# THE INFLUENCE OF LIVESTOCK KEEPING ON FOOD SECURITY OF AGRO PASTORAL COMMUNITIES IN MUTOMO DISTRICT, KITUI COUNTY

**KAVILI, ALEX KAVEVA**

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**DECLARATION**

I declare that this research project report is my original own work and that it has not been submitted either whole or in part to any other university for the award of a degree.

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Kavili, Alex Kaveva Date

REG, No: L50/60682/2011

This research project report has been submitted for examination with my approval as the University Supervisor.

_____ _____

Dr. Ursulla Achieng Okoth Date

Lecturer

School of Education

University of Nairobi

**DEDICATION**

This research report is dedicated to late Grandfather Mr. Sala Maithya Makite

**ACKNOWLEDGEMENT**

I am grateful to the Almighty God for His inspiration and giving me the ability, opportunity and good health during the year (2012) as I undertook this study.

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## ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| **AIDS** | Acquired Immune Deficiency Syndrome |
| **BBC** | British Broadcasting Corporation |
| **DDP** | District Development Plan |
| **DAO** | District Agricultural Officer |
| **DLPO** | district Livestock Production Officer |
| **FAO** | Food Agricultural Organization |
| **HIV** | Human Immune Deficiency Virus |
| **IFAD** | International Fund for Agricultural Development |
| **UNDP** | United Nations Development Programme |
| **NGO** | Non-Governmental Organizations |
| **USAID** | United States Agency for International Development |
| **ASALs** | Arid and Semi-Arid Lands |
| **ALRMP** | Arid Lands Resource Management Project |
| **GDP** | Gross Domestic Product |
| **GOK** | Government of Kenya |
| **IED** | Institute for Education and Democracy |
| **ILRI** | International Livestock Research Institute |
| **PRSP** | Poverty Reduction strategy Programme |
| **ERSWEC** | Economic Recovery Strategy for Wealth and Employment Creation |
| **SRA** | Strategy for Revitalizing Agriculture |
| **MDGs** | Millennium Development Goals (MDGs) |
| **NLP** | National Livestock Policy (NLP). |

**ABSTRACT**

The objectives of the study were to determine the influence of livestock to household foods security, the influence of government policies on livestock, influence of access to markets for livestock and their products and food security and the relationship between crops farming and livestock production. The study used a case study design targeting Mutomo District as a representative of communities who practise livestock keeping as well as crops farming as a source of their livelihood. The targeted population comprised of the farmers and government officials in the two relevant Ministries of Agriculture and the Ministry of Livestock and Fisheries Development. Data collection was carried out using semi-structured questionnaires and an interview guide. The semi structured questionnaires were administered to 150 agro pastoralists and fifteen government officers in three divisions of Mutomo district. The data from the field was coded into a codebook for quantitative data analysis that involved frequency distribution and cross tabulations among other statistical techniques.

The analysed data established that there were Government policies that influence livestock production in the agro pastoral communities. These policies have a positive or negative impact on the role livestock plays to food security in these communities. There existed agricultural extension officers though most of the farmers had never seen them on their farms hence adapting traditional ways of livestock farming which might be the reason for poor production. All the farmers in the district travelled for less than 5 kilometres from their homes to the market centres. These centres were for selling their livestock and their products hence acquiring money to cater for their daily expenses, school fees and other expenses. There is a strong positive relationship between food crop farming and livestock production. The integration of livestock and crops allows for efficient nutrient recycling at the farm level. The researcher recommended that the farmers should be encouraged to increase the number of animals and varieties kept, the Government should increase the number of Agricultural extension offices in Mutomo district, farmers should be encouraged to organize themselves into self-help groups to help them pursue better markets for their animals including obtaining loans to expand their farming. The researcher further recommends that the farmers should have better storage facilities for their farm residues and manure for feeding their animals and fertilizing their farms.

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background to the study

Food security is the state in which all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life (USAID, 1992). Food security is defined as an existing "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life". Commonly the concept is used to include both physical and economic access to food that meets the people's dietary needs as well as their food preferences (World food summit, 1996). Ensuring food security as the basic right of people to access the food they need is one of the greatest challenges facing the world community. The challenges are most critical in low-income, food-deficit countries. There is enough evidence that poverty and hunger are most evident in 23 countries of Africa, where more than forty percent of the people are unable to obtain sufficient food on a daily basis. Every 3.6 seconds a person dies of starvation in developing countries (IFAD, 2006). Available research shows that there is a strong relationship between poor communities and food insecurity in the same community. It shows that those communities who are poor have high chances of being food insecure (Burns, 2004).

Livestock production is an important contributor to total food security in developing countries. Recent increases in livestock products appear to be even more spectacular than those achieved for cereals from the green revolution. The world community has set out reduction of global poverty by half by 2015 and to improve the livestock-related livelihoods of the estimated 600 million poor livestock keepers who can make an important contribution towards this goal. Livestock contribute around 12.9 percent of

global calories and 27.9 percent of protein directly through provision of meat, milk, eggs and offal, and also contribute to crop production through the provision of transport and manure. (Sausoncy,1995). About 65 per cent of the red meat is produced in the arid and semi-arid lands under pastoral production system. According to the 2009 census, Kenya has about 17.3 million cattle (14 million indigenous and 3.3 million exotic), 27 million goats, 17 million sheep, 2.9 million camels and 335,000 pigs. White meat, which includes poultry and pig meat, accounts for about 20 per cent of the total meat which is consumed in the country (Republic of Kenya, 2009)

In Kenya, livestock sector contributes about 12% of Kenya's Gross Domestic Product (GDP), 40% to the agricultural GDP and employs 50% of agricultural labour force. About 60% of Kenya's livestock herd is found in the arid and semi-arid lands (ASALs), which constitute about 80% of the country. It is estimated that 10 million Kenyans living in the ASALs derive their livelihood largely from livestock. Livestock play important roles in Kenya's socio-economic development and contribute towards household food and nutritional security (Narman, 1990; Republic of Kenya, 1994).

The stakeholders in the livestock sub-sector have recognized the role that a vibrant livestock industry can play to reverse the poverty levels and contribute to the nation's economic growth in Kenya. This recognition is emphasized in various government policy documents such as the ninth National Development Plan – 2002 -2008, Poverty Reduction Strategy Paper (PRSP), Economic Recovery Strategy for Wealth and Employment Creation (ERSWEC) 2003 to 2007, Strategy for Revitalizing Agriculture (SRA) 2004 – 2014, Kenya Vision 2030, Millennium Development Goals (MDGs) and the National Livestock Policy (NLP). All these policies have been formulated to boost

the role of livestock in attaining household and national food security in Kenya (USAID 2003)

Mutomo District, Eastern Province, covers an area of 20,402 square kilometers, 34 of which falls under the Tsavo National Park 1. The climate of Mutomo district is semi-arid with very erratic and unreliable rainfall. Most parts of the district are hot and dry throughout the year resulting in very high evaporation rates. Rainfall is distributed within two seasons yearly and varies from 500-1050mm with about 40% reliability. About 40% of the district's total area is categorized as arable while gazette forests cover less than 1%. (FAO, 2008)

The projected populace for the district was 350,000 people in 2005, given moderate annual growth rate of 2.2% the population is estimated to be 450,000 persons. The population is largely rural-based with only 10% residing in the urban areas. Livestock production is the backbone of Mutomo district's economy and together with crop farming account for nearly three-quarters of household earnings. Cattle, sheep and goats are the most important types, with the entire stock estimated at 758,500 animals (FAO, 2008).

Consequently, Mutomo relies heavily on food supplies from other districts to meet its food needs for the better part of the year. With the exception of cereals, the markets supply the bulk of food consumed in the mixed farming livelihood zone, which supports about 57% of Mutomo population. Nearly 39% of the district's residents reside in the marginal mixed farming regions, which largely rely on livestock for food (milk and other products) and income. However, prospects in this livelihood system

just like in the mixed farming zone, are beset by high vulnerability to recurrent and prolonged droughts. This often results in repeated crop failures, lack of water and pasture, and livestock mortality, seriously undermining both present and future efforts to ameliorate food security. Consequently, proceeds received from crops and livestock sales are low due to exploitation by brokers, inhibiting affordability of food in markets. (FAO, 2008)

Ease of access to food in the markets is exacerbated further by widespread poverty (low purchasing power) and poorly developed markets, often characterized by high and unpredictable food prices. Kitui district continues to be a frequent candidate for food and nonfood aid distribution. Furthermore, because of preparedness (strategies and resources), little priority is given to other development goals in terms of resource allocation when the droughts strike since planners have to constantly shift to the emergencies.

### 1.2 Problem statement

A lot of efforts and resources have been spent by the Government Non Governmental organisations and the communities in tackling food insecurity among the agro pastoral communities of Mutomo district. However over the last fifty years there has been an increase in the number of persons suffering from hunger across in the district and the entire globe (Munyoki 2011). It has thus become clear that there is a missing link between these efforts and the real cause of food insecurity among these communities. One of the possible reasons of this state of affairs is the underestimation of the roles livestock production contributes to food security (Sausoncy 1995) in the agro pastoral households. The study sought to bring out the contribution livestock production to food security among the agro pastoral households in Mutomo district.

### 1.3 Purpose of the study

The purpose of the study was to investigate the role livestock production plays in the general food security of agro households in Mutomo district of Kenya.

### 1.4 Objectives of the study

The study was guided by the following specific objectives;

i. To determine the influence of livestock to household food security among the agro pastoral households
ii. To determine the influence of government policies on livestock productivity in the agro pastoral communities
iii. To determine the influence of access to market on households food security
iv. To assess the relationship of food crop farming and livestock production.

### 1.5 Research Questions

The research was guided the following research questions

a. To what extent did livestock influence household food security?
b. To what extent did the government policies affect livestock productivity and hence food security in the agro pastoral communities?
c. To what extent did access to markets of livestock influence household food security?
d. What was the relationship between food crops farming and livestock production?

### 1.6 Significance of the study

The study findings are important to various people in several ways. They may give a suggestion to stakeholders on the most appropriate solution to the food insecurity

problem. Through the study findings and recommendations policy makers in the Ministry of livestock and fisheries development know under what basis they can make policy changes in order to arrest the current food insecurity in Kenya based on livestock interventions strategies.

The government may also understand the effects of policy neglect on the livestock subsector to the general food security in the country. The study can also be an eye opener to the agro pastoral communities in Kitui in the functioning wake of the devolved government under the new constitutional dispensation. They can use the study findings to agitate for the appropriate county government interventions to reduce poverty and food insecurity

### 1.7 Limitations of the study

The researcher gathered information concerning the influence of livestock to food security. Even though the respondents were made aware on the confidentiality of the information given, the researcher was not able to guard against socially correct answers by the respondent meant to please him.

