

**DETERMINANTS FOR THE GROWTH OF RANCHES IN ATHI RIVER  
DISTRICT, MACHAKOS COUNTY, KENYA**

**BY**

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## DECLARATION

This project is my own original work and has not been submitted for a degree award in any university.

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This research project has been submitted for examinations with my approval as university supervisor.

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## **DEDICATION**

To my wife Eunice Mbithe, my parents Julius Marete and Rose Muriungi and my daughter Prudence Kanana.

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## ABBREVIATIONS AND ACRONYMS

<b>D.C</b>	District Commissioner
<b>DVO</b>	District veterinary officer
<b>DAO</b>	District Agriculture officer
<b>FAO</b>	Food Agriculture Organization
<b>GDP</b>	Gross Domestic Product
<b>GRI</b>	Government Research Institutes
<b>ILRI</b>	International Livestock Research Institute
<b>KARI</b>	Kenya Agriculture Research Institute
<b>NCRG</b>	National Centre for Research and Genetics
<b>NGO</b>	Non-Governmental Organization
<b>TFP</b>	Total Factor Production
<b>UNDP</b>	United Nations Development Program
<b>USAID</b>	United States Agency for International Development

## ABSTRACT

The challenge of food security, unemployment in the society has been brought about by inadequate growth in the ranches. This sub sector in the agriculture sector contributes greatest percentage of GDP. This effect has brought up high poverty levels, food insecurity and poor living standards. Patterns of most of the land in Athi River have changed from principally ranching to building of residential estates, setting up industries and agro-ranching production. This trend has in most cases adversely affected livestock production and the production capacity of the land. To arrest the situation, the study therefore sought to investigate the determinants for the growth of ranches in Athi River District, Machakos County, in Kenya.

The study sought to establish whether or not growth of ranches is affected by funding, infrastructure, feed resources, livestock marketing and research. Funds are required to start up, operate and expand enterprises; inadequate financing will always manifest itself in problems both at implementation and thereafter poor operation. Infrastructure is an essential component in the growth and development of ranches, absence of basic infrastructure impedes the growth of Agriculture sector enterprises. The availability of feeds can be increased or feed utilized by improvement of water distribution point and reduced overgrazing, increasing primary production by intensifying land use. Livestock marketing is considered as an essential part of livestock production in ranches because increased production is unlikely to be sustained in these areas, unless the product is traded, thus livestock marketing is the ultimate step in the livestock marketing process. Research increases the set of available technologies; hence agriculture research expenditures are used as a proxy for agriculture technology change. The conceptual frameworks will show the relationship between growth and factors influencing growth in ranches and when they interlay to effect growth. Descriptive survey design was adopted for this study as information deduced from the collected data was able to describe the existing phenomenon. A census was carried out since the target population is small and manageable. The target population of the study was 100 respondents comprising of 88 ranch managers, 10 administrators and 2 livestock officers. The data was collected using two questionnaires one for administrators' and the other one for ranch managers. An interview schedule was conducted to get information from two livestock officers. The data collected was analyzed using quantitative and qualitative approaches. Tabulation of the data was made using the frequency distribution tables and analysis done using Statistical Package for Social Sciences (SPSS).The analyzed data presented indicated that growth of ranches was greatly affected by inadequate funding, unconditioned infrastructure services, lack of enough feed resources, poor livestock marketing systems. The study concluded that funding, infrastructure; feed resources, livestock marketing, research and dependent variable growth in ranches were positively correlated. The study finally recommends quick review of the factors pointed out and further recommends areas for further studies on influence of gender, technology, government policy, education and training on growth of ranches.

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background to the study

Kenya's economy is largely agriculture based. The sector directly supports about 80% of the population and contributes 26% of the Gross Domestic Product (GDP), and 60% of the export earnings (Nyangito, 2012). Kenya's agriculture is mostly rain-fed and dominated by small-scale holders, contributing 75% of the total output. Investing in agriculture was a major preoccupation for the newly independent Kenyan state (Nyoro, 2013). For instance, 13% of the budget in 2009/10 was allocated to the agriculture sector, but fell considerably in 2010/11 to 10% (Nyariki, 2012). This coupled with poor governance in key agricultural institutions and poor sequencing of the liberalization process, have led to the dismal performance of the agriculture sector. Consequently, agricultural productivity in terms of export earnings, employment creation, food security and household farm incomes have significantly declined.

The ranching sub-sector plays an important role in Kenya's economy, contributing about 4% of the GDP, employing about 365,000 people and supporting about 625,000 small scale farmers, who dominate production in Kenya (Ministry of Agriculture, 2013). The industry heavily relies on cattle, which accounts for approximately 84% of total milk production. The dairy cattle population in the country has grown from about 0.8 million in 1960, to about 3 million today, and production has grown gradually to stand at about 2.5 billion litres annually, with demand of 2.3 billion litres (Ministry of Agriculture, 2012). The success in this sub sector is supported by several things, among them being; suitable climatic conditions, which guarantee all-year round milk production, high level domestic consumption and availability of dairy grade cows. Like any other agricultural sub-sector, the sub-sector is dogged by production, processing and marketing challenges due to inefficient technology, legal and policy framework. Currently, an estimated 95 million litres of the milk produced goes to waste annually (Kathuri, 2012). Milk marketing,

previously dominated by the Kenya Cooperative Creameries (KCC), was liberalized in 1992 and there are now about 50 formal milk processors. Failure by the latter to improve prices upwards has led to emergence of informal traders who pay for the milk delivered/collected promptly. The sub sector contributes to employment through the proliferation of labour intensive undertaking, some of which are considered unprofitable for larger enterprises. This has resulted into creation of employment opportunities and hence alleviation of poverty levels (Wilson, 2009).

The ranching sub sector has continued to play a role in the growth of economies by ways of income and employment generated activities, this has improved the living standards and increased food security both in rural areas and urban areas (Tambi & Maina, 2010).

Athi River District of Machakos county is part of the semi-arid lands that comprises 60% of Kenya's landmass, including rangeland that supports extensive livestock operation and wildlife (Hopcraft, 2012). With increased population pressure on land resources, rangeland is being cropped where climatically possible ( Bekure & Chabari, 2011). Athi River District of Machakos County has been one of the Districts in Kenya which rangeland has been highly affected by human activities (Nyoro, 2013). Patterns of most of the land use in Athi river district have changed from principally ranching to building of residential estates, setting up industries and agro-ranching production, This trend has in most cases adversely affected livestock production and the production capacity of the land. This has been precipitated by unprecedented population growth, excessive cropping pressure and over grazing (Muriuki, 2012). Over grazing on land particularly impacts negatively on vegetation resources and biodiversity in general (Mutai, 2012).

Lesorogol, (2011) states that there are various challenges influencing investment growth in ranches which limit achievement of intended goal, these include; limited access to funding, infrastructure, feed resources, livestock marketing and livestock research. Funds are required to

start up enterprises, but their availability has become competitive as different sub-sectors of economy compete for scarce resources. According to (Kortenhorst, 2010), adequate funds should always be availed in time as inadequate financing will always manifest itself in problems such as poor project management, both at implementation and thereafter poor operation and maintenance. Central government has a role to play in ensuring that there is equitable allocation of resources for development (Ministry of Finance, 2012). However, in most cases the government is constrained in terms of resources and unable to fully meet the financial requirements (Mulage & Hatsia, 2011). Multilateral and bilateral aid have been some of the most common forms of financing for ranches in developing countries, either as grants or loan (Ministry of Agriculture, 2013). The beneficiary government sign aid with the donor aid agencies and benefit the investors in large investment that if left on their own will not be able to break even in their production (Otieno, 2012).

Insufficient infrastructural services such as power supply, water, transport, communication and waste management have been identified as a challenge to investment growth in ranches (Stifel & Minten, 2010). Livestock marketing presents another major challenge in ranching subsector (Bekure & Chabari, 2011). Productivity of the subsector is constrained by inefficient in the supply chains, which results from limited storage capacity, lack of post-harvest services and poor access to input markets (Cronin, 2011). Improvement to the livestock marketing systems facilitates access of ranchers to markets, increase competition by traders, increase the supply of stock to the markets and reduce marketing costs, all of which combined would benefit both producers and consumers. These improvements fall in areas of promotion of small stock markets, provision of facilities along trek routes and at livestock markets and improving market information and making credit available to livestock traders (Matthes, 2013). Research increases the set of available technologies; hence agricultural research expenditures are used as a proxy for agricultural technological change (Tatchell, 2009). Livestock research is a very important aspect

in breed stock improvement, reproductive performance, livestock healthcare and supplementary feeding (Sutter, 2010).

## **1.2 Statement of the problem**

In Kenya, efforts of reforming the ranching sub-sector have been made to increase food security, employment and improve standards of living through management of the sector. In managing the sector, the government aimed at relieving the investors from high taxes, provide basic technical and managerial skills, improve infrastructures and enhance financial management (Ministry of Agriculture, 2013). This aimed at sustaining steady growth in the ranching subsector. However, the state in this subsector is still wanting. With increased population pressure on land resources, rangeland has been greatly been affected by human activities (Bekure & Chabari, 2011). Athi River District of Machakos County has been one of the districts in Kenya which rangeland has been highly affected by human encroachment (Nyoro, 2013). Patterns of most of the land use in Athi river district are changing from principally ranching to building of residential estates, setting up industries and agro-ranching production, this trend has in most cases adversely affected livestock production and the production capacity of the land (Muriuki, 2012).

Quality commercial, ranch and farm land has always been a solid long term and often short term investment. Uncertain political, economic and environmental conditions together are making land the go-to investment modality for the discretionary investor (Kessides, 2010). Jacobs (2011) mentions a number of factors which affect negatively growth in ranches they include; absence of basic infrastructure, poor livestock marketing systems and unstable financial markets. However, little information is known about how these challenges have negatively contributed to growth in ranches in Athi river district. The study therefore sought to fill the gap by assessing the influence of funding, infrastructure, feed resources, livestock marketing and research on growth of ranches.

