory nature of this study, the findings generated from the two urban centres provided important insights of the issues that deserve general policy consideration.

The environmental pollution variables resulting from ULK that this study worked on were also limited to: waste heaps, noise, odour, dust and destruction of plants. The study did not address other environmental pollution factors such as damage of infrastructures and health hazards.

1.8 Limitations of the Study

The household questionnaire was relatively too long with many variables to keep the respondents active up to the end. It demanded substantial time to be spent with a single respondent, making the exercise tiresome. It was necessary to establish strong interpersonal and motivational skills to keep the interview interesting. Also some of the respondents were sceptical to some of the questions asked to them for fear of being subjected to disciplinary measures by the Government. This might have affected the research findings in case the respondents gave the answers just to impress the researcher. The researcher however worked hard to win the confidence of the

respondents by clarifying the purpose of the research and assuring them of confidentiality.

1.9 Organization of the Thesis

This thesis is organized into five chapters. Chapter one introduces the study by presenting the background to the research, statement of the problem, objectives of the study, research questions, significance of the study, and scope of the study. Chapter two presents a review of the literature related to conceptual definitions and theoretical framework in which a detailed discussion is based on various related theories to urban livestock keeping. The chapter presents five theories namely; an organisation theory, the theory of planned behaviour, the theory of public enforcement of law, the theory of value-beliefs norms and finally, an institutional theory. The institutional theory is the one, which gives the basis upon which the study objectives are derived based on its special relevance to bylaws. Subsequently, the chapter presents the empirical analysis of relevant studies related to the specific objectives of the study that reflect on what is already known and what is unknown as the basis of this study. The chapter ends up by presenting the conceptual framework of the study that identifies key variables for sustainable urban livestock keeping. Chapter three presents a description of the methodology of the study: it covers the study area, sampling procedures, data collection methods and data analysis procedures.

Chapter four is about the findings and discussions of the study. The chapter presents an overview of respondents' characteristics and examines peoples' awareness of bylaws, the use of bylaws coupled with the extension staff in resolving conflict, environmental

effects of urban livestock keeping and livestock keeping systems practiced in the area. Finally, chapter five gives the summary, conclusions and recommendations of the main findings for addressing the identified challenges in fostering sustainable urban livestock keeping in Tanzania.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

The literature review presented in this chapter is largely based on the concept of institutions and urban livestock keeping. Much of the chapter is devoted to describing institutions and their main facets under the institutional theory. It also presents the empirical studies regarding institutions for urban livestock keeping and winds up by identifying the research gap, which this study has attempted to bridge.

2.2 Conceptual Definitions

2.2.1 Institution

According to Keizer (2007), an institution is a set of interrelated rules to govern human behavior. These rules are categorized as habits, routines, and customs and legal structure that frame the behaviour of particular functions in society. This definition was relevant to this study, which sought to understand how the behaviour of urban livestock keepers was being made compatible with the realities of the urban dynamics.

The understanding of institutions is derived from a number of perspectives. The Durkheim an tradition sees institutions as 'public rules of action and thought' in a society where individuals abdicate their independence in the name of the collective under the guidance of tradition (Lincoln and Guillot, 2004). Searle (2010) adds a dimension of systems of constitutive rules, and asserts that certain status or position in society is dictated by the systems of constitutive rules existing within the society. These rules regulate what is done and create the pattern of societal behaviour. Human institutional reality is created and maintained in existence by representational

institutions, through legalistic uttering (Pina-Cabral, 2011). In the economists' thinking (for example, Aoki, 2005) institutions are more than codified laws, fiats, organizations and other deliberate human devices which are designed to improve performance of world economies.

2.2.2 Institutional Challenges

In the context of this study, institutional challenges are barriers, inadequacies, shortcomings or even hindrances to the functioning of the established bylaws. Such institutional challenges that need to be addressed in order to allow smooth functioning of the institutions (bylaws) include: poor community awareness of the existing urban bylaws caused by weak community involvement in their preparation, use of improper livestock keeping systems, ineffective management of urban livestock keeping due to shortage of staff and limited skills, environmental pollution and social conflict.

2.2.3 Institutional Framework

An institutional framework is a coherent set of rules that shape and restrict human behavior. It is a system comprising of formal laws, regulations, and procedures, and other informal conventions, customs and norms that broaden, mould and restrain socio-economic activity and behaviour (Donnellan, 2012). In this study institutional framework is defined as a system that ensures effective flow of information from bylaws enforcers to the community; a basis upon which the bylaws are enforced for efficient management of urban livestock keeping.

2.2.4 Urban Livestock Keeping

According to Schiere *et al.* (2006), urban livestock keeping refers to keeping of animals and birds in urban areas for economic, cultural or religions meaning. Guendel (2002)

views urban livestock keeping as serving different livelihood strategies such as food security, income and employment generation, saving and insurance and, social status; as well as providing easily convertible assets for covering important household expenditure.

2.2.5 Sustainable Urban Livestock Keeping

Sustainable urban livestock keeping can be defined in the light of sustainable agriculture according to two levels perspective as put forward by Foeken, *et al*. (2014), the household and town level. At household level, sustainability refers to the concept of sustainable livelihood – adequate for the satisfaction of self defined needs, particularly provision of food and income in order to maintain a certain standard of living. At the town level, sustainable urban livestock keeping is largely related to environmental consequences of the practice. In this study, urban livestock keeping is considered sustainable if it does not result into negative consequences upon the environment and the people.

2.3 Theoretical Framework

This section reviewed various theories in an attempt to explain how the current institutional challenges of urban livestock keeping emerge, and the possible ways of addressing them. Grant and Osanloo (2014) place special importance on the theoretical framework as a grounding base and the foundation upon which all knowledge is constructed for a research study. Similarly, Ravitch and Carl (2016) consider theoretical frameworks crucial in assisting researchers in situating and contextualizing formal theories into their studies in positioning studies in scholarly and academic fashion. The theoretical framework also guides the kind of data to be accrued for a particular study

(Lester, 2005); and aids in finding an appropriate research approach, analytical tools and procedures for research inquiry and making research findings more meaningful and generalizable (Imenda 2014; Akintoye, 2015).

This section, therefore, offers important insights on the current study by showing how the study is defined philosophically, epistemologically, methodologically and analytically. It provides an understanding of theories that are relevant to institutional challenges in managing urban livestock keeping in Tanzania. There are various theories that could model the problem under investigation. These include Organizational theory, the theory of planned behaviour (TPB), the theory of the public enforcement of law; the Theory of Values-Beliefs-Norms and, the Institutional Theory. The institutional theory is considered an overriding theory to this study as it mirrors very well the aspects of the other theories discussed in the subsequent sections. Although all these theories are traditionally concerned with how groups and organizations better secure their positions and legitimacy by conforming to the rules and norms of the institutional environment, their internal workings and approach to the subject differ. We briefly explain each theory in terms of its genesis and how it relates to the current study.

2.3.1 Organizational Theory

The Organizational theory studies organizations or group of people who collectively undertake certain actions to identify how they solve problems and how they maximize efficiency and productivity. There are several theories, which explain the organization and its structure.

The scientific management approach is based on the concept of planning of work to achieve efficiency, standardization, specialization and simplification. The approach to increased productivity is through mutual trust between management and workers. Taylor (1947) proposed four principles of scientific management: (i) science, not rule-of-thumb; (ii) scientific selection of the worker; (iii) management and labour cooperation rather than conflict; and (iv), scientific training of workers. The Weber's bureaucratic approach considers the organization as a part of broader society.

The organization is based on the principles of: structure; specialization; predictability and stability; rationality; and democracy (Prasad. *et. al.,* 2004). Under Organizational theory the Weber's bureaucratic approach is considered rigid, impersonal, self-perpetuating and empire building. The Administrative Theory was propounded by Henry Fayol and is based on several principles of management (Fayol, H. (1949). In addition, management was considered as a set of planning, organizing, and training, commanding and coordinating functions.

The organizational theory studies organizations to identify the patterns and structures they use to solve problems, maximize efficiency and productivity, and meet the expectations of stakeholders. Organizational theory then uses these patterns to formulate normative theories of how organizations function best. Therefore, in the context of this study, the organizational theory can be used in identifying the best ways to run the City and the Municipality or, identify more relevant institutions that can successfully manage urban livestock keeping. While the main focus of the theory is to improve productivity at organizational level, the dynamics and strategies involved in

urban livestock keeping are mostly individual in nature – making the organizational theory less potent in this study.

2.3.2 The Theory of Planned Behavior (TPB)

The Theory of Planned Behaviour (TPB) has been applied to a wide range of behaviors in order to better understand which individuals behave in which way. It is one of the best-supported social psychological theories with respect to predicting human behavior. The central premise is that behavioural decisions are the result of a reasoned process in which the behavior is influenced by attitudes, norms and perceived behavior control (Smith et al., 2007). According to Sheeran (2002), people do what they intend to do and do not do what they do not intend. The TPB is an extension of the theory of reasoned action (Fishbein and Ajzen, 1975).

The Theory of Planned Behaviour (TPB) predicts an individual's intention to engage in certain behaviour. It postulates that performance or non-performance of behaviour is a function of salient information, or beliefs relevant to the behaviouras they are linked to a positive or negative outcome (Ejzen and Driver, 1991). Attitude towards the behaviour is thus a measure of the degree to which the person has a favourable or unfavourable evaluation of the behaviour in question; such as perceived social pressure from others to act or not to act. The perceived ease or difficulty of performing the behaviour determines the intention to act or not. The stronger intention a person has, the more likely it is for the behaviour to be adopted (Ajzen, 1991).

TPB can be applied to urban livestock keeping explaining why livestock keepers don't conform to the existing orders on urban livestock keeping. That people can only act

when they are aware, capable or perceive positive results from the intended action. This means, their behaviour is influenced to change through raising of their awareness (normative beliefs). Figure 1 represents the basic TPB model.

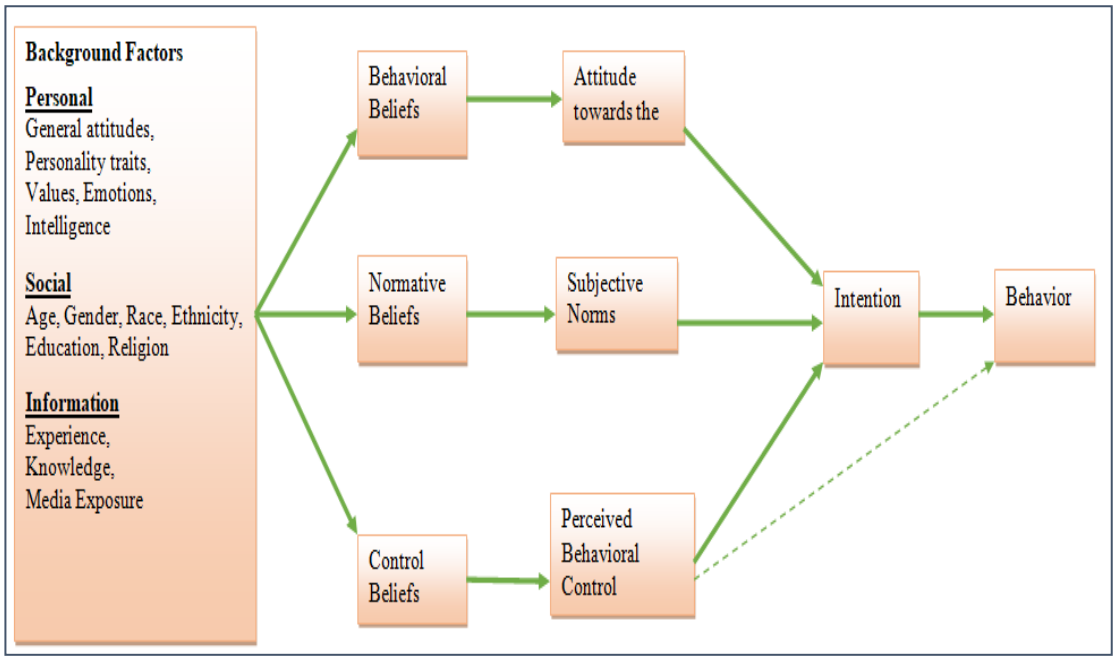

Figure 2.1: Theory of Planned Behaviour
Source: Ajzen (2005)

TPB does consider normative influences (beliefs, norms, and attitudes), which create intention to behavioural change. The theory doesn't say anything about actual control over behavior, and does not take into account environmental factors of which urban livestock keepers are subjected to; making it less potent to this study which largely focuses on regulative capacity of the relevant institutions (bylaws).

2.3.3 The Theory of the Public Enforcement of Law

The earliest economically-oriented writing on the subject of law enforcement dates from the eighteenth century, and has subsequently been improved by various contributors (Polinsky and Shavell 2000). Public enforcement of law (the use of governmental agents to detect and to sanction violators of legal rules) is a subject of

obvious importance. Police and prosecutors endeavour to solve crimes and to punish criminals, regulators attempt to control violations of environmental, safety, consumer protection, and financial disclosure laws, and agents of the Internal Revenue Service seek to enforce the tax code.

According to Polinsky and Shavell (2000), the state has four major policy choices to make in undertaking law enforcement. One is about the sanctioning rule. The rule could be *strict* in the sense that a party is sanctioned whenever he has been found to have caused harm (or expected harm). Alternatively, the rule could be *fault-based*, meaning that a party who has been found to have caused harm is sanctioned only if he failed to obey some standard of behaviour or regulatory requirement. A second choice of the state concerns the form of the sanction: monetary versus nonmonetary (both may be employed together). Here, imprisonment is considered the primary type of non-monetary sanction and monetary sanctions are socially less costly to employ than imprisonment. A third choice involves the magnitude of the sanction. And the fourth choice concerns the probability of detecting offenders and imposing sanctions. This probability depends on the public resources devoted to finding violators and proving that they are liable. An individual who would obtain a gain from committing a harmful act will commit the act if and only if his expected utility from doing so, taking into account the gain and the chance of his being caught and sanctioned, exceeds his utility if he does not commit the act.

Consider that individuals would obtain a gain from committing a harmful act, where the gain varies among them. If an individual does commit the act, he will have to pay a fine because he is strictly liable.

Let

g = gain an individual obtains if he commits the harmful act;

$z(g)$ = density of gains among individuals;

h = harm caused by an individual if he commits the harmful act;5

f = fine; and

w = level of wealth of an individual.

An individual will commit the harmful act if and only if his gain from doing so exceeds the fine: $g > f$.

The general problem of public law enforcement may be viewed as one of maximizing social welfare - the benefits that individuals obtain from their behavior, less the costs that they incur to avoid causing harm - the cost of catching violators, and the costs of imposing sanctions on them.

The theory of public enforcement of law which applies to governmental agents particularly the police and prosecutors who detect and sanction violators of public legal rules to solve crimes and to punish criminals, has limited applicability to urban livestock keeping which is legally accepted and supported by the government through extension services for its perceived benefits. The violation made within the sphere of legal acceptance would require an alternative theory best suited to such environment.

2.3.4 The Theory of Values-Beliefs-Norms

According to Stern (2000), the values-beliefs-norms (VBN) is considered the best in explaining ecological behaviours such as ecological citizenship, political support and

behaviours adhering to the private sphere. The VBN theory is principally founded on Schwartz's 1977 theory of Norms Activation (Onwezen *et al.,* 2013) The latter was one among the early theories of social psychology used to explain the environmental behaviour under the theory of altruistic behaviour.

The altruistic model is adopted if it corresponds to the individual's moral norms and has positive consequences on the others and if the individual takes the responsibility of the aftermath of the behaviour. It is the personal norms, which play a central role within the framework of the theory of Norms Activation. The individual adopts altruistic behaviours out of a feeling of moral obligation. Furthermore, the personal norms are determined by the individual's awareness of the positive consequences of the resulting acts and responsibilities. These two variables directly affect the behaviour.

Schwartz insists that norms activation is more likely when the actor has two types of beliefs. First, he is aware of the consequences of his act towards the subject of norm; second, he feels responsible for causing or preventing these consequences

The model of the norm activation has proved its efficacy for various studies such as the important change in environmental attitudes (Heberlein, 1972), the emergence of an environmental ethic (Vandenbergh, 2005).The VBN theory can equally explain the institutional challenges in managing urban livestock keeping in Tanzania by addressing the livestock keepers' values, beliefs and norms to conform to stipulated bylaws on urban livestock keeping. While majority of people may be aware of the positive results of keeping the environment clean and are unhappy to have stinking heaps of livestock

waste, livestock keepers may not think they have the obligation to keep respective urban areas clean if there is weak enforcement of the bylaws.

The theory of VBN provides good explanation on how informal institutions can best work. Its general applicability to this study is, however, limited by its inability to capture the regulative nature of the bylaws whose enforcement mechanisms are tangible.

2.3.5 Institutional Theory

The focus of institutional theory is on an understanding of situations such as those depicted in Rachel Carson's quote:

> *Why should we tolerate a diet of weak poisons, a home in insipid surroundings, a circle of acquaintances who are not quite our enemies, the noise of motors with just enough relief to prevent insanity? Who would want to live in a world, which is just not quite fatal?* (Carson, 1962).

One area in which these phenomena are notably pronounced is research in the area of the interaction between institutional systems and the workings of the natural environment; the ways in which human societies both understand their interface with that environment, and the ways in which the actions of one impact the other.

The Institutional Theory provides a theoretical lens through which researchers can identify and examine influences that promote survival and legitimacy of organizational practices, including factors such as culture, social environment, regulation (including

the legal environment), tradition and history, as well as economic incentives, whilst acknowledging that resources are also important (Baumol et al., 2009; Hirsch, 1975).

The theory considers the processes by which structures, including bylaws, schemes; rules, norms, and routines, become established as authoritative guidelines for social behavior (Scott, 2001). The theory is traditionally concerned with how groups and organizations better secure their positions and legitimacy by conforming to the rules (such as regulatory structures, governmental agencies, laws, courts, professions, and scripts and other societal and cultural practices that exert conformance pressures) and norms of the institutional environment. The theory can be used to explain how changes in social values, technological advancements, and regulations affect decisions regarding 'green' sustainable activities and environmental management (Rivera, 2004)
In order to survive, organizations must conform to bylaws, rules, norms, and routines prevailing in the environment

The theoretical framework for this study was, therefore, based on the institutional theory as applied in the management of change (Palthe, 2014; Scott, 2014) and identifies three pillars of institutions namely regulative, normative and cultural-cognitive elements that bring meaning to social life.

The regulative element is concerned with the processes that regulate peoples' actions and behaviour such as rule setting, monitoring and sanctioning activities. People comply with this through expediency and enforcing body particularly, the state through laws, bylaws rules and sanctions.

The normative element emphasizes norms and values of the existing social and psychological processes in altering behaviour, with norms specifying how things should be done, and values being the conceptions of the preferred or desirable, together with the construction of standards to which existing structures or behaviours can be compared and assessed. Actors, comply due to a feeling of social obligation and the accompanying social expectations.

The cultural-cognitive element puts much weight to aspects of cognitivism whereby how an individual responds to stimuli from the environment is governed by how the individual uses internal symbolic representations of the world to assign meaning to both external objects and events and to behaviour. These internal symbolic systems are heavily influenced by culture and shared understanding (Rooij, 2012).