### 1.8 Delimitation of the study

This study was designed to investigate the role livestock production plays in influencing households' food security among the agro pastoral communities of Mutomo District, Kenya. Respondents were drawn from agro pastoralist farmers in the district. Data collected and the inferences made should cautiously be generalised to other agro pastoral communities in the country of the world where there may be other peculiar underlying factors not common to the area of study. However the results are significant

because the findings could be used in comparison between results obtained from similar studies in other districts in Kenya or other parts of the world.

### 1.9 Assumptions of the study

The following assumptions were made by the researcher in the study:

i. Non randomised livestock farmers were selected for the study and therefore they were familiar with livestock keeping practices and the contribution of livestock to food security among the agro pastoral farming communities.

ii. The non randomised selected farmers grew crops for both subsistence and income generation at the household level.

iii. The method of data collection was by no means influential on the way participants' responses in the questionnaire.

iv. There were no adverse natural or artificial circumstances that hampered the successful implementation of the study

### 1.10 Definition of significant terms

**Livestock** refers to domestic animal raised for home use or for profit.

**Livestock keeping** refers to the practice of rearing domestic animals level for home use or profit.

**Agro pastoral communities** refer to people who practise crop farming as well as keep livestock.

**Food aid** refers to the food donated by a foreign government or a charitable organisation to people in need usually in developing countries.

**Food access** refers to the ability to have adequate resources to obtain appropriate foods for a nutritious diet, which depends on income available to the household, on the distribution of income within the household and on the price of food.

**Food availability** refers to the availability of sufficient quantities of food of appropriate quality supplied through domestic production or inputs.

**Food security** refers to an existing or a situation when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life

**Food-deficiency** refers to a situation when people are faced with insufficient nutritious food to lead a healthy life. It is also referred to as food shortage.

# CHAPTER TWO
# LITERATURE REVIEW

## 2.1 Introduction

This chapter contains the literature review of related past studies. It consists of the sections on contribution of livestock to household food security in agro-pastoral communities, influence of government policies on livestock productivity in agro-pastoral areas, the influence of access to market to livestock productivity and the contribution of crops to livestock productivity in agro-pastoral communities.

## 2.2 The role of livestock to household food security among the agro pastoral communities.

The contribution of animals to both agricultural and overall economic development has not been adequately evaluated. Official statistics grossly underestimate the contribution of livestock since many important non-food outputs - most of which are difficult to quantify in monetary terms - are excluded. The role of animals in food and agricultural development programmes is underrated almost everywhere throughout the world despite the increasing demand, especially in developing countries, for all the different animal products and services (Sansoucy 1995)

Although food availability has increased along with the growing human population over the last 30 years, there are still 800 million people suffering from malnutrition. This problem is not only the result of insufficient food production and inadequate distribution, but also of the financial inability of the poor to purchase food of reasonable quality in adequate quantities to satisfy their needs (FAO, 1993).

Livestock production constitutes a very important component of the agricultural economy of developing countries, a contribution that goes beyond direct food production to include multipurpose uses, such as skins, fibre, fertilizer and fuel, as well

as capital accumulation. Furthermore, livestock are closely linked to the social and cultural lives of several million resource-poor farmers for whom animal ownership ensures varying degrees of sustainable farming and economic stability. (FAO AGROSTAT, 1992)

Careful analysis and assessment are required so that livestock development strategies can be reoriented towards better use of local resources, contribute more effectively to food security, improve the living standards of poor farmers and ensure sustainable animal agriculture development. In livestock production, the overriding considerations are the availability and efficient use of local natural resources. A successful livestock development strategy requires the formulation of resource management plans that complement the wider economic, ecological and sociological objectives (Sansoucy, R. 1995). Sansoucy goes on to show that livestock not only represent a source of high-quality food, but, equally important, they are a source of income for many small farmers in developing countries, for purchasing food as well as agricultural inputs, such as seed, fertilizers and pesticides. At the national level, livestock food products represent 27 percent of the total agricultural output in most of these countries. At farm level, cash can be generated regularly from direct sales of livestock products, such as milk, eggs and manure, occasionally from the sale of live animals, meat and hides and from fees for draught power or transport services.

Livestock also provide increased economic stability to the farm or household, acting as a cash buffer (small livestock) and as capital reserve (large animals), as well as a deterrent against inflation. In mixed-farming systems, livestock reduce the risks associated with crop production. They also represent liquid assets that can be realized at any time, adding further stability to the production system. In mixed-farming systems,

not only can farmers mitigate risks by producing a multitude of commodities, but they can also increase the productivity of both crops and animals in a more profitable and sustainable way. In this context, livestock can make a major contribution to the efficient use of available natural resources. (Sansoucy 1995)

Cattle and donkeys are used as a source of draught power for variety of purposes such as pulling of mouldboard ploughs, fetching water through carrying water jerricans, ferrying farm produce, charcoal and firewood to the homesteads and the markets. The current number of animals used for draught purposes worldwide is estimated at 400 million. Fifty-two percent of the cultivated area in developing countries (excluding China) is farmed using only draught animals and 26 percent using only hand tools. Draught animals remain the most cost-effective power source for small and medium-scale farmers among the agro pastoral poor communities (Aklilu 1992).

Nutrient recycling is an essential component of any sustainable farming system. The integration of livestock and crops allows for efficient nutrient recycling. Animals use the crop residues, such as cereal straws, as well as maize and sorghum stovers and groundnut haulms as feed. The manure produced can be recycled directly as fertilizer. One tonne of cow dung contains about 8 kg Nitrogen, 4 kg phosphate and 16 kg $K_2O$ (Angé, 1994). The chemical composition of manure varies, however, according to the animal species (poultry manure appears to be a more efficient fertilizer than cow manure) and also to the nature of their diet. In addition to the direct contribution of plant nutrients, manure provides important organic matter to the soil, maintaining its structure, water retention and drainage capacity. The value of manure is so well-recognized that some farmers keep livestock primarily for this purpose. (Mucheru, M. et al 2003)

In the rural areas of many developing countries financial services such as credit, banking and insurance are virtually non-existent. In these areas, livestock play an important role as a means of saving and capital investment, and they often provide a substantially higher return than alternative investments. A combination of small and large livestock that can be sold to meet petty-cash requirements to cover seasonal consumption deficits or to finance larger expenditures represents a valuable asset for the farmer. (Sausoncy 1995)

Often livestock keeping has considerable social and cultural- significance, which may be the main reason for keeping animals in many societies. It is not always possible to attach monetary value to many of these roles. Nevertheless, they cannot be ignored, since animals for cultural or religious events may command very high prices.

**2.3 Influence of government policies of livestock productivity**

Since independence Kenya has adopted policies that do not seem to promote livestock sector as much as other subsectors like agriculture. Kenya has anti poor livestock policies which have their basis in the colonial period policies (Brendan et al 2008).

Colonialism in Kenya was implemented largely on a settler basis, with foreigners establishing large mixed farms (including dairy), extensive ranches, and tea and coffee estates in the most hospitable and fertile areas of the country popularly known as “white highlands”. This had a profound impact on livestock rearing, land use patterns, policy and public administration, the impact of which continued after independence and still affects the livestock sector today. In favoring the highlands, British colonialism systematically neglected more remote, less climatically temperate, “low potential” areas – particularly the ASALs of the northern two-thirds of the country, which were inhabited largely by nomadic pastoralists. During colonialism, these areas received

little attention, and as a result, little educational development, civil service administration, and infrastructure (Brendan et al 2008)

Kenya's colonial heritage paved the way for the country's post-independence neo patrimonial political and policy dynamics, which continue to affect the Kenyan livestock sector. Colonial rule in Kenya, as in much of the rest of Africa, involved the employment and incorporation of traditional African leaders and other administrative middlemen in a form of indirect rule or "decentralized despotism" that was both inexpensive and allowed European personnel to be thin on the ground (Mamdani, M 1996). This laid the foundation for a weak, divided and highly personalized post-independent state in which traditional personal rule is combined with formalized, professional laws and rational-legal codes of conduct (Brendan et al 2008.)

Colonialism, and 40 years of neo-patrimonial rule in Kenya, have has had a significant impact on the way in which policies related to the livestock sector have been made. For example, the centralization of power in the presidency and the workings of patron-client politics, especially during the Moi administration, have tended to exacerbate the colonial heritage of neglect for both the predominantly pastoralist ASALs and the livestock dependent poor generally. As a result, the ASALs have been largely neglected when patronage is distributed from the center. While livestock policy in the independence era has been largely path dependent, based on laws, regulations and patterns established during colonialism, several important changes have occurred since the mid-1980s to bring about the possibility for alterations in these policies. Liberalization, both economic and political, has played a particularly strong role in changing the course of policy direction pertaining to livestock. (Munyoki 2011)

Livestock producers face considerable constraints in achieving a satisfactory standard of living from their livelihood. They remain limited by: neglect by the central government despite the large role livestock plays in the economy, poor governance and high corruption, a politically marginal and weak Ministry of Livestock and Fisheries Development (MoLFD)

**2.4 Influence of access to livestock markets on household food security**

It is estimated that livestock contributes upwards of 10% and about 25 % to Kenya's GDP (of US$ 10.1 million) and agriculture sector respectively. Most of these livestock are produced and marketed from the arid and semi-arid areas of Kenya which account for about 8% of the country's population and occupy roughly 63% of the total land area (Narman 1990; Republic of Kenya, 1994).

Livestock has acquired a niche in the national, regional and global livestock trading chains and livestock producers are part of the commercial webs of trade relationships among people and countries in different locales (Kariuki 2006). However, despite its importance and contribution to the national economy, the development of the livestock sub-sector has faced numerous challenges. The lack of a transparent, timely, and efficient livestock marketing infrastructure is recognized as a major factor hindering the improvement of gains to livestock trade in order to benefit the national economy through derived taxes and more importantly perhaps to benefit the communities of livestock producers (Aklilu 2002).

A reliable livestock market information system is a key element in supporting decision-making of other players such as traders, middlemen and policy makers and contributes to the development of pastoral areas (Barret and Luseno 2001; Kaitho *et al,* 2003).

Provision of marketing information or the improvement of the capacity to communicate the same will have a positive effect on market transactions in terms of improving sales and identifying markets offering better prices, identifying market hot spots and where to source for animals that meet expected quality and health standards for local and international markets.

