THE FACTORS INFLUENCING THE COLLAPSE OF COMMUNAL CATTLE DIPS AFTER PRIVATIZATION OF VETERINARY SERVICES IN KENYA: A CASE OF MAARA DISTRICT, THARAKA-NITHI COUNTY

BY

INDRAPH MUGAMBI RAGWA

A research project report submitted in partial fulfillment of the requirements for the degree of Master of Arts in Project Planning and Management, University of Nairobi.

2012

DECLARATION

This Research Project report is my original work and has not been presented for any Degree in any other University.

Date 14/08/2012

INDRAPH MUGAMBI RAGWA

L50/64197/2010

This Research Project report has been submitted for Examination with my approval as the University Supervisor.

Date 14. 08. 2012

DR. GUANTAI MBOROKI

Senior Lecturer

Department of Educational Studies

University of Nairobi

DEDICATION

This Research Project work is dedicated to my late parents; Indraph M'ragwa Mbae and Naomi Kangai M'ragwa who sacrificed, struggled and toiled in their endeavour to ensure that I internalized the ideals of education. Through their support, encouragement and facilitation I gathered the momentum that propelled my consciousness to pursue this course at my sunset years in the civil service.

ACKNOWLEDGEMENT

I wish to thank the Almighty God for his care, blessings and grace that has enabled me to get this far. I owe a lot of gratitude to my supervisor, Dr. Guantai Mboroki, for his guidance, support and encouragement in the management of this Project. I also feel indebted to the various lecturers for their commitment and devotion in ensuring that we grasped the various concepts pertaining to this course. The non-teaching staff at the Nairobi Extramural Centre and the Dean's Office deserve recognition for their assistance whenever it was needed. I am also thanking my colleagues for their cooperation, inspiration and support in the course of developing this project, where I want to mention the colleague members of group 4 in the first and second semester as well as those of group 2 in the third semester.

I wish to highly extend my appreciation to my wife, Catherine, and children Wanja, Mwenda, and Muthoni for their unwavering support and encouragement that enhanced my working morale. Special thanks to the Director of Veterinary Services, the Head of Veterinary Inspectorate Services Unit and my fellow colleagues at the work place for their understanding while I was undertaking this Project. I cannot forget Dr. Amenya's invaluable coaching in computer skills.

I am also thanking my two research assistants Alfonse Njeru and Gainson Mbae for their dedication and efforts that enabled me to smoothly collect the data for this Project. Equally, I extend my appreciation to Charles Ngonjo for his assistance in analyzing the data.

Generally I wish to thank all the other individuals who contributed in a way or other towards the success of this Project. May God bless you all.

TABLE OF CONTENTS

Page

DECLARATION ii

DEDICATION iii

ACKNOWLEDGEMENT iv

TABLE OF CONTENTS v

LIST OF TABLES ix

LIST OF FIGURES x

ABBREVIATIONS AND ACRONYMS xi

ABSTRACT xii

CHAPTER ONE 1

INTRODUCTION 1

1.1 Background of the Study 1

1.2 Statement of the Problem 4

1.3 Purpose of the Study 4

1.4 Research Objectives 5

1.5 Research Questions 5

1.7 Scope of the Study 6

1.8 Assumptions of the Study 6

1.9 Limitations of the Study 6

1.10 Delimitations of the Study 6

1.11 Definition of significant terms 7

Page

1.12 Organization of the Study 7

CHAPTER TWO **9**

LITERATURE REVIEW **9**

2.1 Introduction 9

2.2 Animal husbandry 9

2.3 Ticks 9

2.4 Tick borne diseases 10

2.5 Tick control 10

2.5.1 Tick control strategies 12

2.5.2 Economic aspects of tick control 13

2.5.3 Government policy on tick control 14

2.5.4 Social-economic perceptions of tick control 15

2.6 Community participation 16

2.7 Privatization of Veterinary Services 19

2.8 Collapse of communal Cattle dips 21

2.9 Poverty Levels in Kenya 22

2.10 Sensitization of Communities to management of communal dips. 24

2.12 Conceptual Framework 25

CHAPTER THREE **26**

RESEARCH METHODOLOGY **26**

3.1 Introduction 26

3.2 Research Design 26

Page

3.3 Research site and target Population 26

3.4 Sample and Sampling procedure 26

3.5 Data Collection 27

3.5.1 Validity of Research instrument 27

3.5.2 Reliability of Research Instrument 28

3.6 Data Analysis 28

3.7 Operational definition of Variables 30

CHAPTER FOUR 31

DATA ANALYSIS, PRESENTATION AND INTERPRETATION OF THE FINDINGS..31

4.1 Introduction 31

4.2 General information 31

4.3 Community Participation 38

4.4 Cost of dipping Cattle 42

4.5 Community Sensitization before handing over 46

4.6 Correlation Analysis 47

CHAPTER FIVE 50

SUMMARY OF FINDINGS, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS 50

5.1 Introduction. 50

5.2 Summary of the Findings 50

5.2.1 Community Participation 50

5.2.2 Cost of dipping Cattle 50

Page

5.2.3 Community Sensitization before handing over after privatization 51

5.3 Discussion of the Findings 51

5.3.1 Community Participation 51

5.3.2 Cost of dipping Cattle 52

5.3.3 Community Sensitization before handing over 53

5.4 Conclusion 53

5.5 Recommendations 55

5.6 Recommendation for Further Studies 55

REFERENCES 56

APPENDICES 61

Appendix 1: Introductory Letter to Respondents 61

Appendix 2: Questionnaire 62

Appendix 3. Letter of introduction to District veterinary officer 68

Appendix 4: Table for Determining Minimum Returned Sample Size for a Given Population Size for Continuous and Categorical Data 69

LIST OF TABLES

Page

Table 4. 1: Respondents Division 32

Table 4. 2: Gender of the Respondents 32

Table 4. 3: Age of Respondents 33

Table 4.4: Marital Status 33

Table 4. 5: Level of Education 34

Table 4. 6: Source of Income 34

Table 4. 7: Average Income per Month 35

Table 4. 8: Cattle Rearing. 36

Table 4. 9: Cattle Breeds reared. 36

Table 4. 10: Main produce from the Cattle 37

Table 4. 11: Selling of Milk 37

Table 4. 12: Origin of the idea for Cattle dips construction 38

Table 4. 13: Approximate cost of Cattle dips construction 39

Table 4. 14: Sponsors of the Cattle dips construction. 39

Table 4. 15: Community's contribution 40

Table 4. 16: Cattle dip functionality 41

Table 4. 17: Cattle dip revival 41

Table 4. 18: Tick Control 42

Table 4. 19: Paymen for dipping Cattle 43

Table 4. 20: Amount paid 43

Page

Table 4. 21: Changes in the dipping fees.....44

Table 4. 22: Amount charged per head of Cattle.....44

Table 4. 23: Effect of the mode of payment on the usage of the Cattle dip 45

Table 4. 24: Charges rating.....45

Table 4. 25: Community Sensitization before handing over 46

LIST OF FIGURES

Figure 2.1: Conceptual Framework 25

ABBREVIATIONS AND ACRONYMS

AHVLA	-Animal Health and Veterinary Laboratories Agency
ASARECA	-Association for Strengthening Agricultural Research in East and Central Africa
DLPO	-District Livestock Production Officer
DVO	-District Veterinary Officer
DVS	-Director of Veterinary Services
ECF	-East Coast Fever
FAO	-Food and Agricultural Organization of the United Nations
GOK	-Government of Kenya
GDP	-Gross Domestic Product
ITM	-Integrated Tick Management
SID	-Society for International Development
MOA	-Ministry of Agriculture
OIE	-International Organization on Epizootics
PDVS	-Provincial Director of Veterinary Services
SAPs	-Structural Adjustment Programmers
SPSS	-Statistical Package for Social Sciences
TBD	-Tick Borne Diseases
UNDP	-United Nations Development Programme

ABSTRACT

This Study is premised on the background that the Livestock farmers in Maara District of Eastern Province of Kenya have stopped using the cattle dipping facilities in the District. The purpose of the study was to find out, from the farmers, why out of the 32 communal cattle dips that were once operating only three are now operational. It is envisaged that the results of this study would assist the government when formulating tick control policies in future; the researchers when exploring the various tick control methods; the farmers when undertaking various developments projects and the development agents while implementing various projects and programmes.

The objectives of the Study were, (i) to determine the extent to which Community Participation in management contributed to the collapse of communal cattle dips, (ii) to establish if the cost of dipping played any role in the collapse of dips and (iii) to determine if Community Sensitization during the Privatization process played any role in the collapse of the dips. The Research Methodology was a Descriptive survey. The Study population was the 9902 Livestock farmers in two Divisions of Maara District. Simple random sampling was used to select 30% of the Divisions in the District for the Study and systematic random sampling used to come up with a sample of 119 respondents. Data was collected from the Livestock farmers through Questionnaires which were administered by the Researcher and his two Assistants. The emanating data was coded, cleaned and analyzed using SPSS and thereafter interpreted to enable conclusions and necessary recommendations to be made. The Study found that Community Sensitization before handing over contributed most to the collapse of communal cattle dips after Privatization of Veterinary Services followed by cost of dipping while Community Participation had the least effect on the collapse of communal cattle dips after Privatization of Veterinary Services. This Study recommends that the government should finance the maintenance of the dips and also ensure that proper management systems are in place to manage the dips for proper functioning. This Study also recommends that the government with aid from non-governmental organizations should intervene to bring the charges down so as to ensure that many farmers will be able to access the dip to have their cattle rid of ticks for maximum production.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Livestock play an important role in the economies of most developing Countries. Anteneh (1989) estimates that the value of commodity output in sub-saharan Africa is equivalent of 25% total food production. In Europe, North America and Australia Livestock contributes over 8% of Gross Domestic Product (Umali et al. 1994a). The Livestock subsector in Kenya accounts for 10% of the entire GDP and 42% of agricultural GDP. The subsector employs 50% of the agricultural sector labour force (National Livestock policy Kenya, 2008).

Ticks are generally regarded as the ectoparasites that cause the greatest economic losses to Livestock Production in the World today, adversely affecting Livestock hosts in several ways (Snelson, 1975): they contribute to unthriftness and anaemia by exsanguinations; they damage hides and subject Livestock to secondary infection; they cause toxicosis and paralysis by the injection of salivary secretions; and, most importantly transmit pathogenic agents that cause diseases, many of which result in debility and death. The economic impact of ticks and diseases they transmit is enormous. Not only is the annual global cost of ticks and tick-borne diseases estimated to run to thousands of millions of dollars, but also mankind is deprived of a significant amount of Animal protein that cannot be replaced from other sources (Bran, 1975; Callow, 1975; Drummond *et al.* 1978; Snelson, 1975).

Approximately 80 percent of the world's cattle population of 1281 million are at risk from ticks and tick borne diseases (TBD). McCosker (1979) estimates the global costs of control and productivity losses to some US $ 7000 million annually. For example, in Australia alone in 1974, losses due cattle ticks were estimated to be US $ 62 million (Springler, 1974); Brazil looses around US $ 2 billion per year (Grisi *et al.* 2002). In Africa, with 186 million head of cattle, ticks and TBD are the most serious constraints to increased production. Such losses could be cut considerably by adopting effective tick control measures. In South Africa, Taylor and Plumb

(1981) demonstrated a large difference in group mean-weights gain between heavily tick-infested and tick free animals.

In Zambia, long term studies using a farming systems approach were undertaken to quantify the impact of tick control on local *sanga* cattle. In the first trial, significant decrease in live weight gains (LWG) occurred only in periods of medium to high challenge with adult *Amblyomma Variegatum* (Pegram *et al.* 1989). In the second trial the impact of tick control on the overall herd productivity was measured. Outputs of milk and weaner calf in relation to carrying capacity of available land were found to be about 25 percent higher in a tick free herd.

In Tanzania perhaps the biggest hurdle facing the ranching sector is the prevalence of bovine diseases. More than 80 percent of the 1,998 cattle dips in the Country are malfunctioning. As a result, pests and diseases are rampant, with high Livestock deaths. In Zimbabwe during the liberation war there was breakdown of dipping services causing losses from TBD approaching over one million head of cattle (Lawrence *et al.*, Norval *et al.* 1991).
The actual ticks and TBD losses are caused directly by death of animals and loss of production or indirectly through the costs of control and reduced production capability. Mukhebi *et al.* (1992) estimated that Theileriosis caused losses of US$ 168 million in Eastern Africa alone, and recent observations indicate direct losses due to ticks and TBD in Tanzania to reach US$ 364 million annually, mainly due to death of more than 1.3 million cattle (Kivaria, 2006a, Kivaria *et al.* 2007).