### **1.3 Purpose of the study**

The purpose of the study was to assess determinants for the growth of ranches in Athi River District, Machakos County.

### **1.4 Objectives of the study**

1. To assess the influence of funding on growth of ranches in Athi River District.
2. To establish the influence of infrastructural services on growth of ranches in Athi River District.
3. To investigate the influence of feed resources on growth of ranches in Athi River District.
4. To examine the influence of livestock marketing on growth of ranches in Athi River District.
5. To establish the influence of research on growth of ranches in Athi River District.

### **1.5 Research questions**

1. What is the influence of funding on growth of ranches in Athi River District?
2. How do infrastructure services influence growth of ranches in Athi River District?
3. How do feed resources influence growth of ranches in Athi River District?
4. What is the influence of livestock marketing on growth of ranches in Athi River District?
5. In what ways does research influences growth of ranches in Athi River District?

### **1.6 Significance of the study**

The study revealed the determinants for the growth of ranches in Athi River District Machakos County. The study has the potential of helping ranch management team by empowering them with knowledge and skills which will assist them to share their leadership widely and equally especially on issues of funding, infrastructure, feed resources, livestock marketing and research. The study will also enlighten the government on most of the challenges the ranchers are facing especially on issues of research and livestock marketing and their roles to play. In addition, the study has the potential of providing ranchers in Kenya with guidelines to improve growth of ranches.

### **1.7 Basic assumptions of the study.**

The study was based on the assumption that respondents gave truthful and honest responses. It's was also assumed that the questionnaires were suitable instruments in gathering information in this study.

### **1.8 Limitations of the study**

The study heavily relied on views expressed by respondents through interviews conducted and questionnaires distributed. The study was therefore open to the same validity threats most qualitative studies suffer from. The secrecy and fear of victimization especially on issues detrimental to the ranch by the managers ended up limiting the study. Some managers were not willing to cooperate due to their busy activities which they were undertaking at the time when the researcher expected them to fill the questionnaire.

### **1.9 Delimitation of the study**

The study was carried out in Athi River District of Machakos County. The study assessed the determinants for the growth of ranches in Athi River District Machakos County. The study used ranch managers who agreed to participate voluntarily and researcher was the enumerator who attained the needed information. Athi River District has good roads which made it easy to reach preferred destinations and most respondents were honest and willing to give accurate information despite the fact that majority maybe semi- literate. Being a native of the area the respondents are likely to be willing to give information and no suspicion may arise since there will be no language barrier.



### 1.10 Definition of significant terms.

<b>Agriculture</b>	Is the cultivation of animals, plants, fungi, and other life forms for food, fibre, bio fuel and other products used to sustain human life.
<b>Determinant</b>	A point or fact or remark that settles something conclusively.
<b>Farm</b>	Is an area of land, or, for aquaculture, lakes river or sea, including various structures, devoted primarily to the practice of producing and managing food (produces grains, or livestock), fibres and, increasingly, fuel.
<b>Feed resources</b>	Animal feeds, feedstuffs and feed additives.
<b>Funding</b>	Acquisition of money
<b>Growth</b>	Is a qualitative change that brings about economic development.
<b>Government policy</b>	Legislation or guidelines that govern how laws should be put into operation, broad ideas and goals in political manifestos and pamphlets
<b>Human capital</b>	Is the stock of competencies, knowledge, social and personality attributes, including creativity, embodied in the ability to perform labour so as to produce economic value.
<b>Infrastructure</b>	Roads, electric power, housing, and communication lines
<b>Infrastructural services</b>	These are basic physical structures needed for the operational of a society enterprise such as power, communication lines, road network and water.
<b>Livestock marketing</b>	Involves the sale, purchase or exchange of products such as live animals, milk, wool, and hides for cash or goods in kind.
<b>Ranch</b>	Is an area of landscape, including various structures, given primarily to the practice of ranching, the practice of raising grazing livestock such as cattle or sheep for meat or wool.
<b>Ranching</b>	Is the practice of raising herds of animals on large track of land.

**Research** Is formal work undertaken systematically to increase the stock of knowledge, including knowledge of humanity, culture and society, and the use of this stock of knowledge to devise new applications.

**Policy** Is a document determined by the government/ stakeholders to guide the operations with the prime concern of building and sustaining recipient capability of self-reliance in the performance of specific functions for decision making.

**Technology transfer** Is the process of transferring scientific findings from one organization to another for the purpose of further development and commercialization

### **1.11 Organization of the study**

Chapter One represents the background of the study, statement of the problem, research questions, objectives of the study, significance of the study, and limitation of the study, scope of the study, delimitation of the study, definition of the significant terms as used in the study and organization of the study.

Chapter Two reviews literature related to determinants for the growth in ranches, Funding, Infrastructural services, feed resources, livestock marketing and research which formed the core of this chapter. The chapter also represents the study conceptual framework and summary of literature reviewed.

Chapter Three discusses studies on research methodology which included; research design, target population, sampling procedures, Data collection procedures, Data collection instruments, reliability and validity of instruments, pilot- testing, data analysis and table of operationalization of variables

Chapter Four gave a detailed analysis, interpretation and discussion of study findings.

Chapter Five gave a review of the whole study, summary of research findings, discussions, conclusion and recommendations.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

The chapter reviews related literature on influence of funding, Infrastructure, feed resources, livestock marketing, research on investment growth of ranches, conceptual framework and summary of literature reviewed.

#### **2.2 Influence of funding on growth of ranches**

Ranches play an essential role in the creation of job opportunities and hence economic development thus, financing should be an important undertaking for poverty reduction ( Made, 2009).Funds are required to start up enterprises, but availability of them has become competitive as different sub-sectors of economy compete for scarce resources. According to Kortenhorst (2010), adequate funds should always be availed in time, as inadequate financing will always manifest itself in problems such as poor project management, both at implementation and thereafter poor operation and maintenance.

Central government has a role to play in ensuring that there is equitable allocation of resources for development such as ranches (Ministry of Finance, 2012). However, in most cases the government is constrained in terms of resources and unable to fully meet the financial requirements (Mulage & Hatsia, 2011). Multilateral and bilateral aid have been some of the most common forms of financing for ranches in developing countries, either as grants or loans (Ministry of Agriculture, 2013).The beneficiary government sign aid with the donor aid agencies and benefit the investors in large investment, that if left on their own will not be able to break even in their production. This form of financing can suffer from premature withdrawal, should the donor country government differ with the recipients' government regardless of whether the programs have been completed or not. Funding can also be obtained from commercial banks and

commercial houses where loans are advanced to the beneficiaries and charged at market related interest rates, since this source of funding requires loan guarantees mainly in form of immovable assets shares. According to (Machyo, 2012) most small ranches are not able to easily access loan as they are considered high risk group in employment.

Made (2009), further explains that financing small ranches should aim at developing sustainability and continuously create more opportunities for the larger population of the country. Investments are required to finance the components of the infrastructure: - Roads, electricity, credit research, extension and marketing. Tatchell, (2009) states that the allocations of funds to different projects depend on their return and priority attached to it in the national development planning. Timely access of funds should be very important as it determines the state of planned activities. Matthes, (2013) further states that the process of acquiring and holding the funds in the form of interest and transacting fees can be high if there is no proper planning of acquiring and utilization of funds. Taking more than what is required if it was a bank loan can result in payment of higher interest, and since the purpose of seeking for external funding for smaller ranches is to bridge the deficit that cannot be met by the beneficiary then it becomes prudent that all funding should be based on an approved project investment, which will ensure that only the critical and viable investment are funded. Once provided, the fund utilization must be planned for, so that all the desired actions are done and at the right time. Ranches should maintain their own bank account where they will be depositing their savings, operation and maintenance, contribution, subscription of fees and any other enterprise finances, (Korir, 2009). Auditing should be conducted according to the laid down by-laws and there should be emergency plan for resource mobilization should it be required. Good management plans for ranches finances will inspire to confidence of both the donors and other financial institutions thus enhancing the sustainability and performance of ranches in the agricultural sector (Grandin, 2009).

### **2.3 Influence of infrastructural services on growth of ranches.**

Infrastructure is an essential component in the growth and development of ranches and horticulture farms both at local, national and international levels (FAO, 2012). The absence of basic infrastructure influences negatively on the growth of ranches and horticulture farms. Infrastructure consists of social and economic services which include health, public utilities for instant power, telecommunications, piped water supply, sanitation sewerage, roads, dams and canal ( Jacobs, 2011) .According to Kessides (2010), the absence of basic infrastructure in ranches impedes the growth of Agriculture sector enterprises. He further noted that, poor conditions in the ranches settlements are characterised by the absence of safe water, solid waste collection and disposal storm drainage, public transport, access roads and footpath, street lights, public amenities, safe play areas, electricity supply and social services translate into unhealthy living conditions which reduce productivity and employment option.

Omiti & Irungu (2012) further states that lack of basic infrastructure services, particularly water, increase the time spent by the poor in processing such resources, time which could have been spend on more productive and income earning is lost. Likewise, such situations forces people to settle for what is locally available even if the quality of the resource is low or unsafe for human consumption, which has impacted negatively on people health and human capital. According to (Kosura, 2010), the Government is expected to set up policy that will regulate the construction of buildings, roads and waterworks which will directly affect the cost and design of particular infrastructure facilities. This regulatory function is important in maintaining policy and legal environment that is conducive to the growth and expansion of the infrastructure services in the informal settlements. Muyanga & Jayne (2011) further states that maintained infrastructure for instance transport, telecommunication, water and power is essential for urban economic growth and expansion of employment.

Challenges' facing the ranches in Kenya is unconcerned in responding to infrastructural problems in the urban and rural areas. Some of the problems include: Power interruptions, accessibility to electricity, inadequate work sites, and insecurity in the rural areas, poor roads, and poor access to clean water, International Organization ( Rege, 2011). Orodho (2012) further states that specific social economic conditions prevail in many economically developing countries including rapid population growth, migration to urban areas, lack of sufficient funds and affordable services and generally low skilled force.