Since the Institutional theory has tangible rules, laws and regulations as formalized guidelines and seeks to understand how people comply through expediency and enforcing body - particularly the state; it is well suited to this study as compared to the other theories discussed above.

From a theoretical point of view, it was expected that urban livestock keeping communities would comply with the exiting bylaws on urban livestock keeping. If they didn't, the state would enforce compliance through coercive measures to ensure conformity so as to avoid conflict among the community members while keeping the environment free from pollution. The regulative capacity of institutional staff, leaders and other stakeholders in enforcing by-laws for urban livestock keeping constitutes a major focus of this study.

2.4 Empirical Analysis of Relevant Studies

2.4.1 Institutions for Managing Pollution and Resolving Conflicts

Institutions are the rules of the game in any society, and are the fundamental cause of socio-economic development of any country (Acemoglu and Robinson, 2008). They are considered to be instrumental in governing access to resources and in how people interact and transact with each other (Sandford and Ashley, 2008).

The development of modern society is unlikely if there are no strong and functioning institutions as basis for socio –economic transformation. The empirical results of the study by Alexiou *et al.* (2014) on "Institutional quality and economic growth in Sudanese economy" indicate that the institutional quality environment is one of the most important factors in defining economic prosperity.

Based on established empirical studies in urban livestock keeping and its resultant consequences, Fuller (2003) identifies issues of environment and pollution, health and diseases, and social problems such as traffic hazards, odour, noise, dirt, and disruption as being caused by five main categories of constraints of which, the institutional constraints are more glaring. Other constraints are socio-cultural biases, poor access to inputs, poor resources and services, constraints of postproduction, especially marketing and processing, organizational constraints, and risks related to farming in the city.

Uddin *et al.* (2010), found that in Bangladesh the institutions were weak, resulting into inefficient services support, poor institutional linkage, poor communication and, poor cooperation and hence, there was effective artificial insemination. They ascribed to the public sector (Department of livestock services and District artificial insemination

centres) the mandate for developing infrastructure, linking different organizations, formulating policies and providing guidelines and, in identifying the private sector, cooperatives and farmer organizations, which were currently not well established.

Bozoglu et al. (2016) conducted a study on the Factors Affecting Students' Environmental Awareness, Attitudes and Behaviors in Ondokuz Mayis University, Turkey. He found that socio-economic and demographic variables namely gender, age, mother education, father education, residence and family income were statistically significant in the formation and growth of environmental awareness among the students.

Recently, there has been a growing concern over the apparent inadequacy of institutional framework for urban livestock keeping in most African countries (Richards and Godfrey, 2003). While it has been well acknowledged that urban livestock keeping is on the increase, there have virtually been no institutions of the poor urban livestock keepers, making urban livestock keeping largely remain out of the mainstream and out of legal framework that supports it (Cabannes, 2012).

Mowo *et al*. (2016) conducted a study on bylaws formulation and enforcement in natural resource management, which aimed at finding opportunities of making natural resources management bylaws more effective in Ethiopia, Tanzania and Uganda. The study found that inadequate community participation in the process of bylaws formulation and enforcement is the main reason for the ineffectiveness of most natural resources management bylaws in the three countries. It was observed that when local communities initiated their own mechanisms for enforcing by-laws they were always successful in addressing natural resources management problems confronting them.

The main conclusion drawn from this study was that bylaws formulation should be based on perceived problems, a common agenda by all involved and a succinct process for identification of the real issues to be addressed; and to ensure all involved understand the problem, the available strategies and how to address it.

Sabiiti *et al*. (2014), noted that formalization of urban agriculture and particularly livestock keeping, in terms of institutional and policy recognition, had been received only recently in few cities such as Kampala and Nakuru, where ordinances governing urban agriculture were put in place He observed a need for coordination and cooperation among the institutions involved in urban livestock keeping for managing pollution. This is supported by Silard (2011) who asserts that for effective performance of institutions, which have almost overlapping objectives, there is a need for close cooperation and procedures on their operational relationship with the understanding that each institution can promote its purposes more effectively if the purposes of other institutions are equally promoted.

Social conflicts are believed to be part of everyday life in our close relations and at a societal level, and are often a steppingstone to change, so long as they are properly handled to prevent aggression, hostility and war (Vestergaard, *et al.* 2011). In the context of livestock keeping, there are socio-economic and political reasons of their occurrence. A study by Benjaminsen, *et al.* (2009) found that poor governance and corruption and the general failure of political leadership through divisive tactics to win local election were the major sources of conflict between farmers and herders in Kilosa that culminated into killings. So, institutional governance stands as another factor that can explain success or failure of enforcement of the laid bylaws.

A cross- sectional survey conducted by Kushoka (2011) to assess how the newly introduced village land-use plans were helpful in resolving land-use conflicts between farmers and pastoralists in Mvomero District found that pastoralists were reluctant in obeying land laws and continued to feed their cattle on crops. When sued, they bribed the local leaders such that cases were not being processed for further litigation. Despite the presence of land-use plan to guide smooth running of livestock keeping and agricultural activities, cattle were still feeding around farms and continued damaging the crops. The identified four conflict resolution institutions were VEOs, Police Force, Farmer-pastoralists committee and Village Land Committee. Majority of the farmers were reporting their conflicts to VEOs due to their clearly perceived leadership role. Very few reported to Land Committee and Police Force; implying that public enforcement of law by police force as conflict resolution measure is considered inappropriate for sustainable peace and tranquillity among the members of the community.

Another study by Angello, *et al. (2016)* assessed the general awareness of the institutions for livestock keepers in Kilosa, Tanzania. They found that very few respondents mentioned by-laws. It was not clear, however, as to whether this lack of awareness of the bylaws was due to weak mechanism of information flow, or because the livestock keepers were well informed of the by-laws which they were supposed to abide by.

In another study by Mwajombe (2012), on Tanzanian city by-laws for controlling and regulating urban farming and their contradictions in Arusha, Dodoma and Kinondoni Municipal Cities; it was found that the municipal authorities recognized and were

knowledgeable of the presence of urban agriculture and had bylaws to control and regulate it. The bylaws recognise broad types of animals that can be domesticated, but at the same time the urban agricultural - based activities are still being viewed as illegal; fortunately, all the bylaws are not adhered to by most urban farmers.

Livestock keeping is practiced by different social groups with different reasons. In India, government and donor support has enormously stimulated dairy production, and marketing through cooperatives (DFID, 2002). In a study by Ishagi *et al.*(2003), it is pointed out that Kampala City Council has officially recognized the importance of urban and peri-urban livestock keeping to the livelihood of its residents, but there is evidently a legislative gap. In another study in Kenya by Ayaga *et al*. (2004), it is pointed that the Government of Kenya provides limited extension services to urban farmers and there is no coherent legal and policy framework governing urban agriculture. Richards and Godfrey (2003) carried out their study in Dar es Salaam, Kampala, Kisumu, and Nairobi, and found that there were few, if any, institutions representing the needs of resource-poor urban livestock keepers. It also found out that urban livestock keeping was perceived to be illegal and a public health threat by most city authorities and was often accompanied by harassment.

The Tanzania National Livestock Policy (URT, 2006) recognizes peri-urban livestock keeping as being practiced in all towns and cities of Tanzania, where cattle, poultry, pigs and pets are kept. It also acknowledges its potential in providing employment, income and supplementary source of livestock products to town dwellers; and conflict and pollution among other key issues of concern. The policy also identifies constraints to environmental conservation in livestock production including low awareness among

stakeholders and low priority accorded to allocation of land for livestock use. The policy does not, however, clearly state how urban livestock keeping should be conducted to avoid environmental pollution and social conflicts.

The National environmental policy (1997) identifies environmental pollution as one of the six major problems for urgent attention. It recognizes pollution in towns and countryside as it affects health of people and lowers the productivity of the environment. The policy does not explicitly mention environmental pollution due to urban livestock keeping and how to address it.

Based on the foregoing discussion on institutional capacity for managing environmental pollution and conflict, there is a need for strong intersectoral coordination for effective management of urban livestock keeping through enforcement of bylaws to sustain urban livestock keeping and its related activities.

2.4.2 Urban Livestock Keeping Systems

Ishagi *et al.,* (2002) reported on three main production systems on urban and peri-urban livestock keeping among the poor in Kampala City as being: zero grazing in which there is full time confinement of the cattle in stalls/sheds where all the feed and water they require is brought to them; tethering in which local and improved cattle were tethered within or near the homestead and also along the roadside as long as there was enough grass for grazing. Supplementary feeding of mainly household waste was given to the animals either during grazing or when they were returned home in the evening and, communal grazing in which a herdsman took the cattle of several owners and was responsible for grazing and looking after the animals throughout the day and returning

them to their owners at dusk. A recent study by FAO (2017) has observed that Zero-grazing of improved cattle breeds using drought-tolerant fodder in Uganda has become an effective livestock management practice in areas with reduced communal grazing land.

Based on reviews of bylaws from various urban authorities in Tanzania, Mlozi (2003) found they all forbid keeping animals outside a building, structure, which in effect it means free range is prohibited in urban areas. The advantages of zero grazing extend beyond ensuring environmental quality, to include higher productivity of livestock.

2.4.3 Environmental Effects of Urban Livestock Keeping

Different studies conducted on livestock keeping have examined the significant negative effects on the environment and how to address them. A study by Guang *et al.* (2013) on effectiveness of monitory and regulation policies in reducing environmental pollution caused by livestock manure in five provinces of China found that livestock manure pollution had been increasing in spite of the existence of different ways of disposing livestock manure. The results from econometric model regress indicated that regulations of garbage discharge, enforcement of environmental pollution regulations, and the development of biogas could effectively reduce livestock manure pollution, however, only enforcing environmental regulations could significantly reduce livestock manure pollution.

Another study by Alam *et al*., (2016) on Impact of livestock rearing practices on public health and environmental issues in selected municipality areas of Bangladesh, found that majority of livestock depended on free roaming system, living in temporal sheds;

subsequently causing various diseases, malodour and blocked roads. Despite the fact that all the respondents (100%) were aware that livestock keeping could have a negative effect on urban health and environment, there was no willingness among them to do away from urban livestock keeping.

Wilson(2018) has noted the impending challenges inherent in animals kept in urban areas in Africa as being conflict, pollution and as reservoirs of diseases including zoo noses. He admits, however, that many of land use by-laws are impossible to enforce and any attempts to do so can almost always assail the poor rather than the better off. He advocates for the replacement of previous by-laws by simple broad-scale zoning.

2.4.4 Effectiveness of Livestock Officers and other Extension Staff

Rutatora and Mattee (2001) give an account of various providers of agricultural extension services in Tanzania,the major extension providers being the Ministry of Agriculture and Food Security; Local government authorities under the President's Office - Regional Administration and Local government; Non-governmental organizations; Donor-supported projects; Private agribusiness and Community-based organizations such as farmer's groups, associations, cooperative societies and networks. Most of the agricultural extension services are provided by government. The Ministry is responsible largely for policy formulation and capacity building programmes for staff, while the Municipal Councils are responsible for direct implementation of programmes and projects at local level.

A study by Chipman and Blum (2016) found that, although the Tanzanian government has established a network of livestock officers to provide basic livestock services, public service delivery is unable to reach farmers largely due to inadequate transport

facilities for extension staff, with only 56% of officers reporting having access to motorised transport, with essentially no support from the government; and second, inadequate policy communication where only 57% of officers were reported being aware of any livestock sector policies and acts, while only 13% were familiar with the National Livestock Development Strategy that defines the objectives of local public service provision.

Another study by Mcharo (2013) on the Perception of Farmers on Effectiveness of Agricultural Extension Agents in Knowledge Transfer to Maize Growers in Kilindi District found that the majority of smallholder famers had generally negative perception on the effectiveness of Agricultural Extension Officers in knowledge transfer and considered them less useful. However, their effectiveness varied with improvements to particular agricultural practices. Most of maize growers expressed limited contacts with agricultural extension officers whose majority were not residents of the villages they were supporting.

A recent study by Semwenda (2016) on Challenges facing agricultural extension under the current institutional framework in Hai District, has found a range of constraints facing extension services such as inadequate number of extension staff leaving some of the villages with no extension officers; placement of extension staff with no regard to their areas of specialization; poor logistical support such as transport means, stationeries and capacity building programmes; inadequate funds to meet their needs for transport, fuel and maintenance, housing, and even in supporting their work plans like establishing farmer field schools, demonstrations and conducting farmer trainings. Other constraints identified were specific to the extension officers themselves like low sense of

accountability in filling OPRAS forms, untimely submission of work reports and holding of meetings irregularly.

Several studies (Angello, *et al.* 2016; Burke, *et al.* 2012 and Sikika, 2010) have identified shortage of required staff as a major constraint of institutional effectiveness, of which Sikika refers to as "a crisis in human resources." Shortage of Livestock of the relevant staffs who are the main source of information on livestock husbandry practices can pose a real threat to urban livestock keeping.

2.5 Conceptual Framework

This study generally conceptualizes that institutions for sustainable urban livestock keeping namely; policies, laws, by-laws, norms and regulations (whether formal or informal) can be effective if there is adequate staff with requisite expertise to enforce them. It is only when the institutions are properly enforced; livestock keepers will abide by the recommended livestock keeping system and proper waste management practices and thus, reduce conflict through improved urban livestock keeping as depicted in Figure 2.1. The formulation of the conceptual framework was guided by the institutional theory, which states that, in order for an organisation to be sustainable, it must comply with the existing constructed structures as established authoritative guidelines for social behaviour. The theory posts that both formal and informal institutions (bylaws, rules, norms, and routines) make groups and organizations secure their positions and legitimacy by conforming to them. In this conceptual model, bylaws stand as representative institutions in view of their availability, formality and reliability of mechanisms for their formulation and enforcement at the community level.

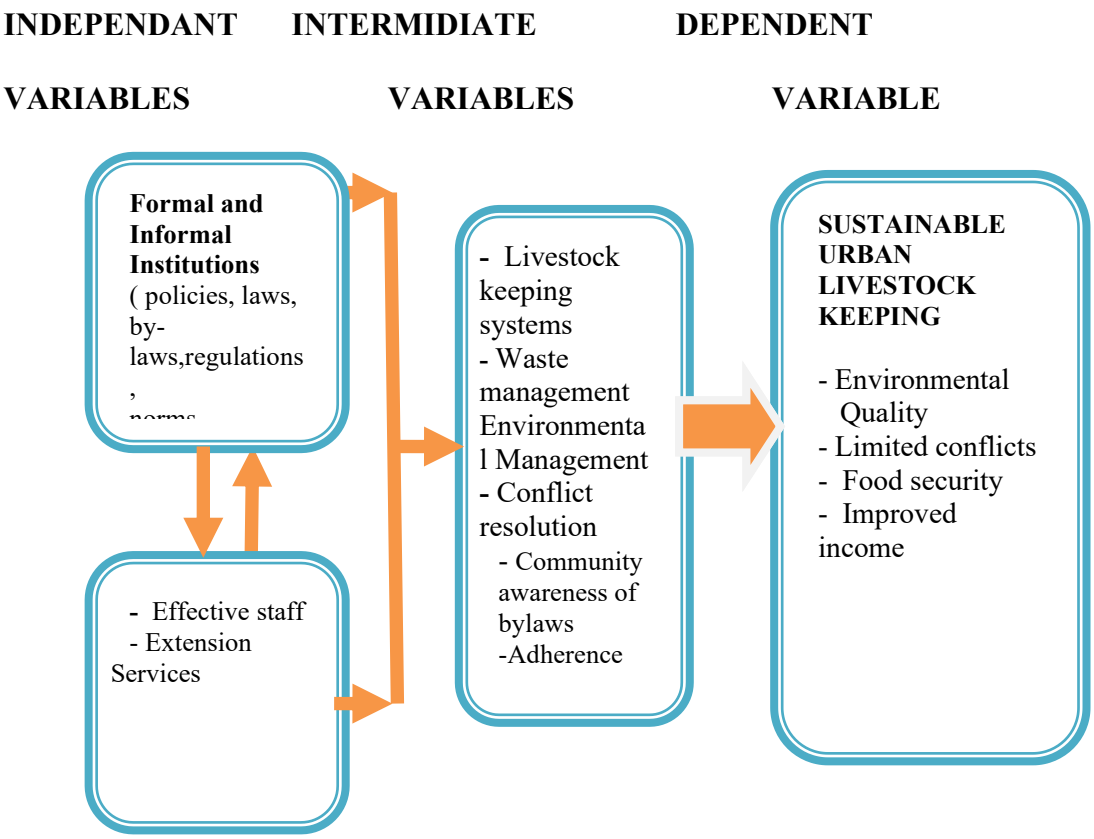

Figure 2.2: A Conceptual Framework for Analysing Institutional Challenges for Sustainable Urban Livestock Keeping

Source: Constructed by Researcher (2017)

In this context, sustainable urban livestock keeping (in terms of pleasant environment, limited conflicts, food security and improved income) will only be achieved if bylaws are effectively enforced by the extension staff; awareness of bylaws by urban livestock keepers and community members; use of proper livestock keeping system (zero grazing); use of bylaws to resolve conflict; proper waste management and strictly adhere to recommended number of each type of livestock kept.

2.6 Summary

Much of the literature review upon which the study was based was drawn from the institutional theory. This theory identifies three elements of institutions that make them

exist and function namely; regulative, normative and cultural cognitive. This study addresses the regulative capacity of the urban livestock institutions by examining how by-laws for urban livestock keeping were being enforced. The main hypothesis was that there was weak regulative capacity to ensure livestock do not cause environmental pollution and social conflict in urban areas.

2.7 Research Gap

From the empirical side, there is a growing literature on the persistence of urban livestock keeping in Sub Saharan Africa including Tanzania. However, most of these studies have concentrated on the role and importance of urban livestock keeping (Mlozi, 2003; 2004; Mlozi, et al., 2014). Other studies have focused on the effect of urban livestock keeping (Lupala and Lupala, 2003; Mlozi *et al.*, 2012; Mwajombe, 2012; Mrisho, et al., 2007). The challenges facing the existing institutions of urban livestock keeping have not significantly drawn the attention of researchers to the same degree as their importance and effect. Such studies among others could not empirically indicate why there is no conformity to bylaws, rules, norms, and routines prevailing in the environment as stated by theory.

In the light of the importance of institutions, their related theories, and the empirical studies as presented in the preceding sections, a number of things are clear from the reviewed literature: (1) that urban livestock is on the increase to meet food and income demand by urban dwellers; (2) that urban livestock keeping is one of the livelihood promotion strategies in urban areas; (3) that there are institutional challenges facing urban livestock keeping; (4) that urban livestock keeping cause environmental pollution and conflicts among urban dwellers; (5) that, there are bylaws on urban livestock

keeping, but are not adequately implemented. One clear gap from the literature review is inadequacy of information on institutional challenges that limit enforcement of bylaws that regulate urban livestock keeping – which was core to this study. Why are the bylaws not implemented? Is it because of low awareness by the community? Is it because of weak enforcement mechanism? Is it because enforcers are in short supply or are poorly equipped with requisite tools? This study sought to understand what limits enforcement of bylaws as a major gap to bridge.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Overview

This chapter presents the methodological approach that was adopted during data collection, up to data analysis and presentation. It gives some highlights on the exploratory research strategy used; the survey population and area of survey; the sampling design and sampling procedures; variables explored and methods employed in data collection, processing and analysis.