Field trials in Kenya using *Boran* heifers immunized against East Coast Fever (ECF) showed that animals dipped weekly gained an average of 78g per day more than the undipped animals over a 30 week period. (de Castrol *et al.* 1985a). de Castrol (1987) also demonstrated that high tick numbers caused proportionally greater live weight losses in tick susceptible *Boran* cattle in tick-resistant animals of the same breed. In Narok district the diseases control efforts especially prevention, are not impressive. There are, for example, 132 communal dips in the district, but only 50 (those supported by the county council) are currently functioning. TBD as a result have become endemic. There is usually an upsurge of these diseases during the wet season as grass is one of the main habitats of ticks (DVO Narok, 1999).

To counteract the adverse effects of ticks and tick-borne diseases, a variety of tick control programmes have been integrated into modern Livestock management practices and tick control is priority for many countries in tropical and sub-tropical regions (Lodos *et al.* 2000). Foremost among these is chemical tick-control which not only decreases the detrimental effects of ticks themselves but also interrupts the transmission cycle of pathogenic agents and, thus, reduces the incidences of tick-borne diseases (Callow, 1976).

According to Drummond (1983) the main weapon for controlling ticks is the use of chemical acaricides. The use of acaricides was introduced in 1902 and used to eradicate ECF from South Africa by 1954 and Swaziland by 1960 (Lawrence, 1991).The various methods employed for control of ticks using acaricides in Kenya include: hand spraying, use of spray races and plunge dips. According to Agnote (2006) and Drummond (1975), the use of cattle plunge dips provides the most effective methods of tick control.

By 1893 in Australia, Africa, and the United States the use of cattle dips to immerse tick-infested cattle was a component of efforts to control ticks and TBD affecting cattle (Mohler, 1996; Mathewson and Baker, 1975). The practice of cattle dipping in Kenya started in 1912 (Hill, 1956) when the first dips were constructed. However, tick control became a national concern with the enactment of the Tick control Act Cap.358, in 1938. However the high initial cost of constructing dips and the cost of acaricides may make dips impractical for many small scale farmers (Drummond 1983); thus the approach used among the small stake holders was to develop communal dips managed by farmer groups or local authorities. The management was, however, not very effective and in 1977, the government took over the management of communal dips to enhance effectiveness of tick control.

There was a policy change, again, in 1986 when the tick control services were privatized after the advent of the structural adjustment programmes in Kenya in line with Session paper No. 1 of 1986. The communal dips were handed over to the communities for routine management and the government was left with the regulatory function. Due to various reasons, the farmers progressively stopped using the dips and according to the Department of Veterinary Services strategic plan, 2008-2012, the number of working dips decreased from 4800 in July 1991 to 608

in June 2011. This Study will thus explore the factors influencing the collapse of the dips in Maara District.

1.2 Statement of the Problem

For many years ticks have taken toll of exotic cattle (*Bos taurus*) introduced to tropical and subtropical developing Countries. The most obvious effect of ticks has been as vectors of disease (Callow, 1976); others are reduced production and Livestock deaths. There are various methods used to control ticks: use of cattle dips, spray races, hand spraying and hand dressing. The government constructed 32 communal dips in Maara District which at one time were all operational. However, after Privatization all the dips virtually collapsed and farmers resulted to spraying their Livestock individually at their homes. According to Maara District Veterinary Officer's report of December 2011 there were only 3 out of the 32 dips that were operational with farmers resulting to hand spraying their cattle at home.

In order to control ticks effectively every part of the cow's body must be wetted with acaricide (Kingsley, 1993) and this is very difficult with hand spraying. In addition the costs of acaricides is prohibitively high (Dube, 1996) and due to existence of unscrupulous traders, there is a possibility of fake, adulterated and ineffective acaricides in the market (ASARECA). Therefore, hand spraying is more expensive than use of communal dips and ends up into eating into the gains of increased productivity (Silayoet *et al.* 1996; Eisler *et al.* 2003). Even with this knowledge the farmers in Maara District are not using the communal dips. This would lead to low incomes from Livestock which could consequently impoverish them negating the objectives of keeping Livestock and defeating the government's goal of reducing Poverty.

1.3 Purpose of the Study

This Study sought to investigate the factors influencing the collapse of communal cattle dips after Privatization of Veterinary Services in spite of the fact that ticks and tick-borne diseases are still prevalent in the District and yet Livestock keeping is meant to be an economic activity. The Study findings would be communicated to the relevant authorities for information and further necessary action as would be appropriate.

1.4 Research Objectives

This Study was to achieve the following objectives

I. To determine the extent to which Community Participation in dipping projects in the District influenced the collapse of communal cattle dips after Privatization of Veterinary Services in Kenya.
II. To establish the extent to which the cost of dipping cattle in Maara District influenced the collapse of communal cattle dips after Privatization of Veterinary Services in Kenya.
III. To determine the extent to which the level of Community Sensitization on dipping projects in the District influenced the collapse of communal cattle dips after Privatization of Veterinary Services in Kenya.

1.5 Research Questions

Three Research Questions addressed by the study were:-

I. To what extent did the Community Participation during the management and handing over of communal dips contribute to their collapse after Privatization of Veterinary Services in Kenya?
II. To what extent did the payment of cattle dipping charges by the farmers contribute to the collapse of communal cattle dips after Privatization of Veterinary Services in Kenya?
III. To what extent did the level of Community Sensitization during the management and handing over of communal dips lead to their collapse after Privatization of Veterinary Services?

1.6 Significance of the Study

The Study will provide the Ministry in charge of Livestock in Kenya with knowledge which can be useful when developing strategies for the control of ticks and tick borne diseases. Researchers can incorporate the knowledge gathered to compare with other tick control methods they investigate. The committees of Constituency Development Fund (CDF) and other development

partners who assist in rehabilitation of dips would use this information to avoid pitfalls in future. The farmers and other change agents would be more knowledgeable on the issues relevant to handing over of projects in future and thus be empowered to take charge of their development agenda.

1.7 Scope of the Study

The Study focused on 119 Livestock farmers in two divisions of Maara District who were respondents to the developed Questionnaire. The results were then generalized to the whole Population.

1.8 Assumptions of the Study

The Study was based on the following assumptions:-

1. That all the respondents would be having data related to the collapse of the dips and will answer the questions without bias.
2. That there would be cooperation from all the relevant arms of the government related with this Study.
3. The situation (social-political and environmental) would be normal.

1.9 Limitations of the Study

I. Time. The time was not enough time to interview all the Livestock farmers in the District.

II. Funds for logistics were not adequate to cover all the Livestock farmers in the District.

Due to the above limitations, only 119 Livestock farmers were randomly sampled to represent the 9902 livestock farmers (DLPO Maara District, 2011) in the two Divisions of the District.

1.10 Delimitations of the Study

This Study was carried in two divisions of Maara District of Tharaka- Nithi County, Kenya.

1.11 Definition of significant terms

Cattle: This refers to farm animals kept for meat and or milk. The males are called bulls if intact or steers when castrated and the females are cows.

Cattle dip: This is a facility used to eliminate ticks from cattle in order to control ticks and tick-borne diseases. The dips have a tank which is filled with water and charged with acaricide where cattle are completely immersed during dipping.

Ticks: These are small blood sucking arthropods that mainly fed on cattle and other domestic as well as wild animals. In the process of sucking blood they can transmit diseases between the sick and healthy cattle.

Tick control: This is the term used to refer to the reduction or elimination of tick infestation in cattle.

Beneficiaries: This term refers to the Community who are within the area where the dip is constructed and can access it to dip their cattle.

Privatization: This refers to the process where the communal dips were handed over to the beneficiaries for management purposes. The process will entail the beneficiaries incurring the operating costs and the Government having the regulatory role.

Community Participation: This refers to the roles undertaken by the Community in the construction and management of the dips.

Community Sensitization: This refers to the creation of awareness to the Community on the policy and its implication after the handing over. It implies that the Community is made aware of their roles and responsibilities vis-à-vis those of the Government.

1.12 Organization of the Study

This Study is organized in five chapters. Chapter one, Introduction, consists of 11 subheadings-: Background of the study, Statement of the problem, Purpose of the Study, Research Objectives,

Research Questions, Significance of the Study, Limitations of the Study, Scope of the Study, Assumptions of the Study, Delimitation of the Study and Definition of significant terms. In Chapter 2 there is the Literature review for the Study which consists of the following thematic are-: Animal husbandry, Ticks, Tick control, Tick borne diseases, Community Participation, Poverty levels in Kenya, Privatization of Veterinary Services, Sensitization of communities to management of communal dips and collapse of communal cattle dips. The Methodology of the Study is covered in Chapter 3 under the following sections-: Research design, Research site, Study Population, Sampling technique, Research instrument, Data collection procedure and Data analysis. In Chapter 4, the Study covers Data analysis, Presentation and Interpretation and is done in three sections-: Response rate, Demographic characteristics and Research questions. The last Chapter, 5, presents the Summary of findings, Discussions, Conclusions and Recommendations of the Study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The Literature Review for this Study concentrated on the following thematic areas; Animal husbandry, Ticks, Tick control, Tick borne diseases, Community Participation, Poverty levels in Kenya, Privatization of Veterinary Services, Sensitization of communities to management of communal dips and collapse of communal dips.

2.2 Animal husbandry

This is an Agricultural practice of breeding and rearing of domestic animals such as cattle, goats, sheep, pigs and horses. It has been practiced for thousands of years since the first domestication of animals (Manger, 2002). It also encompasses Animal Health which is primarily responsible for ensuring that farmed animals are healthy, disease-free and well looked after. This is done through implementing and enforcing policies that seek to prevent animal diseases from entering the human food chain and endangering public health, the economy and rural Community (AHVLA, 2011).

2.3 Ticks

Ticks are blood feeding external parasites of mammals, birds, and reptiles throughout the world. Approximately 850 species of ticks have been described worldwide (Furman and Loomus, 1984). There are two well established families of ticks, the hard ticks (Ixodidae) and the soft tick (Argasidae). Both are vectors of disease causing agents to animals and humans throughout the world. Ticks transmit the widest variety of pathogens of any blood sucking arthropod, including bacteria, rickettsiae, protozoa, and viruses. Ticks are among the most efficient carriers of disease because they attach firmly when sucking blood, feed slowly and may go unnoticed for a considerable time while feeding. Ticks take several days to complete feeding; they wait for host animals from the tips of grasses or shrubs (not trees). When brushed by a moving animal or

person, they quickly let go of the vegetation and climb on the host. Ticks can only craw; they cannot fly or jump and are active in winter days when the ground temperatures are about 45 degrees Fahrenheight (http://www.idph.state.il.us).

2.4 Tick borne diseases

There are in the world about 60 diseases of animals, birds, and human beings that are transmitted by ticks (Crees *et al.*, 1976). When a tick attaches to a host for feeding, it may or may not be carrying disease causing parasites. In fact, only small proportions of ticks' population carry parasites and are capable of transmitting diseases. When a parasite-carrying tick starts feeding, it does not begin injecting the parasites with its saliva until about the third day of the feeding. This interval from when the tick attaches until the infection of the host can occur, is called 'pre-feeding period'. After a tick injects parasites into an animal the parasite will only be able to multiply if the animal is of their host species and does not have enough immunity or natural resistance to prevent them from multiplying.

Because the parasite lives in the blood system, they are carried all round the body by the blood. If their multiplication is not restricted by the defenses of the host, after a certain period of time their numbers become sufficient to start causing disease. This period from the time of the infection to the first symptoms of disease is called "incubation period" of the disease. Generally, the first sign of tick borne diseases is a rise in animal's body temperature (fever). When an animal has high temperature it also has poor appetite and a 'starring coat'. Diseases of the blood system often cause shortage of red blood cells in the body, anemia. In several TBDs the blood supply to the brain is affected resulting in unusual behavior by the patient, ranging from walking in circles to apparent drunkenness or even madness and struggling movements in the final stages of the disease for the animal that die. Examples of TBDs in cattle include East Coast Fever, Anaplasmosis, Heartwater and babesiosis (Crees *et al.*, 1976).

2.5 Tick control

The practice of intensive tick control spread rapidly throughout Africa following the introduction of exotic breeds (Pegram *et al.*, 1987). In many African countries it was enforced through

legislation. In the past decade, it has become apparent that intensive tick control is prohibitively expensive; it must be emphasized that the cost-benefit of intensive tick control programmes have rarely been established since they have been based on assumption that indigenous Livestock require the same degree of control as exotic stock.