#### **2.4 Influence of feed resources on growth of ranches**

The availability of feeds can be increased or feed utilized by improvement of water distribution points and reduced overgrazing, increasing primary production by intensifying land use, a conserving forage, balancing the livestock population and available feed resources (Jacobs, 2011). Wilson, ( 2012) further states that differences in the distribution of water points on the group ranches lead to different patterns of range resource utilization and variation in grazing pressure within ranches. In addition, the frequency at which animals are watered is influenced by distance to water and the grazing resources available between the homestead and the water point. Reliance on one water point by large herds of cattle has resulted in serious range degradation along the many stock routes leading to the springs (Peacock, 2012)

Sones & Jibbo (2009) further states that the ongoing process of land privatization will lead to the creation of single household *bomas* and additional producers may decide to settle in the under-utilized land. Changing to alternate-day watering would reduce the proportion of the herding day spent on trekking and watering and increase access to better grazing areas, but it might reduce milk production and calf growth (Okeyo, 2013). With increasing population pressure on land resources, rangeland is being cropped where climatically possible (Bekure & Chabari, 2011). There has been a rapid spread of wheat, millet and sorghum farming in the Kapiti Plains and in better-watered parts of Athi River has established large-scale, mixed-farming enterprises on their

better grazing land (Meadows, 2012). Since the 2009 drought, the ranchers are increasingly trying to get land along water courses and swamps so as to engage in irrigated farming. In view of this drive to bring more land under cultivation, the question arises as to whether rain fed cropping can be combined with forage production in feed gardens, which could provide supplementary feed for young stock and act as a day-time holding area for them ( Grandin, 2009). Jacobs (2011) further states that feed gardens are feasible if rancher's producers are willing to supply labour for fencing, planting and maturing and will buy seed and other inputs. They also have to realise that the management is rather complex as it requires continuous protection against stock during the growing season, followed by timely harvesting, feed conservation and controlled grazing.

A primary constraint on increasing the productivity of livestock in pastoral systems is the acute shortage of feed during the dry season and the poor quality of what feed is available (Aldington & Wilson, 2010). The feed available from reserved calf pastures *also* loses quality rapidly, making good-quality hay could provide supplementary feed for calves and young small stock during the dry season and ease feed shortages, in particular for poor households (Fuglie, 2013). Chabari (2013) states that an action is required to rehabilitate the degraded areas, including moving *bomas* to other sites and re-aligning stock routes to water points. Short-term protection from grazing would go a long way toward restoring plant cover. Longer periods of protection would be needed because rainfall is lower and vegetation is less resilient. Such protective measures could be enforced by the group-ranch members and should be adopted as part of a general management plan that includes other measures such as reducing the size of rich producers' herds.

## **2.5 Influence of livestock marketing on growth of ranches.**

Kenya's livestock marketing system evolved from a colonial system, designed to safeguard and guarantee European settlers a market free from competition by indigenous Kenyans. By independence, the country inherited a parastatal marketing system that also monopolised the processing of livestock and products (Aldington & Wilson, 2010). Livestock marketing is considered an essential part of livestock production in ranches because increased production is unlikely to be sustained in these areas, unless the product can be traded, thus livestock marketing is the ultimate step in the livestock production process (Milton, 2011). Koger (2012) further states that the key to increased production lies in the motivation of producers through an efficient marketing system. According to Kotler (2009), a marketing channel performs the work of moving goods from producers to consumers, thereby overcoming the time, place and possession gaps that separate goods and services from those who need or want them. Livestock marketing channels are the various processes by which livestock moves from producers to the final consumer through the mediation of marketing intermediaries.

The government role in livestock marketing is important. Where there is a high level of government involvement and control of livestock marketing, there may be fewer marketing options and consequently fewer channels (Grandin, 2009). During the years after colonial rule, the independent Kenyan government was pre-occupied with protecting urban consumers with little regard for rural producers. This took the form of controlling meat prices and putting in place numerous bureaucratic restrictions on livestock marketing, such as the need for movement permits and quarantines. Movement permits had to be issued by the veterinary authority of the originating district to confirm that there was 'no objection' to the animals being moved from one market to another, and movement permit had to specify the number of animals (Evangelou, 2009).



Chabari (2013) further argues that although meat markets were liberalised in the late 1980s leading to fewer market regulations, the livestock marketing opportunities in the area have remained limited for three main reasons; Insecurity restricts the exploitation of rural markets, interferes with flows of livestock from the more distant markets to the regional ones and the flow of money and merchandise in the opposite direction, lack of marketing infrastructure such as operational holding grounds, auction yards and reliable veterinary services impedes trade; and lack of reliable market information makes producers and traders hesitant to enter the marketing system. Gatere & Dow (2012) states that the lack of market information is perhaps the weakest link in beef marketing chain in Kenya. Government policy makers fixed floor prices to producers and wholesale meat prices until February 1987, when Kenya deregulated livestock and meat prices, yet such price-fixing could not have been done effectively in the absence of accurate information on the supply and demand, prices and production and marketing costs. Cronin (2011) time-series data on livestock supply, demand and prices could be collected at various regional livestock markets by the Ministry of Livestock Development at a marginal cost by deploying already existing field staff to collect this information as part of their routine work, example veterinarians who inspect meat at slaughter houses could record data on species, sex and condition of the animals they inspect. They could easily add weight and purchase price to their records and pass on a copy to the Ministry's Marketing Division. Livestock-market information system, hitherto unheeded, should be implemented. The need for this has increased with the deregulation of livestock and meat prices. It is now vital that the Ministry acquire and disseminate the information so that participants in the livestock industry have a guide for their decision-making. Although there is a potential supply of small stock, cattle traders report that it is extremely difficult to purchase enough small stock to be worth trekking long distances to markets and that cattle trading is much more profitable. Trade in small stock is confined to supplying local butchers and itinerant buyers at small trading centers. Small stock off take in the

study area was found to be positively correlated with market accessibility rather than with flock size (Fuglie, 2013).

## **2.6 Influence of research on growth of ranches**

Research increases the set of available technologies; hence agricultural research expenditures are used as a proxy for agricultural technological change (World Bank, 2012). However, the development of technology does not always result in its adoption. In some cases this may be because the technology being developed is not appropriate, that is, it does not meet the needs of agricultural producers. Hence, researchers focus on public expenditure as an explanatory variable in Total factor production growth. Additionally public research has been shown to lead private research (Chavas and Cox, 2009). Several caveats arise in focusing on public research to explain growth in agricultural Total Factor Production. Public research expenditures are used as proxy for research results, yet there is not an exact correspondence between expenditures and technology (ILRI, 2013).

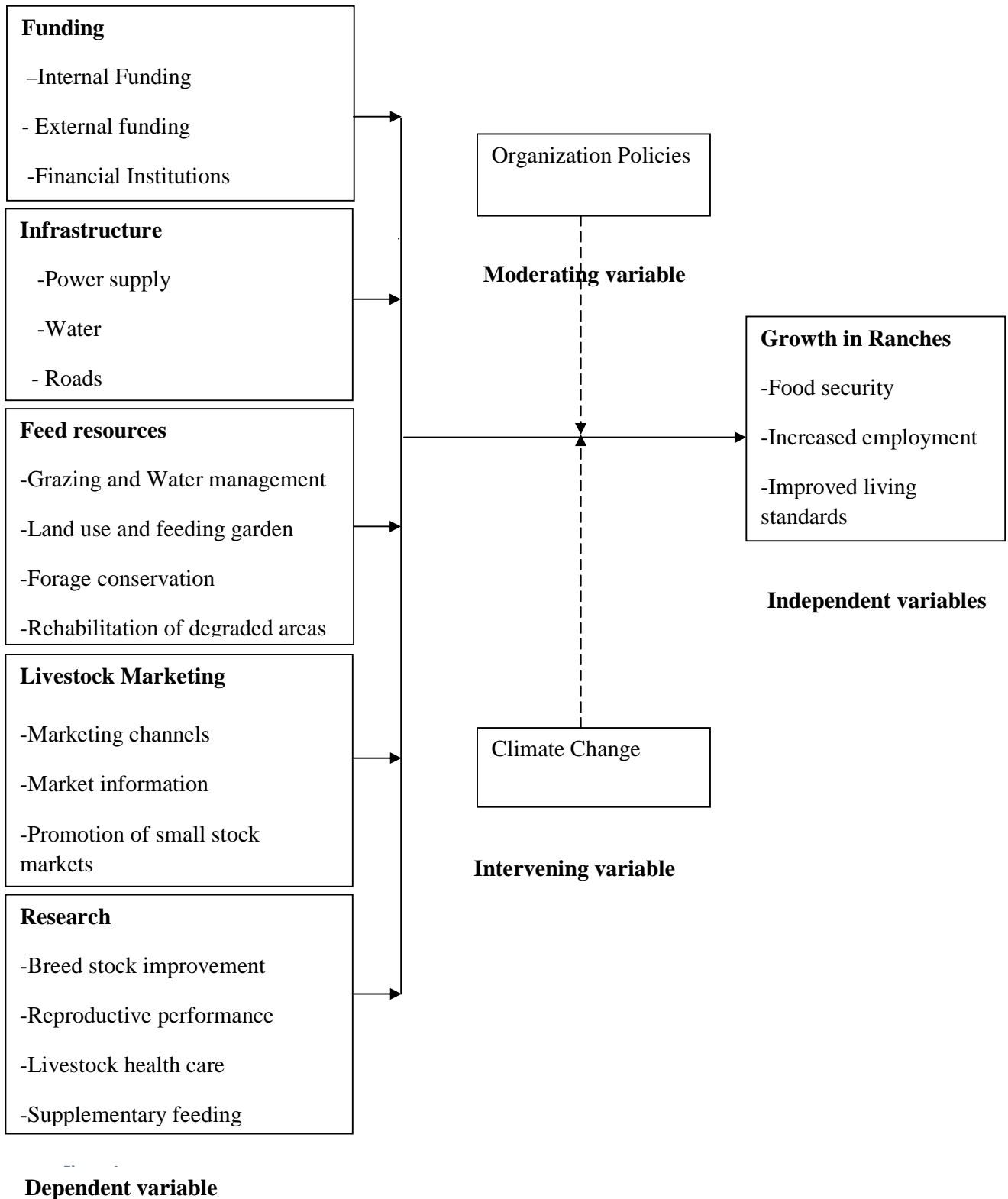
The Kenya Livestock Development Project (KLDP) promoted the use of improved cattle breeds by providing bulls mainly Sahiwal either free or at subsidised prices. However, these crossbreds suffered much higher mortalities than pure local zebus during the long drought of the early 1970s (Behnke, 2013). Crossbreds were less resistant to drought-induced stress and were much more susceptible to tick-borne diseases. In addition, their milk production under ranch conditions was not high enough relative to the local zebu to offset the higher costs of disease control (Meadows, 2012). Breed improvement through the introduction of exotic breeds should be left to the ranchers, who have cattle breeding strategies aimed at maintaining the genetic diversity of their herds (Hopcraft, 2012). The main factor that seemed to influence the reproductive performance of cattle, sheep and goats was nutrition better feeding, especially immediately before the mating period, could substantially increase conception rate and hence birth rate (Okeyo, 2013). Ojango

(2012) states that research on vaccines such as Foot and mouth, Anthrax, lumpy skin and other livestock diseases are needed in order to improve health of livestock.