While several studies looking at land use diversification and household options have been carried out in some agro pastoral system e.g. Rutten, 1992, Homewood, 2004, Thomson and Homewood 2002, Little et al 2000, few have been able to derive measures on how well households are doing, in terms of revenue earned from various activities household members are pursuing and look at what factors significantly influence those returns (Radeny et al 2006)

**2.5 Relations between food crops and livestock production**

Food crops production among the agro pastoral communities relies on rain fed agriculture. This mode of production is prone to climate shocks emanating from unreliable rainfall. This has led to droughts and famines in these areas. Sometimes the rains are quite good that there is a bumper harvests and thus reduces distress animal sales at the household level (FAO, 2008)

Livestock give economic stability to farm households as they act a buffer stocks, capital reserve and as a hedge against inflation. Livestock reduce risk through diversification of production and income sources and thus able to deal with seasonal crop failure and other natural calamities livestock provides a liquid asset which can be realized at any time adding further stability to the production system (FAO, 1992)

Nutrients' recycling is an essential part of any strategy for sustainable agriculture, integration of livestock and crop allows for efficient nutrient recycling through the use of crop residues and by products as animal feeds and for manure as crop fertilizers. Throughout developing world, manure is the primary source of plant nutrients for the traditional rain fed crops, chemical fertilizers are expensive and applied mainly to high yielding varieties especially in integrated conditions. At farm level, drought animal ownership patterns have implications on food production and security. There are positive correlations between draught animals and cereal crop production (Greyseels 1988).

In many developing countries ownership is skewed. Many small and marginal farmers own none or an inadequate number of traction animals. Crop production of these farmers suffer due to late planting, poor quality tillage, use of low value crops needing less tillage and an inability to cultivate all available land. These problems may be aggravated after natural calamities such as drought due to death or poor health of animals and increased drought animal prices (BBS, 1986; Gryseel 1988; Asemenew, G. 1991).

## 2.6 Theoretical frame work

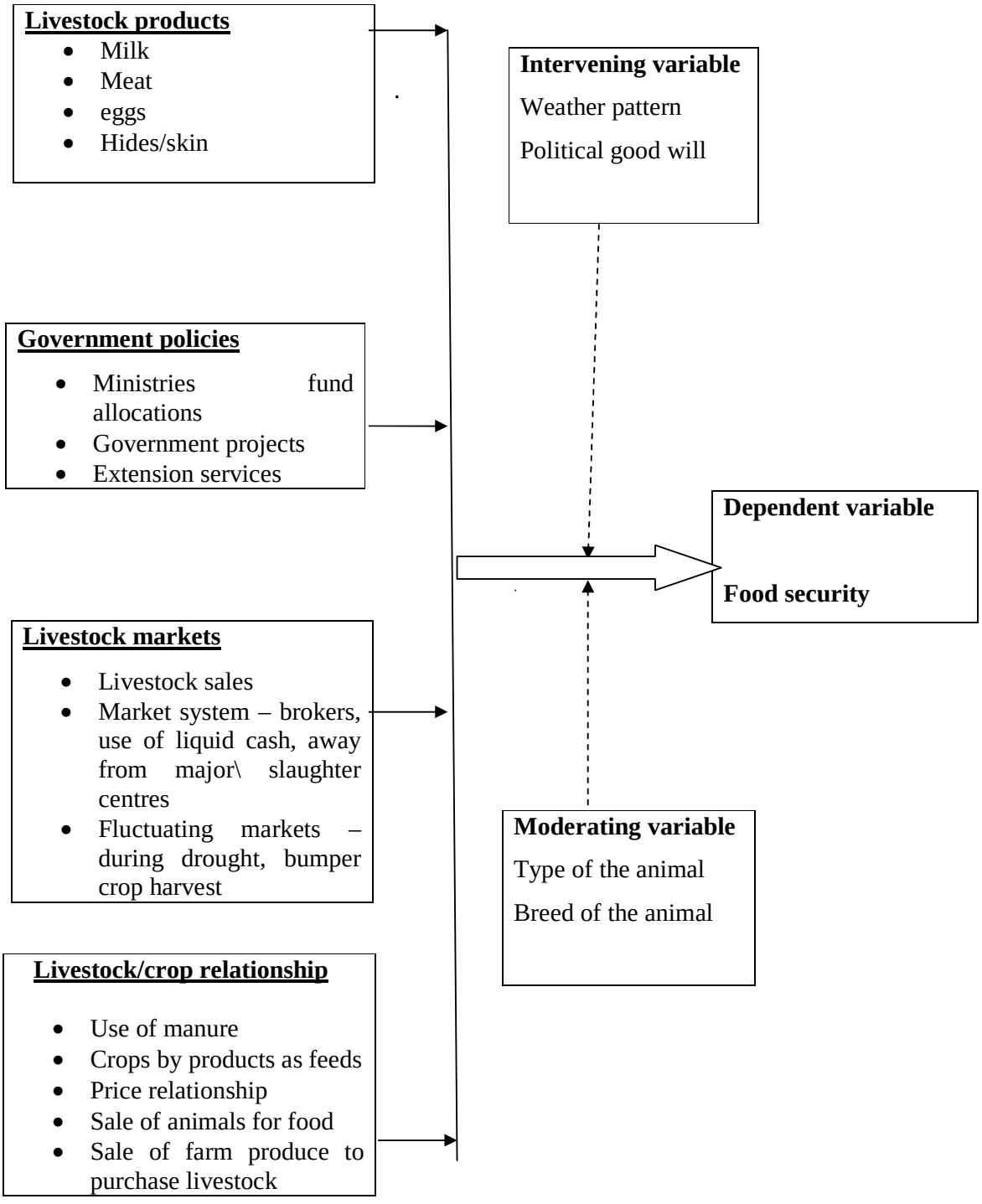
Theoretical framework is not only used to enable the interpretation of the specifics of a research but also helps in the general understanding of the themes involved in the study. In this study of the influence of livestock production to food security among the agro pastoral households in Mutomo district, the researcher will use the **true score Theory**. True Score Theory is a theory about measurement. Like many very powerful model, the true score theory is a very simple one. Essentially, true score theory maintains that every measurement is an additive composite of two components: true ability (or the true level) of the respondent on that measure; and random error. The simple equation of $\mathbf{X = T + e_X}$ has a parallel equation at the level of the variance or variability of a measure. It reminds us that most measurement has an error component. The theory is applicable in the study in that errors in determining the influence of livestock production has, in a way contributed to persistent food insecurity in agro pastoral communities in Mutomo district.

## 2.7 Conceptual Frame work

The conceptual framework illustrates the influence of the independent variable, intervening variable and moderating variable on the dependent variable as shown in figure 2.1

**Figure 2.1 Conceptual Framework**

**Independent Variable**



# CHAPTER THREE
# RESEARCH METHODOLOGY

## 3.1 Introduction

This chapter describes the methodology used to carry out the study. It consists of research design, target population, sampling procedures, sample size and research instruments, validity and reliability of validity of instrument, validity of instruments, reliability of instruments, data collection procedures, data analysis, ethical considerations and operation of variables.

## 3.2 Research Design

The study was a case study design. In this study, Mutomo, Ikanga, Mutha divisions of Mutomo district was the focus of the study. These are areas where agro pastoralism is practised. Data was collected from targeted households in these divisions. A case study that is longitudinal in nature using combinations of different data collection methods to increase reliability was adopted.

## 3.3 Target population

Borg and Gall (1989), describes target population or universe of study as all members of real or hypothetical set of people, events and objects. This study concentrated on 150 household representatives who were agro pastoralists in the district. Fifteen (15) government officers in charge of crops and livestock production in three divisions were also be interviewed.

Mutomo district has a population of approximately 350,000 persons. The district has a growth rate of 2.2 percent a year (DDP, 2002-2008). Out of the 350,000 people about a third consists of the adult population which is about 110,000 people. For every 110,000

persons there are approximately 550 serious farmers and livestock keepers who entirely rely on agriculture and livestock keeping according to district agricultural officer in Mutomo district (2011). The District is a semi-arid region situated 230 km East of Nairobi (appendix III). The elevation of the District is between 400 and 1,830 metres above sea level (GoK, 2001)

### 3.4 Sample size and Sampling procedures

The study targeted 550 agro pastoralists and 15 government officials in the three divisions. The Divisions included in the study were selected using cluster sampling. The Divisions included in the study were, Mutomo, Mutha and Ikanga. In each of the three clusters a sample of fifty (50) agro pastoralists and five (5) government officials was selected using simple random sampling. This gave a sample size of 165 participants which was equivalent to 27% of the target population. The targeted 15 government officers included the District officers of agriculture and livestock in the District. Thus the sample size was above the recommended minimum of 10% of the population (Mugenda and Mugenda 1999).

### 3. 5 Research instruments

A questionnaire and an interview guide were used to collect data. The questionnaire was structured and closed ended. It had two sections; part I captured the biodata of the respondents and part II focused on the influence of livestock productivity on the household food security. The other section of the questionaire targeted government officers in the ministries of livestock and agriculture. It contained the biodata of the respondent and the influence of government policies on livestock productivity.

### 3.6 Validity of instruments

Validity is the degree to which the results obtained from the analysis of the data actually represents the phenomenon under study (Orodho 2005). Content validity of the instruments was used to measure the degree to which the items represented specific objectives covered by the study. To validate the instruments, experts knowledgeable in research methodology from the University of Nairobi examined the content of the instruments item by item and gave guidance to the researcher on the content validity. These experts then advised the researcher on the items to be corrected. These corrections on the identified questions were incorporated in the instrument to increase validity.

### 3.7 Reliability of instruments

Reliability has to do with the quality of measurements. In research, the term reliability means "repeatability" or "consistency" of measures. A measure is considered reliable if it would give the same result over and over again, assuming that what is measured is not changing (Kothari 2006).To establish reliability the interviews were structured in a similar fashion for consistency. To test reliability a test-retest method in the form of a mock study was carried out in households Mutomo, Ikanga and Mutha Divisions. Collected data was also triangulated on different households. The questionnaires were administered in two weeks interval to the sample population. The data values were operationalized and the scores from both periods were correlated using Pearson Product-Moment Correlation Coefficient that gave a value of +0.94 with a 0.084 significance level in the case of the relationship between food crop farming and livestock farming.

### 3.8 Data collection procedures

The researcher obtained both a research permit letter from the National council of sciences and technology and Ministry of Higher Education before proceeding for data

collection. The instruments of data collection were administered through personal visits based on appointment with targeted respondents.