According to Tatchell (1986 and 1987) Research of tick control strategies must be based on sound ecological data and economic assessments derived from studies on the impact of tick control or from field assessment of damage caused by ticks in the absence of control. National and individual perceptions of the need for tick control must also be understood by policy makers. The general principles on which future strategies should be based were summarized by Tatchell (1986 and 1987) as follows;

Preserve enzootic stability or re-establish it through immunization against TBD. Educate farmers and advisors to accept the benefits gained from both boosting immunity to TBD and achieving host resistance to ticks that would result from relaxed tick control regimes.

Assess true benefits of using different cattle breeds. Modify animal husbandry, for example, by allowing the more susceptible cattle to be grazed and treated together

Recently, Tatchell (1992) further developed the concept of integrated tick management (ITM) emphasizing the importance of animal management, ecology, epizootiology, economics and marketing in the formulation of integrated policies for tick and TBD control. The essential elements of integrated tick and TBD control programme include;

i. Appropriate legislation

ii. Correct extension messages, for both disease and vector control

iii. Enzootic stability to TBD through immunization

iv. Host resistance to ticks using correct breed whether exotic or crossbred dairy cattle or selected indigenous beef cattle

v. Appropriate strategies, such as minimal control periods of low challenge and strategic control for seasonal challenges

vi. Economics and marketing, considering the cost of vaccine production and delivery, the type of farming system, whether dairy or beef, and whether it is a private or public programme.

Tatchell (1992) argues that major advances made in the development of novel methods and strategies for the control of ticks in recent years include new and easier methods of applying acaricides e.g. ear tags, neckbands, tail bands and pour-ons. A mechanical applicator has also been developed (Duncan, 1991). In Kenya, an intramuscular slow- protection against tick damage was demonstrated (Tatchell, 1992). Tick repellants to use on livestock are limited (Mwase *et al.*, 1990); however, according to Pegram *et al.* (1990). There are potential benefits of using tick repellant grasses and plants such as *Melinis minutiflora, Stylosanthes* species and *Acacia absus.* The application of tick attractants, such as pheromones, in combination with toxicants has also been applied. Pasture management, including spelling, has been used in Australia, and seasonal changes in cattle grazing areas in Zambia are believed to be responsible for decrease in tick numbers (Pegram *et al.*, 1990).

2.5.1 Tick control strategies

According to Pegram *et al.* (1987) specific strategies for the future vary according to the breed and the type of cattle and to management systems. The following three main options are considered, with particular emphasis on strategic or minimal control regimes in which enzootic stability to TBD is established and maintained through natural exposure or, where necessary, through immunization;

1) Intensive dipping /spraying; Highly productive pure-bred, *Bos taurus*, are likely to continue to require intensive tick control even though they represent only a small, specialized sector of Livestock industry and their suitability to many situations in Africa has been questioned.

2) Strategic tick control; In most farming situations using cross-bred (*B.taurus* x *B.indicus*) beef cattle, as well as in developing small holder dairy systems that also use cross-bred cattle, strategic tick control would appear to be ecologically and economically feasible. These categories form the primary part of immunization programmes

3) Minimal or threshold tick control

2.5.2 Economic aspects of tick control

The global costs of tick and tick-borne disease control has been estimated at US$ 7 milliard (=7r109) by McCosker (1979). Mukhebi *et al.* (1999) estimated that the national annual loss due to cowdriosis in Zimbabwe could attain 5.6 million US$. While Meltzer, Perry & Donachie (1996) arrived at a figure of about 6.5 million US$ in cattle alone on large-scale commercial farms in Zimbabwe. Grisi *et al.* (2002) estimates that Brazil looses around US $ 2 billion per year due to ticks and TBD. Minjauw & McLeod (2003) estimated the annual cost of tropical theileriosis in India at 384.3 million US$, that of East Coast fever in the smallholder dairy system in Kenya and Tanzania at 54.4 million US$ and 4.41 million, respectively, while in the traditional system in Kenya and Tanzania at 34.1 and 129.5 million, respectively.

Justification of intensive tick control has been questioned by several authorities who include: Mathysse (1954) who recommends that "...any large scale tick control programme be preceded by an extended survey of seasonal tick populations, incidence of TBD, mortality and economic loss". Some 30 years later, Tatchell (1984) noted that ".....countries lacking large- scale intensive tick control were keen to establish it whereas those where it was already practiced were trying to find ways of stopping it". The only economic analysis available prior to late 1980s were those of Ferguson (1971) and Sere (1979); Ferguson who concluded that in Uganda "....control measures may provide the cornerstone for expansion of beef and milk production". At that time, however, control costs were much lower than they were in the 1980s; Pegram and Chizyuka (1990) noted that treatment costs in Zambia increased up to 52 times from early 1950s to late 1980s.

Pegram *et al.* (1991) concluded from the studies taken in Zambia that intensive tick control in traditional, multipurpose Livestock system is not justified in the absence of losses of TBD and

strategic seasonal control of adult ticks every two weeks from November to April was suggested as economically viable solution.

2.5.3 Government policy on tick control

According to Pegram *et al.* (1989) the major issue facing policy-makers today is how much the government should be involved in the delivery of Veterinary Services. This economic debate hinges on the extent to which the particular disease falls under the category "public" rather than "private" good. For a long time tick control has been regarded as a national concern hence the provision of communal dips by governments. However, where a country practices minimal dipping and maintains enzootic stability, tick or TBD control becomes the concern of individual producers.

If farmers decide to operate intensive dairy farms with exotic cattle in an area with a high but enzootically stable ECF challenge, then they have to solve the problem for themselves. This requires that they receive correct information from extension services; then they will need to know the cost and possible risks of each initiative, so that these may be weighed against the potential milk income as well as capital value of exotic dairy animal, plus any non recurrent expenditures (dip construction etc) versus those with a local breed. Some countries have already initiated changes in the tick control policies and practices. However, according to Pegram *et al* (1991; Mwase *et al.* (1990); Tatchell (1984) and Ferguson (1971) there are major constraints to immediate widespread changes, which include;

i. Existing legislation in many countries that makes intensive tick control obligatory

ii. Political attitudes. In the past dip construction often secured votes for local politicians who for decades, accepted misinformation about the benefits of intensive tick control.

iii. Attitude of Scientists and radical changes in philosophy. In one country, an eminent Researcher advocated the continuation of intensive dipping; within 12 months this Researcher stated that the costly, short interval dipping was unnecessary.

iv. Attitude of farmers. In some countries, dipping charges are now being levied as a result of policy changes. Farmers' perceptions of the benefits of intensive tick control were completely distorted by government subsidies, and they are now faced with full economic recovery for what they regard as a reduced and therefore less effective service.

v. Inadequate professional and technical staff without the appropriate experience and adequate training in tick and TBD control.

Tatchell (1992) summed up the problem (pertaining to politicians, scientists and farmers)....."lack of progress in the integrated tick management lies mainly in what Van Emden (1989) calls 'user mentality' of preferring chemical control if it is effective because it is convenient and under their direct control".

2.5.4 Social-economic perceptions of tick control

According to Pegram *et al.* (1989); Moran and Nigagura (1990) Burundi and Zambia have been most progressive in their revision of tick control policies. Several factors have contributed to their success. In Burundi, the effectiveness of widespread application of seasonal strategic tick control is largely a result of extension and training programmes (Moran and Nigagura, 1990). The current approach advocates weekly tick control applications over a four month period that coincides with peak adult tick activity. Costs are kept to a minimum as the frequency of the acaricide applications is decreased to one-third or one –sixth; dip tanks are emptied every four or six years and the level of general dip tank management is high. Moreover, the policy decreases tick-resistance problems, environmental contamination and personnel costs. Prior to the introduction of strategic dipping in Zambia, sociological implication was considered (Pegram *et al.* (1989). A Questionnaire designed to determine farmers attitudes indicated that farmers perceived ticks as a major cause of wounds (56%), loss of condition (38%) and disease transmission (38%). They had good knowledge of the types (species) and seasonality of ticks and consequently, the importance of dipping in the rainy season. Most farmers (90%) practiced tick control and were prepared to pay for it.

Kariuki (1988) argued that the strategy of ticks and TBD control in Kenya has focused mainly on controlling *Rhipicephalus appendiculatus* to prevent Theileriosis transmission and to introduce improved exotic breeds of cattle and upgraded indigenous populations in the ECF-affected areas. In these areas, tick control measures are enforced by cattle cleansing act, under which the Minister for Livestock Development is empowered to proclaim infected areas and enforce weekly cattle cleansing with government approved acaricides. 'Proclaimed areas' are those in which ECF is present and cattle cleansing is obligatory. In other areas tick control is voluntary and at the discretion of Livestock owners.

According to Crees *et al.*, (1976) tick control can be done either off or on the host. The off the host approach takes cognizance that hard ticks spend most of their lives on the ground or on vegetation where they can be controlled to some extent by cultivation and burning. If cattle are sufficiently tick resistant or immune to diseases, as in situations of traditional husbandry over most of Africa, burning can be an acceptable means of reducing the numbers of ticks on the land, and hence on the cattle. However, there are many ecological reasons why frequent burning is not desirable.

For tick control, on the host, it is noted that ticks feed on blood and nothing else, and the ticks that carry cattle diseases feed mainly on cattle. Sooner or later, therefore depending on the stocking density and presence of other herbivorous animals, almost all these ticks can be found on the bodies of cattle (Crees *et al.*, 1976). Because of this, cattle are the best means of collecting and bringing them to a cattle dip or a spray race where they can be killed by soaking, with a chemical called acaricide or 'ixodicide'.

2.6 Community Participation

According to Frank and Smith (2006) Community Participation is the process where members of a Community having compatible goals come together to undertake a project that will benefit all involved. It occurs when a Community organizes itself and takes responsibility for managing its problems. Taking responsibility includes identifying problems, developing actions, putting them into place and following through. Together they share the risks and profits of the project since

the project is based on mutual goals established by members. This shared vision is vital for any project to realize intended goals.

Development should be thought of in terms of people and not things (Nyerere, 1973). There have been very many cases where heavy capital investment has resulted in little or no output and thus wasted. It is widely understood that Participation is not a one-off input into a project but is a process which should be an intrinsic part and characteristic of a project throughout its duration. This process evolves through a series of stages which will vary according to nature and purpose of the project (UNDP, 1999). According to Arnstein (1969), 8 different levels of Participation are recognized; from manipulation or therapy of citizens through information, consultation, placation, partnership delegated power, to citizens' control as the highest level.

Stocker (1997) adopted a definition of Community Participation as 'taking part in any of the process of formulation, passage and implementation of public policies. Schubeler (1996), states that Participation refers to a process and not a product. This involves various actors or participants or stakeholders who determine how and what services are delivered. Participatory relationships are voluntary and their effectiveness depends on stakeholders being convinced that the process serves their interest. Participation as any process of social economic development, involves costs, risks as well as benefits. It is a process of give and take in which each side must surrender certain current positions and assume additional costs in the interest of a great overall benefit.

Linder Botterill and Melanie Fisher (2002) ascribes a 5 virtues to programmes focused on Community Participation and argues that;

i. 'Top down' approaches through which governments and other experts have indentified and imposed solutions have failed in the past to resolve these intractable problems.

ii. The relevant Community or organization has a better knowledge of the problem and workable solutions and so the problem will be solved.

iii. Involving the Community will mobilize many more human resources than could be marshaled by government acting alone.

iv. Participative programmes will build capacity of the participators to take any future problems on their own – they will become self reliant.

v. Involving the affected population in deciding their future is a good thing in itself and is a more popular policy approach.

Bhatnagar *et al.* (1992) explains that Community Participation is a proven approach to addressing Community development issues and has long been utilized in projects varying from sanitation to child survival, clean water production, and health infrastructure. However, the quality of Participation varies from project to project. Moreover, in spite of failure of many development programmes designed without participation of target communities, some professionals continue to question the value of Community members' Participation in programme design, implementation and evaluation. The purpose of involving communities is to ensure that people contribute to their own development (Scheepers, 2000). Meaningful Participation depends on appropriate empowerment opportunities. It is this empowerment that leads to the successful transformation of people, organizations and communities.

When consulting Communities on the issue of Participation and involvement in project or programme, it is important to explain the objectives, aims and goals at an early stage of the discussions, and not raise unrealistic expectations. This can lead to disillusionment and even dissolution of the membership as a result of conflict, mistrust, disappointment and perceptions of failure. Monaheng (1998) notes that genuine Community Participation means that people must have the power to influence the discussions that affect their lives. Without empowerment, Participation becomes ineffective.