3.2 Description of the Study Areas and Justification of their Selection

This study was conducted in two urban areas namely Dodoma City and Morogoro Municipality. Dodoma City lies within a semi-arid area of Central Tanzania where only a limited number of crops can survive, making livestock keeping an inevitable option. Dodoma is also a national capital city.

For more than 40 years (1974 -2017) before being officially dissolved through a Presidential Order in May 2017; Dodoma City was under the management of two urban authorities namely; the Capital Development Authority (CDA) and the Dodoma Municipal Council (DMC). The two urban authorities had more or less similar legal mandates and functions that raised special public concern in the way they were being implemented by the two authorities; and their consequences on urban livelihoods including livestock keeping. With the current fast growing population, urban livestock keeping is gaining ground as one of key urban livelihoods of its dwellers (DMLO, 2015).

Morogoro Municipality on the other hand, enjoys a bimodal climate of Uluguru mountain ranges where many varieties of crops and pasture grow which attract livestock

keeping. It has seen rapid industrialization in the past, but has lost some of its industries in the recent past. These dynamics have implications on urban livelihood strategies by its dwellers including livestock keeping (MMLO (2017).

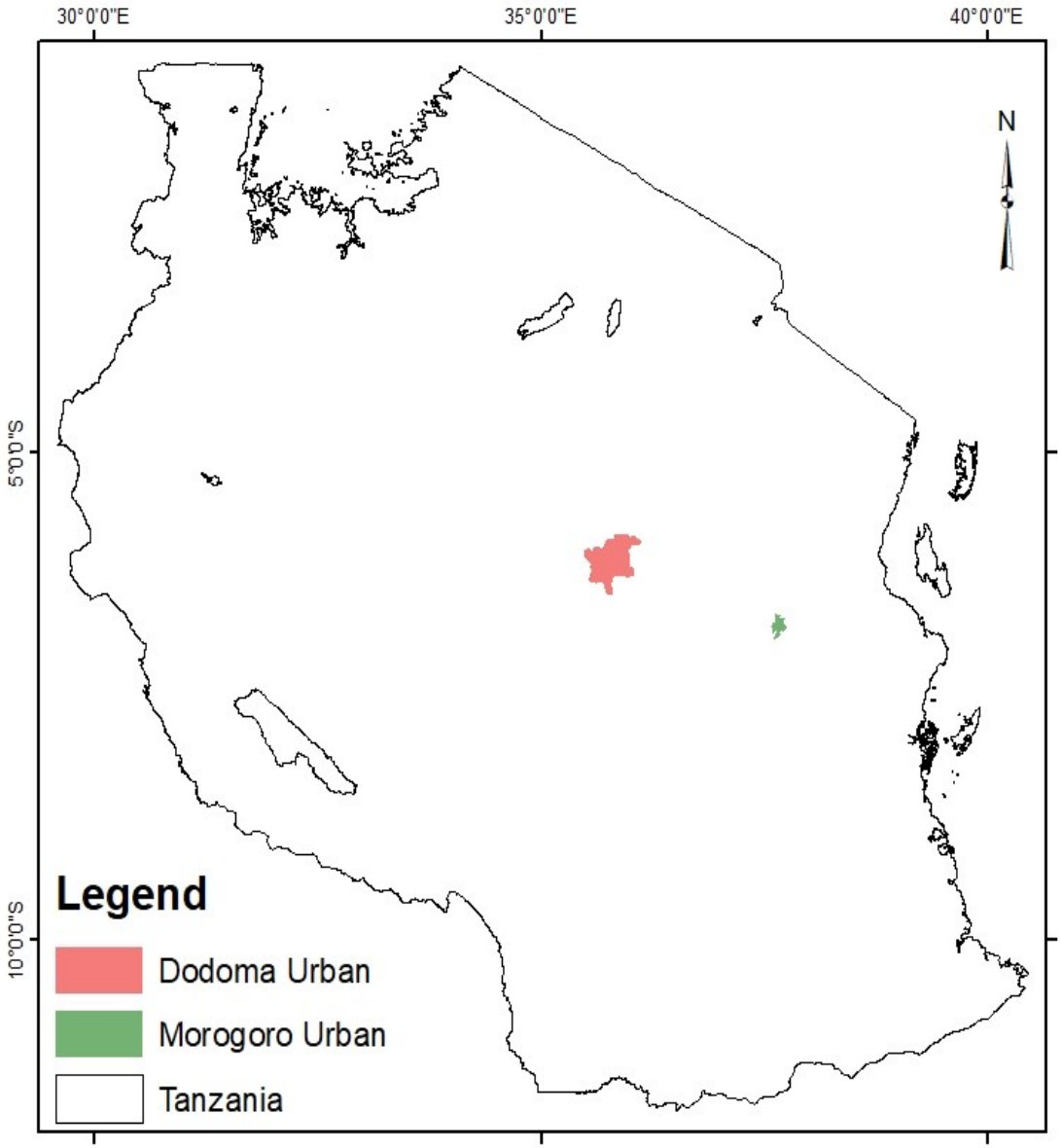

Figure 3.1: Location of Dodoma City and Morogoro Municipality in Tanzania

Source: NBS (2012)

3.3 Dodoma City

3.3.1 Location and Population

Dodoma City covers an area of 2,669 km^2 of which 625 km^2 is urbanized. It lies between latitudes 6^0 00′ and 6^0 30′ south, and longitudes 35^0 30′ and 36^0 02′ east. Administratively, the City is represented by the Dodoma urban district, which is one of the seven districts in Dodoma region. Others are Bahi, Chamwino Chemba, Kondoa, Kongwa and Mpwapwa. Dodoma Urban District has four divisions namely Dodoma Urban, Hombolo, Zuzu and Kikombo.

There are forty-one (41) wards and 42 villages in the district. Based on the 2012 National Population and Housing Census, the population of Dodoma Municipality is 410,956 people of whom 198,081 (or 48.2 percent) are males and 212,875 (or 51.8 per cent) are females. This study was carried out in Dodoma Urban Division, which has a total of 22wards.

3.3.2 Livestock

According to Dodoma City Livestock report (DCLO, 2015); Dodoma Municipality has 38,573,000 cattle, 28,252 goats, 7,242 sheep, 4,634 pigs, 49,480 chickens making a total of 128,181.

3.3.3 Bylaws

The Dodoma City Council has bylaws which guide urban livestock keeping. These focus on general livestock keeping as one of the key economic activities, and there are those that relate to urban environmental management. They all provide guidance on how livestock keeping should be conducted in the city.

The Dodoma City Council has frequently been preparing and updating its bylaws on livestock keeping in ensuring they address current issues of concern. The recent City bylaws contained in the Government Notice No. 164 0f 2014 Section 4(1) prohibit free range livestock keeping and give the mandate to the City Council to prepare, manage and ensure that:

(a) The land use plan considers activities related to agriculture, livestock keeping and human settlement;
(b) Demarcated areas for agriculture, livestock keeping and settlement are protected and used according to the land use plan;
(c) Livestock keepers have the number of livestock as per permits
(d) Livestock keepers use zero grazing system
(e) Livestock keepers retain the number of livestock that ensures productivity
(f) Education on modern livestock keeping is provided for productive livestock keeping.

The bylaws also stipulate the actions to be taken if livestock keepers fail to observe them. Section 8 requires the City council to confiscate livestock found roaming around or grazing in prohibited areas, and that the owner be fined fifty thousand shillings (50,000/=) as penalty for breaching the law, and ten thousand shillings (10,000/=) for each confiscated animal, and subsequently, ten thousand shillings (10,000/=) per animal every day the owner delays payment.

The bylaws on livestock keeping are also supported by those on environmental management (2013). Under these by-laws, Section 8 (k) strictly forbids any livestock keeper to allow animals to feed along the road, open spaces, farmlands, water sources

and other sensitive areas; instead they must ensure they keep small number if livestock under zero grazing system. The bylaws directs the Municipal Council to impose a fine of 50,000/= to 300,000/= upon those who contravene.

Frequent directives have been issued by the City to the public to observe the bylaws by controlling the free range livestock keeping system. Once the directives are made, the City takes the necessary steps, including livestock confiscation and imposition of fines.

There are also interest-based groups which are specific to types of livestock they are involved. Such arrangements are available to poultry keeping and cattle keeping. These temporary groups arise and disappear once they have achieved their short term specific goals, and are not officially registered by the Municipal Council.

3.3.4 Extension Services

Dodoma City Council has currently 31 livestock extension officers who serve in 36 wards. The Council has a total of 41 wards, making 5 wards not served by any livestock officer; while 6 livestock officers are serving two wards each.

3.4 Morogoro Municipal Council

3.4.1 Location and Population

Morogoro Urban District is one of seven districts of Morogoro Region. Administratively, the district has a single administrative division with nineteen (19) wards. The district is located at latitudes $6^0$49′and $6^0$20′south, and longitudes 37^0 39′ and 37^0 55′east. It lies on the northern Morogoro and covers an area of 260 square kilometres.

The district is bordered to the east and south by the Morogoro Rural District and to the north and west by Mvomero District. The 2012 National Population and Housing Census showed that Morogoro Urban District had a population of 315,866 people, whereby 151,700 are male and 164,166 are female. More than 50 percent of the population is employed in agricultural sector, 15 percent are petty traders, and the rest are employees.

3.4.2 Livestock

Based on Morogoro Municipal Livestock Office (MMLO) Annual Report of 2017, Morogoro Municipality has 11,922 cattle, 6,041 goats, 1,162 sheep, 4, 281 pigs and 166,308 chickens making a total of 189,714 livestock

3.4.3 Bylaws

The Morogoro Municipal bylaws of 2002 (Animals in Urban Area) which were amended from the Principal Law No. 8 of the Local Government (Urban Authorities) Act of 1982 states as follows:

(i) Section 8(1); No animal shall be kept within the urban areas unless the \owner seeks and obtains a permit from the Council Director,

(ii) Section 8(2), that the permit to be issued under this By-Law shall specify size of the area to be used, types of animals to be kept and types of the buildings to be used based on the following categories:

(a) High density plots shall include: (1) chickens in a hut of 10m x 10m or battery cages, (2) One (1) dairy cow and a calf which is still breast feeding and should have a pit for liquid filth and refuse and, (3) two dairy goats in a hut built on platform.

(b) Medium Density: Two dairy cows or (2) Five pigs or (3) Four goats or (4) chickens in a hut of 10 m x 30 m;

(c) Low Density: Either (1) Five cows or (2) Ten pigs or (3) Ten goats or (4) Chickens (20m x30m).

The by-laws further directs that in case the animals to be kept are of different types then their number shall be reduced as shall be directed by the Municipal Livestock Officer.

(iii) Section 8(3); any person who has been permitted to keep animals within the urban area shall:

(a) Keep his animals in zero grazing manner;

(b) Clean the premises to the satisfaction of the Municipal Livestock Officers

(c) Arrange for access pit for the removal of manure liquid filth and refuse.

3.4.4 Extension Services

Livestock extension services are reasonably provided in Morogoro Municipality. Out of the current 29 wards, 23 (79%) have livestock extension staff. Only one (1) out of seven (7) selected wards for this study had no livestock extension officer by the time of this study.

3.5 Research Design

The design used in this study was a cross-sectional survey. Cross sectional research design is a popular design that is widely used by researchers. Such a design allows collection of data on different groups of respondents at one point at a time. The design

has greater degree of accuracy and precision in social science studies than other designs (Olsen and St. George, 2004).

In this type of design, either the entire population or a subset thereof is selected, and from the sample population, data are collected to help answer research questions of interest. Cross-sectional survey was used in this study because of its flexibility and its simplicity in collecting many types of information from various data respondents

The design is also economical in terms of costs and time due to its ability to draw generalization about large population on the basis of representative sample (Krishnaswami and Ranganathan, 2005). Data can also be used for simple descriptive interpretations as well as determining the relationships between variables at a particular point at a time. In this study, data were collected from two categories of respondents namely, households, and government officers in Dodoma City and Morogoro Municipality at the same period of time.

3.6 Sample Population

The population for this study was all households in the two urban areas of Dodoma and Morogoro. For Dodoma City, one urban division was involved from which eight wards were selected; and from Morogoro Municipality, Seven Wards from Morogoro Urban Division which also constitute the Morogoro Urban District were selected. This made a total of 15 wards (Table 3.1, Map 3.2 and Map 3.3). In total, 298 households were involved in this study.

Table 3.1: Study Wards and Livestock Status in Dodoma and Morogoro Municipalities

Municipality	Ward	Total Households	Total Livestock	ULK HH
Dodoma	Mnadani	14,373	30,702	140
	Miyuji	14,965	16,304	161
	Nzuguni	15,466	11,365	262
	K/Ndege	10,129	7,964	165
	Chang'ombe	25,415	3,237	87
	T/Reli	6,584	3,115	23
	Kizota	34,453	3,058	68
	Kikuyu Kusini	5,974	695	54
Sub Total	**8**	**127,359**	**76,440**	**960**
Morogoro	Kihonda	44,424	22,620	605
	Boma	8,706	16,575	15
	Kilakala	18,345	15,012	30
	Mbuyuni	11,786	13,864	823
	Kichangani	19,166	12,653	75
	Mwembesongo	43,571	11,070	53
	Mazimbu	72,527	10,204	120
Sub Total	**7**	**218,525**	**101,998**	**1,721**
Total	**15**	**345,884**	**178,438**	**2,681**

Source: Extracted from Annual Reports (DCLD, 2015; MMLD (2017

3.7 Sampling Procedures and Sample Size

Sampling is a selection of the sample from the population from which inference is made to the whole population by examining a part of it (GMU, 2004). Parker (2011) mentions advantages of sampling to include: first, the data collection being cheaper; secondly, it requires fewer people to collect and analyze data; thirdly, it serves time; fourthly, it permits a higher level of accuracy as the sample size allows a check on the accuracy of the design and administration of the questionnaires; and finally fewer cases make it possible to collect and deal with more elaborate information.

The first sampling stage used in this study was related to selection of Dodoma City and Morogoro Municipality and wards using purposive sampling technique based on geographical characteristics and livestock population densities. Purposive sampling was an important criterion for selecting wards because it was considered a convenient method for the researcher to capture important aspects from respondents (Saunders *et*

al. 2006). Purposive sampling was employed for selecting wards, which had high population of livestock hence enabling the researcher to collect data related to institutional challenges in managing urban livestock keeping. The list of wards with respective livestock population was obtained from the respective Municipal Agriculture and Livestock offices.

The second sampling stage used in this study was related to selection of heads of households using probability sampling. From each ward the number of respondents were selected and determined by its respective population or number of households. Systematic random sampling method (Kothari, 2004; Newing *et al.* 2011) was applied to select the heads of households from each ward for interviews. The ward executive officers were asked to provide the households' registers to be used as sampling frames. These were lists of households from the households' registers in each selected ward of the study. From the list of heads of households given by ward executive officers, 298 names of heads of household were drawn using systematic random sampling method (Kothari, 2004; Newing *et al.* 2011).

This was done by first calculating the interval (population divided by sample size), then listing all the names of heads of households on pieces of paper and randomly selected the first name of household head to start with and then continued to pick the names systematically by use of the interval calculated for interview in each selected ward. Systematic random sampling technique was chosen due to its simplicity and easiness to conduct, and its ability to provide equal opportunity to all household heads in the study area to be included in the sample, hence low degree of sampling error (Rwegoshora,

2006). The target population of the present study was the households' heads for they are the potential strugglers for urban livelihood.

The non probability sampling procedure involved first, sampling of 15 wards: 8 from Dodoma City Council and 7 from Morogoro Municipal Council based on livestock population densities. The wards with the biggest number of livestock were, therefore, given priority for inclusion in the study.

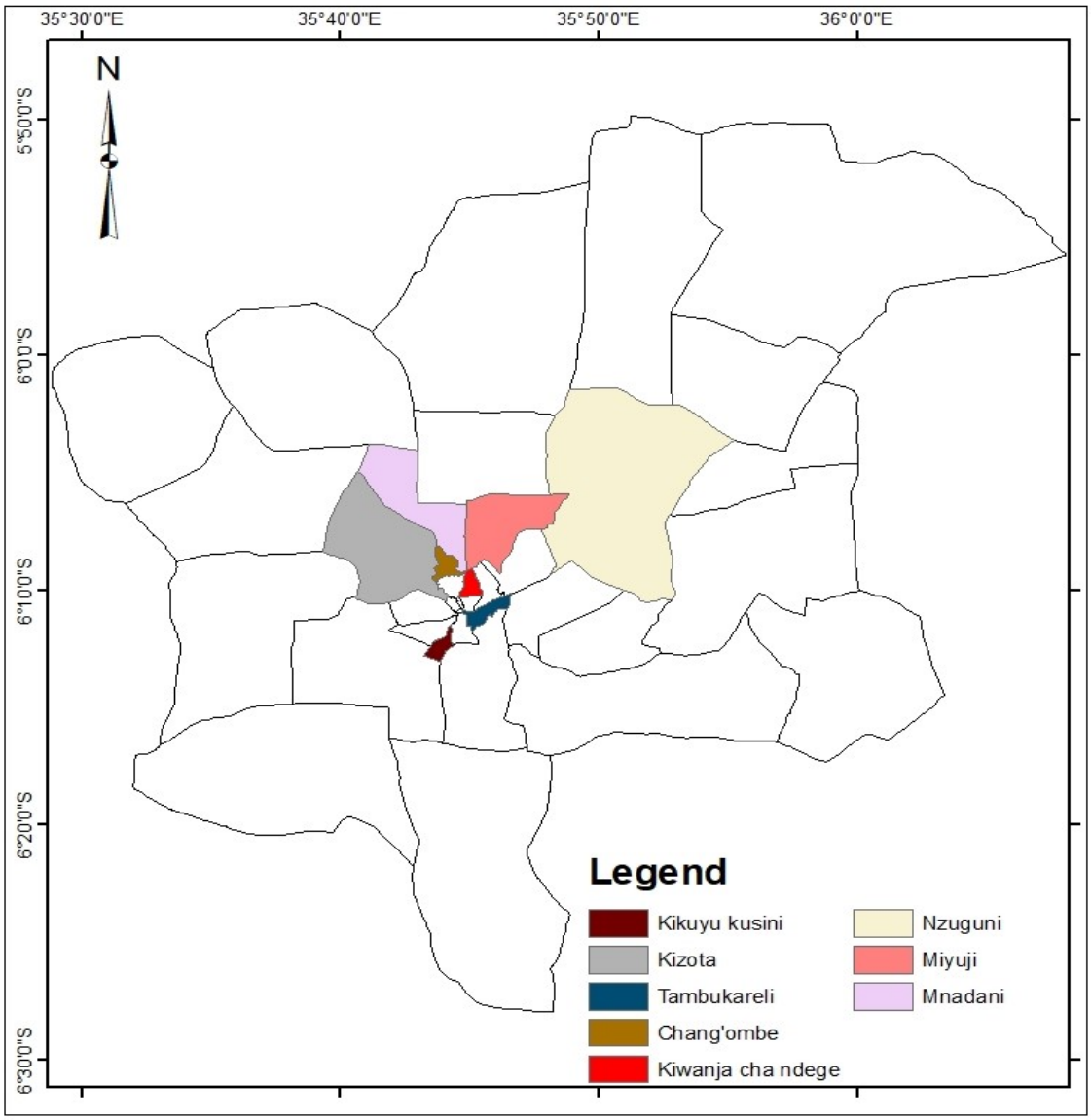

Figure 3.2: Location of Wards Covered by the Study in Dodoma City

Source: NBS (2012)