### 3.9 Data analysis

Qualitative data was collected. The data was categorized and reported in emergent themes. As defined by Watson (1994), qualitative data analysis is a systematic procedure followed in order to identify essential features, themes and categories. Findings from the qualitative data analysis were presented in percentages of verbatim quotations from responses with similar themes. Quantitative data was analysed using descriptive statistics where frequency distribution tables were constructed and percentages for the respondents calculated. Pearson Correlation coefficient was used to determine the strength of the relationship between crop production and livestock production.

### 3.10 Ethical considerations

Because some of the information was touching on private household's information, the respondent remained anonymous and this was first communicated to them before taking part in the study. Again the personal right of choice for one to participate in the study was also sought first.

### 3.11 Operation definition of variables

| Objectives | Variables | | Indicators | Measure -ment | Level of scale | Tools of analysis |
|---|---|---|---|---|---|---|
| | Independent | Dependent | | | | |
| To determine the role of livestock to household food security | Livestock products | Household food security | Quantity of milk<br>Quantity of Meat<br>Quantity of Eggs | Interval<br>Interval<br>Interval | Ordinal<br>Ordinal<br>Ordinal | Measures of central tendency, Mean , Frequency distributio n tables. |
| To determine the influence of government policies on livestock productivity | Government policies | Livestock productivity | Funding level of ministries<br>Staffing levels<br>Number of projects<br>Relief aid<br>Motor vehicles and motorbikes | Interval<br><br>Interval<br>Interval | Ordinal<br><br>Ordinal<br>Ordinal | Measures of central tendency, Mean and Frequency distributio n tables |
| To determine the influence of access to livestock markets to household food security | Livestock markets | Livestock productivity | Annual income<br>Direct sales in the market<br>Sales through middlemen<br>Access to the markets | Interval<br><br>Nominal | Nominal | Descriptiv e statistics Frequency distributio n tables. |
| To determine the influence of crops on livestock productivity | Influence of crops on livestock | Livestock productivity | Livestock sales to buy food<br><br>Use of manure<br>Crop residues as livestock feed<br>Sale food to buy livestock | Interval<br><br>Nominal | Nominal | Descriptiv e statistics Frequency distributio n tables |

# CHAPTER FOUR
# DATA PRESENTATION, ANALYSIS AND INTERPRETATION

## 4.1 Introduction

This study investigated the role livestock production plays in the general food security of agro households in Mutomo district of Kenya. The study therefore sought to establish why despite the Government and Non Governmental Organisations (NGOs) and the communities spending a lot of resources in tackling food insecurity among the agro pastoral communities of Mutomo district. The researcher sought to determine the influence of livestock to household food security among the agro pastoral households, the influence of government policies on livestock productivity in agro pastoral communities, the influence of access to markets by households and to assess the relationship of food crop farming and livestock production.

## 4.2. Questionnaire return rate

Questionnaire return rate is the proportion of the sample that participated in the survey and returned their questionnaires as intended by the researcher. The results on questionnaire return rate were presented in table 4.1

**Table 4.1: Questionnaire rate**

| **Response rate** | **Frequency** | **Percentage (%)** |
|---|---|---|
| Returned | 150 | 100% |
| Not returned | 0 | 0% |
| **Total** | **150** | **100%** |

Table 4.1 shows that 100% of the questionnaires were returned. This shows that the respondents were taking the issue of research seriously and were clearly briefed of the researcher's expectations.

### 4.3. Distribution of respondents by gender

The respondents were asked to indicate their gender with the aim of establishing whether the study was gender sensitive and to establish if gender influenced livestock farming. The results are shown in table 4.2

**Table 4.2: Distribution of respondents by gender**

| **Gender** | **Frequency** | **Percentage (%)** |
|---|---|---|
| Male | 70 | 47% |
| Female | 80 | 53% |
| **Total** | **150** | **100%** |

Table 4.2 shows that 53% of the respondents were female while 47% were male. This indicates that the number of female respondents were more than the male. However the female respondents were more by only 6% indicating a very small difference. There seem to be a gender balance in the respondents' distribution.

### 4.4 Family Leadership

The researcher sought to establish the family leadership of the respondents. This assisted him to know whether all the respondents interviewed were the family head or not. The results are presented in table 4.3.

**Table 4.3: Responses on Family Leadership**

| Family Head | Frequency | Percentage % |
|---|---|---|
| Yes | 67 | 45% |
| No | 83 | 55% |
| **Total** | **150** | **100%** |

Table 4.3 shows that 45% of the respondents were family heads while 55% were not. This is an indication that the respondents who were family heads were composed of both males and females. There were also some respondents who were not the family heads. The family heads were either working elsewhere or simply not available at the time of the survey.

### 4.5 Age distribution of the respondents

The researcher sought to establish the age of the respondent in order to know whether there is any relationship between the age of the respondent and livestock keeping. The responses are shown in table 4.4

**Table 4.4: Age distribution of respondents**

| Age in years | Frequency | Percentage |
|---|---|---|
| Less than 20 | 22 | 15% |
| 20-30 | 45 | 30% |
| 30- 40 | 45 | 30% |
| 40 – 50 | 30 | 20% |
| Above 50 | 8 | 5% |
| **Total** | **150** | **100%** |

Table 4.4 shows that majority of the respondents (60%) were aged between 20 and 40 years. This was followed by those who were aged between 40 – 50 years with 25%. The least were those who were aged above 50 years making 15%. This data shows that majority of the livestock farmers (75%) were in their youthful age between 20 and 40 years. This group is strong and has the ability to take good care of the crops and the animals.

### 4.6 Farming experience of respondents

The researcher investigated the farming experience of the respondents.

The results are shown in table 4.5

**Table 4.5: Farming experience of respondents**

| **Farming experience in years** | **Frequency** | **Percentage** |
|---|---|---|
| **1- 10** | 90 | 60% |
| **11- 20** | 38 | 25% |
| **21 - 30** | 20 | 13% |
| **Over 30** | 2 | 2% |
| **Total** | **150** | **100%** |

**Table 4.5** shows that majority of the respondents (60%) had a farming experience of 1 - 10 years. This was followed by those with farming experience of 11- 20 years making 38%. This was followed by those with farming experience of 21- 30 with 13%. The least was those who practised farming for over 30 years. This shows that many farmers who had started farming earlier stopped at some point.

### 4.7 Academic qualification of the respondents

The researcher sought to establish the academic qualification of the respondents. This was aimed at finding out whether there was relationship between farmers' academic qualification and livestock keeping. The results were shown in table 4.6

**Table 4.6: Distribution of respondents by academic qualification**

| Category | Frequency | Percentage (%) |
|---|---|---|
| **Illiterate** | 75 | 50% |
| **Primary** | 40 | 27% |
| **Secondary** | 23 | 15% |
| **University/College** | 12 | 8% |
| **TOTAL** | **150** | **100%** |

**Table 4.6** revealed that majority of the respondents, 50% were illiterate. 27% of the respondents had primary education; 15% had secondary education while only 8% had reached university or college level. The illiteracy level seems to be very high among the livestock farmers in the District and this might affect food security in livestock farming because education helps in value addition.

### 4.8 Respondents family size

The researcher sought to establish the respondent's family size. The results were shown in table 4.7

**Table 4.7 Respondents family size**

| Family size | Number of households | Percentage |
|---|---|---|
| 1- 4 | 40 | 27% |
| 5-8 | 60 | 40% |
| Over 9 | 50 | 33% |
| **Total** | **150** | **100%** |

Table 4.7 shows that 40% of the respondents have 5 -8 family members in their households. This was followed by those with more than 9 family members with 33%. The least is those with 1-4 members making 27%. This shows majority of livestock farmers have big families and that explains the need for more food to feed these families.

### 4.9 The influence of livestock to household food security among the agro pastoral households.

The first objective for this study was to determine the influence of livestock to household food security among the agro pastoral households. To achieve this objective, the respondents were requested to give information about livestock ownership, products, and their use at household level. The results were presented in table 4.8, table 4.9, 4.10, and 4.11.

**Table 4.8 Responses on the animal ownership.**

| Animals | Draught | Cattle | Donkey | Goats/sheep | Poultry |
|---|---|---|---|---|---|
| 0 - 4 | 130 (87%) | 70(47%) | 150(100%) | 10(7%) | 6(4%) |
| 5 - 9 | 20(13%) | 40(26%) | 0(0%) | 20(13%) | 6(4%) |
| 10 - 14 | 0(0%) | 15(10%) | 0(0%) | 42(19%) | 20(13%) |
| 15 - 19 | 0(0%) | 10(7%) | 0(0%) | 58(38%) | 40(26%) |
| 20 - 24 | 0(0%) | 9(6%) | 0(0%) | 15(10%) | 60(40%) |
| Over 25 | 0(0%) | 6(4%) | 0(0%) | 5(3%) | 18(13%) |
| **Total** | **150 (100%)** | **150(100%)** | **150(100%)** | **150(100%)** | **150(100%)** |

Table 4.8 shows that all the respondents kept between 0 – 4 donkeys making 100%. This was followed by 87% of the respondents who kept 0 -4 draught animals. It was also revealed that 47% of the respondents kept 0 -4 cattle. It was also observed that 40% of the respondents kept 20 – 24 poultry. This was followed by 38% of those who kept 15 – 19 goats and sheep. As far as the number of animals kept is concerned, it was revealed that only 13% of the respondents kept over 25 poultry. This was followed by 4% and 3% of the respondents who kept over 25 cattle and goat/sheep respectfully. It also shows all the interviewed households kept livestock.

**Table 4.9: Quantities of meat production and their use at household level**

| Meat in ( Kg) | Cattle | | | Goats/sheep | | | Poultry | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Produced** | **Consumed** | **Sold** | **Produced** | **Consumed** | **Sold** | **Produced** | **Consumed** | **Sold** |
| 0 – 4 | 0(0%) | 0(0%) | 0(0%) | 130 (87%) | 130(87%) | 150(100%) | 80(53%) | 80(53%) | 150 (100%) |
| 5 – 9 | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 40(27%) | 40(27%) | 0 (0%) |
| 10 – 14 | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 20(13%) | 20(13%) | 0 (0%) |
| 15 – 19 | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 10(7%) | 10(7%) | 0 (0%) |
| 20 – 24 | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| 25 – 29 | 0 (0%) | 0 (0%) | 0 (0%) | 20(13%) | 20(13%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| 30 – 34 | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| Above 35 | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| **Total** | **150(100%)** | **150(100%)** | **150(100%)** | **150(100%)** | **150(100%)** | **150(100%)** | **150(100%)** | **150(100%)** | **150(100%)** |

Table 4.9 shows that no respondent produced cattle meat at the household level. It also shows 100% of household sold goats' meat in the market. Goats/sheep meat production followed with 87% producing no meat and 13% producing 25 – 29 kg of meat. The trend was different for poultry with majority producing 0 – 4 kg of meat making 53% responses. The same amount for poultry meat was consumed while 100% of the respondents sold 0-4 kg of meat.27% of respondents produced 4 – 9 kg of poultry meat of which all was consume leaving nothing for sale. This was followed by 10 – 14kg and 15 – 19 kg of poultry meat with 13% and 7% respectively. The same percentage for both was consumed leaving no meat for sale. It was also observed that in all the animals no animal produced meat between 20 and 35 Kg.