All the different aspects of empowerment (political, economic and institutional) must be present for Participation to be meaningful. The twin process of empowerment and Participation constitute the people centered form of development. Mulwa (2004) suggests that people should, of necessity, participate in decisions that affect their lives. This serves to instill local

responsibility as well as enhancing their sense of dignity and worth. It is believed that people will give their total support to initiatives that they help to create. Genuine Participation practice will not only seek to involve the beneficiary communities in project design and implementation, but more importantly, the process will seek to link peoples felt needs with project goals and objectives. This is another milestone consideration in ensuring local ownership and the sustainability of project benefits long after donor funding is withdrawn.

2.7 Privatization of Veterinary Services

Historically, Veterinary Services have been the domain of the public sector and in many developing countries they remain so (Umali and Haan, 1992). This is largely reinforced by public- sector orientation in the 1960s and 1970s which viewed the government as the main spur of development. Furthermore, past Veterinary Services were involved almost exclusively in the prevention of highly infectious diseases, which have strong 'public good' characteristics. According to Leornard (1985) an increasing number of functions are carried out in cooperation with or transferred to, private operators and Privatization of some Veterinary Services has received a strong impetus in the developing world over the last decade due to several factors:-

a. Fiscal constraints and poor management of resources leading to a decline in operational efficiency of the public sector service.

b. The development of new technologies has shifted the focus from mostly herd-level prevention, which is more compatible with public intervention to treatment of individual animals, which is more suitable for private handling.

c. Traditional Livestock farming is shifting towards more commercialized operations.

d. Increasing supply of Veterinarians and shrinking public market.

Tber (1995) argues that to bring about Privatization, there is need for policy changes to remove barriers. Policies that promote unfair competition should be eliminated and an enabling legislation adapted to the conditions of the country be established to protect and promote private animal health practice.

Although the economic theory suggests that public sector is the most appropriate means of supplying Veterinary Services (Leonard, 1993), the state is alleged to have performed so badly in practice that some now argue that it is better to let the private sector supply 'these public services' even if this means they will be provided at an economic 'sub-optimum level'. Such argument implies that the state has universally failed in the delivery of Veterinary Services and overlooks the fact that there are opportunities for improving public sector performance.

Privatization has been widely advocated as a means of improving the supply of Veterinary Services (Leonard, 1985; de Haan & Bekure, 1991). Initial enthusiasm for Privatization has, however, been tampered by the recognition that in many situations Veterinary Services require some form of public management (Umali *et al*, 1994a). The crisis of public sector finances in developing countries during the 1970s and 1980s, and the growing perceptions of statist models of development as inefficient compared with the market based approaches, led to international pressure for reform of state institutions (Farrington *et al.*, 1993). The consequent structural adjustment programmes promoted by multilateral lending agencies in many developing countries typically involved reduction of state expenditures and therefore departmental budgets.

The impact of budget reductions and broad service responsibilities left many state Veterinary Services with insufficient operating budgets to fulfill their obligations and encouraged the view that they had become inefficient (CTA 1987; de Haan and Nissen, 1985). The publicity given to this view provoked calls for Privatization of many of their roles, so as to reduce state budget liabilities and simultaneously improve the efficiency of state Animal health Service delivery by introduction of market forces (Leonard, 1985; de Haan & Bekure, 1991). In recent years there have been claims that reform programmes have failed, and that the reasons for these failures have been the refusal of donors to consult, and to agree on process of change, with State Veterinary Services (Gross, 1994; Odeyemi, 1994).

It has been argued that reforms did not consider the objectives and opinions of key stakeholders in State Veterinary Services, and had, furthermore, been motivated primarily by a need to reduce budget deficits rather than improve the delivery of Animal health Services (Tber, 1995). Various countries have started to implement or have already implemented Privatization of some

Veterinary Services. The results are mixed. It is established that private provision alone is not optimal, and a blend of private and public sector Veterinary Services is required to utilize the virtues of both (Sen and Chander, 2003). In Kenya, the Privatization of tick control services became a policy in 1986 after the enactment of Session paper no.1 of 1986 on 'Economic Management for Renewed Growth'.

2.8 Collapse of communal Cattle dips

According to Mohler (1986); Mathews and Baker (1975), by 1893, cattle dips were used to control ticks and TBD in Australia, Africa and United States of America. Hill (1956) states that the practice of dipping in Kenya started in 1912 when the first dips were constructed. However, tick control became a national concern after the enactment of Tick control Act, Cap 358, in 1938. However the high cost of constructing cattle dips and the initial cost of acaricide may make dips impractical for many small scale farmers (Drummond, 1983); thus the approach used among small stakeholders was to develop communal dips managed by farmer groups or local authorities.

The Cattle cleansing Act Cap 358, laws of Kenya, in section 4 allows the Minister for Livestock Development to declare areas as 'cattle cleansing areas'. These are the areas where East Coast Fever is prevalent due to availability of vectors. Section 8 of the act requires owners within the declared areas to dip their cattle once every week (Cap. 358). In 1977, the government took over the management of the communal cattle dips to increase effectiveness and then highly subsidized dipping charges. This continued up to 1986 when, under the influence of Breton wood institutions, the government effected the structural adjustment programmes (SAPs) and privatized the tick control services (DVS, 2008). Unfortunately, low private sector participation led to poor service delivery and compromised Livestock productivity (ASDS, 2010-2011).

The DVS annual report (2008) indicates that the management of communal dips started collapsing after the handing over to the beneficiaries, According to the 2008-2012 strategic plan of the Department of Veterinary Services, the number of working dips decreased from 4800 in

July 1991 to 608 by June 2011 in Kenya. In Maara District only 3 out of the 32 dips were working in December 2011 (DVO, Maara).

In all the reports, the factors leading to the collapse of dips are not indicated. Instead of the efficiency and effectiveness envisaged during the handing over of the dips to beneficiaries, it is noted that most of the dips collapsed. This Study will thus explore the factors that influenced the collapse of dips in Maara district after Privatization of Veterinary Services in Kenya.

2.9 Poverty Levels in Kenya

Poverty is a multi-dimensional phenomenon, defined and measured in a multitude of ways. In many cases, poverty has been defined and measured in economic welfare terms such as income or consumption. An individual is poor if he/she falls below a predetermined level of economic welfare deemed to constitute a reasonable minimum in some absolute level or by the standards of a specific society (Lipton and Ravallion, 1995). Nyoro (2000) argues that total household income comes from four sources: net crop income, net livestock income, non-farm business income, and salary/remittances. According to Bradshaw (2004) five theories of poverty are recognized. These theories of poverty place its origin from 1) individual deficiencies, 2) cultural belief systems that support subcultures in poverty, 3) political-economic distortions, 4) geographical disparities, or 5) cumulative and circumstantial origins.

Kenya has been described as highly unequal, ranking among the top ten most unequal countries in the world and fifth in Africa (SID, 2004). Inequality is worse in rural areas: the richest 20% of the rural and urban populations earn 62% and 51% of incomes, respectively (SID, 2004), while the bottom 20% earns 3.5 % of rural income and 5.4% of urban income (World Socialist Website, 2008). Inequality describes the differences between individuals or households in terms of opportunities and outcomes. In addition to the income gap between the rich and the poor, inequality entails differences in access to education, health, land use, land ownership, and other welfare enhancing assets and services. Inequality is an important issue in economic development as it can hinder economic growth, and it can result in social instability.

Alleviating poverty remains one of the key challenges in many developing economies. In Kenya, a recent nation-wide survey, the 2006 Kenya Integrated Household and Budget Survey, (KIHBS) finds that 46% of the total Kenyan population is absolutely poor, i.e. below the poverty line, whereas 49% of the rural population is absolutely poor (Kenya National Bureau of Statistics, 2007). The 1997 Welfare Monitoring Survey showed a poverty rate of 57% overall and 60% in the rural population. Poverty is not a static concept. People often move in and out of poverty from year to year. This is unsurprising in Sub-Saharan Africa, given that these economies mainly depend on agriculture and are dominated by seasonality and highly variable weather conditions.

Changes in Poverty status can be due to economic cycles and shocks, such as poor weather, loss of employment, or loss of a major income earner through death, injury, or long illness. Adding to this, institutions for income and consumption smoothing in these economies are either inadequate or are absent altogether. Some households do manage to escape poverty, while others remain in poverty for extended periods of time. Understanding what factors drive household movements in and out of poverty is extremely important for the design of poverty reduction strategies, (Gamba, and Mghenyi, 2004).

The primary development goal for Kenya is to achieve a broad-based, sustainable improvement in the standards of welfare of all Kenyans. Kenya's Interim Poverty Reduction Strategy (IPRSP, 2000) has five basic components and policy objectives where one of them is control of crop and livestock pest and diseases. However, after the adoption of Session Paper No. 1 of 1986 on 'economic management for renewed growth', the country practiced much of the market liberalization and structural adjustment reforms that swept the world, with less explicit attention paid to Poverty than in the past. In facing the overwhelming task of helping both poor people and their poverty neighborhoods, there is no easy answer to breaking the cycle of Poverty. Asset mapping (Kretzman and McKnight, 1993) is a way to identify whatever strengths the Community has and to use them to solve problems in the most effective way rather than to spend time identifying problems for which there may not be adequate answers. Finally, Community organizing is a tool by which local people can participate to understand how their personal lives and the community well being are intertwined. Breaking the cycle of Poverty must include individuals to participate as a Community.

2.10 Sensitization of Communities to management of communal dips.

The Government of Kenya and the Livestock farmers are the main stakeholders in tick control. However, the pharmaceutical industries also play a major role in control of ticks and tick-borne diseases (DVS, 1991). In 1991 the Government handed the management of communal dips to the farmers. According to the Department of Veterinary Services annual report of 1991, the communities were to be sensitized on the roles to be played by all stakeholders in the new arrangement. According to 'Policy strategy and legislation framework on control of ticks and tick-borne diseases document'; Maina, (2003) outlines the various roles.

Roles of the Department of Veterinary Services:

i. Training and extension to farmers
ii. Testing and registration of new acaricides
iii. Regulation of export and importation of acaricides
iv. Surveillance on quality of acaricides sold to farmers in various agro-veterinary outlets in the country
v. Promotion of efficient management of dips in partnership with pharmaceutical companies that supply acaricides to farmers
vi. Overall supervision and monitoring of dipping services in the country

The roles of the farmers were:

i. Present all cattle for dipping and promptly pay dipping fees
ii. Contribute towards dip repairs, cleaning, clearing of the compound and provision of water.
iii. Elect dip committees who would coordinate collection and banking of dipping fees, purchase of acaricide, keeping of proper dipping records, writing reports and calling for farmers' management meetings.

The pharmaceutical industries were to continue training farmers on issues of acaricide, provide backup services and ensure continuous supply of acaricides. If all the stakeholders played their roles effectively the tick control services would be successfully sustained (DVS, 1991).

2.12 Conceptual Framework

In this Study, a conceptual framework was formulated to show the relationship between Community Participation, Community Sensitization, Privatization and the collapse of dips. The independent variables are Community contributions (labour, capital, land and time); Community Sensitization (trainings, tours and meetings) and cost of dipping (dipping charges). The moderating variable was the government policy.