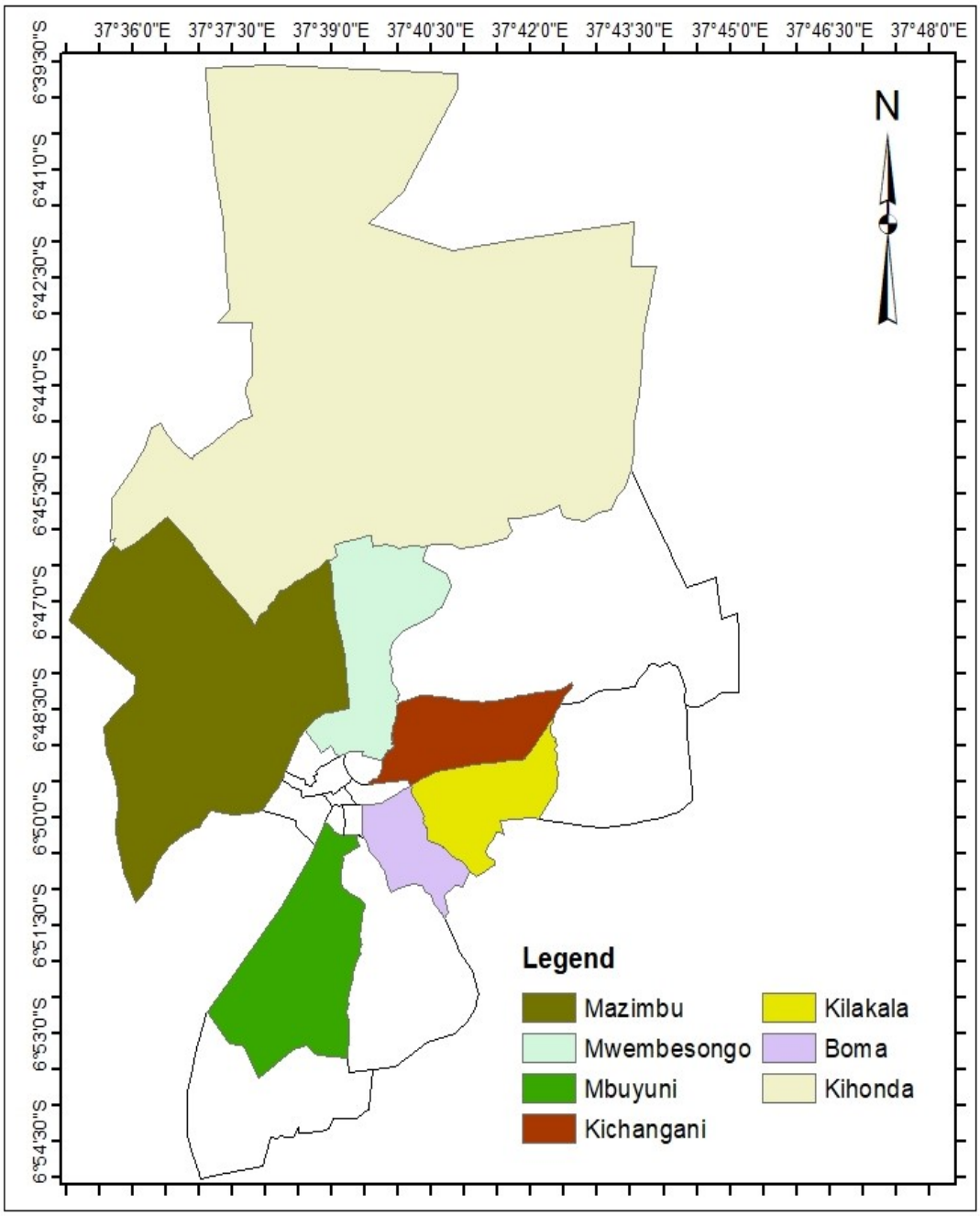

Figure 3.3: Location of Wards Covered by the Study in Morogoro Municipality
Source: NBS (2012)

Secondly, non probability sampling procedure was also adopted in selecting key informants based on their position and experience in dealing with institutions related to urban livestock keeping, environmental management, urban planning, and/or conflict handling responsibilities. A total of 10 key informants were selected among the city and

municipal officers namelyCity and Municipal Directors, Livestock Officers, Urban Planning Officers, Health Officers and Environmental Officers.

The sample size of this study was 298 household heads from the two Municipal Councils. The determination of this sample was based on the formula by Cochran (1977) as follows:

$$n = \frac{Z^2 (1-p) p}{(ME)^2}$$

Where,

n, is a sample size,

Z, is critical value (1.96 for 95% confidence interval);

p, is proportion of the livestock keeping households in the population; Livestock keeping households are 2,681, Non livestock keeping households are 343,203 (345,884 – 2,681) and Therefore, p = 2,681/345,884, making n, 298.

ME, is the marginal error (1%)

Out of the 298 respondents, 158 were drawn from Dodoma Municipal Council and 140 were from Morogoro Municipal Council.In addition, a total of 10 key informants were also involved in this study, making a total sample of 308 as shown in Table 3.2.

Table 3.2: Number of Respondents from Dodoma City and Morogoro Municipality

Category of Respondents	Dodoma Urban	Morogoro Urban	Total
Households	158	140	**298**
Key Informants	5	5	10
Total	**163**	**145**	**308**

3.8 Data Types and Sources

This study made use of both, secondary and primary data. Both primary and secondary data were collected and used to achieve the objectives of the study. Primary data were collected from the target population using different methods of data collection. Primary data were related to respondents and study area characteristics, awareness of bylaws, how bylaws help to resolve conflict resulting from Urban Livestock Keeping (ULK), livestock keeping systems, effects of livestock keeping on environment, effectiveness of livestock officers and other extension staff in making sure that ULK is practised in a proper manner.

Secondary data on the other hand, were collected by reviewing various documents and bylaws on urban livestock keeping which were obtained from Municipal Offices (Agriculture and Livestock Department, Department, Urban Planning and, Environment and Health Department); from libraries (SUA, IRDP) and through internet or websites to complement information obtained from respondents..

Secondary data were collected from various sources such as government officials at Municipal Councils and national levels and from NGOs reports, libraries, institutions and Secondary data collected provided background information on urban livestock keeping situation in the country, extension services, and existing bylaws on ULK, livestock keeping systems and environmental pollution.

3.9 Data Collection Methods and Tools

Both qualitative and quantitative approaches of data collection were employed due to the nature of the study. The study involved examining awareness on ULK bylaws

ofindividual households, which was assumed to have contribution on sustainable urban livestock keeping. The qualitative approach enabled the researcher to make an in-depth investigation of the variables related to challenges of institutional framework for urban livestock keeping.

A combination of methods was used for triangulation purpose, to collect both qualitative and quantitative. These included structured and semi structured interviews, Focus Group Discussion and field observations. The use of a combination of methods in data collection was due to diversity of information that was required to achieve the objectives of the study. Three research assistants were involved in data collection after they were trained and acclimatized in the content of the questionnaire (Mrisho *et al.* 2008; Newing *et al*. 2011). Explanations that were of special interest were recorded using mobile phones to avoid the possibility of losing some key facts.

3.9.1 Interview Method

The interview method was adopted due to its strength in capturing empirical data in both informal and formal settings (Kothari, 2013). This made use of researcher's administered questionnaire(Appendix I) as a data collection tool which consisted of both open and closed ended questions. Open ended questions were designed to solicit information from respondents' characteristics in relation to the challenges of institutional framework for addressing urban livestock keeping. Closed ended questions on the other hand, intended to capture information relating to respondents' awareness of the bylaws controlling ULK, livestock keeping systems, effects of livestock keeping to the environment and the effectiveness of extension staff in making sure ULK is practiced in proper manner. The questions that were asked to all respondents were

identical in order to solicit homogeneous information. The interview was made up of four major parts: the first part was designed to collect information on respondent's characteristics; part two aimed to collect information on livestock keeping; part three was designed to capture information relating to conflict resolution from ULK; and part four was concerned with bylaws on ULK.

Interviewing involved a meeting between the researcher and a respondent and involved the interviewer asking a predetermined set of questions using basically the same wording and order of questions within the interview schedule. The interview method was very useful since it allowed face-to-face interaction with respondents and allowed the researcher to restructure the questions or give clarification to questions when necessary. The choice of interview method for this study was dictated by the experience gained during the pilot survey whereby the majority of respondents preferred oral discussions with the researcher to filling in the questionnaires. This can also be attributed to the nature of study population (urban residents) who are busy and many prefer to listen than reading. Rwegoshora (2006) mentions the advantages of the interview, among others as follows: (i) it makes possible to study events that are not open to observation, (ii) allows for the study of abstract factors like attitude, back emotions and reactions of the respondents, (iii) allows for the study of phenomenon in its historical background, (iii) allows for gathering information that is quite reliable, and (iv) enables to study past events.

Semi-structured interviews were used during discussions with government officials, and other key informants. Unlike structured interview, which involves tight control over the format of questions and answers, in semi-structured interview the questions are open

ended and emphasis is on the respondent to elaborate points of interest (Denscombe, 2003). The interviewers had a list of issues for which they wished to obtain answers from respondents. Nevertheless, they were flexible in terms of the order of the questions. Semi-structured interview, according to Kothari (2013), has advantages of allowing the researcher to restructure questions if need arises. Interviews were found useful as they allowed face-to-face discussion with respondents, restructuring of some questions to suite the situation and to capture some controversial issues between different groups of respondents. Due to the nature of the study which required the investigation on people's attitude and awareness of bylaws on controlling ULK, semi structured interviews were appropriate and offered more opportunity in gathering information.

Information gathering from government offices at the Municipality level involved officials in the planning, healthy, livestock; and environment departments. At the ward level, Ward executive officers were involved. The information generated from discussions with these respondents helped to confirm some findings from household respondents and making relevant recommendations.

3.9.2 Focus Group Discussion

This method involved interviewing a small group of respondents drawn from similar background, who were believed to present general public opinion towards urban livestock keeping bylaws. They were of two categories, livestock keepers and non livestock keepers. The focus group comprised of an average of 7 members who were selected with consideration of all social groups representations (men, women, youth, aged people in the ward) on voluntary basis. The advantage of this method according

to Kreuger and casey (2000) is that it presents a more natural environment than that of the individual interview. It also allows the researcher to focus on group norms and dynamics around the issue being investigated. Moreover focus group discussions are useful in verifying and clarifying information and in filling in gaps of information caused by inadequate information gathered from the interviews and observations.

Focus group discussions were conducted in six (6) representative wards, where each ward had two groups. The six wards were Mnadani, Nzuguni, Chang'ombe and Kizota in Dodoma municipality and, Mwembesongo and Kihonda in Morogoro municipality. From focus group discussions, qualitative information such as general opinion, environmental pollution, social conflict and awareness on bylaws for ULK was collected. The checklist was the basic tool for conducting focus group discussions. Participants' responses were recorded in a notebook during the discussions or immediately thereafter.

3.9.3 Field Observation

Observation makes it possible to study behaviour as it occurs. The researcher simply watched things and people as they do and say. This enabled the generation of first hand data free from "contamination" by factors standing between the investigator and the object of the research (Mansell, 2011), and particularly useful for collecting data from respondents who are either unwilling to express themselves verbally or are mentally incapacitated. Furthermore verbal reports could also be validated and compared with actual behaviour through observation.

Direct observations were used to examine the existing livestock keeping systems, heaps of livestock wastes, destroyed plants and types of livestock kept. Furthermore

observation helped to study some facial expressions, gestures and other behaviours during interviews, which portrayed the hidden or doubtful responses during interactions between observer and respondent particularly on sensitive issue like beliefs and attitudes towards ULK. A camera was used to capture some events and structures of interest to this study. The information gathered using observation was used to counter-check information provided by household respondents and focus group participant, Checklist for Observationis in Appendix VI.

3.9.4 Summary of Methods and Tools Used by Specific Objectives

S/N	Objective	Data Collection Method	Tool	Reasons For Method Selected
1	Examine community awareness on existing bylaws that help to control environmental pollution resulting from urban livestock keeping in the study areas;	Interview and Focused Group Discussion	Questionnaire and Checklist	Collect different data
2	Examine how by-laws coupled with urban livestock management help to resolve conflicts resulting from urban livestock keeping in the study areas.	Interview and Focused Group Discussion	Questionnaire and Checklist	Collect different data and Verify reported information in the questionnaire
3	Identify the urban livestock keeping systems practiced by livestock keepers in the study areas;	Interview Focused Group Discussion and Observation	Questionnaire Checklist and camera	Collect different data and Verify reported information in the questionnaire
4	Examine the effects of livestock keeping on the environment in the study areas.	Interview, Observation and Focused Group Discussion	Questionnaire Checklist and camera	Collect different data and Verify reported information in the questionnaire

3.10 Field Survey

3.10.1 Pilot Survey

Prior to detailed field survey, a pilot survey was conducted using the research assistants to 10 respondents from 2 wards, Kikuyu Kusini in Dodoma municipality and Kihonda in Morogoro municipality. The pilot study was administered for the purpose of; (i) soliciting background information about the study areas (ii) familiarizing with the areas where the main survey was to be conducted (iii) establishing sampling frames and units (iv) pre-testing the questionnaires to validate the relevance of the questions to the intended respondents (v) determining the approximate time or duration taken to fill a questionnaire with one respondent and (vi) finding out the most efficient way of carrying out main survey. The pilot survey was carried out in June 2017 whereby a visit was made to selected wards and conducted discussions with household heads, Ward Executive Officers and Municipal Officials. Following the pilot survey some amendments were made to the questionnaires and interview guidelines, whereby questions were added, some were deleted while others were reframed to make them clearer and easier to understand.

During pilot survey, research assistants were recruited and trained to assist in data collection. Due to the nature of the sample population (urban setting), selection of research assistants considered, in addition to fluency in English and Swahili, also proficiency in the local language of the study area. Three research assistants were trained in order to orient them on interviewing techniques, recording of information collected and in dealing with difficulties encountered with respondents. Emphasis was

put on ensuring harmonious interaction between interviewees and the interviewer for smooth running of the exercise.

Following the pilot survey, some areas of the questionnaire were improved, particularly on gender-based awareness of bylaws. It also became obvious that most of the household respondents could not fill the questionnaire on their own. They were somehow reluctant to read and fill the questionnaire; instead they were more comfortable in listening and answering. The questionnaires were therefore subsequently administered directly by the Researcher and her assistants.

3.10.2 Detailed Field Survey

The formal survey was conducted from July to December 2017. It involved household interviews, observation, focus group discussions and discussions with government officials. The interviews were conducted by the researcher with the assistance of three well-trained enumerators. Prior to commencement of interviews, the researcher visited the municipalities and wards to inform and agree with the relevant authorities about the purpose of the study and modality of conducting interviews.

Individual respondents were interviewed in their homes or offices after an initial appointment. The objectives of the study were explained precisely by the researchers to each respondent prior to interviews in order to win the willingness and cooperation of

the respondents. The interviews were conducted in Swahili, a language which most household respondents could speak.

3.11 Data Processing and Analysis

3.11.1 Data Processing

Data collected through interviews were coded and entered into the IBM Statistical Package for Social Sciences (SPSS) for windows versions 20. Data cleaning was done by running frequencies of individual variables and later analyzed. Once errors were detected, they were handled appropriately so that data could be analyzed without losing their integrity or robustness. Cleaned data were later exported to STATA version 13 for analysis.

3.11.2 Data Analysis

Both descriptive and quantitative techniques were used to analyse the data. Methods of analysis were based on the nature of objective and the intended inference as shown in Table 3.3. The analysis was conducted using STATA software version 13.

As it is indicated in Table 3.3, substantial part of the analysis was based on descriptive analysis. These statistics were used to assess and determine the following aspects: respondents' socio-economic characteristics, people's awareness of by-laws on ULK, use of by-laws to resolve conflict resulting from ULK, environmental effects of ULK,

urban livestock keeping systems practiced and, effectiveness of livestock officers and other extension staff in enforcing bylaws on ULK.

Qualitative data analysis particularly, content data analysis was used to describe most of the aspects of this study. The process involved transcription of verbally recorded data during the field into written form, and relating it to the general context of the study. The use of quotes was made to generate information that was relevant to the emerging issues in line with the key areas of the study.

Table 3.3: Analytical Framework

NO.	Objective	Variables	Methods of Analysis
1	Examine the community awareness on bylaws that help to control environmental pollution resulting from urban livestock keeping in the study area;	• Number of households who are aware of bylaws • Household socio - economic and demographic characteristics	• Descriptive Analysis • Quantitative Analysis:- Chi-square tests for independence to ascertain two categorical variables (social - economic and demographic characteristics and awareness on bylaws on ULK)
2	Examine how by-laws coupled with urban livestock management help to resolve conflicts resulting from urban livestock keeping in the study areas;	Effectiveness in use and enforcement of Bylaws. • Extension visits; • Number of extension Officers; • By-laws enforcement • Involvement in by-laws making; and Supervision • Knowledge on environmental pollution;	Descriptive Analysis
3	Identify the urban livestock keeping systems practiced by livestock keepers in the study area;	• ULK Households • Livestock Keeping System (Semi Free Range; Free range; Zero grazing) • Most preferred Livestock Keeping System	Descriptive Analysis

NO.	Objective	Variables	Methods of Analysis
4	Examine the effects of livestock keeping on the environment in the study area.	• Environmental Pollution parameters (Odor, Noise, Heaps, Dust, and Plant Destruction) • Conflicts • Types of Livestock kept [Cattle(A); Poultry (E); Goat (C); Sheep (D); and Pig (B)]	Quantitative Analysis:- Chi-square tests for independence to ascertain two categorical variables (keeping livestock and environmental pollution)

3.11.3 Data Presentation

The analysed data on awareness of by-laws of ULK, use of by-laws to resolve conflict resulting from ULK, environmental effects of ULK, livestock keeping systems and effectiveness of staff were presented using cross-tables and figures such as histograms and pie-charts. Concluding remarks, recommendations and discussion were based on computed frequencies, percentages, Pearson Chi-square test analysis and logistic regression analysis.

3.12 Validity and Reliability

3.12.1 Validity

Validity refers to the extent to which a measurement procedure actually measures what it is intended to measure rather than measuring something else, or nothing at all (Amin,2005). Validity was observed through selection of the respondents based on the established sampling procedures for the qualitative and quantitative data. With qualitative data, it was important that the respondents come from the wards with higher livestock population densities where the experience related to challenges of urban livestock keeping could easily be obtained. Data was collected by interviewers who were trained on how to use the data collection tools and had themselves been involved in the pre-test of the tools. There was a possibility of triangulation on the data collected

because of the different types of methods and data collected, on the one hand, and the repetitiveness of the same questions, on the other hand.