Examining the feasibility of calf supplementation to minimise mortality in calves and cows during droughts, to increase the amount of milk available for human consumption during the dry season by replacing suckled milk with high-quality supplementary feed (Meadows, 2012). The long-term benefits of calf supplementation during droughts need to be studied using a simulation model. The calf supplementation would have to rely on purchased concentrates. Cost/benefit analysis of feeding sufficient calf pellets (15% digestible protein and 2.5 Mcal of energy; KSh 3/kg) to meet all the calf's protein requirements and half its energy needs indicated a benefit/cost ratio of 2.95 for the low-mortality herd and 1.58 for the medium-mortality herd. These ratios indicate that calf and cow mortalities have to be reduced drastically to make supplementary feeding during drought attractive, in particular in respect of the labour demands of such feeding. During droughts labour demands for watering and grazing, rescuing starving cattle and slaughtering cattle and skinning dead ones are very high, so that extremely high benefit/cost ratios are required to make the extra effort attractive (Grandin, 2009).

## **2.7 Conceptual framework**

The conceptual framework shows determinants for the growth of ranches in Athi River District of Machakos County. Factors form the independent variables whereas growth in ranches is the dependent variable. The various factors exhibited by the conceptual framework include influence funding, infrastructure, feed resources, livestock marketing and research. The different factors that influence growth also affect one another. For example livestock marketing and research is determined by the availability of funds. On the same note, feed resources may be affected by availability of infrastructure. The relationship between the independent variables and dependent variable is affected by two moderating variables namely climate and organization policy.



**Figure 1: Conceptual Framework**

## **2.8 Summary of Literature review**

Growth of ranches as dependent variable and funding, infrastructure, feed resources, livestock marketing and research as independent variables which come into play to effect the growth in ranches. Growth is measured in form of economic growth which is seen in the creation of employment, food security and improved living standards. Funding allows investors to expand their business through access of loaning facilities that both small and large ranches can afford. These can be done through waived or minimal interest rates. With the presence of sufficient funding will allow more innovations and starting up of new enterprises which will improve sustainable growth in ranches.

Infrastructural services: provision of reliable transport system, communication network, provision of clean water, supply of power, housing facilities and environmental management where there is proper disposal of waste matter. Provision of these will reduce cost of production in terms of instant replay of information, movement of goods and services to the customers. The availability of feeds can be increased or feed utilized by improvement of water distribution points and reduced overgrazing, increasing primary production by intensifying land use and conserving forage and balancing the livestock population and available feed resources.

Livestock marketing is considered an essential part of livestock production in ranches because increased production is unlikely to be sustained in these areas unless the product can be traded, thus, livestock marketing is the ultimate step in the livestock production process. Research increases the set of available technologies hence livestock research and development expenditures are used as a proxy for livestock change.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter describes the methodology that was used to carry out the study. This includes the research design, target population, sample size and sample selection, data collection instruments and an explanation of how the instruments were piloted and checked for both reliability and validity, data collection procedures, data analysis techniques, ethical considerations and operationalization table of variables.

#### **3.2 Research Design**

A research design is the conceptual structure within which research is conducted (Kothari, 2007). This study employed a descriptive survey research design since the researcher sought to collect data from respondents from the field. These data helped bring out salient issues on growth of ranches in Athi River District of Machakos County. Descriptive survey was important for this study as information deduced from the collected data was able to describe the existing phenomenon. The major purpose of a descriptive research is description of the state of affairs whereas surveys are concerned with describing, recording, analyzing and interpreting conditions as they exist or existed (Kothari, 2007).

#### **3.3 Target Population**

Target population according to (Borg and Gall, 2003) is all the members of a real or hypothetical set of people, events or objects to which we wish to generalize the results of research. According to David (2012) there are a total of 28 ranches in Athi river district in Machakos County. The target population for this study was 100 respondents consisting of 88 ranch managers working for 28 ranches in Athi River District, 2 livestock officers who work with the ranchers, and 10

provincial administrators selected from the 10 divisions of Athi River District. The table below shows the distribution of ranch managers in various types of ranches.

**Table 3.1: Sample Size**

Type of ranch	Top level	Middle level	Operational
Beef ranch	6	6	7
Dairy ranch	10	9	9
Dual purpose	12	15	14
Total	28	30	30

Source: Machakos Makueni Ranchers Association 2013

### **3.4 Sample Size and Sampling procedure**

This study was a census of 88 ranch managers consisting of 28 top level managers 30 middle level managers and 30 operational managers working in ranches and therefore no attempt was done at sampling the managers. The design is preferred since the target population was small and manageable. According to Mugenda and Mugenda (2003), when the target population is small, taking the whole population would be advisable. Morris & Patel (2008) further states that when the population size is less than 300, the researcher can survey the entire population. Two livestock officers who work with the ranchers, and 10 provincial administrators selected from the 10 divisions of Athi River District were also involved in the study. In this study, the researcher will survey the total population of 100.

### **3.5 Research Instrument**

Questionnaires were used to collect data from managers of ranches and provincial administrators. The questionnaire had six sections and consisted of open-ended and closed ended questions. It sought to collect data on personal background in section one, influence of funding on growth in section two, influence of infrastructure on growth section three, influence of feed resources on growth in section four, influence of livestock marketing on growth in section five

while the last section will be on influence of research on growth of ranches. The questionnaires were the most appropriate tool as it allows the researcher to collect information from diverse background; the findings remain confidential, saves time and since they are presented in paper format and there is no opportunity for bias. Distribution and collection of the questionnaire occurred each on a separate day. It was anticipated that each participant would take about twenty minutes to complete the questionnaire. Managers were encouraged to complete their questionnaire during break/lunch period to avoid encroachment into the regular ranch programmes.

Interview schedule was used to collect data from livestock officers. The interview schedule is important since it enabled the researcher to get in-depth information on growth in ranches. This was a very appropriate because of its flexibility. Its permits issues to be probed and rejoinder questions to be added as the need arises. The researcher ascertained the respondents comfort by being warm and created a suitable environment where the interviewee was able to respond to questions freely. The data was collected and recorded manually. One of the limitations of interview guide was that it required highly skilled interviewers and notes makers. It also required considerable amount of time and energy for information management and review.

### **3.6 Validity of the Instruments**

According to Nachmias and Nachmias (2005), validity is concerned with the question “Am I measuring what I intend to measure.” Mugenda and Mugenda (2003), defines validity as the accuracy and meaningfulness of inferences, which are based on research results. Validity indicates the degree to which an instrument measures what it is supposed to measure (Kothari, 2007). He further says that its determination is purely judgmental and can be done by using a panel of persons who will judge how well the instrument meets the standard. In this study, validity was ensured by having the instrument reviewed by the university supervisor whose



recommendations were to be used to review the instrument. Kasomo (2007) further says that validity applies to how representative of the total defined domain that instrument is and whether it contains adequate traits expected to measure that domain. The study used content validity as a measure of the degree to which data will be obtained from the research instruments. All the five objectives will be included in the research instrument. Simple language was used in the research instrument in order to ensure that the respondents fully understood the content. The researcher followed up the managers via email to clarify any issue of uncertainty.

### 3.7 Reliability of the Instruments

Nachmias and Nachmias (2005) define reliability as the extent to which a measuring instrument contains errors that appear inconsistently from observation to observation, during any one measurement attempt or that vary each time a given unit is measured by the same instrument. A measuring instrument is reliable if it provides consistent results (Kothari, 2007). A pilot study was conducted to check the validity and reliability of the questionnaire and also check for their ethical appropriateness. The instruments were piloted among 10 managers in Laikipia East District and one provincial administrator in the area. Laikipia East District was chosen since the most successful ranches are found in the area. The researcher used the split half method in assessing reliability during piloting of the instrument. In this case, the research instrument were divided into two groups (odd and even) where scores from one group will be correlated with scores from another group. The reliability estimate is then stepped up to the full test length using the spearman-Brown prediction formula.

Predicted reliability,  $\rho_{xx'}^*$  is estimated as:

$$\rho_{xx'}^* = \frac{N\rho_{xx'}}{1 + (N - 1)\rho_{xx'}}$$

Where  $N$  is the number of "tests" combined and  $\rho_{xx'}$  is the reliability of the current "test". The formula predicts the reliability of a new test composed by replicating the current test  $N$  times. A reliability of 1 will be deemed reliable.