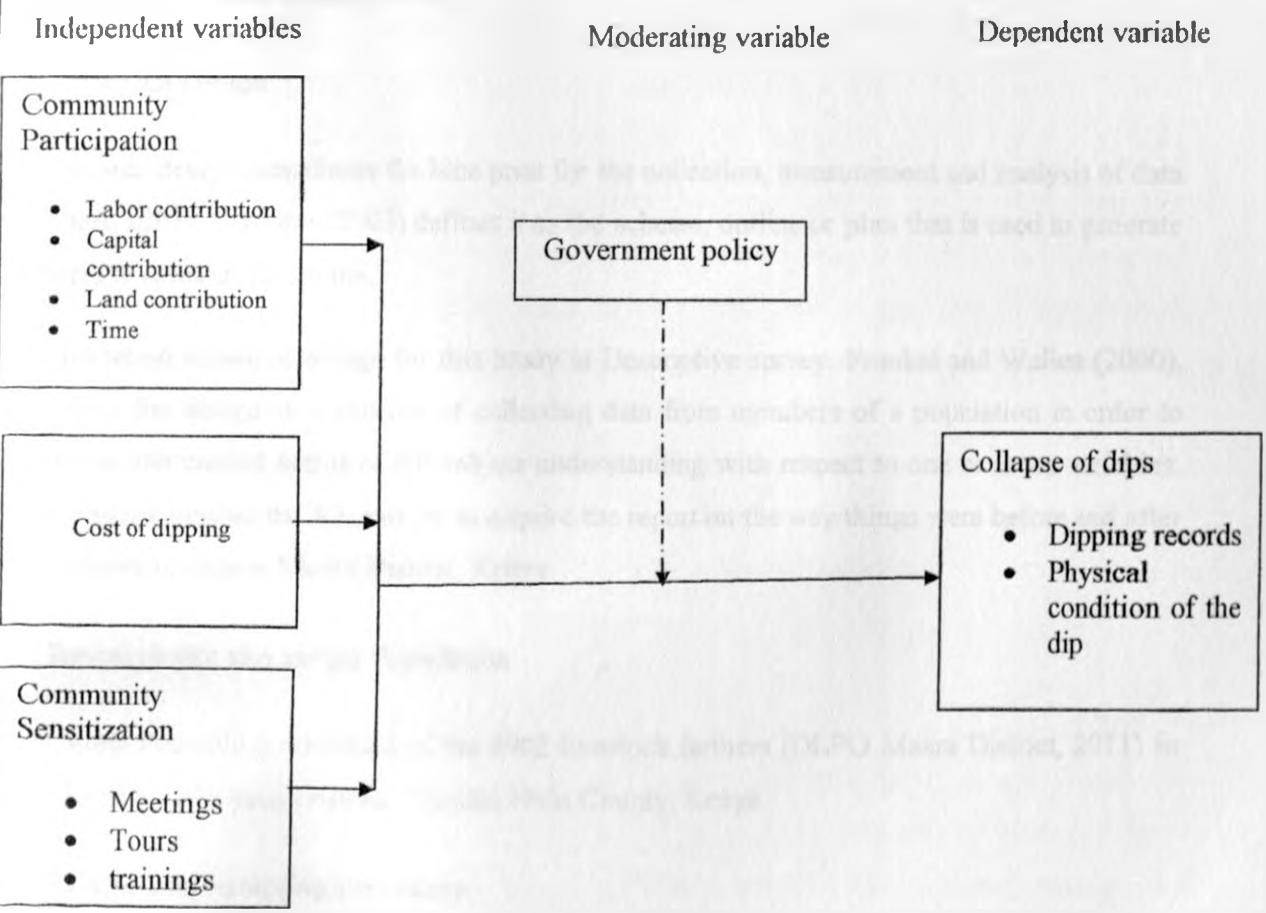

Figure 2.1: Conceptual Framework

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This Chapter dealt with description of the method that was used in carrying out the Research Study. It is organized under the following sections; Research design, Research site, Study Population, Sampling technique, Research instruments, Data collection procedures and Data analysis (Kombo and Tromp, 2010).

3.2 Research Design

A Research design constitutes the blue print for the collection, measurement and analysis of data (Kothari, 2003). Orodho (2003) defines it as the scheme, outline or plan that is used to generate answers to research problems.

The preferred Research design for this Study is Descriptive survey. Frankel and Wallen (2000), describes this design as a process of collecting data from members of a population in order to determine the current status of the subject understanding with respect to one or more variables. This method enabled the Researcher to acquire the report on the way things were before and after the collapse of dips in Maara District, Kenya.

3.3 Research site and target Population

The Study Population consisted of the 9902 livestock farmers (DLPO Maara District, 2011) in two Divisions of Maara District, Tharaka Nithi County, Kenya.

3.4 Sample and Sampling procedure

Sampling is the procedure a Researcher uses to gather people, places or things to study. It is a process of selecting a number of individuals, or objects from a population such that the selected group contains elements representative of the characteristics found in the entire group (Orodho and Kombo, 2002).

A sample is a finite part of a statistical population whose properties are studied to gain information about the whole (Webster, 1985). According to Mugenda and Mugenda (1999), a descriptive study should take 10% or above of the accessible population and should be enough for a specific study; while Fischer (1992) recommends 50% of the target population in a social research.

This Study used the Tables developed by Barlett, Kotrlik and Higgins (Cochran, 1977) to determine the sample size. With the Population of 9902 livestock farmers in Chogoria and Muthambi divisions of Maara district a sample of 119 was arrived at using systematic random sampling at 95% level of confidence and 3% (0.03) error margin from the true value.

3.5 Data Collection

Primary data was used for this Study. Questionnaires were used to collect data from the respondents. Kothari (1994) describes questionnaires as the most popular instrument for survey design. It is appropriate in this Study since it will collect information that is not directly observable. The questions were both closed and open ended; adequate, clear and unambiguous. The close-ended questions provided more structured responses to facilitate tangible recommendations. The open-ended questions provided additional information that may not have been captured in the close-ended questions. Data was collected by the Researcher assisted by two Research Assistants who administered the questionnaire to the respondents.

3.5.1 Validity of Research instrument

Validity is the degree to which an instrument measures what it purports to measure (Best and Kahn, 1998). It is a relationship between two variables in causal relationship. In this Study, the instruments were reviewed by peers and also be subjected to expert judgment by the Supervisor. In addition, the Researcher and his two Assistants administered the Questionnaire themselves. The tool was further validated by carrying out a pilot study which indicated the parts of the Questionnaire that require polishing. However, in this Study no changes were found desirable after the pilot study.

3.5.2 Reliability of Research Instrument

A reliable instrument is one that produces consistent results when used more than once to collect data from samples drawn randomly from the Population (Mulusa, 1990). Mugenda, *et al.* (2006) argue that an instrument is reliable when it can measure a variable accurately and consistently and obtains the same results under the same conditions over a period of time. Reliability is, thus, an indication of the truthfulness of the responses.

Reliability can be improved by standardizing the conditions under which measurements take place (Kothari, (1994). The Researcher selected a pilot group of 15 individuals from the target Population to test the reliability of the Research instruments. In order to test the reliability of the instruments, internal consistency techniques were applied using Cronbach's Alpha as per the formula:

$$\alpha = \frac{N \cdot \bar{c}}{\bar{v} + (N-1) \cdot \bar{c}}$$

Where N is equal to the number of items, c-bar is the average inter-item covariance among the items and v-bar equals the average variance. The alpha value ranges between 0 and 1 with reliability increasing with the increase in value. Coefficient of 0.6-0.7 is a commonly accepted rule of thumb that indicates acceptable reliability and 0.8 indicated good reliability (Mugenda, 2008). The pilot data was not included in the actual Study.

3.6 Data Analysis

The data was then edited, organized and analyzed. Data analysis involved organizing, accounting for and explaining the data in terms of respondents' definition of the situation, noting the patterns, themes, categories and regularities (Gay, 1992). In this Study, the collected data was cleaned, coded and the analyzed quantitatively using Statistical Package for Social Sciences (SPSS) to get the measures of central tendency, variability and correlation. The quantitative data in this Research was analyzed by descriptive statistics using Statistical Package for Social Sciences (V. 17.0). The qualitative data took an exploratory/conceptual content analysis process.

The data was then presented using frequency Tables and Figures. In addition the Study used Karl Pearson's product moment correlation analysis to assess the relationship between the variables. This is because correlation analysis illustrates both the direction and strength of the relationship between two variables (Malhotra and Peterson, 2006).

3.7 Operational definition of Variables

Objectives	Variable	Indicators	Measure	Measurement scale	Type of analysis	Tools of analysis
To determine the extent of Community Participation in dipping projects in the District and its influence on the collapse of communal Cattle dips after Privatization of Veterinary Services in Kenya.	Labour contribution	Number of hours spent	Number of hours	Ratio	Quantitative	SPSS
	Capital contribution	Amount contributed	Amount (KES)	Ratio	Quantitative	SPSS
	Land contribution	Number of acres contributed	Number of acres	Ratio	Quantitative	SPSS
To establish if the dipping charges contributed to collapse of dips after Privatization of Veterinary Services in Kenya.	Dipping charges	Amount charged	Amount (KES)	Ratio	Quantitative	SPSS
To determine if the level of community sensitization contributed to collapse of dips after Privatization of Veterinary Services in Kenya.	Trainings	Number of trainings	Trainings	Ratio	Quantitative	SPSS
	Meetings	Number of meetings	Number of days	Ratio	Quantitative	SPSS
	Tours	Number of tours	Tours	Ratio	Quantitative	SPSS

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION OF THE FINDINGS

4.1 Introduction

This Chapter discusses the Interpretation and Presentation of the findings. The purpose of this Study was to investigate the factors that influenced the collapse of communal cattle dips after Privatization of Veterinary Services in spite of the fact that ticks and tick-borne diseases are still prevalent in the District and also the fact that Livestock rearing is an economic activity. The study further sought to examine how the extent of Community Participation, the level of Community Sensitization in dipping projects and whether payment of dipping fees influenced the collapse of communal cattle dips after Privatization of Veterinary Services in Kenya.

4.2 Response rate

The sample size of this Study was 119 Livestock farmers in Chogoria and Muthambi Divisions of Maara District. Out of 119 sample size, 90 respondents filled and returned their questionnaires. This represents a 75.63% response rate. According to Babbie (2002) any response of 50% and above is adequate for analysis thus 76% is even better.

4.2 General information

In this section, the Researcher requested the respondents to indicate their Divisional background, gender, age, marital status, and agriculture, salary/employment or Livestock as a source of income.

Respondents Divisions

The Researcher requested the respondents to indicate the Divisions that they come from.

Table 4.1: Respondents Division

Response	Frequency	Percent
Chogoria	44	48.5
Muthambi	46	51.5
Total	**90**	**100.0**

From the findings, 51.5% of the respondents indicated that they came from Muthambi Division, while 48.5% indicated they came from Chogoria Division. Therefore, majority of the respondents came from Muthambi Division.

Gender of the respondents

The Researcher requested the respondents to indicate their gender and the results are shown in Table 4.2.

Table 4.2: Gender of the respondents

Response	Frequency	Percent
Male	68	75.0
Female	22	25.0
Total	**90**	**100.0**

According to the findings, 75% of the respondents indicated that they were male while 25% indicated that they were female. From these findings we can deduce that majority of the respondents were male.

Age of the respondents

The Researcher also requested the respondents to indicate their age. The results are shown in Table 4.3.

Table 4.3: Age of Respondents

Response	Frequency	Percent
26-35	3	3.3
36-45	23	25.0
46-55	25	28.3
Above 55	39	43.3
Total	**90**	**100.0**

From the findings, 43.3% of the respondents indicated that they were aged above 55 years, 28.3% were aged between 46 and 55 years, and 25% were aged between 36 and 45 years while 3.3% were aged between 26 and 35 years. This shows that majority of the respondents were aged above 55 years.

Marital status

The respondents were also requested to indicate their marital status. The results are presented in Table 4.4.

Table 4.4: Marital status

Response	Frequency	Percent
Single	2	2.2
Married	84	93.3
Divorced	2	2.2
Widow	2	2.2
Total	**90**	**100.0**

According to the findings, 93.3% of the respondents reported that they were married, 2.2% indicated that they were single, 2.2% indicated that they were divorced and the same percentage indicated that they were widowed. This shows that majority of the respondents in this study were married.

Level of education

The respondents were also requested to indicate their highest level of education they attained. The results are shown in Table 4.5.

Table 4.5: Level of education

Response	Frequency	Percent
Primary	32	35.0
Secondary	36	40.0
College	23	25.0
Total	**90**	**100.0**

From the findings, 40% of the respondents indicated that they had Secondary level of education, 35% indicated that they had Primary level of education while 25% indicated that they had College level of education. In this Study majority of the respondents had Secondary education as their highest level of education.

Source of income

The Researcher requested the respondents to indicate their source of income. The results are shown in Table 4.6.

Table 4.6: Source of income

Source of income	Frequency		Percent	
Response	Yes	No	Yes	No
Agriculture (crops)	84	6	93.3	6.7
Livestock	51	39	56.7	43.3
Salary/employment	12	78	13.3	86.7
Business	15	75	16.7	83.3

From the findings, 93.3% indicated that they obtained their income from agricultural crops, 56.7% said they obtained it from Livestock, 16.7% was from business while 13.3% said they obtained their income from salary/employment.

Average income per month

The Researcher also requested the respondents to indicate their average income per month. The results are shown in Table 4.7.

Table 4.7: Average income per month in Kenya shillings.

Response	Frequency	Percent
0 -5,000	2	1.7
5,001-10,000	21	23.3
10,001-15,000	54	60.0
15,001-20,000	6	6.7
Over 20,000	7	8.3
Total	**90**	**100.0**

From the findings, 60% of the respondents reported that their average income per month was between 10,001 and 15,000, 23.3% reported their income per month to be between 5,001 and 10,000, 8.3% indicated that their average income per month was over 20,000, 6.7% reported it was between 15,001 and 20,000 and lastly 1.7% indicated it was below 5,000. This clearly shows that most of the Livestock farmers' average monthly income was between 10,001 and 15,000.

Cattle rearing

The Study also sought to determine whether the Livestock farmers were rearing cattle. The results are presented in Table 4.8.

Table 4.8: Cattle rearing.