3.12.2 Reliability

Reliability refers to the consistency or dependability of measuring instrument. Golafshani, N. (2003) defines reliability as replicability or repeatability of results or observations. To ensure reliability, the household questionnaire was pre-tested in Kikuyu Kusini ward (Dodoma Municipality) and Kihonda (Morogoro Municipality) so as to ensure that respondents understood the questions in the same way and answers obtained were similar. The methods employed involved interviews, focus group discussion, observation, and documentation. This helped the researcher to picture how multiple, but somehow different, measures used to collect data were simultaneously true

3.13 Ethical Considerations

The research process was guided by sound ethical principles, which included the followings:

Voluntarism and consent**:** the researcher ensured that respondents were not coerced or manipulated into participating in the study. Respondents were told the purpose of the study and their consent to participate in the study was sought. For objectivity purpose, the research team also ensured any attempt to bias results was avoided. The respondents were also assured of confidentiality and anonymity. Their names were not written anywhere in the report, and were assured that the information given would only be used for academic purposes. Respondents were also given the freedom to terminate the

interview whenever they felt uncomfortable to continue since their participation in the interview was entirely voluntary.

CHAPTER FOUR

FINDINGS AND DISCUSSION

4.1 General Overview

This chapter is about the findings of the study and discussion of the results. It starts by presenting the socio-economic and demographic characteristics of the respondents in terms of gender, age, marital status, level of education and occupation. Next is a discussion and analysis of bylaws as key institutions of urban livestock keeping in terms of respondents' awareness of bylaws and their experiences in use of bylaws to minimize environmental pollution and conflict among urban dwellers. Then follows a presentation of the effects of ULK such as noise, heaps of livestock wastes, destruction of plants and fences, bad odour, dust and conflict; and types of livestock keeping systems practiced. The chapter ends with an analysis of the effectiveness of extension officers in enforcing urban livestock bylaws.

4.2 Respondents Characteristics

Table 4.1 to Table 4.4 summarize the socio-economic characteristics of the population sample of the study areas. Five important characteristics were considered in view of their influence on livestock keeping namely; gender, age, marital status, education level, and occupation.

4.2.1 Age and Gender of Respondents

A total of 158 and 140 household heads were interviewed in Dodoma City and Morogoro Municipal Council respectively. The results in Table 4.1 indicate that the majority of households (72.8%) in the study area were male headed as compared to

female headed households (27.2%). This distribution is in line with the typical Tanzanian cultural system in which males are dominant household heads with decision making powers at household level. Table 4.1 further indicates that majority of respondents were mature adults aged 41 – 60 who are also resource owners at household level. It is doubtless, therefore, that urban livestock keeping is a male's domain.

Table 4.1: Gender and Age of the Respondents (N = 298)

Characteristic	Dodoma CC		Morogoro MC		Total	
Gender	**No. of Resp.**	**%**	**No. of Resp.**	**%**	**No. of Resp.**	**%**
Male	104	65.8	113	80.7	217	72.8
Female	54	34.2	27	19.3	81	27.2
Total	**158**	**100**	**140**	**100**	**298**	**100**
Age						
Between 18 – 40	40	25.3	22	15.7	62	20.8
Between 40 – 45	46	29.1	57	40.7	103	34.6
Between 46 - 60	47	29.7	42	30	89	29. 9
Above 60	25	16	19	13.6	44	14.8
Total	**158**	**100**	**140**	**100**	**298**	**100**

Source: Field Survey (2017)

4.2.2 Level of Respondent's Education

Table 4.2 shows that most of respondents (73.2%) had completed Secondary education (Form IV and Form VI), which indicates that the majority of urban dwellers had basic education. This is also expected since the Government of Tanzania has long been encouraging secondary education. The thrust for secondary education has been more pronounced in urban areas where primary school leavers cannot be employed by government and private companies because at that level of education they do not have the required skills. Generally, however, urban livestock keeping is practiced by people from all categories of education level.

Table 4.2: Level of Education of the Respondents (N = 298)

Characteristic	Dodoma		Morogoro		Total	
Level of Education	**No. of Resp.**	**%**	**No. of Resp.**	**%**	**No. of Resp.**	**%**
No Formal Education	1	0.6	0	0	1	0.3
Standard Seven	16	10.1	3	2.1	19	6.4
Form Four	80	50.6	63	45	143	48
Form Six	32	20.3	43	30.7	75	25.2
Certificate	6	3.9	3	2.1	9	3.0
Diploma	13	8.2	12	8.6	25	8.4
Degree	10	6.3	16	11.5	26	8.7
Total	**158**	**100**	**140**	**100**	**298**	**100**

Source: Field Survey (2017)

4.2.3 Marital Status of Respondents

According to Table 4.3, majority of the respondents were married (61.7%) followed by singles (23.8%). This is also in line with our expectation where under normal situation, household heads are supposedly male adults. One striking feature of the respondents is the growing number of single headed households. This is also an expected phenomenon under urbanized conditions where many young men and women workers and business dealers stay single for a reasonable time before they marry.

Table 4.3: Marital Status of the Respondents (N = 298)

Characteristic	Dodoma CC		Morogoro MC		Total	
Marital Status	**No. of Resp.**	**%**	**No. of Resp.**	**%**	**No. of Resp.**	**%**
Single	37	23.4	34	24.3	71	23.8
Married	92	58.2	92	65.7	184	61.7
Widowed	21	13.3	11	7.9	32	10.7
Separated	8	5.1	3	2.1	11	3.8
Total	**158**	**100**	**140**	**100**	**298**	**100**

Source: Field Survey (2017)

4.2.4 Respondent's Occupation

In terms of occupational status, Table 4.4 shows that more than two-thirds of the respondents (69.8%) were self-employed. This is an indication that the informal sector is dominant in the study areas and livestock keeping could be serving an important employment role to urban dwellers. The implication is that, if urban livestock keeping will be prohibited, some of its dwellers will become jobless and form the urban poor. The results further indicate that all categories of occupation had respondents who were involved in livestock keeping. This implies that urban livestock keeping serves different livelihood strategies including food security, income generation, saving, employment, insurance and social status (Guendel, 2002).

Table 4.4: Occupation of the Respondents (N = 298)

Characteristic	Dodoma CC		Morogoro MC		Total	
Occupation	**No. of Resp.**	**%**	**No. of Resp.**	**%**	**No. of Resp.**	**%**
Self employed	113	71.5	95	67.9	208	69.8
Private Entity	19	12.1	16	11.4	35	11.7
Government Employee	13	8.2	23	16.4	36	12.1
Others	13	8.2	6	4.3	19	6.4
Total	**158**	**100**	**140**	**100**	**298**	**100**

Source: Field Survey (2017)

4.3 Institutions for Urban Livestock Keeping

Institutions are considered the backbone of any social life and important instruments of success of any desired outcome since they create an enabling environment (Accemoglu and Robinson, 2008; Rodrik and Subramanian, 2003). According to Sandford and Ashley (2008), the success of any development interventions does not only depend on the quality of the technical solution that can be introduced, but also on an enabling environment. If there are strong institutions dealing with urban livestock keeping,

sustainable livestock-based livelihoods can be sustainable, along with harmonious relationships between livestock keepers and the rest of urban dwellers.

This study examined the Municipal by-laws, which are the commonest institutions in guiding urban livestock keeping. There were some differences in terms of content and clarity of the bylaws between Dodoma City and Morogoro Municipal Council. For instance, while Morogoro bylaws specify the number of certain types of livestock to be kept in the high, medium and low density areas, the Dodoma bylaws are not specific on the number and types of animals to be kept. Nevertheless, the types of livestock mentioned in the Morogoro Municipal bylaws are not exhaustive. For example, sheep are not mentioned although they are also kept in the area.

Conversely, the Dodoma bylaws provide for specific penalties for each type of offence committed, but nowhere are penalties mentioned in specific terms in the Morogoro Municipal bylaws. These discrepancies point to the fact that the general framework from which the bylaws are crafted needs to be reviewed. It was also found that, while the strategic plans had Livestock and Fisheries Development as one of the 13 municipal departments that are expected to provide services to municipal dwellers, there was no clear provision of land for livestock keeping by the department responsible for land use planning.

4.3.1 Awareness of Bylaws on Urban Livestock Keeping

The first objective of this study was to examine the community awareness on bylaws that help to control environmental pollution resulting from urban livestock keeping.

Awareness of bylaws was considered the first and a necessary condition for farmers to abide by them (Rogers (1995). Livestock keepers could not be expected to implement the by-laws on urban livestock keeping for which they are not aware of. Respondents were asked to indicate if they were either aware or not, of any by-laws that guide urban livestock keeping in their area. The results of their responses were as presented in Table 4.5.

Table 4.5: Respondent's Awareness of By-laws on ULK (N=298)

Characteristic	Dodoma CC		Morogoro MC		Total	
Awareness on bylaws	**No. of Resp.**	**%**	**No. of Resp.**	**%**	**No. of Resp.**	**%**
Yes	31	19.6	32	22.9	63	21.1
No	127	80.4	108	77.1	235	78.9
Total	**158**	**100**	**140**	**100**	**298**	**100**

Source: Field Survey (2017)

Results in Table 4.5 show that, more than three quarters of the respondents (78.9%) were not aware of any by-laws that guide urban livestock keeping. This alarming rate of unawareness was doubtless, caused by some factors. The likely reasons considered for the respondents' unawareness include poor extension services exhibited by limited number of visits to livestock keepers, shortage of extension staff, and inadequate enforcement of the by-laws by the relevant agents including the socio-economic and other demographic characteristics of the respondents particularly; education level, occupation, gender and age.

In order to establish whether these factors were responsible for poor community awareness in the study areas or not, a measure of association using Chi-square test was performed. The results from the statistical test of seven (7) variables on their association with awareness on the by-laws are summarized Table 4.6.

Table 4.6: Association between Socioeconomic and Demographic Characteristics of Respondents with Awareness of Bylaws on ULK

Variables	Pearson chi2	P-value
Number of extension Staff	120.61	0.000
Extension Visit	195.36	0.002
Law enforcement	3.833	0.050
Level of Education	187.434	0.000
Age group	187.430	0.000
Gender	158.26	0.000
Occupation	5.434	0.246

Source: Field Survey (2017)

Results in Table 4.6 show that awareness of by-laws by the respondents was closely associated with the number of extension visits made by extension officers and also the number of extension staff. Other characteristics associated with the respondents such as the level of education, gender and age were also associated with awareness of the bylaws on urban livestock keeping. The results show that by-law enforcement mechanisms and occupation (at $p \geq 0.05$) had insignificant influence on the awareness of the by-laws. The results are in agreement with Bozoglu *et al.* (2016), who found that the students' socio-demographic and economic variables such as gender, age, mother education, father education, residence and family income were statistically significant in the formation and growth of environmental awareness.

4.3.2 Determinants of Awareness of Bylaws on ULK

The regression analysis was conducted to determine how variables, such as number of extension staff, extension visit, level of education, age, gender and occupation, effect awareness of by-laws on ULK. The response variable used is "awareness on bylaws/not

aware", this is a binary variable. The principal analytical tool used is the Binary Logistic Regression model, which is used to model dichotomous outcome variables. The reason attached to its selection is as recommended by Cox (1970) that in those situations where the response variable is qualitative and independent variables are mixture of categorical and continuous variables the statistical model preferred is the binary logistic regression model. Since, in this objective the response variable is qualitative and independent variables are mixture of categorical and continuous variables then, the statistical model preferred for the analysis is the binary logistic regression model.

The model is estimated using the maximum likelihood because it does predict probabilities, rather than just classes; therefore we fit it using likelihood. The estimated logistic regression model is:

$$\begin{aligned}\text{Logit (bylaws awareness)} = {} & 0.1806 + 1.1653\text{extension\_staff} + 1.1646\text{extension\_visit} \\ & + 1.1836\text{age} + 2.6600\text{gender} + 1.2221\text{education} \\ & + 1.0009\text{ocupation}\end{aligned}$$

The detailed results of regression estimates are shown in Table 4.7. The likelihood ratio chi-square of 41.46 with a p-value of 0.0000 is observed, implying that the independent variables, jointly, were important determinants of awareness of bylaws on ULK (Table 4.7). The "LR chi2" is analogous to the overall F-statistic in multiple regressions. It seeks to establish if using the logistic regression improves our ability to predict the response variable.

The tolerance statistic and/or variance inflation factor (VIF), which is a measure of collinearity were used to test for multicollinearity in the estimated model (Collinearity Diagnostics). Greene (2012) points out that since non-experimental data will never be orthogonal to some extent multicollinearity will always be present. From various recommendations on acceptable levels of VIF, a value of 10 is recommended as the maximum (Gujarati, 2004; Kennedy, 1992). However, a recommended maximum VIF value of 5 (Rogerson, 2001) and even 4 (Pan and Jackson, 2008) have also been recommended in the literature.

It may be seen from Table 4.7 that the tolerance statistics and VIF values of all the explanatory variables were greater than 0.20 and less than 4.0 respectively. These collinearity statistics indicate that there was low incidence of multicollinearity among the explanatory variables implying that the estimated parameters were stable and reliable. In the light of the above statistical and econometric criteria, the estimated model was regarded as the best and the impact of the independent variables in that model were therefore, discussed.

Table 4.7: Regression Model Estimates for Determinants of Awareness of Bylaws on ULK

bylaws awareness	Odds Ratio	Std. Error	z	P>|z|	Tolerance Statistic	VIF
extension staff	1.1653	0.0199	8.95	0.000***	0.429	2.333
extension visit	1.1646	0.0202	8.79	0.002**	0.729	1.372
age	1.1836	0.1088	1.83	0.000***	0.485	2.064
gender	2.66	1.5204	1.71	0.014*	0.434	2.304
education	1.2221	0.4271	0.57	0.000***	0.474	2.111
occupation	1.0009	0.001	3.86	0.614	0.429	2.333
cons	0.1806	0.0428	-7.22	0.000	0.728	1.373

****= Significant at P < 0.001; ** = Significant at P < 0.01, * =Significant at P < 0.05; Log likelihood = 41.46; Prob> chi2= 0.0000*

The findings from logistic regression analysis revealed that, with the exception of occupation of the household head, other variables such as number of extension staff, extension visit made by extension officer, age of household head, gender and education are statistically significant. These variables are significantly affecting the awareness of bylaws for urban livestock keeping.

The estimated model reveals that, number of extension staff is significantly affecting awareness level of bylaws related to urban livestock keeping ($P < 0.001$). The model indicates that the odds of being aware of bylaws related to urban livestock keepingare predicted to grow about 1.17 times larger for each additional number of extension staff devoted on urban livestock keeping, *ceteris paribus.* It is also revealed that, controlling other factors, the odds of being aware of bylaws related to urban livestock keepingare predicted to grow about 1.16 times larger for each additional extension visit. So, if there are two urban livestock keeping household heads in a particular area among the studied city and Municipal the household head who has been visited more by extension officer has predicted odds of being aware of bylaws related to urban livestock keeping of1.16*1.16 or 1.35 times larger than the household head that is less visited.

The estimated model reveals that, holding other factors constant, the odds of being aware of bylaws related to urban livestock keepingare predicted to grow about 1.22 times larger for each additional year of education. So, if two urban livestock keeping household heads differ by 2 years of education, the household head with more education has predicted odds of being aware of bylaws related to urban livestock keeping of 1.22*1.22 or 1.49 times larger than the household head with less education. Likewise, if two household heads differ by 10 years of education, the odds that the household head

with more education is aware of bylaws related to urban livestock keeping are 1.22^{10} or 7.3 times larger than those of the household head with less education.

The estimated model reveals that, the age of household is significantly affecting the awareness level on of bylaws related to urban livestock keeping ($P < 0.001$). The model indicate that the odds of being aware of bylaws related to urban livestock keepingare predicted to grow about 1.18 times larger for each additional years of age, *ceteris paribus* - implying that, if two household heads differ by 10 years of age, the odds that the older household head is aware of bylaws related to urban livestock keeping is 1.18^{10} or 5.2 times larger than the household head with less years of age.

The finding from logistic regression analysis reveals that, the gender of household is significantly affecting the awareness level of bylaws related to urban livestock keeping ($P < 0.001$). It is revealed that the odds of being aware of bylaws are predicted to be about 2.66 times larger among men (controlling for other factors) than they are among women.

The results are in agreement with Bozoglu *et al.* (2016), who found that socio-demographic and economic variables such as gender, age, education and family income were statistically significant in the formation and growth of environmental awareness.

In logistic regression analysis, the odds ratios greater than 1 correspond to "positive effects" because they increase the odds. While the odds ratios between 0 and 1 correspond to "negative effects" because they decrease the odds. On the other hand, odds ratios of exactly 1 correspond to "no association." It is recognized that an odds

ratio cannot be less than 0. In that regard, the variable occupation in the model indicated to have no association with awareness on bylaws related to urban livestock keeping.

4.4 Bylaws and Conflict Resolution

The second objective of this study intended to examine how by-laws coupled with urban management help to resolve conflicts resulting from urban livestock keeping.In order to establish the effectiveness of the extension officers in this aspect, the following variables were considered: number of the available extension officers, number of extension visits received by livestock keepers, respondents' awareness of the bylaws on urban livestock keeping, peoples' knowledge of environmental pollution and, efficient enforcement of bylaws on urban livestock keeping.

4.4.1 Number of Livestock Officers

Inadequate extension services to farmers in Tanzania have largely been attributed to inadequate number of extension staff (Angello *et al.* 2016; Semwenda, 2016; Mcharo 2013). In order to clearly establish the factors behind unsatisfactory provision of extension services by livestock officers, we first need to establish if livestock keepers know how many livestock officers are available in their areas. This is important because it is the livestock keepers themselves who are supposed to demand the services of the officers. Table 4.8 gives the impression of livestock keepers' knowledge of the available livestock officers in their area.

Table 4.8: Number of Livestock Officers known to the Respondents (N = 298)

Known number of Livestock Officers	Dodoma CC		Morogoro MC		Total	
	No. of Resp.	%	No. of Resp.	%	No. of Resp.	%

1	118	74.7	114	81.4	232	77.9
2	27	17	22	15.7	49	16.4
3	6	3.8	3	2.2	9	3.0
4	5	3.2	0	0	5	1.7
5	2	1.3	1	0.7	3	1.0
Total	**158**	**100**	**140**	**100**	**298**	**100**

Source: Field Data (2017)

According to Table 4.8, more than three quarters of the respondents (77.9%) knew only one staff who was involved in activities related to urban livestock keeping. There were few respondents who knew more than 4 extension staff in their area. The implication of these results is that the study areas had shortage of extension workers to meet the needs. The fact that there were some respondents who knew more than four staff, however, implies that the area has a reasonable number of livestock officers to assist the livestock keepers in observing the recommended husbandry practices under urban conditions.