### **3.8. Data Collection Procedure**

A research permit to enable the researcher carry out the study was obtained from the office of District commissioner Athi River District. The researcher then visited each of the ranches where the ranch managers were stationed. Permission to conduct the research study before embracing on fieldwork was sought from the ranch proprietors. The researchers administered the research tools after a prior visit that assisted in refining timings of distribution of questionnaires. It provided a rough picture of the respondent's expectations. The researcher then issued the questionnaire to the managers and administrators and then organized with them the date of collecting the completed questionnaire. The study used both open and close ended questions in the questionnaire to collect data, which incorporated qualitative and quantitative data. Questionnaires were the main source of primary data because they provided detailed feedbacks which gave accurate picture for determinant of growth in ranches. An interview schedule was conducted by the researcher with the district veterinary officer and the district vaccination officer who works with the ranchers. The researcher got in-depth information on growth in ranches.

### **3.9 Data Analysis Techniques**

All questionnaires were checked for data quality before data was analyzed. It involved editing of data which ensured that the collected raw data was free from errors and omissions and where detected, corrections were made. Coding was done by assigning numerals to responses for the sake of classification. Classification involved arranging data in groups or classes on the basis of similarities. Tabulation of the data was made using the frequency distribution tables and analysis done using Statistical Package for Social Sciences (SPSS) computer program. Frequencies,

percentages, mean, standard deviation, correlation and regression were used to analyze data from the questionnaires.

### **3.10 Ethical Considerations**

Mugenda (2003) suggests that protecting the rights and welfare of the participants should be the major ethical obligation of all parties involved in a research study. The researcher used to take precautions to ensure non-disclosure of research data to parties that may use such data for their own purposes. All possible measures were taken to ensure that the respondents' names and particulars were not disclosed. A system of coding the participants' responses will be established so that each completed tool can be linked to the managers without using actual names. Participation in research was voluntary and subjects can withdraw if they wish. This was communicated prior to the start of the study. The researcher obtained an informed consent before the study commenced. Research findings were shared out with the participants through meeting.

**Table 3.2: Table of Operationalization variables**

Objective	Variables		Indicators	Measurements	Level of scale	Tool of Analysis
	Independent variable	Dependent variable				
To assess the influence of funding on growth of ranches	Funding	Growth in ranches	Loan from commercial banks	Number of investment projects proposed by managers of ranches	Nominal	Descriptive statistics Mean Percentage Standard deviation Correlation Regression
To investigate the influence of feed resources on growth of ranches	Feed resources	Growth in ranches	Increase of water point in ranches	Number of water points available in each ranch, No of hay bailed to be used during dry season	Nominal Ordinal Interval	Descriptive statistics Percentage Correlation Regression
To establish the influence of infrastructural services growth of ranches	Infrastructural services	Growth in ranches	Supply of power	Number of roads well maintained.	Nominal Ordinal	Descriptive statistics Percentage Correlation Regression
To examine whether livestock marketing influence growth of ranches.	Livestock Marketing	Growth in ranches	Marketing information systems	Number of marketing channels involved.	Nominal Ordinal	Descriptive statistics Percentage Correlation Regression
To establish the influence of research on growth of ranches.	Research	Growth in ranches	Resistance to drugs and vaccines administered	Number of vaccines available for resistance diseases; Number of research project successful.	Nominal Ordinal	Descriptive statistics Percentage Correlation Regression

## CHAPTER FOUR

### DATA ANALYSIS, PRESENTATION AND INTERPRETATION

#### 4.1 Introduction

This chapter presents data analysis on the determinants for the growth of ranches in Athi River District of Machakos County. Data collected was analyzed using frequencies, percentages, mean standard deviation, correlation and regression.

#### 4.2 Nature and Characteristics of Respondents

The total population targeted by the study was 100 respondents. Out of these respondents, 2 were Livestock officers who responded by use of an interview schedule while 88 were ranch managers and 10 were Provincial administrators working in Athi River District. However, 73 out of 88 Ranch Managers filled in and returned the questionnaire contributing to 82.9% response rate. The 15 managers (17.1%) questionnaires that were not returned were due to rationale like; the respondents were not accessible to fill them in time. Provincial Administrators were more readily available to fill the questionnaire than Ranch Managers; this is indicated by 100% response rate as shown in Table 4.1. The follow up was done through emails and telephone messages offer an explanation for the good response rate obtained. This conformed to Mugenda and Mugenda (2003) who recommends that for simplification a response rate of 50% is sufficient for scrutiny and exposure, 60% is good and a response rate of 70% and over is excellent.

**Table 4.1: Survey response rate**

Questionnaire Type	N	%
Managers	73	82.9
Administrators	10	100

Source: Field data, 2013.

**Table 4.2: Respondents by gender**

The study sought to investigate the distribution of gender on types of ranches. The distribution of gender in different types of ranches is illustrated in the table below.

Gender	Beef		Dairy		Dual purpose		Total	
	N	%	n	%	N	%	N	%
Male	14	19.2	24	32.9	25	34.2	63	86.3
Female	1	1.4	2	2.7	7	9.6	10	13.7
Total	15	20.5	26	35.6	32	43.8	73	100

Table 4.2 shows gender distribution among the respondents who took part in the survey. 86.3% were male while their female counterparts were 13.7%. The findings suggest a gender imparity between the two sexes which can be attributed purely to more men working for ranches than women.

**Table 4.3: Respondents by age group**

The managers were further asked to state their ages, and this was categorized into five age sets in the intervals between less than 25years, 25-30 years, 31-40 years, 41-45 years, and above 45.

The age distribution of the study managers is illustrated in table below.

Age	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	N	%
< 25 years	1	1.4	3	4.1	4	5.5	8	11.0
25 – 30 years	5	6.8	9	12.3	5	6.8	19	26.0
31 – 40 years	4	5.5	5	6.8	10	13.7	19	26.0
41 – 45 years	2	2.7	5	6.8	7	9.6	14	19.2
>45 years	3	4.1	4	5.5	6	8.2	13	17.8
Total	15	20.5	26	35.6	32	43.8	73	100

In terms of ages of ranch managers the study found out that 26% were aged between 25-30 years and 31-40 years, 19.2% were aged between 41-45 years, 17.8% were above 45 years while the

minorities were aged below 25 years of age and this is shown in table 4.3.

**Table 4.4: Respondents by working experience**

The managers were further asked to state their years of experience, and this was categorized into four classes in the interval between less than one year, 1-10 years, 11-20 years, and greater than 20 years. The experience distribution of the study is illustrated in the table below.

Experience	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	N	%
< 1 year	2	2.7	1	1.4	6	8.2	9	12.3
1 – 10 years	7	9.6	17	23.3	17	23.3	41	56.2
11 – 20 years	4	5.5	6	8.2	5	6.8	15	20.5
>20 years	2	2.7	2	2.7	4	5.5	8	11.0
Total	15	20.5	26	35.6	32	43.8	73	100

The study revealed that 56.2% of the managers had experience ranging between 1-10 years, 20.5% served 11-20 years, 12.3% less than one year while 11% had served more than 20 years.

**Table 4.5: Academic qualification for managers**

The managers were further asked to state their academic qualification and this was categorized in six classes; primary, secondary, diploma, bachelor's degree, post graduate diploma and masters' degree. The academic qualification for managers is illustrated in the table below.

Education	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	N	%
Primary	1	1.4	4	5.5	3	4.1	8	11.0
Secondary	7	9.6	12	16.4	12	16.4	31	42.5
Diploma	4	5.5	9	12.3	12	16.4	25	34.2
Bachelor degree	3	4.1	1	1.4	2	2.7	6	8.2
Postgraduate diploma	-	-	-	-	1	1.4	1	1.4
Master degree	-	-	-	-	2	2.7	2	2.7
Total	15	20.5	26	35.6	32	43.8	73	100

The academic qualification of the manager indicates that the majority of them had Secondary qualification (42.5%); 34.2% had Diploma qualification, while 12.3% had University qualification and finally 11% had Primary qualification.

**Table 4.6: Demographic profile of the Administrators' sample**

The provincial administrators in the study were asked to state their gender, age, working experience, academic qualification, their position and area of administration. Their response is illustrated below.

<b>Factors</b>	<b>Descriptors</b>	<b>N</b>	<b>%</b>
Gender	Female	3	30.0
	Male	7	70.0
Age	25 - 30 years	1	10.0
	31 - 40 years	1	10.0
	41 - 45 years	5	50.0
	>45 years	3	30.0
Experience	1 - 10 years	5	50.0
	11 - 20 years	3	30.0
	>20 years	2	20.0
Education	Secondary	1	10.0
	Diploma	6	60.0
	Bachelors' degree	3	30.0
Position	District Officer	9	90.0
	Chief	1	10.0
Area of Administration	Division	9	90.0
	Location	1	10.0

There were 10 Administrators who were surveyed. Male administrators were 70% and female were 30%. Most administrators were at the age between 41-45years while the rest were greater than 45years of age and the least being those at the age between 25-30years and 31-40 years were both 10%. Their administrative experience was from 1-10years giving 50.0% followed by



11-20 years with 30% and finally greater than 20 years having 20%. Most administrators 60% had diploma qualification, 30% with a bachelor's degree and 10% with secondary qualification. Out of 10 administrators interviewed 90% were district officers in charge of division and 1 chief.

### 4.3 Determinants for the growth of ranches in Athi River District Machakos County

The rest of the chapter will address variables that affect growth of ranches in Athi River District Machakos County.

#### 4.3.1 Influence of funding on growth of ranches

The study sought to assess the influence of funding on growth of ranches in Athi River District. This included yearly income, major financiers, government funding of ranches, rate of acquiring loans and the extent funding influences growth of ranches.

#### Table 4.7: Yearly income

The managers were asked to state their yearly income and this was categorized into four classes; less than 1,000,000, 1, 000, 0000-5,000,000, 5,000,000-10,000,000 and greater than 10,000,000.

The table below illustrates their response.