Response	Frequency	Percent
Yes	90	100.0

From the findings, all the respondents indicated that they reared cattle (100%). This shows that all the respondents in this Study were rearing cattle.

Cattle breeds reared

The Table 4.9 shows the types (breeds) of cattle that the respondents were rearing in terms of local, cross-breeding and exotic.

Table 4.9: Cattle breeds reared.

Response	Frequency	Percent
Local	2	1.7
Cross-breed	41	45.0
Exotic	48	53.3
Total	**90**	**100.0**

According to the findings, 53.3% of the respondents reported that they reared exotic breeds, 45% of the respondents indicated that they reared cross-breeds while 1.7% indicated the reared local breeds. This shows that majority of the Livestock farmers were rearing exotic breeds.

Main produce from the cattle

The Table below shows the main produce from the cattle that the respondents indicated that they reared

Table 4.10: Main produce from the Cattle

Response	Frequency	Percent
Meat	3	3.3
Milk	87	96.7
Total	**90**	**100.0**

According to the findings, 96.7% of the respondents indicated that milk was their main produce from their cattle while 3.3% indicated that meat was their main produce from their cattle. From these findings we can deduce that milk was the main produce from the cattle reared by most of the Livestock farmers in this Study.

Selling of milk

The Study also sought to establish where the respondents were selling their milk. The results are shown in Table 4.11.

Table 4.11: Selling of milk

Response	Frequency	Percent
Individual homes	6	6.7
Groups/ cooperatives	84	93.3
Total	**90**	**100.0**

From the results, 93.3% of the respondents indicated that they were selling their milk in groups/cooperatives while 6.7% indicated that they were selling their milk to individual homes. This clearly shows that majority of the respondents in this Study were selling their milk to group/cooperatives.

4.3 Community Participation

This Study sought to determine the extent of Community involvement in dipping projects in the District and its influence on the collapse of communal cattle dips after Privatization of Veterinary Services in Kenya.

Origin of the idea for the Cattle dips construction

The Researcher requested the respondents to indicate where the idea of constructing cattle dips come from. The results are shown in Table 4.12.

Table 4.12: Origin of the idea for Cattle dips construction

Response.	Frequency	Percent
Community	16	18.3
Government	60	66.7
Don't know	14	15.0
Total	**90**	**100.0**

As indicated in the findings, 66.7% of the respondents reported that the idea of constructing cattle dips came from the government, 18.3% indicated it came from the Community while 15% indicated that they did not know. From these findings we can deduce that the idea of constructing the dip came from the government.

Approximate cost of the Cattle dips construction

The Researcher also requested the respondents to indicate the approximate cost of constructing the dip. The results are presented in Table 4.13.

Table 4.13: Approximate costs of the Cattle dips construction

Cost in Kenya shillings (Ksh.)	Frequency	Percent
10,00-20,000	16	18.3
21,000-40,000	32	35.0
41,000-50,000	33	36.7
51,000-60000	6	6.7
Above 60,000	3	3.3
Total	**90**	**100.0**

According to the findings, 36.7% of the respondents indicated that the approximate cost of constructing the dip was between 41,000 and 50,000, 35% indicated between 21,000 and 40,000, 18.3% indicated between 10.000 and 20.000, 6.7% indicated between 51,000 and 60,000 while 3.3% indicated above 60,000. This clearly shows that the approximate cost of constructing the dip was between 41,000 and 50,000.

Sponsors of the Cattle dips construction

The Study also sought to establish who sponsored the construction of dip. The results are shown in Table 4.14.

Table 4.14: Sponsors of the Cattle dips construction.

Sponsor	Frequency	Percent
Community	3	3.3
County council	2	1.7
Government	75	83.3
Don't know	11	11.7
Total	**90**	**100.0**

From the findings, 83.3% of the respondents indicated that the government was the main sponsor of the construction of cattle dips, 11.7% indicated that they did not know, 3.3% indicated it was the Community while 1.7% indicated it was the county council. Majority of the respondents reported that the government was the main sponsor of the cattle dip construction.

Community's contribution

The Researcher also requested the respondents to indicate the extent to which they agreed with the statements in relation to Community contribution during cattle dip construction. The results are shown in Table 4.15.

Table 4.15: Community's contribution

Type of contribution	Mean	Std. Deviation
During construction of this dip the Community contributed cash	2.7000	1.13943
During construction of this dip the Community contributed labour	3.2833	1.16578
During construction of this dip the Community contributed materials	2.6500	1.08651

From the findings the respondents agreed with a mean of 3.2833 that the Community contributed labor during dip construction. It was also agreed with mean of 2.7000 that the Community contributed cash during dip construction. Lastly, it was agreed with a mean of 2.6500 that the Community contributed materials during dip construction.

Cattle dip functionality

The Researcher also requested the respondents to indicate whether their dip was functioning. The results are presented in Table 4.16.

Table 4.16: Cattle dip functionality

Response	Frequency	Percent
Yes	8	8.9
No	82	91.1
Total	**90**	**100.0**

From the findings, 91.1% of the respondents reported that their dip was not functioning while 8.9% reported that their dip was functioning properly. Majority of the respondents indicated that their dip was not functioning.

Cattle dip revival

The Study also sought to determine whether cattle owners sometimes meet to look for ways of reviving their dip. The results are shown in Table 4.17.

Table 4.17: Cattle dip revival

Response	Frequency	Percent
Strongly disagree	2	1.7
Disagree	54	60.0
Don't know	3	3.3
Agree	30	33.3
Strongly agree	2	1.7
Total	**90**	**100.0**

From the findings, 60% of the respondents disagreed with the statement that cattle owners sometimes meet to look for ways of reviving their dip, 33.3% agreed, 3.3% indicated that they did not know, 1.7% strongly disagreed and finally 1.7% strongly agreed. Most of the respondents disagreed with the statement that "cattle owners meet to look for ways of reviving the cattle dip".

Tick control

The Researcher further requested the respondents to indicate whether the Livestock farmers were controlling ticks in cattle when the dip was not working. The results are shown in Table 4.18.

Table 4.18: Tick control

Response	Frequency	Percent
Yes	87	96.7
No	3	3.3
Total	**90**	**100.0**

From the results, 96.7% of the respondents affirmed that they were controlling ticks in cattle when the dip was not working while 3.3% did not. Majority of the respondents affirmed that Livestock farmers were controlling ticks in cattle by hand spraying when the dip was not working.

4.4 Cost of dipping Cattle

The Study sought to establish whether the cost of dipping cattle influenced the collapse of communal cattle dips after Privatization of Veterinary Services in Kenya.

Payment for dipping Cattle

Table 4.19 shows whether the respondents were paying for dipping cattle when the government was in control of the dips management.

Table 4.19: Payment for dipping Cattle

Response	Frequency	Percent
Yes	81	90.0
No	9	10.0
Total	90	100.0

From the findings, 90% affirmed that they were paying for dipping cattle when the government was in control of the dips management while 10% indicated that they were not paying. This shows that Livestock farmers used to pay for dipping cattle when the government was in control of the dips management.

Amount paid

Table 4.20 shows the amount in Kenyan shillings that the respondents were paying for dipping cattle.

Table 4.20: Amount paid

Response	Frequency	Percent
1-10	87	96.7
11-20	2	1.7
21-30	2	1.7
Total	**90**	**100.0**

As indicated in the findings, 96.7% reported that they were paying between 1 and 10 Kenya shillings per head for cattle dipping, 1.7% indicated that they were paying between 11 and 20 Kenya shillings while 1.7% indicated that they were paying between 21 and 30 Kenya shillings. This shows that Livestock farmers were paying between 1 and 10 Kenya shillings for cattle dipping.

Changes in the dipping fees

Table 4.21 shows the findings on whether there were changes in the dipping fees after handing over of the communal cattle dips.

Table 4.21: Changes in the dipping fees

Response	Frequency	Percent
Yes	88	98.3
No	2	1.7
Total	**90**	**100.0**

From the results, 98.3% affirmed that there were changes in the dipping fees after handing over of the dips while 1.7% indicated that there were no changes. This clearly shows that there were changes in the dipping fees after handing over of the dips.

Amount charged per head of Cattle

Table 4.22 shows the amount charged per head currently or the last time the dip was operational.

Table 4.22: Amount charged per head of Cattle

Response	Frequency	Percent
1-10	29	31.7
11-20	41	45.0
21-30	15	16.7
30-40	5	5.0
Over 40	2	1.7
Total	**90**	**100.0**

According to the findings, 45% of the respondents reported that that the amount charged per head currently or the last time the dip was operational was between 11 and 20 Kenya shillings, 31.7% indicated that it was between 1 and 10 Kenya shillings, 16.7% indicated that it was between 21 and 30 Kenya shillings, 5% indicated that it was between 30 and 40 Kenya shillings and lastly, 1.7% indicated that it was over 40 Kenya shillings. Majority of the respondents indicated that the amount charged per head currently or the last time the dip was operational was between 11 and 20 Kenya shillings (Ksh.).

Effect of the mode of payment on the usage of the Cattle dip

Table 4.23 below shows the extent to which mode of payment affected usage of the cattle dip

Table 4.23: Effect of the mode of payment on the usage of the Cattle dip

Response	Frequency	Percent
No extent	12	13.3
Little extent	27	30.0
Moderate extent	27	30.0
Great extent	24	26.7
Total	**90**	**100.0**

From the findings, 30% of the respondents indicated that the mode of payment affects the usage of the cattle dip to a little extent, 30% indicated to a moderate extent, 26.7% indicated to a great extent and lastly 13.3% indicated to no extent at all. From these findings we can deduce that the mode of payment affected usage of the cattle dip to a little and moderate extent.

Charges rating

The Researcher also requested the respondents to rate the charges for cattle dipping. The results are shown in Table 4.24.

Table 4.24: Charges rating

Response	Frequency	Percent
Low	20	21.7
Medium	34	38.3
High	36	40.0
Total	**90**	**100.0**

From the results, 40% of the respondents indicated that the charges were high, 38.3% indicated they were medium and 21.7% indicated they were low. Most of the respondents indicated that the charges were high.

4.5 Community Sensitization before handing over

The Study was set to determine how the level of Community Sensitization in the District influenced the collapse of communal cattle dips after Privatization of Veterinary Services in Kenya

Community sensitization before handing over

The Research requested the respondents to indicate the extent to which they agreed with the statement in relation to Community Sensitization. The results are sown in Table 4.25.

Table 4.25: Community Sensitization before handing over

Aspect of Sensitization	Mean	Std. Deviation
Dipping fees is used to manage the dipping operations.	3.2500	1.00212
The cattle owners are very conversant with the dipping operations.	2.9333	1.02290
Dipping of cattle reduces tick borne diseases	4.1833	0.50394
There are cultural practices and beliefs that prohibit the farmers from dipping their Livestock.	2.1667	0.95964
Dipping is more effective in control of ticks in comparison to hand spraying.	3.8333	1.15225
Farmers were invited for meetings to be taught on how to manage the dip after privatization	3.1000	1.05284
Farmers participate in learning tours to other dips that are already privatized	4.2833	0.53867

The respondents agreed with a mean of 4.2833 that farmers participate in learning tours to other dips that are already privatized. They also agreed with a mean of 4.1833 that dipping of cattle reduces tick borne diseases. Further, it was agreed among the respondents with a mean of 3.8333 that dipping is more effective in control of ticks in comparison to hand spraying. In addition, the respondents moderately agreed with a mean of 3.2500 that dipping fees are used to manage the dipping operations. It was also moderately agreed with a mean of 3.1000 that farmers were invited for meetings to be taught on how to manage the dip after Privatization. It was lowly agreed with a mean of 2.9333 that the cattle owners are very conversant with the dipping operations. Finally, the respondents disagreed with a mean of 2.1667 that there are cultural practices and beliefs that prohibit the farmers from dipping their Livestock.

Reasons for the dip not working

The respondents gave the following reasons as to why the dip was not working. They cited over dependence on donor fund as well as poor committee management. It was also noted that walking of animals to the dip is very difficult. Ignorance of farmers was noted to affect the working of the dip. Further it was noted that lack of acaricides and acaricide ineffectiveness coupled with operational expenses affected the working if the dip.

Suggestions to ensure that the dips continue working

The respondents were to give suggestions to ensure that the dip continued operating. They indicated that government should control dip operations. It was also suggested that the dip to be run by milk co-operative societies. It was also suggested that the farmers should be trained on ownership. Another suggestion was that new dip committees should be elected. The government intervention in structural repair was cited to be wanting. Finally it was suggested that the farmers should have their own dips.