**Table 4.10: Milk production**

| Milk in litres | 0Cattle | | | Goats/sheep | | |
|---|---|---|---|---|---|---|
| | **Produced** | **Consumed** | **Sold** | **Produced** | **Consumed** | **Sold** |
| 0 – 4 | 15 (10%) | 20(13%) | 88(57%) | 20(13%) | 30(20%) | 120(80%) |
| 5 – 9 | 20(13%) | 20 (13% | 10(7%) | 40(26%) | 20(13%) | 20 (12% |
| 10 – 14 | 30(20%) | 30(20%) | 20(13% | 60(40%) | 40(27%) | 10 (7%) |
| 15 – 19 | 25(17%) | 20(13%) | 5 (3%) | 10 (7%) | 20 (13%) | 0 (0%) |
| 20 – 24 | 40(27%) | 30(20%) | 10(7%) | 10 (7%) | 0 (0%) | 0 (0%) |
| 25 – 29 | 8(5%) | 20 (13%) | 15(10%) | 10 (7%) | 0 (0%) | 0 (0%) |
| 30 – 34 | 7(5%) | 5(3%) | 3 (4%) | 0 (0%) | 0 (0%) | 0 (0%) |
| Above 35 | 5(4%) | 5(4%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| **Total** | **150(100%)** | **150(100%)** | **150(100%)** | **150(100%)** | **150(100%)** | **150(100%)** |

Table 4.10 revealed that the highest amount of the respondents cattle milk produced per week was 20 – 24 liters making 27%. This was followed by 10 -14 liters with 20%, and 5 – 9 liters with 12%. The least was those who produced above 35 liters of milk with 4%. Out of the produced milk it was observed that the highest consumed amount was 10 – 14 liters with 20% and the least consumed was above 35 liters with 4%. It was also noted that 57% of the respondents sold only 0 – 4 liters per week. The goats on the other hand had a majority of respondents producing 10 – 14 liters per week with 40% responses.

**Table 4.11 Eggs production**

| Eggs | Produced | Consumed | Sold |
|---|---|---|---|
| 10 -19 | 15(10%) | 130(88%) | 33(22%) |
| 20 -29 | 55(37%) | 8(5%) | 45(30%) |
| 30 – 39 | 65(43%) | 7(4%) | 58(38%) |
| Above 40 | 15(10%) | 5(3%) | 15(10%) |
| **Total** | **150(100%)** | **150(100%)** | **150(100%)** |

**Table 4.11** revealed that 43% of the respondents produced 30 – 39 eggs per week while 37% produced 20 – 29 eggs per week. The least was 10% of the respondents who produced 10 -19 and over 40 eggs. It was further revealed that out of the produced eggs, 88% of the respondents consumed 10 – 19 eggs. The highest amount of eggs sold was 30 -39 eggs with 38%.

### 4.10 The influence of government policies on livestock productivity in agro pastoral communities.

The second objective for this study was to determine the influence of government policies on livestock productivity in agro pastoral communities. To achieve this

objective, the respondents indicated their options on some given questions on government policies. The results were presented in table 4.13

**Table 4.12: Responses on the influence of Government policies on livestock productivity.**

| Responses | Aware of any government policy | Extension services in livestock production received |
|---|---|---|
| Yes | 130(87%) | 53(35%) |
| No | 20(13%) | 97(65%) |
| **Total** | **150(100%)** | **150(100%)** |

Table 4.12 shows that majority of the respondents (87%) were aware of Government policies governing livestock productivity while only 13% were not aware. On the other hand, 65% of the respondents had received extension services in livestock production while 975 had not received.

The researcher further wanted to investigate Government relief aid provision to the agro pastoral farmers. The results were shown on table 4.13

**Table 4.13 Responses on Government relief aid provisions to livestock farmers.**

| Government Provision | Frequency | Percentage |
|---|---|---|
| Food | 120 | 80% |
| Livestock | 8 | 5% |
| Seeds | 22 | 15% |
| Livestock feeds | 0 | 0% |
| Others | | |
| **Total** | **150** | **100%** |

Table 4.13 shows that 80% of respondents received food supply from the Government while only 15% received seeds. However only 5% of the respondent received livestock related support from the government.

### 4.11 Government officers gender composition response

**Table 4.14: Distribution of respondents by gender**

| Gender | Frequency | Percentage (%) |
|---|---|---|
| Male | 8 | 53% |
| Female | 7 | 47% |
| **Total** | **15** | **100%** |

The table 4.14 shows that the number of male officers in the two ministries was slightly higher than their female counter parts. This could be attributed to the fact that the number of male graduates in agricultural oriented courses in the Kenyan universities is higher than that of females and thus the discrepancy in the work force

### 4.12 Government officials' age distribution

The researcher sought to establish the age of government officials respondent in order to know whether there is any relationship between the age of the respondent and the government's efforts toward improving livestock keeping

**Table 4.15: Age distribution of government respondents**

| Age in years | Frequency | Percentage |
|---|---|---|
| Less than 20 | 0 | 0.0% |
| 20-30 | 1 | 7% |
| 30- 40 | 8 | 53% |
| 40 – 50 | 4 | 27% |
| Above 50 | 2 | 13% |
| **Total** | **15** | **100%** |

Table 4.15 shows that majority of the respondents (53%) were aged between 30 and 40 years. This was followed by those who were aged between 40 – 50 years with 27%. The least were those who were aged between 20 -30 years with 7 % and those above 50 years making 13%. This data shows that majority of the government extension workers are middle aged and thus less energetic in the provision of extension services in the field.

### 4.13 Work experience of the government officer respondents

The researcher investigated the work experience of the government officers in the filed in providing extension services.

The results are shown in table 4.16.

**Table 4.16: Work experience of respondents**

| Work experience in years | Frequency | Percentage |
|---|---|---|
| **1- 10** | 9 | 60% |
| **11- 20** | 3 | 20% |
| **21 - 30** | 2 | 13% |
| **Over 30** | 1 | 7% |
| **Total** | **15** | **100%** |

**Table 4.16** shows that majority of the respondents (60%) had a working experience of 1 - 10 years. This was followed by those with work experience of 10- 20 years with 20% making 80%. This was followed by those with work experience of 21-30 years with 13%. The least was those who had the experience of over 30 years with 7 %. This shows that many government extension officers were have been recently employed and thus the few years of work experience.

**4. 14: Academic qualification of the government officers respondents**

The researcher sought to establish the academic qualification of the respondents. This was aimed at finding out whether there was relationship between officers' academic qualification and services provision in the livestock keeping. The results were shown in table 4.17.

**Table 4.17: Distribution of respondents by academic qualification**

| Category | Frequency | Percentage (%) |
|---|---|---|
| **Illiterate** | 0 | 0% |
| **Primary** | 0 | 0% |
| **Secondary** | 0 | 0% |
| **University/College** | 15 | 100% |
| **TOTAL** | **15** | **100%** |

Table 4.17 revealed that all the respondents, 100% had college or university qualification with none in the illiterate, primary and secondary levels of education. This shows that the government had purposed to give quality extension services in the sector.

**4.15 Government supported projects, staffing, vehicles, motorbikes and funds**

The researcher wanted to find out from the district agricultural officer and the district livestock development officer how the government has been supporting the livestock and agriculture sectors in terms of projects. The results are shown in the table 4.18

**Table 4.18 Government supported projects, staffing, vehicles, motorbikes and funds**

| | Projects | Staffing | Vehicles | Motorbikes | Funds |
|---|---|---|---|---|---|
| **Agriculture** | 9(60%) | 12(60%) | 3(75%) | 7 (70%) | 10M (56%) |
| **Livestock** | 6 (40%) | 8 (40%) | 1 (25%) | 3 (30%) | 8M (44%) |
| **Total** | **15(100%)** | **16(100%)** | **4(100%)** | **10(100)** | **18M(100)** |

Table 4.18 shows there are more government supported agricultural projects (60%) than the livestock projects (40%) in Mutomo district. This is the case despite the district being more of a livestock production zone than agricultural. Agriculture department had the highest number of staff (60%) while livestock (40%) had the lowest. Agriculture department has the highest number of vehicles (75%) while livestock has (30%). Agriculture department has the highest annual funds allocation 56 % above the livestock which receives 44%

### 4.16. The influence of access to markets on household food security

The researcher sought to establish the influence of access to markets on the household food security. This was aimed at finding out weather the distance from the households nearness to the market had a bearing on the number, frequency or the price of the animal and thus the income to the household.

### 4.17 Respondents responses on market access

The respondent responses on their access to the markets was shown in table 4.19

**Table 4.19 Respondents responses on market access**

| Distance from Market in Km | Frequency | Percentage |
|---|---|---|
| < 5km | 98 | 65% |
| 5-10km | 40 | 27% |
| 11-15 | 12 | 8% |
| 16-20km | 0 | 0% |
| 21-25km | 0 | 0% |
| >25km | 0 | 0% |
| **Total** | **150** | **100%** |

Table 4.19 shows that 65% of the respondents travelled less than 5 kilometres from their homes to the market centres. 25% travelled between 5-10 km while 8% travelled between 11-15 km. This means that the markets were easily accessible and thus could be used to sale their animal products.

The researcher further wanted to establish the market analysis for the respondents. The results were show on the table 4.20.