Income	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	N	%
<1,000,000	5	6.8	11	15.1	9	12.3	25	34.2
1,000,000 – 5,000,000	7	9.6	8	11.0	10	13.7	25	34.2
5,000,001 – 10,000,000	1	1.4	3	4.1	5	6.8	9	12.3
>10,000,001	2	2.7	4	5.6	8	11.0	14	19.2
Total	15	20.5	26	35.6	32	43.8	73	100

To characterize the top yearly income bracket more specifically, 34.28% (n =25) of the respondents reported earning less than Ksh1, 000,000 per year, while 34.2% (n =25) of the survey sample indicated that they earned between Ksh1, 000,000 and Ksh5, 000,000 per year. The remaining 19.2% of respondents (n =14) reported earning more than Ksh10, 000,000 per

year and only 12.3% of respondents (n=9) reported earning between Ksh5, 000,001 and Ksh10, 000,000 per year.

**Table 4.8: Major financier**

The managers were further asked to state their major financiers, and this was categorized in the following groups; government, donors, partners, proprietors, fundraising and commercial banks. The table below illustrates their response.

Funding	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	N	%
Government	1	1.4	2	2.7	1	1.4	4	5.5
Donors	3	4.1	3	4.1	4	5.5	10	13.7
Partners	7	9.6	11	15.1	11	15.1	29	38.7
Proprietors	4	5.5	8	11.0	13	17.8	25	34.2
Fundraising	-	-	1	1.4	1	1.4	2	2.7
Commercial banks	-	-	1	1.4	2	2.7	3	4.1
Total	15	20.5	26	35.6	32	43.8	73	100

The managers indicated that their major financier of ranches. 38.7% indicated that the source of funding was partners, 34.2% was proprietors, and 13.7% was donors, 5.5% government, 4.1% commercial banks and less than 3% through fundraising.

**Table 4.9: Acquiring loans in Agricultural sector**

The managers were asked whether they had access to loaning facility in the agriculture sector. Their response is indicated in the table below.

Loaning Facilities	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	n	%
No	14	19.2	22	30.1	22	30.1	58	79.5
Yes	1	1.4	4	5.5	10	13.7	15	20.5
Total	15	20.5	26	35.6	32	43.8	73	100

The managers were also required to indicate yes or no on whether they had access to loaning facilities in the Agricultural sector. The entire ranch managers (79.5%) responded by indicating no, and only 20.5% responded that they accessed loan facilities.

**Table 4.10: Government funding ranches from Administrators**

The provincial administrators were asked whether government funds ranches in their area of jurisdiction. Their response is indicated in the table below.

Loaning Facilities	N	%
No	8	80
Yes	2	20
Total	10	100

The administrators were also required to indicate yes or no on whether government funds ranches in their area. The entire administrators (80%) responded by indicating no, and only 20% responded that government funds ranchers.

**Table 4.11: Rate of acquiring loans**

The managers of the ranchers that acquire loan facilities were asked the rates at which they acquire loans. Their response is illustrated in the table below.

Loaning Rate	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	n	%	N	%	N	%
18.5%					2	2.7	2	2.7
19.5%			1	1.4	1	1.4	2	2.7
20.0%					2	2.7	2	2.7
20.5%					1	1.4	1	1.4
22.5%	1	1.4	2	2.7	2	2.7	5	6.8
25.0%			1	1.4	2	2.7	3	4.1
Total	1	1.4	4	5.5	10	13.6	15	20.4

Examining the minimum, maximum, and range of the data may provide additional useful information. The minimum in this example is 18.5% and the maximum is 25%, so the range is 6.5; this is only 2.285 standard deviations with a mean of 21.6%.

**Table 4.12: Extent funding influences growth in ranches**

The managers were asked the extent in which funding influences growth of ranches, and this was categorized in five classes large, average, low, very low and no influence. The table below illustrates the response of managers.

Funding	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	n	%
Large	4	5.5	4	5.5	4	5.5	12	16.4
Average	8	11.0	13	17.8	24	32.9	45	61.6
Low	-	-	5	6.8	2	2.7	7	9.6
Very low	3	4.1	1	1.4	2	2.7	6	8.2
No influence	-	-	3	4.1	-	-	3	4.1
Total	15	20.5	26	35.6	32	43.8	73	100

Table 4.12 first, 61.6% of the respondent indicated that funding average influences growth, 16.4% influences to large extent while 9.6% influences to a low extent; 8.2% reported very low extent and 4.1% indicated no influence.

#### **4.3.2. Influence of Infrastructure on growth of ranches**

The study sought to establish the influence of infrastructural services on growth of ranches in Athi River District. The analysis was done based on sources of energy in ranches, types of roads, state of roads, how transport system affect performance of ranches and finally the extent infrastructure influence growth of ranches.

**Table 4.13: Sources of energy in ranches**

The survey further targeted managers on the different sources of energy they use in their ranches.

The sources of energy were classified into four classes namely; electric power, solar energy, generator, and fuel. Their response is indicated in the table below.

Source of energy	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	n	%
Electric power	1	1.4	2	2.7	5	6.8	8	11.0
Solar energy	6	8.2	14	19.2	12	16.4	32	43.8
Generator	3	4.1	2	2.7	3	4.1	8	11.0
Fuel, firewood	5	6.8	8	11.0	12	16.4	25	34.2
Total	15	20.5	26	35.6	32	43.8	73	100

In Table 4.13 the respondents were required to indicate sources of energy in the ranch. It was found that 43.8% of the respondents use solar energy; on the other hand, 34.2% indicated that they often use fuel, firewood while only 11% indicated that they equally use electric power and generator as source of energy.

**Table 4.14: Roads leading to business premises**

The managers were further asked to state the type of roads leading to their ranches. Their response is illustrated in the table below.

Roads	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	n	%
Tarmac	5	6.8	11	15.1	8	11.0	24	32.9
Murram	-	-	1	1.4	2	2.7	3	4.1
Muddy	10	13.7	14	19.2	22	30.1	46	63.0
Total	15	20.5	26	35.6	32	43.8	73	100

Tables 4.14 shows roads were leading business premises 63% indicated it was muddy roads whereas 32.9% indicated it was tarmac and 4.1% indicated murram road.

**Table 4.15: Types of roads found responses from Administrators**

The administrators were further asked to state the type of roads leading to their ranches. Their response is illustrated in the table below.

Roads	N	%
Tarmac	2	20%
Murram	3	30%
Muddy	5	50%
Total	10	100

Table 4.15 indicates that 50% of the roads are muddy, 30% are murram and 20% are tarmac.

**Table 4.16: State of roads leading to business premises**

The managers were further asked to state the state of roads leading to their ranches. Their response is illustrated in the table below.

Roads	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	n	%
Well maintained	4	5.5	11	15.1	9	12.3	24	32.9
Maintained	2	2.7	6	8.2	10	13.7	18	24.7
Poorly maintained	9	12.3	9	12.3	13	17.8	31	42.5
Total	15	20.5	26	35.6	32	43.8	73	100

While Table 4.16 shows the status of roads leading to business premises, 42.5% (n=31) of the respondents reported poorly maintained whilst 32.9% (n=24) indicated well maintained and only 24.7% (n=18) maintained.

**Table 4.17: State of roads found responses from Administrators**

The administrators were further asked to state the status of roads leading to their ranches. Their response is illustrated in the table below.

Roads	Total	
	N	%
Well maintained	3	30
Maintained	3	30
Poorly maintained	4	40
Total	10	100

While Table 4.17 shows that 40% (n=4) of the respondents reported poorly maintained whilst 30% (n=3) indicated well maintained and 30% (n=3) maintained.

**Table 4.18: Transport system affecting firm performance**

The managers were asked whether transport system affects the performance of their ranches. Their response is indicates in the table below.

Response	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	n	%
Yes	11	15.1	17	23.3	23	31.5	51	69.9
No	4	5.5	9	12.3	9	12.3	22	30.1
Total	15	20.5	26	35.6	32	43.8	73	100

Finally Table 4.18, 70% (n=51) indicated that transport system affects firm performance and 30% (n=22) indicated no. This suggests that management have the responsibility of maintaining roads leading to the ranches.

**Table 4.19: Extent Infrastructure influences growth of ranches**

The managers were asked the extent in which Infrastructure influences growth of ranches, and this was categorized in five classes' large, average, low, very low and no influence. The table below illustrates the response of managers.

Livestock marketing	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	n	%
Large	5	6.8	5	6.8	5	6.8	15	20.5
Average	5	6.8	12	16.4	16	22	33	45.2
Low	2	2.8	5	6.9	6	8.2	13	17.9
Very low	2	2.7	2	2.7	2	2.7	6	8.2
No influence	2	2.7	2	2.7	2	2.7	6	8.2
<b>Total</b>	<b>16</b>	<b>21.9</b>	<b>26</b>	<b>35.6</b>	<b>31</b>	<b>42.5</b>	<b>73</b>	<b>100</b>

In Table 4.19, 45.2% of the respondent indicated that Infrastructure average influences investment growth, 20.5% influences to large extent while 17.9% influences to a low extent, 8.2% very low and 8.2% reported no influence.

#### 4.4.3 Influence of feed resources on growth of ranches

The study was designed to investigate the influence of feed resources on growth of ranches in Athi River District. This focused on water source for livestock, distance of water point, availability of feed garden in ranches and the extent feed resources influence growth in ranches.

#### Table 4.20: Water source for livestock

The managers were asked to state different sources of water in their ranches. Their response is indicated in the table below.

Water source	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	n	%
Boreholes	6	8.2	15	20.5	20	27.4	41	56.2
Dams	8	11.0	11	15.1	9	12.3	28	38.4
Springs	-	-	-	-	1	1.4	1	1.4
Pipe water	1	1.4	-	-	2	2.7	3	4.1
<b>Total</b>	<b>15</b>	<b>20.5</b>	<b>26</b>	<b>35.6</b>	<b>32</b>	<b>43.8</b>	<b>73</b>	<b>100</b>

Table 4.20 indicate that 56.2% use borehole as source of water, 38.4% use dams, 4.1% use piped water and only 1.4% use springs.



**Table 4.21: Distance to water point**

The managers were asked to state distance between watering points in their ranches. Their response is indicated in the table below.