4.6 Correlation Analysis

The correlation coefficient is a measure of linear association between two variables. Values of the correlation coefficient are always between -1 and +1. A correlation coefficient of +1 indicates that two variables are perfectly related in a positive linear sense; a correlation

coefficient of -1 indicates that two variables are perfectly related in a negative linear sense, and a correlation coefficient of 0 indicates that there is no linear relationship between the two variables.

Table 1: Correlation coefficients

		Collapse of communal cattle dips after Privatization of Veterinary Services	Community Participation	Cost of dipping	Community Sensitization before handing over
Collapse of communal cattle dips after Privatization of Veterinary Services	Pearson Correlation Coefficient	1			
	Significance (2-tailed)	.			
Community Participation	Pearson Correlation Coefficient	-0.821	1		
	Sig. (2-tailed)	0.021	.		
Cost of dipping	Pearson Correlation Coefficient	0.728	0.323	1	
	Significance (2-tailed)	0.023	0.006	.	
Community Sensitization before handing over	Pearson Correlation Coefficient	-0.937	0.243	0.667	1
	Significance (2-tailed)	0.022	0.002	0.000	.

The analysis of correlation results between the collapse of communal cattle dips after Privatization of Veterinary Services and Community Participation show a negative coefficient

0.821, with p-value of 0.021. It indicates that the result is significant at α =5% and that as the Community Participation increases the collapse of communal cattle dips after Privatization of Veterinary Services would decrease. The correlation results between cost of dipping and collapse of communal cattle dips after Privatization of Veterinary Services shows a strong positive correlation coefficient of 0.78 coefficient and a p-value of 0.023 which significant at α = 5%. The results also show that there is a strong negative correlation between Community Sensitization before handing over and collapse of communal cattle dips after Privatization of Veterinary Services where the correlation coefficient is 0.937, with a p-value of 0.022.

This therefore infers that Community Sensitization before handing over contributed most to the collapse of communal cattle dips after Privatization of Veterinary Services followed by Community Participation while cost of dipping had the least effect on the collapse of communal cattle dips after Privatization of Veterinary Services.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction.

This Chapter presents the discussion of key data findings, conclusion drawn from the findings highlighted and recommendation made there-to. The conclusions and recommendations drawn were focused on addressing the purpose of this Study which was to investigate the factors influencing the collapse of communal cattle dips after Privatization of Veterinary Services in spite of the fact that ticks and tick-borne diseases are still prevalent in the District and that Livestock rearing is an economic activity. The Study further sought to examine how the level of Community Sensitization in the District, the extent of Community Participation in dipping projects in the District and whether payment of dipping fees influenced the collapse of communal cattle dips after Privatization of Veterinary Services in Kenya.

5.2 Summary of the Findings

The findings are summarized according to the Objectives of the Study under the indicated sub-heads.

5.2.1 Community Participation

In relation to Community Participation, the Study established that the idea of constructing the dip came from the government (66.7%). It was also revealed that approximate cost of constructing the dip was between Ksh. 41,000 and 50,000 (36.7%). The Community's contribution to cattle dip projects was through labor (M=3.2833), cash (M=2.7000) and materials (M=2.6500). The dips were not functioning (91.1%). In addition, the Study revealed that cattle owners did not meet to look for ways of reviving the dip (60%).

5.2.2 Cost of dipping Cattle

It was established that the government was in control of the dips management prior to Privatization (90%).After the changes in the dipping fees as a result of Privatization the Study

found out that the amount charged per head at the time of the Study or the last time the dip was operational was between 11 and 20 Kenya shillings. These charges were indicated to be high by the respondents.

5.2.3 Community Sensitization before handing over after Privatization

The Study determined that dipping of cattle reduces tick borne diseases and that inadequate Community Sensitization prior to handing over of dips to beneficiaries influenced the collapse of communal cattle dips after Privatization of Veterinary Services in Kenya (M=4.2833). It also revealed that farmers participate in learning tours to other dips that are already Privatized (M=4.1833).In addition, the study established that farmers were invited for meetings to be taught on how to manage the dip after Privatization (M=3.1000).

5.3 Discussion of the Findings

The Study found out that majority of Livestock farmers in Maara District were male. In addition, most of the respondents were above 55 years in age. In relation to their level of education, most of the Livestock farmers in Maara District had secondary education as their highest level of education (40%). Most of the farmers were obtaining their income from agriculture and livestock (76.7%). In addition, most of the Livestock farmers' average monthly income was between Ksh. 10,001 and 15,000 (60%). Milk was the main produce from the cattle reared by most of the Livestock farmers in this study (96.7%) where most of it was sold to groups or cooperative societies (93.3%).

5.3.1 Community participation

This Study sought to determine the extent of Community Participation in dipping projects in the District and its influence on the collapse of communal cattle dips after Privatization of Veterinary Services in Kenya. The Study established that the idea of constructing the dip came from the government (66.7%). The study also found that the approximate cost of constructing the dip was between Ksh. 41,000 and 50,000 (36.7%) and the government was the main sponsor of the cattle dip construction (83.3%). According to Scheepers, (2000) the purpose of involving

Communities is to ensure that people contribute to their own development while Schubeler (1996), states that Participation involves various actors or participants or stakeholders who determine how and what services are delivered The Study also found that the Community contributed labor during dip construction (M=3.2833). It was also established that the Community contributed cash money during dip construction (M=2.7000). The Study also revealed that the Community contributed materials during dip construction (M=2.6500). According to Arnstein (1969), 8 different levels of Participation are recognized; from manipulation or therapy of citizens through information, consultation, placation, partnership delegated power, to citizens' control as the highest level. The Study also found that most of the dips in Maara District were not functioning (91.1%). The Study findings also indicate that cattle owners do not meet to look for ways of reviving the dip (60%). Livestock farmers were controlling ticks by hand spraying their cattle when the dip was not working (96.7%). Monaheng (1998) notes that genuine Community Participation means that people must have the power to influence the discussions that affect their lives. Without empowerment, Participation becomes ineffective.

5.3.2 Cost of dipping

The Study sought to establish if payment of dipping fees influenced the collapse of communal cattle dips after Privatization of Veterinary Services in Kenya. The Study also revealed that Livestock farmers used to pay for dipping cattle when the government was in control of the dips management (90%). Livestock farmers were paying between 1 and 10 Kenya shillings per head of cattle for dipping (96.7%). The Study also established that there were changes in the dipping fees after handing over of the dips (98.3%). The amount charged per head currently or the last time the dip was operational was between 11 and 20 Kenya shillings (45%). The mode of payment affected the usage of the cattle dip to a little extent and to a moderate extent (30%). The charges for cattle dipping were found to be high (40%). According to Drummond, (1983) the high cost of constructing cattle dips and the initial cost of acaricide may make dips impractical for many small scale farmers; thus the approach used among small stakeholders was to develop communal dips managed by farmer groups or local authorities. Dube (1996) argues that farmers ability to purchase their own acaricides for use in individual farms is hampered by the high costs

of acaricides while Silayo *et al* (1996) and Eisler *et al* (2003) argue that the costs of controlling ticks takes away the gains associated with increased productivity.

5.3.3 Community Sensitization before handing over

The Study was set to determine how the level of Community Sensitization in the District influenced the collapse of communal cattle dips after Privatization of Veterinary Services in Kenya. According to the Department of Veterinary Services annual report of 1991, the Communities were to be Sensitized on the roles to be played by all stakeholders in the new arrangement. This Study established that farmers participate in learning tours to other dips that are already privatized (M=4.2833). The Study also revealed that dipping of cattle reduces tick borne diseases (M=4.1833). Further, it was established that dipping is more effective in control of ticks in comparison to hand spraying (M=3.8333). In addition, the Study found that dipping fees are used to manage the dipping operations (M=3.2500). It was also found that farmers were at times invited for meetings to be taught on how to manage the dip after Privatization (M=3.1000). The cattle owners were not very conversant with the dipping operations (M=2.9333). Finally, the Study found that there are no cultural practices and beliefs that prohibit the farmers from dipping their Livestock (M=2.1667).

The Study also found that reasons as to why the dip was not working were over dependence on donor fund as well as poor committee management, walking of animals to the dip was cited to be very difficult, ignorance of farmers was noted to affect the working of the dip and lack of acaricides coupled with other operational expenses affected the working of the dip.

5.4 Conclusion

The Study concludes that there is a negative relationship between Community Participation in the dipping project cycle management and the collapse of communal cattle dips after Privatization of Veterinary Services of coefficient 0.821, with p-value of 0.020. The Study also established that the Community contributed labour, cash money and materials during construction. Further it was established that the cattle owners do not meet to look for ways of reviving the dip.

It can be concluded, therefore, that the dips could have collapsed due to unsatisfactory Community Participation during all the stages of the project cycle management. Community Participation should be aimed at creating a shared vision between all project stakeholders for achieving the goals of the project. In order for Communities to Participate in projects, they need to understand the associated costs, benefits and risks. Moreover, the Communities should be empowered to identify their problems, look for solutions, develop action plans, put these plans in place and then carry them through. A process like Participatory Rural Appraisal (PRA) would assist. Once the Communities are convinced that the project serves their interests, they are likely to own it and thus increase chances of sustainability. It is possible that a 'top down' approach was used during the construction and management of the dips where other considerations, like politics, could have been prioritized.

The Study further concludes that between Community Sensitization before handing over and the collapse of communal cattle dips after Privatization of Veterinary Services there was a negative correlation where the correlation coefficient was 0.937 and a p-value of 0.027 was significant at $\alpha = 5\%$. In addition, the Study found that dipping of cattle reduces tick borne diseases. The Study also revealed that the cattle owners were not very conversant with the dipping operations, dipping is more effective in control of ticks in comparison to hand spraying, farmers were invited for meetings to be taught on how to manage the dip after Privatization and farmers were Participating in learning tours to other dips that are already Privatized

The Study concludes that there is a positive association between cost of dipping and the collapse of communal cattle dips after Privatization of Veterinary Services where the correlation coefficient is 0.728, with a p-value of 0.025. The Study found out that that there were changes in the dipping fees after handing over of the dips. In addition, the amount charged per head currently or the last time the dip was operational was between 11 and 20 Kenya shillings, which was considered to be high.

5.5 Recommendations

From the Study findings the following recommendations are made to the Government, Development agents and the Communities.

1. That the Government and other development agents need to involve the actors, participants and all stakeholders in all the phases of the dipping projects life cycle management (initiation, planning, implementation and closure). Further, it should be clarified to the Communities that they are the project owners while the Government and other agents of development are facilitators. This also calls for Community empowerment for them to take charge of their own development agenda.
2. It is necessary for Government and other development agents to carry out enough extension services to ensure that the Livestock farmers embrace dipping as one of the activities to promote Animal health thus budget for it amongst other costs of rearing Cattle.
3. The Government needs to provide an enabling environment for the Livestock farmers to reap optimum benefits from cattle rearing thus enabling them to take care of Cattle dipping charges.
4. The Government needs to carry out effective Community Sensitization to ensure that they comprehend all the aspects of dipping management relating to their roles and responsibilities concerning dipping of Cattle.

5.6 Recommendation for Further Studies

This Study recommends further studies on the Poverty levels in Maara District and its effect on the collapse of communal cattle dips.

REFERENCES

Agnote, J. (2006). *The use of Cattle Plunge Dips provides the most effective Method for controlling Ticks in Cattle*. Department of Resources, Australia.

Ashley, S. D., Holden, S. J. and Bazeley, P. B. S. (1996). *The Changing Role of Veterinary Services:* A Report of a Survey of Chief Veterinary Officers Opinions. Somerset, United Kingdom.

Bell, J. (1993). *Doing Your Research Project*: A guide to first time Researchers in Education, Health and Social Sciences: Open University Press.

Best, J.W. and Kahn, V. (1996). *Research in Education*, 7th edition. New Delhi: Prentice Hall of India.

Bhatnagar, B. (1992). *Participatory Development and the World Bank*. Washington DC.

Bradshaw, T. K. (2000). Complex Community Development Projects: Collaboration, Comprehensive Programs and Community Coalitions in Complex Society. *Community Development Journal*, 35(2), 133-145.

Cheneau, Y., Idriss, A. H. and Ward, D. (2004). *An Assessment of Strengths and Weaknesses of Current Veterinary Systems in Developing World*. FAO, Rome, Italy.

Clutton, B. J. (1988). *The Walking Larder*: Pattern of Domestication, Pastoralism, and Predation. London.

Crees, H. J. S., Nissen-Petersen, E. and Githari, J. K. (1976). *Cattle Tick Control*. MLD, Nairobi, Kenya.

CTA (1987). *Primary Animal Health Care in Africa*. Synopsis of a Seminar Held at Blantyre 25-28 September 1985.