**Table 4.20: Market analysis for the last three months**

| How sold | Draught | Cattle | Goats/sheep | Poultry |
|---|---|---|---|---|
| Direct sale | 25(11%) | 40(27%) | 80(53%) | 120(80%) |
| Through brokers | 30(20%) | 35(23%) | 20(13%) | 30(20%) |
| Group marketing | 0(0%) | 0(0%) | 0(0%) | 0(0%) |
| Didn't sale | 95(63%) | 75(50%) | 50(33%) | 0(0%) |
| **Total** | **150(100%)** | **150(100%)** | **150(100%)** | **150(100%)** |
| **Where sold** | **Draught** | **Cattle** | **Goats/sheep** | **Poultry** |
| Farm gate | 0(0%) | 0(0%) | 0(0%) | 0(0%) |
| Village/market | 0(0%) | 0(0%) | 0(0%) | 50(33%) |
| Nearest market town | 150(100%) | 150(100%) | 150(100%) | 100(67%) |
| Regional market | 0(0%) | 0(0%) | 0(0%) | 0(0%) |
| Abattoir/butchery | 0(0%) | 0(0%) | 0(0%) | 0(0%) |
| Others | 0(0%) | 0(0%) | 0(0%) | 0(0%) |
| **Total** | **150(100%)** | **150(100%)** | **150(100%)** | **150(100%)** |
| **Reasons for sale** | **Draught** | **Cattle** | **Goats/sheep** | **Poultry** |
| No longer needed | 0(0%) | 0(0%) | 0(0%) | 0(0%) |
| To pay daily expenses | 0(0%) | 25(18%) | 0(0%) | 100(67%) |
| To buy food | 0(0%) | 0(0%) | 0(0%) | 30(20%) |
| Medical expenses | 0(0%) | 0(0%) | 0(0%) | 0(0%) |
| Other emergences | 0(0%) | 0(0%) | 0(0%) | 0(0%) |
| School fees | 55(37%) | 50(33%) | 100(67%) | 20(13%) |
| Pay debt | 0(0%) | 0(0%) | 0(0%) | 0(0%) |
| Others | 0(0%) | 0(0%) | 0(0%) | 0(0%) |
| **Total** | **55** | **75** | **100** | **150** |

Table 4.20 revealed that 80% of poultry were sold directly by the respondents while 11% of the draught animals were sold directly. 23% of the cattle were sold through brokers while 13 % of goats/sheep were sold through brokers. However none of the respondents sold their livestock through group marketing.

It can also be observed that 100% of the livestock were sold in the nearest market town with an exception of chicken of which only 67% was sold in the nearest market with 33% sold in the village/ market. None of the livestock was sold in the farm gate; regional market; abattoir/butchery and others. It was also revealed that 67% of the respondents sold their poultry and goats/sheep to pay daily expenses and school fees respectively. Draught animals, cattle and poultry were also sold for school fees by 37%, 33% and 13% of the respondents respectively. However none of the livestock were sold for, no longer needed; pay normal daily expenses; to pay medical expenses; to pay other emergences; pay debt; or other reasons.

### 4.18 The relationship between food crop farming and livestock production.

The last objective for this study was to assess the relationship of food crop farming and livestock production. The results were presented in table 4.21

**Table 4.21: The relationship between crop farming and livestock production.**

| Responses | Use farm Yard Manure (FYM) | Use crop residues to feed livestock | Sold animals to buy food | Sale farm produce to buy livestock |
|---|---|---|---|---|
| Yes | 130(87%) | 150(100%) | 120(80%) | 67(45%) |
| No | 20(13%) | 0(0%) | 30(20%) | 83(55%) |
| **Total** | **150(100%)** | **150(100%)** | **150(100%)** | **150(100%)** |

Table 4.21 revealed that 100% of the respondents use crop residues to feed livestock. It was also revealed that 87% of the respondents used farmyard manure on their crops. 45% sold farm produce to buy livestock while 20% sold livestock to buy food. It was also revealed that 20% of the respondents did not sale animals to buy food while 55% did not sale farm produce to buy animals. Finally, 13% of the respondents did not use farmyard manure on their crops.

Further the research used Spearman's correlation coefficient to test the strength of the relationship between food crop farming and livestock production. The results are shown in table 4.22

**Table 4.22 Pearson correlation between food crop farming and livestock production**

| | | Food crop farming | livestock production |
|---|---|---|---|
| Food crop farming | Pearson Correlation | 1 | 0.94 |
| | Sig. (2-tailed) | | 0.084 |
| | N | 150 | 150 |
| livestock production | Pearson Correlation | 0.94 | 1 |
| | Sig. (2-tailed) | 0.084 | |
| | **N** | **150** | **150** |

The correlation coefficient between food crop farming and livestock production is +0.94 with 0.084 significant level. This correlation coefficient is very high implying that there is a strong positive relationship between food crop farming and livestock production.

# CHAPTER FIVE

# SUMMARY OF THE STUDY, CONCLUSIONS AND RECOMMENDATIONS.

## 5.1 Introduction

The main purpose for this study was to investigate the role livestock production plays in the general food security of agro households in Mutomo district of Kenya. Data were collected using the questionnaires as the main research instruments. The questionnaires were subjected to 150 respondents' composed Farmers, 15 agriculture/livestock extension officers, and a District Agriculture Officers (DAO) and a District Livestock Development Officer (DLPO). The researcher sought to determine the influence of livestock to household food security among the agro pastoral households, the influence of government policies on livestock productivity in agro pastoral communities, the influence of access to markets by households and to assess the relationship of food crop farming and livestock production.

## 5.2 Summary of the study

This study investigated the role livestock production plays in the general food security of agro households in Mutomo district of Kenya. The researcher sought to determine the influence of livestock to household food security among the agro pastoral households, the influence of government policies on livestock in agro pastoral communities, the influence of access to markets by households on livestock productivity in agro pastoral communities and to assess the relationship of food productivity crop farming and livestock production.

Under the objective of the influence of livestock to the household food security, the study showed that all the respondents kept livestock. Every household kept donkey

because donkeys are important in fetching water for the household consumption. The number of owned livestock numbers in lower in the large stocks (draught, cattle and donkey) while its higher in the small stocks (goats/sheep and poultry).The study revealed that the meat produced at the household level is meant for the family consumption and for sale to get income. Goats/sheep and poultry have fairly good percentage of consumed and sold meat and thus play an important role in attaining food security at the household level. Milk produced at the household level is sold and consumed by the household members. Again like meat, milk plays an important role in the household food security. Eggs produced are also consumed at the household level and also sold in the market for the household to earn income.

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Under the objective of the influence of the government policy on livestock productivity, the study established that majority of the respondents (87%) were aware of Government policies governing livestock production. It was also established that 80% of respondents receive food supply from the Government while 5% received livestock. However 15% respondent was given seeds and none received livestock feeds, or any other supply from the Government. The number of projects supported by the government is higher in crops projects than in the livestock department. Staffing, vehicles, motor bikes and funds are more in the agriculture department than in the livestock counter part. This shows that successive governments in Kenya have always leaned toward supporting crops production while overlooking livestock production.

The study was also to determine the influence of access to market on household's food security. It was revealed that 65% of the respondents travelled less than 5 kilometres from their homes to the market centres. This means that the markets were easily

accessible and thus could be used to sale their animal products. It was further established that 80% and 11% of respondents sold their poultry and draught animals directly. 23% of the cattle were sold through brokers while 13 % of goats/sheep were sold through brokers. However none of the respondents sold their livestock through group marketing. It was also observed that 100% of the livestock were sold in the nearest market town. The reason for selling livestock was revealed to be daily expenses, to buy food and school fees.

The study also purposed to assess the relationship between food crop farming and livestock production. It was revealed that 100% of the respondents use crop residues to feed livestock and 87% of the respondents use farmyard manure on their crops. This is a very important component of nutrients recycling and helps in balancing the ecosystems. Also 45% of the respondents sold farm produce to buy livestock while 80% sold livestock to buy food. Further it was established that there is a strong positive relationship (0.94) between food crop farming and livestock production.

### 5.3 Discussion of the findings

This study investigated the role livestock production plays in the general food security of agro households in Mutomo district of Kenya.

The study sought to determine the influence of livestock to household food security among the agro pastoral households. It was established that the livestock farmers in Mutomo district kept different animals, namely donkeys, draught, cattle, goats, sheep and poultry at different numbers with majority keeping poultry. All these animals were kept for different purposes which included production of meat, milk and eggs for own consumption or sale among other purposes. This agrees with Sansoucy (1995) who argued that livestock not only represent a source of high-quality food, but, equally

important, they are a source of income for many small farmers in developing countries, for purchasing food as well as agricultural inputs, such as seed, fertilizers and pesticides. He further argued that at the national level, livestock food products represent 27 percent of the total agricultural output in most of these countries.

The study also established that there were Government policies which influenced livestock productivity in agro pastoral communities. Although there were extension officers, most of the farmers had never seen them on their farms hence adapting traditional ways of livestock farming. The number of projects supported by the government in the district, the levels of staffing, the equipments (vehicles and motor bikes) and the level of funding to these departments in higher in the agriculture department than in the livestock department. This agrees with Brendan et al (2008) who argued that since independence Kenya has adopted policies that do not seem to promote livestock sector as much as other subsectors like agriculture. He further argued that, Kenya has anti poor livestock policies which have their basis in the colonial period policies. This also agrees with the Ministry of Livestock and Fisheries Development (MoLFD), that those Livestock producers face considerable constraints in achieving a satisfactory standard of living from their livelihood. They remain limited by: neglect by the central government despite the large role livestock plays in the economy, poor governance and high corruption, a politically marginal and weak.

The study also revealed that 65% of the respondents travelled less than 5 kilometres from their homes to the market centres to sell or buy animals. The sale of livestock and their products helped the farmers to cater for their daily expenses, and school fees among other things. This agrees with Sansoucy (1995) who argued that at farm level,

cash can be generated regularly from direct sales of livestock products, such as milk, eggs and manure, occasionally from the sale of live animals, meat and hides and from fees for draught power or transport services.

Finally, the study established that there is a strong positive relationship between food crop farming and livestock production. This is because livestock farmers used animal manure on their farms and also crop residues to feed their animals. This agrees with Angé, (1994) who argued that nutrient recycling is an essential component of any sustainable farming system. The integration of livestock and crops allows for efficient nutrient recycling. Animals use the crop residues, such as cereal straws, as well as maize and sorghum stovers and groundnut haulms as feed. The manure produced can be recycled directly as fertilizer. One tonne of cow dung contains about 8 kg Nitrogen, 4 kg phosphate and 16 kg $K_2O$. The value of manure is so well-recognized that some farmers keep livestock primarily for this purpose (Mucheru et al 2003).

**5.4 Conclusions of the study.**

The study established that the livestock farmers in Mutomo district keep different animals, namely donkeys, draught, cattle, goats, sheep and poultry at different numbers with majority keeping poultry. These animals were kept for different purposes which included production of meat, milk and eggs for own consumption and selling among other purposes.

The study established that there were Government policies which influenced livestock productivity in agro pastoral communities. There existed agricultural extension officers though most of the farmers had never seen them on their farms hence adapting traditional ways of livestock farming which might be the reason for poor production.