Distance (km)	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	n	%
0 – 5 km	8	11.0	15	20.5	18	24.7	41	56.2
6 – 10 km	4	5.5	8	11.0	12	16.4	24	32.9
11 – 15 km	1	1.4	3	4.1	2	2.7	6	8.2
16 – 20 km	2	2.7	-	-	-	-	2	2.7
Total	15	20.5	26	35.6	32	43.8	73	100

Table 4.21 indicate that the distance between most watering point is 0-5Kms indicated by 56.2%, 32.9% indicated between 6-10Kms, 8.2% indicated 8.2Kms and only 2.7% indicated 16-20Kms.

**Table 4.22: Feed gardens in the ranch**

The managers were asked whether their ranches have feed gardens. Their response is illustrated in the table below.

Feed gardens	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	n	%
Yes	1	1.4	2	2.9	1	1.4	4	5.5
No	13	18.6	22	3.4	34	44.3	69	94.5
Total	14	20.0	24	34.3	32	45.7	73	100

Table 4.22 indicates that 94.5% of the ranches have no feed gardens; only 5.5% have feed gardens.

**Table 4.23: Extent Feed resource influences growth in the ranch**

The managers were asked the extent in which Feed resources influences growth of ranches, and this was categorized in five classes large, average, low, and very low and no influence. The table below illustrates the response of managers.

Feed resource	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	n	%
Large	2	2.8	11	15.3	8	11.1	21	28.8
Average	11	15.3	9	12.5	16	22.2	36	49.3
Low	2	2.8	1	1.4	3	4.2	6	8.2
Very low	-	-	2	2.8	4	5.6	6	8.2
No influence	-	-	2	2.8	2	1.4	4	5.5
Total	15	20.5	25	34.7	33	44.4	73	100

In Table 4.23, 49.3% of the respondent indicated that feed resource average influences growth, 28.8% influences to large extent while 8.2% both influences to a low extent and very low; 5.5% reported no influence.

#### **4.3.4 Influence of livestock marketing on growth of ranches**

The study was designed to examine the influence of livestock marketing on growth of ranches in Athi River District. This included availability of marketing departments in ranches, main customers, availability of marketing channels, pricing methods, availability of promotional and the extent livestock marketing influences growth in ranches.

**Table 4.24: Marketing departments in the ranch**

The managers were asked whether they have marketing departments in their ranches. The table below illustrates their responses.

Marketing departments	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	n	%
Yes	7	9.7	11	15.3	10	13.9	28	28.4
No	8	11.1	14	19.4	23	30.6	45	61.6
Total	15	20.8	25	34.7	33	44.4	73	100

Table 4.24, 61.6% of the responses indicated that ranches have no marketing department, only 28.4% have marketing departments

**Table 4.25: Main customers in the ranch**

The managers who participated in the study were asked their main customers, and this was categorized into five classes; butchers, farmers, supermarkets, Kenya Meat Commissioner and other ranches. The table below illustrates their responses.

Customer	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	n	%
Butchers	11	15.5	19	26.8	15	21.1	45	61.6
Farmers	1	1.4	2	2.8	10	14.1	13	17.8
Supermarkets	1	1.4	2	2.8	-	-	3	4.1
Kenya Meat Commission	1	1.4	2	2.8	4	5.6	7	9.6
Other ranches	1	1.4	0	2.8	4	2.8	5	6.9
Total	15	21.1	25	35.2	33	43.7	73	100

Table 4.25, 61.6% of the response indicates butchers are the main customers, 17.8% farmers, 9.6% KMC, 6.9% other ranches and only 4.1% for supermarkets.

**Table 4.26: Marketing channels in the ranch**

The managers who participated in the study were asked whether they have marketing channels in their ranches. The table below illustrates their responses.

Marketing channels	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	n	%
Yes	6	8.3	12	16.7	7	9.7	25	34.2
No	9	12.5	14	19.4	25	33.3	48	65.8
Total	15	20.8	26	36.1	32	43.1	73	100

Table 4.26 65.8% of the response indicate availability of marketing channels while 34.2% have no marketing channels.

**Table 4.27: Pricing methods in the ranch**

The managers were asked whether they have pricing methods in their ranches. The table below illustrates their responses.

Pricing methods	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	n	%
Yes	11	15.3	23	31.9	21	29.2	55	75.3
No	3	4.2	3	4.2	12	15.3	18	24.7
Total	14	19.4	26	36.1	33	44.4	73	100

Table 4.27 75.3% of the response indicate presence of pricing methods while 24.7% have no pricing methods.

**Table 4.28: Promotion services to customers**

The managers were asked whether they provide promotion services to their customers. The table below illustrates their responses.

Promotion services	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	N	%
Yes	8	11.1	10	13.9	7	9.7	25	34.2
No	6	8.3	16	22.2	26	34.7	48	65.8
Total	14	19.4	26	36.1	33	44.4	73	100

Table 4.28 65.8 % of the response indicate that no promotion services offered while 34.2% offer promotional services.

**Table 4.29: Extent Livestock marketing influences growth in the ranch**

The managers were asked the extent in which Marketing influences growth of ranches, and this was categorized in five classes’ large, average, low, very low and no influence. The table below illustrates the response of managers.

Livestock marketing	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	n	%
Large	4	5.8	7	10.1	4	5.8	15	20.5
Average	6	8.7	6	8.7	12	17.4	24	32.9
Low	3	4.3	9	13.0	8	11.6	20	27.4
Very low	2	2.9	2	2.9	4	5.8	8	11.0
No influence	-	-	1	1.4	5	1.4	6	8.2
Total	15	21.7	25	36.2	33	44.4	73	100

In Table 4.29, 32.9% of the respondent indicated that marketing on average influences growth, 27.4% influences is low while 20.5% both influences to a large extent and 11% very low; 8.2% reported no influence.

**4.3.5 Influence of research on growth of ranches**

The study sought to establish the influence of research on growth of ranches in Athi River District. The main focus of analysis was presence of research department, qualified veterinarian, supplementary feeding of calves and extent research influences growth in the ranches.

**Table 4.30: Presence of research departments in ranches**

The managers were asked whether they have research departments in their ranches. The table below illustrates their responses.

Research department	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	N	%
Yes	6	8.2	8	11.0	16	21.9	30	41.1
No	9	12.3	18	24.7	16	21.9	43	58.9
Total	15	20.5	26	35.6	32	43.8	73	100

Table 4.30, 58.9 % of the responses indicated that ranches have no research department, only 41.1% have research departments.

**Table 4.31: Information on research on how to improve reproductive performance**

The managers were asked whether they undertake research on how to improve reproductive performance. Their response is illustrated in the table below.

Undertake research	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	N	%
Yes	7	9.7	8	11.1	14	19.4	29	39.7
No	8	11.1	17	23.6	19	25.0	44	60.3
Total	15	20.8	25	34.7	33	44.4	73	100

Table 4.31, 60.3% of the responses indicated that they do not research is undertaken to improve reproductive performance while only 39.7% undertake research.

**Table 4.32: Qualified veterinarian in ranches**

The managers were asked if they have qualified veterinarian in their ranches. Their response is illustrated in the table below.

	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	N	%
Qualified veterinarian								
Yes	9	12.3	8	11.0	10	13.7	27	37.0
No	6	8.2	18	24.7	22	30.1	46	63.0
Total	15	20.5	26	35.6	32	43.8	72	100

Table 4.32 indicates that 63% of ranches have no qualified veterinarian compared to 27% who have qualified veterinarian.

**Table 4.33: Supplementary feeding of calves in ranches**

The managers were asked whether they provide supplementary feeding for their calves. The table below illustrates their response.

	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	N	%
Supplementary feeding								
Yes	5	6.9	2	2.8	4	5.6	11	15.1
No	9	12.5	24	33.3	29	38.9	62	84.9
Total	14	19.4	26	36.1	33	44.4	73	100

Table 4.33 indicates that 84.9% of the responses indicate that ranches do not provide supplementary feeding for calves while 15.1% provide supplementary feeds.

**Table 4.34: Managers - Information from Government research institute (GRI)**

The managers were asked whether ranches ranchers do receive information from government research Institutes. The table below illustrates their response.

	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	N	%
Information from GRI								
Yes	8	11.3	9	12.7	10	14.1	27	37.0
No	6	8.5	17	23.9	23	29.6	46	63.0
Total	14	19.7	26	36.6	33	43.7	73	100

Table 4.34 indicates that 63% of the responses indicate that ranches do not receive information from government research institutes while 37% receive information.

**Table 4.35: Administrators - Information from Government research institute**

The administrators were asked whether ranches ranchers do receive information from government research Institutes. The table below illustrates their response.

Information from GRI	Total	
	N	%
Yes	4	40.0
No	6	60.0
Total	10	100

Table 4.35 indicates that 60% of the responses indicate that ranches do not receive information from government research institutes while 40% receive information.

**Table 4.36: Extent Research influences growth in the ranches**

The managers were asked the extent in which Research influences growth of ranches, and this was categorized in five classes' large, average, low, very low and no influence. The table below illustrates the response of managers.

	Beef ranch		Dairy ranch		Dual purpose		Total	
	N	%	N	%	N	%	N	%
Large	2	2.8	5	7.0	3	4.2	10	13.7
Average	8	11.3	11	15.5	13	18.3	32	43.8
Low	-	-	2	2.8	4	5.6	6	8.2
Very low	2	2.8	5	7.0	7	9.9	14	19.2
No influence	2	2.8	3	4.2	4	5.6	11	15.0
Total	14	19.7	26	36.6	31	43.7	73	100

In Table 4.36, 43.8% of the respondent indicated that research on average influences growth, 19.2% influences to very low while 15% influences no influence, 13.7% large extent and 8.2% low.



**Table 4.37: Correlation matrix for independent variables**

Correlation analysis was done to establish relationship of variables in the study. The table below illustrates the relationship between different variables and levels of significant.