It was found that, out of the seven (7) wards visited in Morogoro Municipality, only one ward had no livestock officer. Similarly, out of 8 wards in Dodoma City, only two (2) had not been allocated their own livestock officers. Under the current staffing position, livestock keepers cannot abide by the stipulated bylaws either because they don't know the bylaws due to shortage of livestock extension officers, staff inefficiency in delivering the messages timely and effectively to livestock keepers; or else the livestock keepers themselves are unwilling to make use of the available extension staff. It was however, difficult to establish the extent to which the available staff fell short of their actual requirements in each ward since there are no clearly established staff requirement criteria. The current government efforts aimed at ensuring each ward had

at least one agricultural extension officer. But the wards' population and area sizes differ, making comparison in terms of number of staff inappropriate.

4.4.2 Extension Visits to Livestock Keepers

Effectiveness in the delivery of extension services is not only determined by number of staff, but also the frequency of their visits. The respondents were asked whether they had been visited by agricultural extension staff or not. The responses by the respondents are indicated in Table 4.9.

Table 4.9: Respondent's Response on being Visited by Agricultural Extension Staff (N = 298)

Visited	Dodoma CC		Morogoro MC		Total	
	No. of Resp.	%	No. of Resp.	%	No. of Resp.	%
Yes	105	66.5	86	61.4	191	64.1
No	53	33.5	54	38.6	107	35.9
Total	**158**	**100**	**140**	**100**	**298**	**100**

Source: Field Survey (2017)

The results in Table 4.9 show that majority (64.1%) of the respondents had been visited at least once in the past twelve months. This is also an indication of availability of agricultural extension staff in the study area. However, since some of the respondents were not visited, these results also imply that there were some areas where livestock officers reached and supported farmers, and others were not reached at all. The possible explanation is that there is either shortage of staff; livestock keepers do not demand livestock services or the staff were not well distributed in the wards. It may as well be true, that unvisited farmers did not know that they were supposed to demand for services.

In view of the availability of different extension officers who deal with activities related to urban livestock keeping, respondents were also asked to indicate whether they had ever received any advice from each of the relevant officers; namely livestock officers, environmental officers, urban development planners and health officers. This was important in the understanding of the dynamics of the providers of extension services in the area (in terms of their availability and effectiveness).Table 4.10 gives a summary of the responses on whether respondents ever received any advice from various extension staff or not.

Table 4.10: Percentage of Respondents with Respect to Receipt of Advice from Various Extension Officers (N = 298)

Received advice	Category of Extension Agent							
	Livestock Officer		Environmental Officer		Urban Planner		Health officer	
	No. of Resp.	%	No. of Resp.	%	No. of Resp.	%	No. of Resp.	%
Yes	164	55.0	39	13.1	14	4.7	138	46.3
No	134	45.0	259	86.9	284	95.3	160	53.7
Total	**298**	**100**	**298**	100	298	**100**	**298**	**100**

Source: Field data (2017)

Results in Table 4.10 show that livestock officers were the most common extension staff in the study areas (55.0%) followed by Health officers (46.3). Urban planners and environmental officers were unpopular to livestock keepers. This implies that there is a significant awareness by farmers on the delivery of traditional livestock services such as disease control, as well as provision of public health education for disease control. Unavailability of services from environmental officers implied limited provision of education on land use planning, environmental pollution and environmental management.

4.4.3 Effectiveness of Extension Staff by Selected Criteria

In view of the discussion above and other related preceding sections, we can deduce the following as being determinants of effectiveness of extension staff: through assessment of peoples' awareness of the existing bylaws on urban livestock keeping; level of enforcement of the bylaws; visiting livestock keepers; peoples' knowledge on environmental pollution and, adequacy of extension staff in the area. Table 4.11 gives a summary of responses on how the selected effectiveness criteria applied to their situation.

Table 4.11: Respondents' Multiple Responses on the Criteria for Effectiveness of Livestock Officers and other Extension Staff

Criteria	Response				Total	
	Yes		No			
	No. of Resp.	%	No. of Resp.	%	No. of Resp.	%
People are awareness of bylaws	63	21.1	235	78.9	298	100
Livestock keepers are often visited	62	30.7	140	69.3	202	100
Lack of Environmental pollution knowledge	69	23.2	228	76.8	298	100
Shortage of extension officers	62	20.8	236	79.2	298	100
Bylaws are well enforced	107	35.9	191	64.1	298	100

Source: Field Data (2017

Based on results in Table 4.11, we can deduce that, agricultural extension officers and other extension staff were generally ineffective in the study area since majority of the respondents were not aware of the existing bylaws on urban livestock keeping; livestock keepers were not often visited by them and that they didn't enforce bylaws. However, respondents had the opinion that the number of staff was enough to provide the needed services and that people were knowledgeable of environmental pollution.

It was anticipated that, environmental pollution due to urban livestock keeping was consequently causing conflict between different groups of urban dwellers and livestock keepers; and that by-laws could mitigate such conflicts. The manner in which the bylaws could be useful instruments of conflict resolution was considered to be through effective enforcement of bylaws, availability of sufficient extension staff, close follow up and supervision by leaders and extension staff, peoples' involvement in preparation of the by-law and, the frequency of visits to livestock keepers by extension staff. The respondents were asked to choose one of the variables above which was most relevant to them. Figure 4.1 indicates responses on the methods for ensuring that bylaws resolve conflicts.

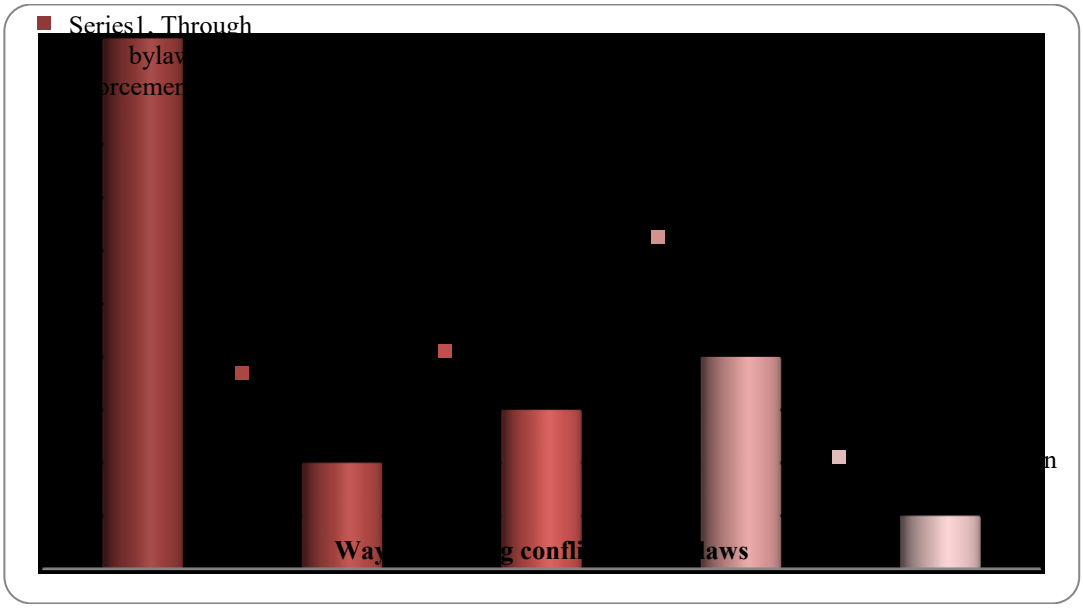

Figure 4.1: Ways by which By-laws Solve Conflict Resulting from ULK

Results in Figure 4.1show that majority of the respondents (50%) were of the opinion that by-law enforcement is the most effective way for conflict resolution in their area; followed by those who felt a need for their full participation in making the by-laws

(20%). Extension visits, number of extension staff and supervision by relevant people were considered only marginally important.

4.4.4 Enforcement of By-laws

It has been established in Table 4.5 that more than three quarters of the respondents were not aware of the bylaws that govern urban livestock keeping. It has also been established in Figure 4.1 that respondents were of the opinion that effective enforcement of the by-laws was essential in addressing most of the conflicts related to urban livestock keeping. One basic question for which this study intended to address was: to what extent were the available bylaws enforced by the relevant authorities? This is important in the understanding of the current institutional capacity to address environmental pollution and social conflicts arising from livestock keeping.

It was anticipated that for bylaws to be enforced, local leadership (councillors, political and religious leaders) were considered paramount to actively engage the local community, particularly livestock keepers, in collaboration with the relevant government staff, namely Livestock Officers, Environmental officers, Town planners and Health Officers who were considered well placed in conducting public education and delivering extension messages to the farmers on daily basis. The community members themselves are at the centre of the process, and have to report to the authorities (leaders, staff) all incidences of pollution that are taking place in their area. It was anticipated that some of the livestock keepers who caused trouble to other people were brought before the court of law for legal action to be taken against them. Under extreme

situation where livestock caused perpetual damage and nuisance to people, the livestock owners were supposed to be driven out of the residential areas.

It was found that, the by-laws were marginally enforced by all categories of enforcers in both urban centres. This enforcement weakness was found to originate right from the time an urban farmer decides to keep livestock. While the by-laws require all those who want to keep livestock in urban areas to obtain permit from Livestock officers, such permits had never been issues by the relevant authorities to anyone since the requirement is unknown to urban dwellers altogether. Subsequently, all enforcement mechanisms have generally been weak. Table 4.12 shows the responses on how different enforcement mechanisms were being implemented in the study area.

Table 4.12: Respondents' Multiple Responses on Enforcement of the Current By-laws (N = 298)

Variable	Dodoma CC		Morogoro MC		ALL	
	No. of Resp. Involved	%	No. of Resp. Involved	%	No. of Resp. Involved	%
Supervision by Leaders	50	31.7	35	25.0	85	28.5
Supervision by Govt Staff	31	19.6	18	12.9	49	16.4
Reporting to the authority	136	86.1	113	80.7	249	83.6
Removing livestock keeper	10	6.3	3	2.1	13	4.4
Taking Legal action	3	1.9	5	3.6	8	2.7

Source: Field Survey, 2017

Results in Table 4.12 show that supervision of the bylaws by either the local leaders or government staff was generally weak, as exemplified by a small percent of respondents who had ever witnessed this. Interestingly, when livestock cause problems to people; the community on its part, actively (83.6%) reports the incidences to where action is

expected to be taken. The results further show that legal actions to livestock keepers whose animals cause problems are uncommon (2.7%). Similar to this is removing them from the areas where conflict occurred (4.4%).

The implication of these results is that, while livestock keepers are not observing the bylaws, the relevant authorities are equally not taking necessary measures against the culprits. This situation is in effect forcing the affected individuals to defend themselves by taking unilateral and destructive actions against the livestock keepers.

In Morogoro, it was found that despite the presence of elaborate bylaws on how urban livestock keeping should be carried out, some farmers were not abiding by them since the bylaws were either not known or lacked clear enforcement mechanisms. The implementation of the bylaws was largely left to Livestock officers' personal interpretations and the means of enforcement available to them. It was also found that, the by-laws were not clearly coordinated at national level through President's Office, Regional Administration and Local Government (PO-RALG) to ensure they are within the common framework. Subsequently, the bylaws were often violated for lack of implementation resulting into serious consequences upon the livestock keepers themselves. This is evident in a story by one of the respondents from Morogoro Municipality to the researcher, who claimed to have suffered a great loss of his chickens that were poisoned by his neighbour when they were allegedly found feeding on his crops:

> "*I will never forget the day I lost all my chickens through poisoning by a neighbour. I used to keep my chickens locked in their hut. Although at*

times, few of them could get out through escape points of the hut, there were no serious damages ever reported by my neighbours. But this particular day, we were all out of home. It was a shock of the day when we found all our chickens (more than 100) dead and their carcases scattered all over! It was latter confirmed that they were poisoned when they were feeding on crops of my neighbour! It was a frustrating big loss, which forced me to move away from that place, and the house is now rented out."

This story reveals three inter-related aspects as far as bylaws on urban livestock keeping are concerned: first, that urban livestock keeping is not solely conducted under zero grazing system as purported by the bylaws; second, there is generally weak enforcement of the available bylaws by the relevant authorities and, third, that non observance of the laws by livestock keepers cause conflict with neighbours whose actions can be disastrous to livestock keepers and social cohesion in the community as a whole.

It was found that the Municipal authorities were frequently conducting campaigns against livestock that roam around the towns and, were confiscating some of them in order to be redeemed through payment of fines. This had, however, not stopped many more livestock keepers from violating the bylaws. From the theory of the public enforcement of law, it is clear that an individual will commit the harmful act if and only if his gain from doing so exceeds the fine. Since majority of them could pay the fines, the amount of fines being imposed are possibly relatively low making them easily manageable.

As regards to the laxity in the implementation of the current bylaws, it was found that, Dodoma City Council was issuing various directives over and over again. The directives were stressing on the need for livestock keepers to observe the City bylaws by controlling their livestock from roaming around. The fact that the City Council had to issue these directives oftentimes, is enough evidence that the by-laws were not being observed either due to lack of clear modality of implementing them, or were not clearly known to people as we have already established in the preceding sections.

One of the assumptions of this study was that if the current situation of environmental pollution and social conflict due to urban livestock keeping was not adequately addressed, then the bylaws were either weak or incomplete. Weak bylaws are those which cannot clearly state the actions needed to be taken and by who. Incomplete or inadequate bylaws could be those that do not recognize or apply to certain situations that could otherwise need their legal guidance. This aspect was not relevant in the field since the bylaws were literary not observed regardless of their contextual orientation. The results in Figure 4.1 as detailed in Table 4.12 on enforcement of bylaws suggest that inadequate awareness and poor community participation are the overriding causes. These findings are supported by Mowo *et al.* (2016) who observed that inadequate community participation in the process of bylaws formulation and enforcement is the main reason for the ineffectiveness of most natural resources management bylaws in Ethiopia, Tanzania and Uganda. This finding is also in line with common sense:

> *"A bylaw that is too vague, uncertain or unspecific may be unenforceable. It is a matter of common sense that a bylaw should be drafted in such a way that it can be fairly enforced. A local government seeking compliance*

must be able to point to a specific bylaw that clearly sets out how and why a person's actions (or non-actions) are prohibited. If a bylaw is drafted in an unclear way that prevents its enforcement, or leads to inconsistent decision making, then its administration will be problematic (Ombudsperson, 2016).

4.5 Livestock Keeping Systems

The third objective of this study sought to identify the commonly usedlivestock keeping systems practiced by livestock keepers in the study area. Understandably, most of environmental problems faced by urban dwellers due to livestock keeping are attributed to the nature of livestock keeping systems practiced. Livestock keeping systems can be categorized in different ways depending on the purpose to which the information is intended to serve (Smith and Olaloku, Op cit).

For the purpose of this study, three major systems of livestock keeping were considered namely; zero grazing, free range and semi free range systems. The extent of environmental pollution due to livestock keeping in urban areas can largely be attributed to one or two of these three livestock keeping systems. Respondents were asked to indicate the type of livestock keeping commonly used in their areas by urban livestock keepers. Table 4.13 summarizes the responses by the respondents on the most common type of livestock keeping system in the area.

Table 4.13: Respondent's Response on the most used Livestock Keeping Systems in the Study Area (N=298)

Livestock Keeping System	Frequency	Percentage

Zero grazing	113	37.9
Free range	33	11.1
Semi Free Range	152	51
Total	**298**	**100**

Source: Field Survey (2017)

According to Table 4.13, slightly above half of the respondents (51.0%) indicated that semi free range was the most common type of livestock keeping in their area, followed by zero grazing (37.9%). Yet, more than 10 percent were using free range system! These results are contrary to our expectation. Free and semi-free range systems are not suited to urban areas where animals are supposed to be confined for security and environmental protection purposes as purported by many municipal bylaws (Mlozi, 2003). For minimal environmental pollution and limited conflicts, zero grazing is considered the most appropriate livestock keeping system in urban areas (FAO, 2017). The bylaws for both, Dodoma and Morogoro Municipalities were also very clear on this; that livestock keepers must use zero grazing system.

In order to establish with certainty whether zero grazing system was really used in the study area or not, the respondents who were keeping livestock were also asked to indicate their mostly used livestock keeping system. Table 4.14 gives a summary of responses by livestock keepers on livestock keeping system they mostly used in the study area.

Table 4.14: Responses of Livestock Keepers on the Livestock Keeping System they Mostly use (N=202)

Livestock Keeping System	Frequency	Percentage

Zero grazing	56	27.7
Free range	38	18.8
Semi Free Range	108	53.5
Total	**202**	**100**

Source: Field Survey (2017)

Table 4.14 indicates that semi free range system was used by the majority of livestock keepers (53.5%); while the recommended zero grazing system which is also supported bylaws followed far back (27.7%). The results in the two tables (4.13& 4.14) are similar, although responses by livestock keepers themselves who were using zero grazing show that this recommended livestock keeping system is used by only slightly above a quarter of all urban livestock keepers.

Since the two livestock keeping systems which are not suitable for urban areas (free range and semi free range) represented more than 70 percent of livestock keeper respondents, this implies that there is a fundamental problem of compliance to bylaws by urban livestock keepers in the study areas. This is because the bylaws for both, Dodoma City Council and Morogoro Municipal Council required livestock keepers to use zero grazing system. These results are different from those by Alarcon *et al.* (2017) who found that in the city of Nairobi, over 50% of small farms and most medium-scale keepers raised their sheep and goats using zero-grazing practices; except for few small holder farmers who fed their animals through scavenging and vegetable markets waste and restaurant food leftovers. The probable reason for use of zero grazing by Nairobi farmers is the presence of strong extension services and enforcement of the related bylaws.

In view of the fact that livestock keepers were not exclusively using one system, and that a free range and semi-free range systems were substantially practiced, there was a possibility of having poorly managed wastes and destruction of plants leading to social conflicts

Figure 4.2: A Man Looking after his Goats as they Feed just along the Tarmac Road near his Home at Image-barabara Mpya, in Kikuyu Ward. It is not uncommon to see other types of livestock roaming around the urban areas under semi-free range system

4.6 Status of Urban Livestock Keeping

The first staring point to the understanding of the institutional challenges of urban livestock keeping was to establish the extent of livestock keeping in terms of number of households involved and types of livestock kept. The assumption was that, the bigger the number of livestock, the severer is the problem related to environmental pollution. Likewise, the nature and severity of pollution not only depends on the number of livestock in question, but also the type of livestock involved. Experience has shown that

some urban authorities prohibit certain animal types, which are considered to pose significant risk to health and nuisance (Butler, 2012). The percentages of respondents who indicated they were keeping livestock such as cattle, pigs, goats, sheep and poultry; and those who were not keeping any type of livestock are shown in Figure 4.3.