The study established all the farmers in the district travelled for less than 5 kilometres from their homes to the market centres. These centres were for selling their livestock and their products hence acquiring money to cater for their daily expenses, school fees and other expenses.

The study established that there is a strong positive relationship between food crop farming and livestock production. This is because livestock farmers used animal manure on their farms and also crop residues to feed their animals this is because nutrient recycling is an essential component of any sustainable farming system. The integration of livestock and crops allows for efficient nutrient recycling. Animals use the crop residues, such as cereal straws, as well as maize and sorghum stovers and groundnut haulms as feed.

**5.5 Recommendations from the study**

The researcher argued in this research that the livestock farmers in Mutomo district keep animals like, donkeys, draught, cattle, goats, sheep and poultry at different numbers with majority keeping poultry. These animals were kept for different purposes which included production of meat, milk and eggs for own consumption and selling among other purposes.

Further the researcher argued that although there were agricultural extension officers, most of the farmers had never seen them on their farms. The study also established that he farmers in the district travelled for less than 5 kilometres from their homes to the market centres to sale their livestock and their products and used their money to cater for their daily expenses, school fees and other expenses. The researcher also argued that there is a strong positive relationship between food crop farming and

livestock production. It is against this background that the recommendations below are made.

The farmers should be encouraged to increase the number of animals and varieties kept. Secondly, the Government should increase the number of Agricultural extension offices in Mutomo district. Thirdly, farmers should be encouraged to organize theme selves into self-help groups to help them pursue better markets for their animals including obtaining loans to expand their farming.

Finally the researcher recommends that, farmers should have better storage facilities for their farm residues and manure for feeding their animals as well as using them in their farms.

**5.6 Suggestion for further research.**

This study investigated the role livestock production plays in the general food security of agro households in Mutomo district of Kenya. The researcher wishes to propose that further research can be done on:-

1. Factors influencing value addition of livestock products
2. Factors influencing value addition of crop products
3. The effects of animal breed on its productivity in the agro pastoral farming

## REFERENCES


Agref , 2005. The study of livestock marketing and support to the establishment of livestock disease free zones/livestock disease free export zones in Kenya.

Aklilu Y, 2002. An audit of the livestock marketing status in Kenya, Ethiopia and Sudan. Volume II. Issues and proposed measures. Community-Based Animal Health and Participatory Epidemiology Unit. Pan African Programme for the Control of Epizootics Organisation of African Union/Interafrican Bureau for Animal Resources.

Ange AL. 1994. Integrated plant nutrition management in cropping and farming systems - A challenge for small farmers in developing countries. Food and Agriculture Organization: Rome, Italy.

Anon, 1989. Challenges of agricultural production and food security in Africa. In: The challenges of agricultural production and food security in Africa. Report and proceedings of an international conference by the African Leadership Forum, 27-30 July 1989, Ota, Nigeria,

Asamenew G. 1991. A study of the farming systems of some Ethiopian highland vertisol areas. International Livestock Centre for Africa: Addis Ababa, Ethiopia (mimeo).

Barrett C.B. and Winnie K. Luseno, (2001) Decomposing producer price risk: an analysis of livestock markets in northern Kenya. Paper presented at the annual meeting of the Western Agricultural Economics Associations, July 2001, Logan, Utah.

Bates, Robert. 1981. Markets and States in Tropical Africa: the Political Basis of Agricultural Politics. Berkeley: University of California Press.

BBS, (1986). The Bangladesh census of agriculture and livestock - 1983/84.Bangladesh Bureau of Statistics, Ministry of Planning: Dhaka, Bangladesh.

Blackburn H and de Haan C (eds), 1993. Livestock development projects: Past, present and future. Proceedings of an informal meeting of donor representatives involved in livestock development, organized by USAID and the World Bank, 4-6 December 1993, Paris, France. World Bank: Washington DC, USA.

Brendan McSherry & jenniffer N, 2008. The political economy of pro-poor livestock policy reforms in Kenya

Burns, Cate, 2004. A review of the literature describing the link between poverty, food insecurity and obesity with specific reference to Australia

FAO Committee on World Food Security, 17th Session, 23 to 27 March 1992, Rome, Italy. 33 pp.

FAO, 1998. The role of ruminant livestock in food security in developing countries

FAO, 2008, Food security outlook Kitui District

FAO. 1993b. Strategies for sustainable animal agriculture in developing countries.

FAO. 1982. Livestock production: a world perspective. The State of Food and Agriculture 1982, p. 76-141. Rome, FAO.

FAO. 1987. Agriculture: toward 2000. Rome, FAO.

FAO. 1989. Methodology for preparing comprehensive national food security programmes: 2nd Ad hoc consultation with FSAS donors, 27 October 1989. Food and Agriculture Organization: Rome, Italy (mimeo).

FAO. 1992. The role of ruminant livestock in food security in developing countries. Committee on World Food Security. Seventeenth Session, 23-27 March 1992. Food and Agriculture Organization: Rome, Italy.

FAO. 1992. The role of ruminant livestock in food security in developing countries.

FAO. 1993. Livestock and improvement of pasture, feed and forage. FAO Committee on Agriculture, 12th Session, Item 7, 26 April to 4 May 1993, Rome, Italy. 19 pp.

FAO. 1993a. Livestock and improvement of pasture, feed and forage. Committee on Agriculture, Twelfth Session, Item 7, 26 April-4 May 1993. Food and Agriculture Organization: Rome, Italy.

FAO. 1993b. Agriculture towards 2010. Food and Agriculture Organization: Rome, Italy.

FAO. 1993c. Agriculture: towards 2010. Doc. C 93/24, November 1993. 320 pp.

Global Livestock CRSP: http://glcrsp.ucdavis.edu/about/ GL-CRSP. (2003). USAID GL-CRSP 2003 Annual Report.

GOK (Government of Kenya), 2001. Population and housing census. Volume I.

Gryseels G. 1988. The role of livestock in the generation of smallholder farm income in two vertisols areas of the central Ethiopian highland. In: Jutzi SC, Haque I,

McIntire J and Stares JES (eds) *Management of vertisols in sub-Saharan Africa.* International Livestock Centre for Africa: Addis Ababa, Ethiopia.

Homewood, K. 2004 Policy, Environment and development in African rangelands. *Environmental Science and Policy* 7, 125-143.

http://www.irinnews.org/webspecials/drought/kenya2.asp. Found 16 December 2006.

Individualization of Land Ownership among the Maasai Pastoralists of Kajiado

IRIN. “Kenya: Pastoralists Facing Neglect” IRIN. Online internet.

Kaitho R. J., Stuth J.W. and Jama A.A. 2003. Application of information communication technology in livestock marketing in the pastoral areas of eastern Africa. The International Archives of the Photogrammetry, Remote Sensing and \Spatial Information Sciences, Vol. 34, Part XXX.

Kariuki G. and Kaitho R.(2006). Application of information communication technology in developing a national livestock marketing information system: The case of Kenya. GL-CRSP Research Brief 06-01.

Kasomo D, 2006. Research Methods in humanities and education. Eldoret, Kenya:Zapf chancery

Kothari, C.R, 2006. *Research methodology: Methods & techniques.* India: New Age International Publishers.

Kristjanson P, Radeny M, Baltenweck I, Ogutu J, Notenbaert A. 2005. Livelihood mapping and poverty correlates at a meso-level in Kenya. *Food Policy* 30(6) 568-

Kristjanson P., Radeny M., Nkedianye D., Kruska R., Reid R., Gichohi H.

Leksmono, C., J. Young, N. Hooton, H. Muriuki and D. Romney. 2006. Informal Traders

Leng, R.A. 1993. The impact of livestock development on environmental change. In

Mamdani, Mahmood. 1996. Citizen & Subject: contemporary Africa and the legacy of late colonialism. Princeton NJ: Princeton University Press.

Mucheru-Muna M, Mugendi D, Kangai R, Kungu, J and Mugwe J, 2003, Soil Productivity improvement technologies for increased food production in Meru

Munyoki, 2011. The influence of relief food aid on food security in Mutha division, Mutomo district KenyaSouth District, Kenya

Narman A. (1990). Pastoral peoples and the provision of education facilities: A case of Kenya. Nomadic Peoples, 25-27, 108-124.

Omiti J. 1995. Economic analysis of crop-livestock integration: the case of the Ethiopian highlands (Ph. D. Thesis). Department of Agricultural and Resource Economics, University of New England: Armidale, Australia.

Orodho J. A. (2005). Techniques of writing research proposals and reports in education and social sciences. Nairobi:

Republic of Kenya (Central Bureau of Statistics), 1994. Statistical Abstract Nairobi: Government Printer.

Sansoucy R. 1995, Livestock - a driving force for food security and sustainable development School of Exercise and Nutrition Sciences, Deakin University

Williams TO, Powell JM and Fernandez-Rivera, S. 1994. Manure utilization, drought cycles and herd dynamics in the Sahel: implication for cropland productivity. In:

Winrock. 1992. An assessment of animal agriculture in sub-Saharan Africa. Winrock International: Morrilton, USA.

World Bank,1986. *Poverty* and hunger: Issues and options for food security in developing countries. World Bank: Washington DC, USA.

World Food Summit, 1996. Web site: http://www.fao.org/wfs/index_en.htm, accessed on 23/01/11.

# APPENDICES

## APPENDIX I Letter of Introduction

UNIVERSITY OF NAIROBI

P.O. BOX 30197,

NAIROBI.

9TH JUNE, 2012.

Dear Respondent,

I am a post graduate student in the University of Nairobi pursuing a Masters degree in project planning and Management course. I am carrying out a research on "The role livestock production plays in the general food security of agro pastoral households in Mutomo district of Kenya".

Your division has been sampled for the study and you have been selected as a respondent. Please answer the questions as truthfully as possible.

The result of this study will be used for academic purposes only. Any information collected will be treated with utmost confidentiality. Thanks in advance.

Yours Faithfully,

Kavili, Alex Kaveva

## APPENDIX II: Agro pastoralist Questionnaire

I am glad to inform you that you have been selected to participate in this important study on the role of livestock in attaining food security in Kitui District. I am a postgraduate student at the University of Nairobi pursuing a Masters Degree in Project Planning and Management.