De Haan, C. and Bekure, S. (1991). *Animal Health Services in Sub-Saharan Africa. Alternative Approaches*. World Bank, Washington DC.

FAO (1997). *An electronic Conference on Principles for Rational Delivery of Public and Private Veterinary Services.*

Farrington, J. Bebbington, A., Wellard, K. and Lewis, D. J. (1993). '*Reluctant Partners: Non Governmental Organizations, the State and Sustainable Agricultural Development*'. Routledge, London.

Gamba P, and Mghenyi E. (2004). *Rural Poverty Dynamics*, Agricultural Productivity and Access to Resources. Working Paper No 21, Tegemeo Institute of Agricultural Policy and Development, Egerton University.

GOK (1986). Sessional Paper No. 1 of 1986 on Economic Management for Renewed Growth; Nairobi : Government Printer,

GOK (2008). Sessional Paper No. 2 0f 2008 on National Livestock Policy. , Nairobi : Government Printer,

GOK (1938). Cattle cleansing act, Cap. 358., Nairobi : Government Printer

IFAD (1995). *Animal Health Services Rehabilitation Programme*, Kenya: Programme Completion Evaluation Report. Nairobi.

Isaac, S. and Michael, W. B. (1990). *Hand Book in Research and Evaluation*. San Diego, California: Edits Publishers.

KNBS (2009).The 2009 Population and Housing Census, Vol.1. Ministry of Planning and National Development, Kenya.

Kerlinger, F. N. and Lee, H. B. (2000). *Foundations of Behavioural Research*. 4th edition. New York: Holt, Rinehart and Winston.

Kombo, D.S. and Tromp, D. L. A. (2010). *Proposal and Thesis Writing*: An Introduction. Makuyu, Kenya. Don Bosco Printing Press.

Kothari, C. R. (2004). *Research Methodology*: Methods and Techniques. New Delhi: Wishwa

Lefevre, P., Blanco, J., Chermette and Uilenberg, G. (2010). *Infections and Parasitic Diseases of Livestock*, Vol.1. ISBN.

Linder, B. and Melanie, F. (2002). The blind Leading the Blind?: Policy Transfer Without Policy Learning. *Public Policy Network Conference*. University of Tasmania, Hobart 31 January-1 February 2002.

Maina, H. (2003). *Role of stakeholders in the management of communal cattle dips*: Proceedings of the workshop on policy strategy and legal framework on control of ticks and tick-borne diseases; Nakuru, Kenya, pp 28-31.

Manger, L. N. (2002). *A History of Life Sciences*. New York: Basel.

Mathysse, J. G. (1954). *Report on Tick-borne diseases*, Northern Rhodesia; Lusaka, Zambia, Government Printer, pp28.

MOA (1995). *National Dairy Development Desk Study*; Tick Control Consultancy Report: MOA, Nairobi, Kenya.

MOLD (2008). *Draft Strategic Plan 2007-2012*. Veterinary Department, Nairobi.

Monaheng, T. (1998). *Participation and Human Development*: Some Implementation Problems. Africanus.

McCosker, P. J. (1979). *Global Aspects of the Management and Control of Ticks of Veterinary Importance*-pp 45-53. New York, NY, USA: Academic press.

Mugenda Q. M. and Mugenda A. G. (1999). *Quantitative and Qualitative Approaches*; Nairobi, Kenya: Acts Press.

Mulwa, W. F. (2004). *Demystifying Participatory Community Development; Beginning from the People; Ending at the People*. Eldoret: Zapf Chanchery.

Nyerere, J. (1973). *Freedom and Socialism*. Dar es Salaam: Oxford University Press.

Oakley, P. and Marsden, D. (1984). *Approaches to Participation in Rural Development*. International Labour Office , Geneva.

PDVS (2011). *Monthly report for December 2010*. Eastern Province, Embu.

Pegram, R. G. and Chizyuka, H .G. B. (1987). *Towards an Assessment of Economic Importance of Ticks on Rural development*. /In R. W. Sutherst, ed. /Ticks and Tick Borne diseases. / ACIAR proceedings 17, p.104-107. Canberra Australia, ACIAR.

Scheepers, T. (2000). *A Practical guide to Law and Development*: An Introduction to the Law applicable to Development and Development Management process in S. A. Juta.

Schulbeler and Schulber P. (1996). *Participation and Partnership in Urban Infrastructure Management*. World Bank, Washington DC.

Sekaran, U. (1992). *Research Methods for Business*. A skill building approach. New York: John Wiley and Sons, INC.

Sen, A. and Chander M. (2003). *Privatization of Veterinary Services in Developing Countries*. Gujarat, India: India Institute of Management.

Springell, P. H. (1974).*The Cattle Tick in relation to Animal Production in Australia*. Wld Anim. Rev. (FAO), (10):19-23.

Tatchell, R. J. (1986). *Interactions between Ticks and their Hosts. In*: Howell, J. M. (ed), /Proceedings of the 6th International Congress on Parasitology, Australia, Brisbane 1986 /. // Australian National University, Canerra, Australia pp 597-606.

Tber, A. (1995). *Privatization of Veterinary Practice*: Evaluation of the experience f African Countries in the Field. Mimeo.

The Nairobi Star (29-10-2011). *Minister assures Villagers Over Cattle Dips*, Nairobi.

Umali, D. L., Feder, G. and de Haan, C. (1992). *The Balance between Public and Private Sector Activities in the Delivery of Livestock Services.* World Bank Discussion Paper 163. Washington DC.

UNDP (1999). *Empowering People. A guide to Participation.*

Young, A. S., Groocock, C. M. and Kariuki, D. P. (1988). *Integrated Control of Ticks and Tick-borne Diseases of Cattle in Africa:* Parasitology 96, 403-432: Cambridge University Press.

APPENDICES

Appendix 1: Introductory Letter to Respondents

INDRAPH MUGAMBI RAGWA

P.O. Box Private Bag, 00625 Kangemi,

Nairobi.

7th May 2012

RE: QUESTIONNAIRE

Dear respondent,

I am a post graduate student at the University of Nairobi undertaking a masters course in project planning and management and as part of the course, I am undertaking research study on " The factors that influenced the collapse of dips in Maara district after privatization of veterinary services in Kenya".

Kindly please assist in filling the attached questionnaire. The information will remain confidential and will be used for the purposes of the study only.

Thank you for your cooperation.

Yours faithfully,

Indraph M. Ragwa

Appendix 2: Questionnaire

Please respond by filling in the gaps or putting an (x) against the correct option as applicable.

For example:

The capital city of Kenya is.....Nairobi..... Or

The answer of two multiplied by four is?	4	6	8	10	12
			x		

A. Respondent's background information

1. Name of respondent (optional).....Telephone.....
2. Mark the name of your Division

Chogoria	Ganga	Mitheru	Muthambi	Mwimbi

3. Please indicate your Sex

Male	Female

4. Please indicate your age category (years)

15-25	26-35	36-45	46-55	Above 55

5. What is your occupation? .....

6. Please indicate your marital status

Single	Married	Divorced	Widow	Widower

7. Please indicate the highest level of education attained.

Primary	Secondary	College	University	Other (specify).....

8. Please mark your sources of income

Agriculture	Livestock	Salary/employment	Business	Other (specify).....

9. Please indicate your average income per month

0 - 5,000	5,001-10,000	10,001-15,000	15,001-20,000	Over 20,000

10. Do you rear cattle?

Yes	No

If yes, please indicate the type

Local	Cross-breed	Exotic	Other (specify).....

11. What is the main produce from the cattle?

Meat	Milk	Other (specify).....

12. Where do you sell your milk?

Individual homes	Hotels	Groups/ cooperatives	Do not sell	Other (specify).....
				.....

B. Community participation

1. Where did the idea of constructing this dip come from?

Community	County Council	Government	Don't know	Other (specify).....

2. What was the approximate cost of constructing the dip?

10,00-20,000	21,000-40,000	41,000-50,000	51,000-60000	Above 60,000

3. Who sponsored the construction of your dip?

Community	County council	Government	Don't know	Other (specify).....

4. Community contribution during dip construction	Strongly agree	Agree	Don't know	Disagree	Strongly disagree
a. During construction of this dip the community contributed cash					
b. During construction of this dip the community contributed labour					
c. During construction of this dip the community contributed materials					

5. Is your dip working?

Yes	No

If no, which year did it stop working?

.....

6. The Cattle owners sometimes meet to look for ways of reviving the dip

Strongly agree	Agree	Don't know	Disagree	Strongly disagree

7. When the dip is not working do you control ticks in cattle?

Yes	No

If Yes, how do you control ticks on cattle in your farm?

.....

C. Cost of dipping

1. Were you paying for dipping cattle when the government was in control of the dips management?

Yes	No

If yes, how much were you paying in Kenyan shillings?

1-10	11-20	21-30	30-40	Over 40

2. Were there any changes in the dipping fees after handing over of the dips?

Yes	No

If Yes, What is the amount charged per head currently or the last time the dip was operational?

1-10	11-20	21-30	31-40	Over 40

3. To what extent does the mode of payment affect your usage of the cattle dip?

Very great extent	Great extent	Moderate extent	Little extent	No extent

4. How do you rate these charges?

Very high	High	Medium	Low	Low

D. Community sensitization before handing over

1. Dipping fees is used to manage the dipping operations.

Strongly agree	Agree	Don't know	Disagree	Strongly disagree

2. The cattle owners are very conversant with the dipping operations.

Strongly agree	Agree	Don't know	Disagree	Strongly disagree

3. Dipping of cattle reduces tick borne diseases

Strongly agree	Agree	Don't know	Disagree	Strongly disagree

4. There are cultural practices and beliefs that prohibit the farmers from dipping their livestock.

Strongly agree	Agree	Don't know	Disagree	Strongly disagree

5. Dipping is more effective in control of ticks in comparison to hand spraying

Strongly agree	Agree	Don't know	Disagree	Strongly disagree

6. Farmers were invited for meetings to be taught on how to manage the dip after privatization

Strongly agree	Agree	Don't know	Disagree	Strongly disagree

7. Farmers participate in learning tours to other dips that are already privatized

Strongly agree	Agree	Don't know	Disagree	Strongly disagree

8. In your opinion why is your dip not working?

.....

.....

.....

9. What would you suggest to be done to ensure that your dip continue operating?

.....

Thank you for your cooperation.

Appendix 3. Letter of introduction to District veterinary officer

Indraph Mugambi Ragwa

Central Veterinary Research Laboratories- Kabete

Private bag, 00625-Kangemi

15th June 2012

To

The District Veterinary Officer

Maara District

P.o. Box 273, Chogoria.

RE: LETTER OF INTRODUCTION

I am a civil servant currently working with the Department of Veterinary Services in the Ministry of Livestock Development and stationed at the Director of Veterinary Services' offices, Kabete.

I am undertaking a Master's course in Project Planning and Management at the University of Nairobi. To this end, I am supposed to carry out a research project as part of the course. My proposed research project topic is "The factors influencing the collapse of communal cattle dips in Maara District". I have already defended my proposal at the university and I have obtained approval to collect data for analysis and subsequent interpretation.

Data collection will entail interviewing livestock farmers in the district where the information gathered will be confidential and used only for the purposes of the research.

I am herewith soliciting form your support in this endeavor.

Yours sincerely,

Indraph Mugambi Ragwa

Cc The District Livestock Production Officer, Maara District

Appendix 4: Table for Determining Minimum Returned Sample Size for a Given Population Size for Continuous and Categorical Data

Population size	Sample size					
	Continuous data (margin of error=.03)			Categorical data (margin of error=.05)		
	alpha=.10 t=1.65	alpha=.05 t=1.96	alpha=.01 t=2.58	p=.50 t=1.65	p=.50 t=1.96	p=.50 t=2.58
100	46	55	68	74	80	87
200	59	75	102	116	132	154
300	65	85	123	143	169	207
400	69	92	137	162	196	250
500	72	96	147	176	218	286
600	73	100	155	187	235	316
700	75	102	161	196	249	341
800	76	104	166	203	260	363
900	76	105	170	209	270	382
1,000	77	106	173	213	278	399
1,500	79	110	183	230	306	461
2,000	83	112	189	239	323	499
4,000	83	119	198	254	351	570
6,000	83	119	209	259	362	598
8,000	83	119	209	262	367	613
10,000	83	119	209	264	370	623

NOTE: The margins of error used in the table were .03 for continuous data and .05 for categorical data. Researchers may use this table if the margin of error shown is appropriate for their study; however, the appropriate sample size must be calculated if these error rates are not appropriate. Table developed by Bartlett, Kotrlik, & Higgins (Adopted from Cochran, 1977)