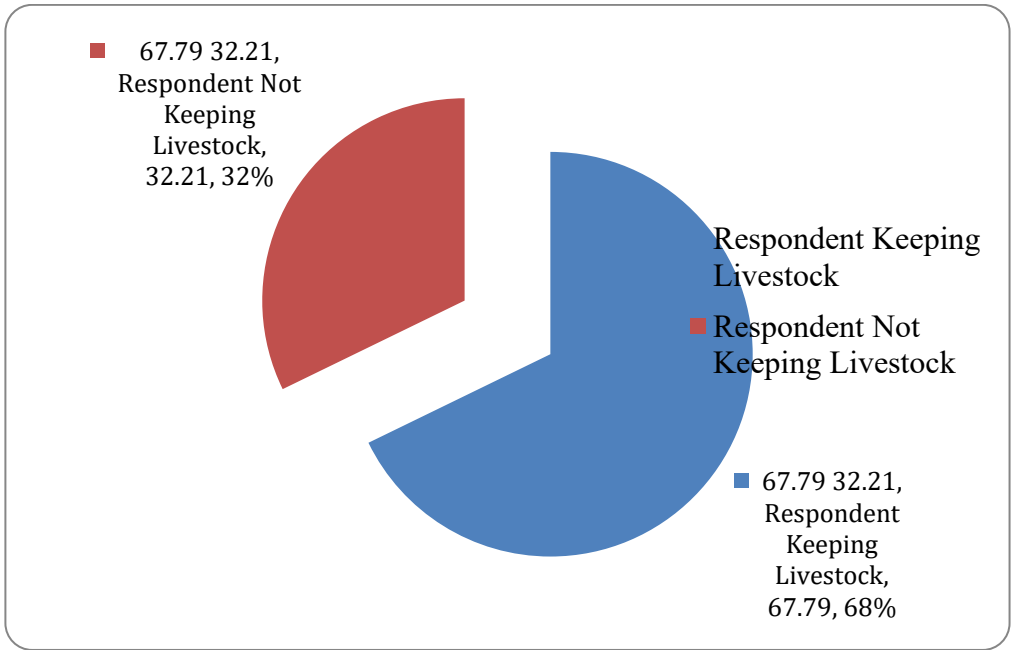

Figure 4.3: Respondent's involvement in Livestock Keeping

In Figure 4.3, majority of the respondents (68%) were keeping some livestock regardless of the types and number of animals kept. This implies that livestock keeping is an important livelihood activity to urban dwellers that deserves due attention in development planning. The common challenges that were considered to be associated with livestock keeping in urban areas were categorized into four major groupings: first, challenges related to environmental pollution per se namely; odour, noise and dust; second, were those challenges threatening human health; third were those related to destruction of infrastructures (such as water taps, gardens, fences and ornamental plants) and lastly, are those affecting social relations (conflict). Table 4.15 gives a

summary of respondents' responses who knew the existence of a particular challenge in their area.

Table 4.15: Respondent's Multiple Response on Knowledge of Challenges of Urban Livestock Keeping (N = 298)

Variable	Dodoma CC		Morogoro MC		ALL	
	No. of Resp. Involved	%	No. of Resp. Involved	%	No. of Resp. Involved	%
Environmental Pollution	71	45	79	56.4	150	50.3
Infrastructure Destruction	59	37.3	28	20	87	29.2
Diseases	32	20.3	17	12.1	49	16.4
Social Conflict	74	46.8	58	41.4	132	44.3

Source: Field Survey (2017)

According to Table 4.15 more than half of the respondents (50.3%) knew the existence of environmental pollution in the study area; followed by those who knew there were some conflicts related to urban livestock keeping (44.3%) Respondents had a limited knowledge on diseases caused by livestock (16.4%) and livestock destructive cases in their area (29.2%). These findings are in agreement with those of Alam *et al.* (2016) in Bangladesh, who found thatall the respondents (100%) were aware that livestock keeping could have negative effect on urban health and other environmental problems.

The respondents' personal encounters with various environmental problems caused by different types of livestock are summarized in Table 4.16. The environmental problems which were considered to pose social conflict include: heaps of waste, noise, dust, odour and destruction of plants.

Table 4.16: Respondent's Personal Encounters with Challenges by Type of Livestock (N = 298)

Variable	Challenges encountered

Type of Livestock	Heaps of waste		Noise		Dust		Odour		Destruction of plants		Conflict with neighbour	
	No. Res. Involved	%	No. Res. Involved	%	No. Res Involved	%	No. Res Involved	%	No. Res. Involved	%	No. Res Involved	%
Cattle	136	45.6	50	16.8	42	14.1	80	26.8	99	33.2	101	33.9
Pig	57	19.1	77	25.8	15	5	198	66.4	37	12.4	215	72.1
Goat	53	17.8	66	22.1	36	12.1	46	15.4	136	45.6	112	37.6
Sheep	44	14.7	25	8.4	38	12.8	39	13.1	74	24.8	66	22.1
Poultry	118	39.6	79	26.5	35	11.7	72	24.2	186	62.4	176	59.1

Source: Field Survey (2017)

The detailed description of the results in Table 4.16 is provided hereunder:

4.7 Environmental Effects of Urban Livestock Keeping

The fourth objective of this study was to examine the effects of livestock keeping on the environment. The purpose of establishing this objective was to know if the livestock in the study area cause pollution to the environment and social conflict to community or not. The existence of environmental pollution and social conflict in caused by ULK is an evidence of incompliance of livestock keepers to bylaws.

4.7.1 Environmental Pollution through Heaps of Wastes

One of the problems that are expected to happen in urban areas as a result of livestock keeping is accumulation of livestock wastes in open spaces for lack of appropriate disposal areas. Such wastes not only make people feel uncomfortable to look at, but also produce unpleasant smell which, attract swarms of flies, and threatens eruption of contagious diseases.

According to Table 4.16, cattle keeping is leading in causing heaps of waste in urban areas as majority of the respondents (45.6%) pointed out; followed by poultry (39.6%). The other types of livestock were considered relatively less contributors to heaps of

livestock wastes around the towns. The implication of above results is that, appropriate waste disposal areas by livestock keepers are not seriously considered when planning for cattle and poultry keeping in urbanized areas.

Figure 4.4: One of the Heaps of Animal Wastes in an Open Space Near Residential Houses in Kikuyu Ward in Dodoma Municipality

It was found that the by-laws for health sector required any person intending to keep livestock in urban areas to ensure that there was adequate space to accommodate the activity. This was a general directive whose operationalization required a clear clarification in terms of who decides on what size of the available space is adequate or not.

Effective management of livestock wastes can significantly reduce pollution and conflicts among urban dwellers. This is especially important for wastes that produce nasty smell like that of pigs' dung.

Disposal areas can present a formidable challenge in urban livestock keeping, and therefore a careful selection of where to dispose the wastes is needed. It was found that most of livestock keepers were disposing of animal wastes outside their houses and in pits close to the houses due to lack of proper disposal areas, low knowledge on waste management and lack of disposal guidance.

It can be concluded that, urban dwellers in the study area are generally not aware of the existing best waste management practices; have limited space for livestock waste disposal and, are not knowledgeable of the relevant laws and requirements for urban livestock keeping.

4.7.2 Environmental Pollution through Noise

Noise is one of the forms of environmental pollution. When livestock make noise, it disturbs people and distracts concentration on some important tasks, events, or leisure. This can also cause conflict between livestock keepers and those who affected by noise. In Table 4.16, poultry was the noisiest livestock of all in the study area (26.5%), followed by pigs as indicated by slightly more than a quarter of the respondents (25.8%). Generally, however, livestock noise does not feature as serious environmental problem in the study area since only few respondents reported to have experienced it.

4.7.3 Environmental Pollution through Dust

Livestock keeping is considered to cause dusty environments through their powdery feeds and dried wastes if not well managed. The results in Table 4.16, however, show insignificant number of respondents who indicated having encountered disgusting dusty

situation resulting from different types of livestock. The results show that environmental pollution through dust was the least of all other forms of pollution caused by urban livestock keeping in the study area.

4.7.4 Environmental Pollution through Odour

Bad smell is one of the commonest environmental pollution associated with livestock keeping, especially in congested urban areas. Odours come directly from certain types of animals such as male goat, fresh animal wastes, decomposing livestock wastes and, rotting remains from animal feeds. In Table 4.16 pigs were considered the leading animals in producing bad odour in the study area (66.4%), followed by cattle (26.8%). Other types of livestock were considered less significant in causing odour in the study area. We have already established that pigs were among the animals least kept in the study area. One of the reasons of their undesirability can partly be attributed to the odour they cause.

4.7.5 Environmental Pollution through Destruction of Plants

Almost all livestock are destructive to plants such as crops in the field and, planted trees and garden lawns around homes if are not well confined. The nature and magnitude of destruction depends on the type of livestock involved. Results in Table 4.16 show that poultry was the most destructive livestock of all (62.4); followed by goats (45.6). These results were expected: small scale poultry keeping particularly chickens can be done by many poor households, and if they are left to freely search for their food they can end up eating planted trees and crops. Similarly, goats are stubborn animals to tame, they can easily escape from the sight of the herder and cause havoc to crops planted under urban agriculture (Lupala and Lupala, 2003).The implication of these results is that,

free range and semi free range livestock keeping systems are not suited to urban areas for all types of livestock.

It was found that, despite the by-laws stipulating a maximum number of four large animals and using zero grazing to avoid environmental pollution and conflict; many urban livestock keepers were keeping more than the required number, and were leaving their livestock to roam around the streets. This was largely because the livestock keepers were ignorant of the by-laws as previously discussed.The findings are similar to those of Angello, *et al,* (2016) who found that many animals in Kinondoni and Morogoro municipalities were roaming around in search for food.

Figure 4.5: A Section of Local Chicken Feeding on Vegetables in an Abandoned Home Garden that was Frequently Fed on by Chicken in Mwembesongo Ward in Morogoro Municipality

These findings are in line with the report by the Tanzania Smallholder Livestock Sector (URT, 2016), which indicated that the most common urban herds are composed of poultry (30% of all herds). Intensive poultry keeping in Tanzania is currently most practiced in urban areas. The cost involved in keeping chicken is relatively low, and many can afford to keep few chickens.

Achi-square test was conducted to ascertain whether the two categorical variables under the study (keeping livestock and environmental pollution) were independent or not, as indicated in Table 4.17 on effects of ULK on environmental pollution.

The chi-square test of association between keeping cattle and environmental pollution rejected null hypothesis of independence at 5% level of significance on pollution variables except one (dust), implying that keeping cattle could result into noise, heaps of waste, odour, and plant destruction. Likewise thenull hypothesis of independence between cattle and conflict was rejected at 5% level of significance indicating that keeping cattle could result into conflict among community members in the study area. The fact that the Chi-square test failed to reject null hypothesis of independence at 5% level of significance between keeping cattle and environmental pollution resulting to dust implies that there is little or no evidence to suggest that keeping cattle could cause dust among the community in the study area on the basis of the data provided.

The chi-square test of association between keeping pig and environmental pollution rejected null hypothesis of independence at 5% level of significance on all cases except one case (dust), implying that keeping pig in urban areas could result into environmental pollution namely odour, noise, plant destruction, and heaps of waste.

Table 4.17: Effects of Urban Livestock Keeping on Environmental Pollution

	Environmental Pollution											
Livestock	**Odor**		**Noise**		**Heaps**		**Dust**		**Plant Destruction**		**Conflict**	
Keeping	**chi2**	**P-value**	**chi2**	**P-value**	**chi2**	**P-value**	**chi2**	**P-value**	**chi2**	**P-value**	**chi2**	**P-value**
Cattle	64.03	0.000	108.91	0.000	59.42	0.000	0.95	0.330	53.67	0.000	45.80	0.000
Pig	209.45	0.000	185.09	0.000	159.53	0.000	0.7382	0.390	172.09	0.000	163.49	0.000
Goat	275.13	0.000	191.75	0.000	185.49	0.000	2.1552	0.142	98.31	0.000	206.79	0.000
Sheep	0.0535	0.817	0.2982	0.585	186.44	0.000	1.8262	0.177	63.19	0.000	0.5716	0.450
Poultry	158.55	0.000	1.1645	0.281	242.80	0.000	0.7634	0.382	117.88	0.000	84.92	0.000

Further analysis indicated that keeping pig in urban areas could also result into conflict among the community in the study area at 5% level of significance. The fact that the Chi-square test failed to reject null hypothesis of independence at 5% level of significance between keeping pig and environmental pollution resulting to dust implies that there is little or no evidence to suggest that keeping cattle could cause dust among the community in the study area on the basis of the data provided.

Similarly, the chi-square test of independence between keeping goats and environmental pollution rejected null hypothesis of independence at 5% level of significance on all cases except one case (dust), implying that keeping goats in urban areas also could result into environmental pollution namely odour, noise, plant destruction, and heaps of waste. Further analysis indicated that keeping goat in urban areas could also result into conflict among the community in the study areas at 5% level of significance.

Following a Chi-square test of independence conducted to ascertain whether keeping sheep could results into environmental pollution, the test results rejected the null hypothesis of independence at 5% level of significance on two cases, implying that keeping sheep in urban areas also could result into environmental pollution namely plant destruction and heaps of waste. The test statistic failed to reject null hypothesis of independence between keeping sheep in urban areas and environmental pollution namely odour, dust and noise at $P \geq 0.05$, also test statistic failed to reject the null hypothesis of independence between keeping sheep in urban areas and social conflict at $P \geq 0.05$.

In this category of livestock the analysis indicated that keeping sheep could not result into noise, dust, douror social conflict. This implies that there is little or no evidence to suggest that keeping sheep could cause odour, dust, noise and social conflict among the community in the study area on the basis of the data provided.

With regards to poultry keeping the chi-square test of independence rejected the null hypothesis of independence at 5% level of significance on all cases, except two cases (noise and dust) implying that keeping poultry in urban areas could also result into environmental pollution namely, odour, plant destruction and heaps of waste.

In this category of livestock the analysis indicated that keeping poultry does not result into noise and dust both at $P \geq 0.05$; but could result into conflict among the community in the study areas at 5% level of significance. The implication of these results is that, regardless of the type of livestock involved, there are negative environmental consequences associated with keeping them in urban areas.

4.8 Trends of Incidences of Problems Caused by ULK

One of the key areas of interest in this study was to know whether the problems caused by urban livestock keeping were still existing, to what extent and, the current trend of their occurrence; in order to know if they can still constitute a development agenda. Respondents indicated the current trend of each case involving problems caused by urban livestock keeping in terms of increasing trend, constant trend and decreasing trend as shown in Table 4.18.

Table 4.18: Respondents' Multiple Responses on Trends of Occurrences of Urban Livestock Keeping Challenges (N = 298)

Challenges encountered	Trend					
	Increasing		Constant		Decreasing	
	No. Resp. Involved	%	No. Resp. Involved	%	No. Resp. Involved	%
Odour, noise, noise and dust	128	43	127	42.6	43	14.4
Diseases	146	49	121	40.6	31	10.4
Destruction of infrastructure	161	54,0	103	34.6	33	11.1
Destruction of gardens and ornaments	146	49,0	121	40.6	31	10.4
Conflicts among community members	156	52,3	109	36.6	33	11.1
Inappropriate livestock waste disposal	171	57.4	97	32.6	30	10.1

Source: Field Survey (2017)

The results in Table 4.18 show that respondents felt that the problems caused by urban livestock keeping were generally increasing rather than decreasing in their areas, as exemplified by high percent of respondents whose opinion was on increasing trend in all problems related to urban livestock keeping.

While these results cannot be taken on absolute terms as voiced out by the respondents, they are nevertheless an important reflection on how people feel bad to see the problems that are caused by urban livestock keeping in their areas on daily basis. One respondent whose vegetable garden was occasionally invaded by different groups of livestock in Dodoma City had the following lamentation:

> "*You see this garden, it was very beautiful. It was a great toil on my side to prepare it as I spent almost 300,000/= to dig up the well - water table is just near. Then I fenced it locally using thorny trees. I grew tomatoes and Chinese cabbage, and was expecting to get at least 40,000/=daily from tomato and Chinese cabbage sales. When the vegetables were about to be harvested, cattle destroyed everything! Since then, the garden has been under constant attacks by goats, chickens and cattle. It is just impossible to continue with this activity!"*

Based on the foregoing discussion on effects of urban livestock keeping in the two Municipal cities of Dodoma and Morogoro, it can be argued that as much as livestock keeping has continued to be integral part of urban life, its management has continued to fall short of proper urban development dynamics. There is poor animal waste disposal resulting into absurd heaping, livestock cause noise, destructs infrastructure and gardens, cause dusty conditions, nasty smell and, diseases to urban dwellers – resulting into conflict with urban livestock keepers. These effects are demonstrated by all types of livestock at varying degrees. Livestock keeping of any type in urban areas has, therefore, negative environmental and health consequences thus calling for effective enforcement of bylaws on urban livestock keeping.

4.9 Summary and Conclusion of Findings

The foregoing discussion has revealed pertinent institutional challenges that confront urban livestock keeping. They include low awareness of people on bylaws, limited use of bylaws in resolving conflict resulting from ULK, inappropriate livestock keeping systems, various environmental effects in urban areas and, ineffectiveness of livestock officers and other leaders.

Based on regulative pillar of the institutional theory that has tangible rules, laws, bylaws and regulations as formalized guidelines; the study sought to understand why people do not comply with bylaws through government enforcement mechanism. It has been established that the regulative capacity of bylaws in sustaining urban livestock keeping is constrained by poor community awareness of the bylaws, weak application of bylaws to resolve conflict, inadequate extension staff, multiplicity of the environmental effects

of urban livestock keeping, inappropriate livestock keeping systems and, inefficient extension staff.

The results point to the fact that environmental problems caused by urban livestock keeping were common but largely tolerable since livestock keeping has traditionally been part and parcel of urban life. The bylaws were not effectively enforced because many urban dwellers from all socio-economic characteristics were involved in urban livestock keeping; there was inadequate staff and people were not aware of existing bylaws. Each municipal council designs and crafts its own bylaws, making the contents to differ from one council to another with limited coordination of their requirements. The implementation of the bylaws rests on the Livestock officers and other extension staff who were inadequate and ineffective. Although there were no clearly established criteria on livestock staff requirement, the available livestock officers were generally not effectively and efficiently serving livestock keepers. Consequently, livestock keepers had limited education on technical issues such as land use planning, environmental pollution and environmental management. Moreover, livestock keeping was not exclusively conducted under zero grazing system as purported by the bylaws leading to occasional environmental problems and conflicts. This often resulted into disastrous consequences to urban livestock keepers themselves.

The main contribution of this study on environmental challenges of urban livestock keeping is twofold: first, not all types of livestock cause similar environmental effects. Disaggregating the effects on the basis of types of livestock involved provides more clarity on the nature of policy action to be taken for sustainable urban livestock keeping. Second, participation is central to community awareness. Where there is no genuine

community participation in drafting a bylaw, there is likelihood that the bylaw will be vague, uncertain or unspecific - making it unenforceable. Compliance to bylaws demands them to be clear to those who will be affected by them as to how and why their actions or inactions are prohibited.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Chapter Overview

The chapter is subdivided into three sections: section one is a summary of the study findings in relation to the objectives of the study. Section two presents conclusion on the study findings while section three recommends on some possible measures to improve institutional framework for sustainable urban livestock in Tanzania.

5.2 Summary of the Study

The general objective of this study was to assess the institutional challenges of managing urban livestock keeping in Tanzania. The study was conducted in Dodoma City Council and Morogoro Municipal Council where urban livestock farming consequences have frequently been reported. The study was based on a realist institutionalism facet of the institutional theory, and made use of bylaws under the regulative pillar.