As part of the requirement for the award of this degree, I am carrying out a study on the influence of farmer's education on food security in Kitui District Eastern Province, Kenya. Therefore, this questionnaire is designed to gather information about how your food security is influenced by livestock productivity. The information you will give will be purely used for the purpose of this study. I kindly request you to respond to all items and indicate correct alternative by putting a tick (√) where applicable:

**Part I: Respondents personal information (Agro pastoralist)**

1. Gender of the respondent (Researcher observe) (____)*1= Male; 2= Female*
2. Is the respondent the head of household? (_____) *1= yes; 2= no*
3. Age of the respondent (_____) *1= Less than 20yrs; 2= between 20-30yrs; 3= between 30- 40 yrs; 4= between 40-50 yrs; 5= above 50yrs*
4. Farming experience:(____)*1=1-10 yrs; 2=11-20yrs; 3=21-30yrs; 4= Over 31 yrs*
5. Indicate your highest academic qualification :(____) *1= primary; 2=secondary; 3=university/college; 4= illiterate*

6. How many members are there in the household? (_____)

7. How many members are 18 years and below? (_____)

8. How members are 18 years and above? (_____)

**Part II: contribution of Livestock to household food security**

**1. Livestock ownership, products and their use at household level**

a. How many animals do your household own?

| | Number |
|---|---|
| i. Draught | (_____) |
| ii. Cattle | (_____) |
| iii. Donkey | (_____) |
| iv. Goats/sheep | (_____) |
| v. Poultry | (_____) |

b. How many animals did you acquire in the last three months

| | Number |
|---|---|
| i. Draught | (_____) |
| ii. Cattle | (_____) |
| iii. Donkeys | (_____) |
| iv. Goats/sheep | (_____) |
| v. Poultry | (_____) |

c. Livestock products and their uses per week

| i. Meat (kg) | Produced | Consumed | Sold |
|---|---|---|---|
| Cattle | (_____) | (_____) | (_____) |
| Goats | (_____) | (_____) | (_____) |
| Poultry | (_____) | (_____) | (_____) |

| ii. Milk(litres) | Produced | Consumed | Sold |
|---|---|---|---|
| Cattle | (_____) | (_____) | (_____) |
| Goats | (_____) | (_____) | (_____) |

| iii. Eggs | Produced | Consumed | Sold |
|---|---|---|---|
| | (_____) | (_____) | (_____) |

**2. Influence of access to markets to livestock productivity**

a. Distance from the market in km (_____)

*1= < 5km; 2= 5-10km; 3= 11-15; 4= 16-20km; 5= 21-25; 6= >25km*

b. Market analysis in the last three months

| **Animal** | **How sold** | **Where sold** | **Reason of sale** | **Average price** |
|---|---|---|---|---|
| Draught | | | | |
| Cattle | | | | |
| Goats /sheep | | | | |
| Poultry | | | | |

***Code**: How sold: 1=Direct sale; 2= through brokers; 3= group marketing*

*Where sold: 1= farm gate; 2= village/market; 3= nearest market town;*

*4= regional market; 5=abattoir/butchery; 6= others*

*Reason for sale: 1=no longer needed; 2=to pay normal daily expenses; 3=to buy food 4= to pay medical expenses; 5= to pay other emergences; 6=to pay school fees; 7= to pay debt; 8 = others (specify*

a. What is the average price of animals during the various seasons in the region

| | Drought/famine | Good harvest |
|---|---|---|
| Draught | (_____) | (_____) |
| Cows | (_____) | (_____) |
| Goats | (_____) | (_____) |
| Sheep | (_____) | (_____) |
| Poultry | (_____) | (_____) |

b. What is the average price of crops farm produce during the various seasons in the region

| | Drought/famine | Good harvest |
|---|---|---|
| Maize | (_____) | (_____) |
| Sorghum | (_____) | (_____) |
| Millet | (_____) | (_____) |
| Green grams | (_____) | (_____) |
| Beans | (_____) | (_____) |
| Cowpeas | (_____) | (_____) |

**3. Influence of crops to livestock productivity**

a. What is the acreage size of your farm? (_____)

b. Do you use Farm Yard Manure (FYM) on your farm? (____)*1= yes; 2 = no*

c. If the answer in 3b is yes, approximately how much FYM in kilograms did you use in the last planting season (_____)

d. Is there significance difference when you use and do not use manure in your farm in terms of crop productivity (_____)

*e.* Do you use crop residues from the farm to feed livestock? (_____) *1= yes; 2= no*

f. Do you conserve these crop residues to feed livestock in times of feed scarcity? (_____)*1= yes; 2= no*

g. In the last one year have you sold animals to purchase food crops? (_____)*1=yes; 2= no*

h. If the answer in 3g above is yes, how many animals did you sale to purchase food items? (_____)

i. Approximately how much income did you get from the sales of the animals in 3h above? (_____)

*j.* In the last one year did you sale your farm produce to purchase livestock? (_____) *1=yes; 2= no.*

*k.* What type of animal did you purchase from the farm produce sales in 3j above? (_____) *1=draught; 2= cattle; 3= goats/sheep; 4 = poultry; 5= others(specify)*

**4. Influence of government policies on livestock productivity**

a. Are you aware of any government policy that promotes livestock productivity in your area?(_____) *1= yes; 2= no*

b. How many livestock improvement government supported projects are there in your area? (_____)

c. How many crops production government supported projects are there in your area(_____)

d. Do you get extension services in crops production from government officers?(_____) *1= yes; 2= no*

e. Do you get extension services in livestock production from government field officers?(_____) *1= yes; 2= no*

*f.* During times of famine what do you mostly receive from the government and other development actors as famine relief? (_____) *1= food; 2= livestock; 3= seeds; 4= livestock feeds; 5= others (specify)*

**Part I: Personal information (Government officers)**

1. Gender of the respondent (_____) *1= male; 2= female*

2. Age of the respondent (_____) *1=less than 20yrs; 2= 20- 30yr; 3= 30-40yrs; 4= 40- 50 yrs 5=above 50yrs*

3. Working experience (_____) *1=1-10yrs; 2=11-20yrs; 3=21-30 yrs, 4= Over 31yrs*

4. Highest academic qualification. (_____) *1= Primary; 2=Secondary; 3= Diploma/Certificate; 4= Degree*

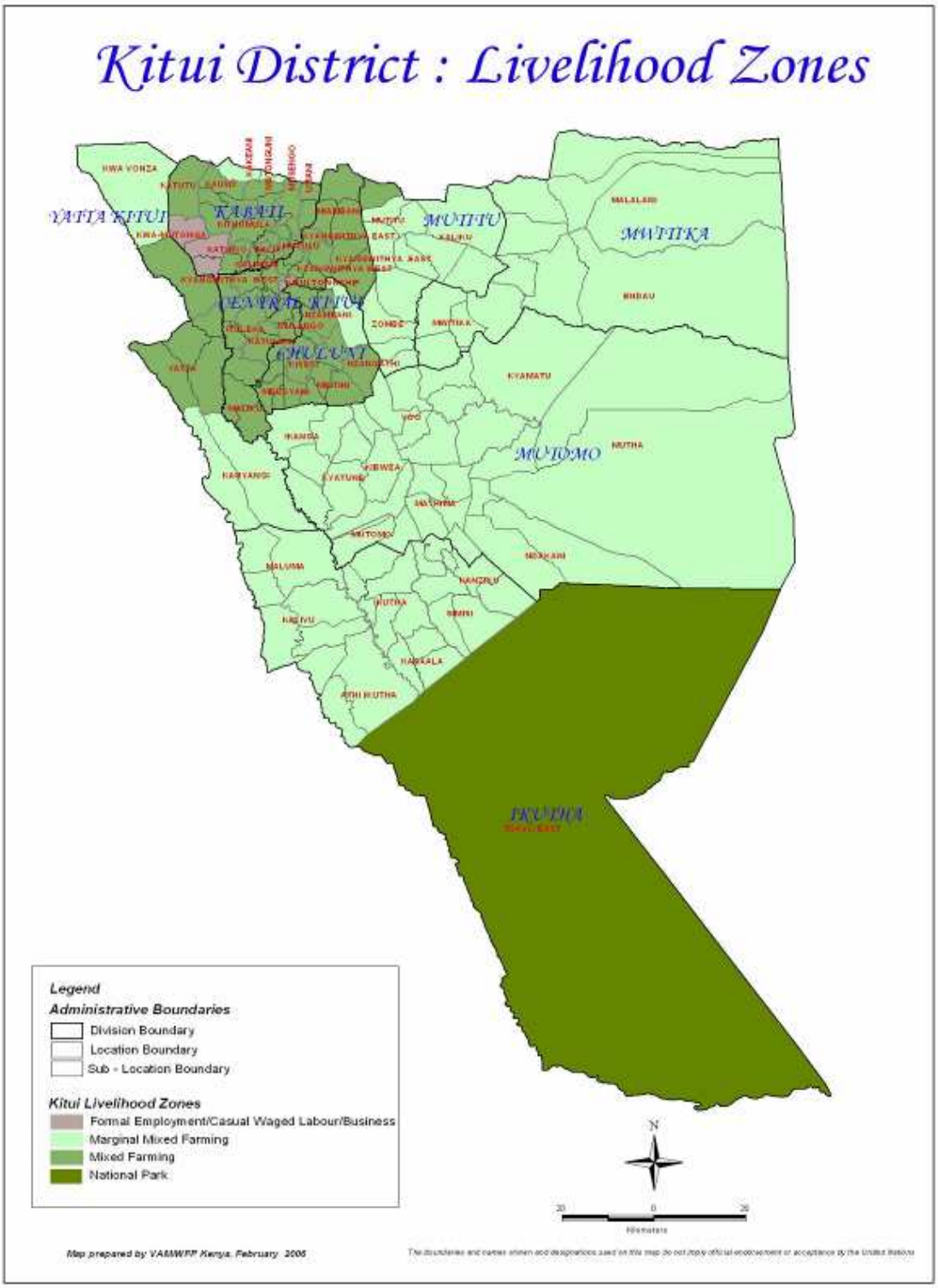
**Part II: Government policy (To be filled by the District Agricultural officer)**

a. How many government supported crop production projects are there in the district? (_____)
b. What is the total number of your staff members in the district? (____)
c. How many vehicles does your staff have in the district? (_____)
d. How many motorbikes does your staff have in the district? (_____)
e. In your own estimation what is the level of the government funding in millions per year? (_____)

**Part II1: (To be filled by the District Livestock officer)**

a. How many government supported livestock production projects are there in the districts? (_____)
b. What is the total number of your staff members in the district? (_____)
c. How many vehicles does your staff have in the district? (_____)
d. How many motorbikes does your staff have in the district? (_____)
e. In your own estimation what is the level of the government funding in millions per year? (_____)

**APPENDIX III**




Adopted from food security Kitui District, Eastern Province profile 2008