The study employed purposive procedures in the selection of study wards based on livestock population, and in the selection of key respondents. A systematic sampling procedure was adopted in selecting the households based on ward resident registers. The study addressed four areas as far as challenges of managing bylaws on urban livestock keeping are concerned: assessment of community awareness of by-laws on urban livestock keeping, use of by-laws coupled with their enforcement capacity for conflict resolution, environmental effects of urban livestock keeping and urban livestock keeping systems practised.

This study was guided by the institutional theory on regulative pillar using bylaws. Four specific objectives were tested; the first objective examined the awareness on current

by-laws on environmental pollution resulting from urban livestock keeping. Findings through descriptive analysis have shown that the majority of the respondents (78.7% in Table 4.5) were not aware of bylaws on urban livestock keeping. A chi-square test of association between awareness of bylaws and the socio-economic and demographic characteristics of the respondents indicated that awareness of bylaws was strongly associated with extension visits, number of extension staff, level of education, age of the respondent and gender. Low enforcement and occupation, on the other hand, were found not directly associated with awareness of bylaws ($p \geq 0.05$).

The findings from logistic regression analysis revealed that, with the exception of occupation of the household head, other variables such as number of extension staff, extension visits made by extension officer, age of household head, gender and education are statistically significant. These variables are significantly affecting the awareness of bylaws for urban livestock keeping, implying that the independent variables, jointly, were important determinants of the awareness of bylaws on ULK. Therefore, there is a need for livestock and extension officers to deliberately raise people's awareness about the bylaws in line with those variables.

The second objective of the study examined how by-laws coupled with urban livestock management help to resolve conflicts resulting from urban livestock keeping in the study area. It was found that City Councils and Municipal councils had generally short supply of livestock officers who were still, ill-equipped with working tools. There are no clearly established criteria on livestock staff requirement; and the available staff are not effectively and efficiently serving the livestock keepers; livestock keepers - who have limited knowledge on land-use planning, environmental pollution and

environmental management. Based on results in Table 4.10 which identified certain criteria of effectiveness namely; peoples' awareness of the existing bylaws on urban livestock keeping, level of enforcement of the bylaws, visiting of livestock keepers, peoples' knowledge on environmental pollution and, adequacy of extension staff in the area; it was found that, agricultural extension officers and other extension staff were generally ineffective in the study area since the majority of the respondents were not aware of the existing bylaws on urban livestock keeping; livestock keepers were not often visited, and that they didn't enforce bylaws.

The variables through which the bylaws were considered useful instruments of conflict resolution include: effective enforcement, availability of sufficient extension staff, peoples' involvement in preparation of the by-laws, specific supervisory role of leaders and extension staff and, frequency of visits to livestock keepers by extension staff. The Majority of the respondents (50%) were of the opinion that enforcement of bylaws was the most effective way of resolving conflicts in the area, followed by those who said people's involvement in bylaw preparation was the most effective way of conflict resolution. Thus, livestock officers need to enforce the bylaws that govern urban livestock keeping.

The third objective of the study was to identify the urban livestock keeping systems, which are practiced by livestock keepers in the study area. Findings have revealed that free range and semi free range constituted over 70 percent of all livestock keeper respondents. The results are contrary to the expectation since the current bylaws require zero grazing system and prohibit the two systems to be practiced in the urban areas (Mlozi, 2003).

The fourth objective of the study sought to establish the environmental effects of ULK in the study area. It was found that environmental problems caused by urban livestock keeping include odour, noise, heaps of animal wastes, disease, destruction of property and conflict. Inability of farmers to permanently feed their livestock indoors leads to perpetual environmental pollution and social conflict - sometimes with disastrous consequences upon livestock keepers themselves. Based on the chi-square test conducted to ascertain whether there was any association between the two categorical variables under the study (keeping livestock and environmental pollution in terms of waste heaps, noise, odor, dust, destruction of plants and conflicts) results in Table 4.16 indicate that there was strong association. The few exceptions were on certain types of livestock. For instance, keeping sheep was not found to cause odor, noise, dust and conflict; and poultry, cattle, pig and goats keeping were not likely to cause dust. This could be attributed to biological nature of these types of livestock.

5.3 Conclusions

In the light of the findings based on the assessment of the current institutional challenges specifically by-laws which govern urban livestock keeping, it can be concluded that there is still unawareness of people on the bylaws; the by-laws are not effective tools for conflict prevention and resolution because they are incomplete and not effectively enforced; urban livestock keeping systems are not concomitant with urban realities and, by-law enforcement mechanisms and extension services were inadequate to guarantee full compliance.

5.4 Recommendations

From the conclusions drawn from the findings, the following recommendations are made for actions to be taken in order to improve the current institutional framework for sustainable urban livestock keeping.

5.4.1 Clear Government Policy on Urban Agriculture is Needed

The current policies such as the National Livestock Development Policy and other related laws focus more attention on the management of livestock keeping in rural areas. There is no specific development policy on urban livestock keeping and urban agriculture in general; despite its silent recognition in terms of extension services provision. This lack of clarity makes it extremely difficult to address the matters related to urban livestock keeping. We recommend that the Government comes out with clear policy and related laws on urban agriculture in general and urban livestock keeping in particular.

5.4.2 Improve Coordination of Urban Livestock Keeping

Our findings from this study have indicated that each urban authority prepares its own bylaws on urban livestock keeping and urban development in general, making their material content to differ from one local authority to another. Consequently, there is limited institutional coordination between the Local Government Authorities (LGAs) who craft the by-laws on urban livestock keeping, and the President's Office, Regional Administration and Local Government (PO-RALG) as an overall national coordinator. This goes together with unclear criteria for determining the number of extension staff required by each local authority. The observed discrepancies in the contents of the by-laws between Dodoma City Council and Morogoro Municipal Council point to the fact

that the general framework from which the bylaws are crafted and implemented needs to be improved by clarifying policy and legal issues at national level through the relevant Ministry in the President's Office, Regional Administration and Local Government. Detailed guidelines should be given by PORALG on every problem area that can call for establishment of a by-law to ensure all LGAs prepare comprehensive and harmonized by-laws. It is foreseen that when by-laws have common essential features they can be transferable on common matters, from one LGA to another.

5.4.3 Capacitate Ward Development Committees to Enforce Bylaws

It has been established in the findings that livestock officers are given exclusive mandate to give permits to livestock keepers and approve when they comply with the requirements for environmental quality. We have, however, indicated that urban livestock keeping goes beyond the domain of Livestock department to encompass health, urban planning, environmental management, community development and development planning.

It is recommended that, a community participatory team be institutionalized that can represent interests of various stakeholders indicated above, including religious organs, education institutions such as primary and secondary schools, and other interest groups such as *Mali Hai Clubs*. This forum is expected to work better with the community in establishing the by-laws of which they are conscious of the quarterly monitoring and evaluation report should form a permanent agenda in full council meetings. The institutional framework for sustainable urban livestock keeping requires complete community awareness of why and how municipal bylaws are needed and crafted, elimination of bylaws' enforcement barriers, minimizing environmental effects of

ULK, ensuring proper livestock keeping systems are used and ensuring effective leadership and extension services.

5.4.4 Address Community Awareness Bottlenecks

One critical finding of this study is that, the majority of urban dwellers are not aware of the bylaws on urban livestock keeping. Addressing the barriers to awareness particularly through effective community participation in ULK bylaw formulation and implementation, proper dissemination of bylaws through relevant channels such as meetings and mass media, effective enforcement of bylaws and recruitment of adequate staff are likely to help in raising awareness of people on the bylaws.

5.4.5 Strengthen Implementation of Bylaws

The observed laxity in implementing bylaws for conflict resolution was attributed to weak enforcement, poor community participation, inadequate staff, and weak supervision of bylaws by staff and leaders and, limited visits to livestock keepers by livestock staff.

It is recommended that enforcement of bylaws be strengthened by instituting clear disciplinary measures to bylaw enforcers and violators; make the people owners of bylaws through effective community participation; and set clear standards of assessing performance of staff and leaders in addressing urban livestock keeping. There is also a need for establishing clear criteria for benchmarking the number of extension staff requirement. This is critical in judging effectiveness of staff in enforcing the by-laws.

5.4.6 Inclusive Urban Development Planning is Required

The fact that there are environmental problems caused by urban livestock keeping that range from pollution, destruction of infrastructure and limited spaces for animal waste disposal; is an evidence of inadequate attention among urban development planners to critically consider how to accommodate livestock keeping in their plans. Since livestock keeping remains widely acknowledged by urban authorities, but with limited corresponding efforts to make this happen on sustainable manner, it is recommended that LGAs should comprehensively incorporate urban livestock keeping in their land use-plans.

5.3.7 Recommendations for Further Researches

This study was limited to by-laws in two urban areas namely Dodoma City Council and Morogoro Municipal Council. In view of the severity of the challenges of urban livestock keeping in Tanzania, similar studies could be carried out in other urban areas in the country to come up with comprehensive recommendations and way forward for sustainable urban livestock development in Tanzania.

The study has assessed one pillar of institutions: the regulative capacity of the current urban livestock institutions by examining how by-laws are being prepared and enforced. Within this pillar, policies, regulations and rules have not been touched. More importantly, the other pillars of institutions namely normative and cultural-cognitive have not been examined. These pending institutional areas are recommended for further research since they can generate different information on how urban livestock keeping can effectively be managed. We suggest further studies to establish causal – effect relationship between the types of livestock and their related environmental and social effects.

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APPENDICES

Appendix I: Households Questionnaire on Assessment of Institutional Framework Challenges on Urban Livestock Keeping in Tanzania

Date of interview.....

Respondent's Name/Number.....

Ward..... Mtaa.....

Region.....Municipal…….....

A. RESPONDENT'S CHARACTERISTICS

1. Age..... (Years)

2.Marital status: Tick in the blank box below the answer;

Na.	Variable	Status				
2	Marital status	Single	Married	Widowed	separated	Others (specify)
		1	2	3	4	5

3. Gender: 1 =Male ☐ 2 = Female ☐

4. Education level: Tick in the blank box below the answer;;

Na.	Variable	Level					
4	Education level	Non-formal	Primary	Secondary	Post secondary certificate	Diploma	Higher education
		1	2	3	4	5	6

5. Occupational status: Tick in the blank box below the answer

Na.	Variable	Status				
5	Occupational status	Self Employed	Casual Employment	Permanent Employment by government	Permanent Employment by Private	Others (specify)
		1	2	3	4	5

INFORMATION ABOUT LIVESTOCK KEEPING

6. Do you keep livestock? 1 = Yes ☐ 2= No ☐

If yes, what are the reasons for keeping livestock? Provide choices.....

If No, go to question **16 – 41 (leave out Qn 20)**

7. What type and how many livestock do you keep? (Tick in the blank box in row 6 and fill in row 7 of the following):

Na.	Variable	Types					
7	Type of livestock	Cattle	Pigs	Goats	Sheep	Chicken	others
		1	2	3	4	5	6
8	number of livestock kept per each type	Number					

9. What is the most dominant type of livestock keeping systems do you use?

1= Zero grazing

2= Free range

3 = Semi - Free range

4= Others (specify)……..

10. Is the system mentioned in question 8 above, used throughout the year

1= Yes

2= No

(If No go to question 10)

11. When do you use the following types of livestock keeping systems and Why (Tick in the blank spaces against each answers)

Na.	Variable	Season		Why do you use this system in this season
		Rain seasons	Dry seasons	
		1	2	
11	Zero grazing			
	Free range			
	Semi - free range			
	Others (specify)			

12. Which types of livestock keeping system is used mostly

Na.	Variable	Types					
		Cattle	Pigs	Goats	Sheep	Chicken	others
		1	2	3	4	5	6
12	Zero grazing						
	Free range						
	Semi - free range						
	Others (specify)						

13. What type of problems do you encounter from each type of livestock you keep? (Tick in the blank boxes in problems encountered columns)

Na.	Variable	Problems encountered						
13	Type of livestock	Heaps of waste	Noise	Dust	Odour	destruction of plants	Conflict with neighbors	Others (specify)
		1	2	3	4	5	6	7
	Cattle							
	Pig							
	Goats							
	Sheep							
	Poultry							
	Others (specify)							

14. What types of problems are encountered from each livestock keeping system?

Na.	Variable	Problems encountered						
14	Type of livestock keeping systems	Hips of waste	Noise	Dust	Odour	destruction of plants	Conflict with neighbours	Others (specify)
		1	2	3	4	5	6	7
	Zero grazing							
	Free range							
	Semi free range							
	Others (specify)							

15. Where do you dispose wastes from each type of livestock? *Tick the answer*

Na.	Type of livestock	Waste disposal area				
		Outside the house	In the home garden	In the pit near house	To the farm very far	Others (specify)
		1	2	3	4	5
15	Cattle					
	Pig					
	Goats					
	Sheep					
	Poultry					
	Others (specify)					

16.What are the problems caused by urban livestock keeping? (*Tick all relevant answers)*

1= Odour , noise and dust .....

2=.Diseases.....

3=Destruction of infrastructure (e.g. water ways).....

4=.Destruction of gardens, fences and ornaments.....

5= Conflicts among community members.....

6= others (specify).....

17. How often have you encountered any of the above mentioned problems caused by urban livestock keeping in the previous year? (*Please tickthe answer)*

NA	Problem encountered	Occurrence		
		Almost always	Occasionally	Others (specify)
		1	2	3
17	Odour , noise and dust			
	Diseases			
	Destruction of infrastructure (e.g. water ways)			
	Destruction of gardens, fences and ornaments			
	Conflicts among community members			
	All problems as mentioned above			

18. Are there any livestock wastes around the homes areas?

1= Yes.....

2= No.....

19. What do you consider to be the most appropriate livestock waste disposal systems for each type of the livestock kept in your area? (Fill in the blank spaces against each livestock type)

Na.	Type of livestock	Appropriate livestock waste disposal systems		
		1	2	3
19	Cattle			
	Pigs			
	Goats			
	Sheep			
	Poultry			
	Others (specify)			

20. What are the major reasons for not using appropriate waste disposal systems/methods?(*Tick as appropriate*)

1. Lack of knowledge on waste management....

2. Inadequate space for waste disposal.....

3. Lack of appropriate waste disposal systems/methods in place/ facilities.....

4. Others (specify .....

21. What is the current trend and possible reasons for each case involving damages caused by urban livestock and inappropriate livestock waste disposal? (*Tick the answer and give the reason to your answer)*

NA	Problem encountered	Trend				Reasons for each trend observed
		Increasing	Decreasing	Constant (the same)	Others (specify)	
		1	2	3	4	
21	Odour , noise and dust					
	Diseases					
	Destruction of infrastructure (e.g. water ways)					
	Destruction of gardens, fences and ornaments					
	Conflicts among community members					
	All problems as mentioned above					
	inappropriate livestock waste disposal					
	Others (specify)					

22. Which types of livestock do you consider to be more problematic in terms of environmental pollution than others in your area*? (Choose only one) . Tick the one answer*

1= Cattle.....

2= Pigs.....

3=Goats.....

4=Poultry.....

5 = All types mentioned above.....

6= others (specify).....

23. Explain the basis of your choice in question 21 above. ……

……

24. What type of urban livestock keeping system is more commonly used in your area?

(Tick one answer)

1= Zero grazing.....

2= Free range.....

3= Semi free range.....

4= others (specify).....

25. What are the common types of environmental pollution in your area?

1.....

2.....

3.....

(Add as many as you can)

26. What are the major causes of each type of environmental pollution mentioned?

1.....

2.....

(Add as many as you can)

C: INFORMATION RELATING TO CONFLICT RESPLUTION

27. Have you ever been involved in any conflicts caused by urban livestock keeping?

Tick the answer

1= Yes.....2= No.....

28. If yes, how did you resolve the conflict according to its type and source? *Fill in the blank spaces in each column (Fill as many as you can)*

Na.	Types of conflict	Source	How do you resolve	How many times such type of conflict occurs

29. Who is supervising the operations of these institutions?

1. Local leaders.....
2. Government staff.....
3. Both, Government and local leaders.....
4. Others (specify).....

30. How are the challenges mentioned in 28 above addressed? (Mention many as possible)

.....

. ……

……

D: BYLAWS ON URBAN LIVESTOCK KEEPING

31. Who formulates the regulations governing urban livestock keeping in your area?

32. Have you ever been involved in formulation of any regulation governing livestock keeping in your area?

33. Who is responsible in enforcing these regulations?

34. What are the major weaknesses in these regulations?

35. How do you rate the level of adherence to these regulations by urban livestock keepers? *Tick the answer*

1. Poor.....
2. Good.....
3. Very good.....
4. Others (specify).....

36. What are the reasons for the adherence levels observed above?

.....

.....

. ……

……

GENERAL QUESTIONS

37. How have you been dealing with challenges caused by urban livestock keeping? *Tick the answer*

Reporting problems to relevant institutions and committees....

Taking of legal action against livestock keepers.....

Driving out by force, livestock keepers who go against the rules....

Other (specify).....

38. What knowledge do you need to address conflicts resulting from urban livestock keeping?

39. What do you think is missing in your area for addressing environmental pollution and conflicts due to urban livestock keeping?

40. What is your opinion regarding the appropriateness of urban livestock keeping systems/methods/practices?

41. .In case you find wastes around your area, what do you do?

Appendix II: A Checklist for Municipal Director

1. Institutions involved in urban livestock keeping and environmental management and their status in this area.
2. Who is supervising the operations of these institutions?
3. Challenges confronting the institutions
4. Any guidelines by the government on how these institutions should conduct their affairs
5. Any programmes dealing with environment in the area?
6. Regulations governing urban livestock keeping
7. The major weaknesses of these regulations
8. Responsibility for enforcement of the regulations
9. Persons involved in formulation of regulations governing livestock keeping
10. Adherence challenges to these regulations by urban livestock keepers

Appendix III: Checklist for Municipal Livestock Officer

Name of Respondent..... Designation.....

1. Types of livestock kept in area.
2. Problems caused by urban livestock keeping in the area
3. How do you solve problems caused by urban livestock keeping in your urban area?
4. Institutions involved in urban livestock keeping and environmental management and their statusin this area.
5. Regulations governing urban livestock keeping
6. Adherence challenges to these regulations by urban livestock keepers

Appendix IV: Checklist for Urban Planning Officer

Name of Respondent..... Designation.....

1. Are there any Land use plans for urban livestock keeping?
2. What challenges do you face in accommodating livestock keeping into urban planning?
3. How do you work with the institutions dealing with urban livestock keeping and environmental protection?
4. What measures do you take against livestock keepers who do not observe the regulations guiding their work?

Appendix V: Checklist for Focused Group Discussion

1. Whatare the environmental problems resulting from Urban livestock keeping
2. What are the social conflicts relating from livestock keeping and their causes
3. How conflicts are resolved, who resolves them
4. Opinions on urban livestock keeping
5. Strengths and weaknesses of existing institutions for urban livestock keeping
6. Way forward on how urban livestock keeping can be kept sustainably

Appendix VI: Checklist for Observation

1. Livestock keeping systems practised in the study area
2. Types of livestock kept in the study area
3. Evidence on environmental pollution resulting from ULK
    (i) Livestock waste heaps
    (ii) Evidence of destruction of plants or property
    (iii) Suitability of constructed sheds for livestock and space