		<b>Funding</b>	<b>Infrastructure</b>	<b>Feeds</b>	<b>Marketing</b>	<b>Research</b>
<b>Funding</b>	Pearson Correlation	1	.819**	.427**	.427**	.439**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	73	73	73	73	73
<b>Infrastructure</b>	Pearson Correlation	.819**	1	.475**	.647**	.472**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	73	73	73	73	73
<b>Feeds</b>	Pearson Correlation	.427**	.475**	1	.331**	.170*
	Sig. (2-tailed)	.000	.000		.000	.000
	N	73	73	73	73	73
<b>Marketing</b>	Pearson Correlation	.710**	.647**	.331**	1	.377**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	73	73	73	73	73
<b>Research</b>	Pearson Correlation	.439**	.471**	.170*	.377**	1
	Sig. (2-tailed)	.000	.001	.002	.011	
	N	73	73	73	73	73

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

Table 4.37, demonstrates the correlation matrix of the funding, infrastructure, feed resources, livestock marketing and research. The analysis shows that there is positive significant and strong correlation exists between these variables at 0.01 and 0.05 levels.

The research study used multiple regression analysis in order to analyze impact of independent variable on dependent variable. The multiple regression models are as under:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon \dots \dots \dots (1)$$

Where **Y** is growth of ranches (dependent variable)

**α** is constant

**X** is other factors affecting growth **β** is the regression coefficient which may be positively or negatively affecting dependent and independent variables.

$$\mathbf{GR} = \alpha + \beta_1\mathbf{F} + \beta_2\mathbf{I} + \beta_3\mathbf{FR} + \beta_4\mathbf{LM} + \varepsilon \dots \dots \dots (2)$$

Where **GR**=Growth of ranches (dependent variable) **β1F**= Funding (Independent Variable) **β2** Infrastructures (Independent Variable), **β3** Feed resources (Independent Variable) **β4R**=Research (Independent Variable).

**Table 4.38: ANOVA table for independent variables**

ANOVA <sup>b</sup>					
Model	Sum of squares	Degree of freedom	Mean square	F	Sig
Regression	257.950	4	64.488	120.140	.000 <sup>a</sup>
Residual	104.670	60	.537		
Total	362.62	72			

a. Predictors (constants) Funding, Infrastructures, Feed resources, Livestock marketing and Research.

b. Dependent variable: Growth of ranches

The F value is 120.140 and is significant because the significance level is .000 which is less than  $P \leq 0.05$ . This implies that over all regression models is statistically significant, valid and fit. The valid regression model implies that all independent variables are explaining that all independent variables are explaining that there is a positive and significant relationship with dependent variable.

**Table 4.39: Regression model summary**

Model	R	R Square	Adjusted R Square	Std Error of the Estimate
1	.843 <sup>a</sup>	.711	.705	.73264

a. Predictors (constants) Funding, Infrastructures, Feed resources, Livestock marketing and Research.

Regression coefficient 'R' = .843 or 84.3% relationship exist between independent variable and dependent variable. The coefficient of determination  $R^2=0.711$  which shows that 71.1% of variation in ranch growth is explained by Funding, Infrastructures, Feed resources, Livestock marketing and Research. The rest 28.9% is explained by other factors not in the study.

**Table 4.40: Table summary of coefficient for independent variable**

Model	Unstandardized coefficient		Standardized Coefficients	T	Sig
	B	Std Error			
1. (Constant)	-.174	.201		-.866	.387
Funding	.615	.059	.620	10.494	.000
Infrastructure	.174	.049	.152	3.568	.000
Feed resources	.149	.048	.131	3.095	.002
Marketing	.111	.057	.107	1.941	.005
Research	.121	.064	.129	.0987	.000

In the above table the regression coefficient for funding of ranches  $\beta_1=.620$  which implies that one percentage increase in funding increases 62% growth of ranches if other variables are kept controlled. The T value is 10.494 which are significant at .000 because significant level is less than  $P \leq .05$ . It implies that the alternative hypothesis should be accepted that is: Infrastructure has significant positive effect on growth of ranches. The regression coefficient ( $\beta_2$ ) = .152% or 15.2% which implies that one percentage increase in infrastructure on average 15.2% increase in growth of ranches if other variables are controlled. The T value is 3.568 which are significant at .000 levels which is less than the  $P \leq .05$ . It implies that the alternate hypothesis should be accepted that is: Infrastructure has positive significant effect on growth of ranches. The regression coefficient for feed resources ( $\beta_3$ ) = .131 or 13.1 % which means that once percent increase in feed resources increase 13.1% in growth of ranches if other variables are kept constant. The T value is 3.095 which are significant at .002. So research study accepted the

alternative hypothesis that is feed resources has significant positive effect on growth of ranches. The regression coefficient for livestock marketing ( $\beta_4$ ) = .107 or 10.7 % which means that once percent increase in livestock marketing increases 10.7% in growth of ranches if other variables are kept constant. The T value is 1.941 which is significant at .05 levels. So again alternative hypothesis should be accepted that is: livestock marketing has significant positive effect on growth of ranches. The regression coefficient for research ( $\beta_5$ ) = .129 or 12.9 % which means that one percent increase in research increases 12.9% in growth of ranches if other variables are kept constant. The T value is 0.987 which is significant at .000 levels. So again alternative hypothesis should be accepted that is: research has significant positive effect on growth of ranches.

#### **4.3.5 Interview schedule response**

The two staff from Livestock department of Athi River District responded well to the interview. Both have worked in the department for more than 6 years. The response rate was 100%. According to District Veterinary officer, mostly the government support financially the government owned ranches. But they support the ranchers with information such as best breeds to keep, cases of outbreak of diseases and provision of no objection and movement permits incase ranchers want to purchase or sell their animals to other districts. The departments also provide training services to veterinarians working in ranches to ensure proper diagnosis of diseases. The government also through the department of livestock provides ranchers with information on the best time to breed their animals such that they can lamb or calve during wet seasons. Information on when to bail hay is also provided to the ranches.

Regarding the factors influencing growth of ranches, the District vaccination officer said that government should come up with measures to subsidize the vaccines and make them easily available to the ranchers. Infrastructure services such as roads should be maintained and government should control land usage patterns since most of the land that was initially used for livestock keeping has been encroached. Extension services should be provided to ranchers such that they are aware of best breeding practices. A network between the government and ranchers should be established to unify the prices of livestock product to avoid exploitation by middlemen.

**CHAPTER FIVE**  
**SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND**  
**RECOMMENDATIONS**

**5.1 Introduction**

This study was conducted to establish the determinants for the growth of ranches in Athi River District Machakos County in Kenya. This chapter provides information on summary of findings, discussion, conclusions, suggestions for further research and the recommendations of the study

**5.2 Summary of Findings**

The findings on determinants for the growth of ranches were numerous and are shown in the following sections.

**5.2.1 Influence of funding on growth of ranches**

The study has noted that annual income for 68.4% of the ranches is below five million which has inhibited the expansion of ranchers. Ranchers are mostly financed by partners 38.7% the rest is through proprietors, donors, government, fundraising and commercial banks. The study also noted that 79.5% of the ranches have no access to loan facilities in the agriculture this has limited growth of ranches since funds are required to finance most of the ranch projects. The same response was received from 80% of administrators who affirmed that ranches do not receive funding from the government. Those that acquire loan 20.5% suffer from high interest rates ranging from 18.5 % to 25% they also complain of short term payment period for the loans. The study also noted that 61.6% of the managers indicate that funding on average influences growth of ranches. The study also indicates that there is positive significant and strong correlation between funding and growth of ranches.

### **5.2.2 Influence of infrastructure on growth of ranches**

The study noted that poor infrastructure services inhibit growth in ranches. This is characterized by unconditioned roads, absence of reliable water services and reliable energy source. Study findings have revealed that 43.8% of ranches use solar as the main source of energy and 34.2% use fuel and wood. The initial startup cost for solar is quite high while the cost of running the generator is high especially with the current fluctuation of fuel. This has influenced negatively on the growth of ranches since power being a basic necessity in performing multi-task with low cost of maintenance. Further studies on the condition of infrastructure have revealed that most of the roads constantly used by ranchers in the day to day activities are not well maintained. About 63% of the roads used, as indicated by respondents are muddy and impassable especially during rainy season.

Ranchers experience problems during rainy season as they ferry animal feeds and cattle minerals to different animal stations within their ranch hence increases the cost of transportation and time spent. This has negatively affected monthly profit earned. The same response came from administrators 40% who affirmed that the roads were poorly maintained and this could be as a result of inadequate allocation of funds for repair and maintenance of roads. Water resources are vital components in the growth of ranches. The study has revealed that water is a very important component in livestock, animals need water for survival. The study reveals that most of the ranches 56.2% use borehole with 52.6% indicate that this source of water is not reliable especially during dry season when water levels in boreholes goes down. The study also indicates that there is positive significant and strong correlation between infrastructure and growth of ranches.

### **5.2.3 Influence of feed resources on growth of ranches**

The distance between watering points of most ranches range between 0 to 5 kilometers this is indicated by 56.2%. Animals are forced to trek long distances in case one watering point dries. The study also revealed that 94.5% of the ranches have no feed gardens; these feed gardens are useful for supplementary feeding in ranches experiencing dry seasons. With absence of feed gardens mortality is likely to be high during dry seasons. Most ranchers cut and store grass to be used during dry period. But they experience challenges during hay harvesting. The cost of bailing is quite high because farm equipment such as bailer, cutter and Lakers need to be purchased. In case a contractor is hired the charges are higher since the cost of bailing one bail ranges from 70-100 Kenya shilling. The study also indicates that there is positive significant and strong correlation between feed resources and growth of ranches.

### **5.2.4 Influence of livestock marketing on growth of ranches**

The study revealed that 61.6% of the ranches have no marketing department. Their products are marketed by ranch managers who have no marketing skills. The study also indicated that 65.8% of ranches have no marketing channel for their products they depend mostly on butchers who exploits them. The study also indicated that. 65.8% of ranches do not offer promotional services for their customers. They claim that the promotional of products in expensive, but in long run promotion is a very important tool in marketing mix. The study also indicates that there is positive significant and strong correlation between livestock marketing and growth of ranches.

### **5.2.5 Influence of research on growth of ranches**

The study revealed that 58.9% of ranches have no research department. The study also indicated that 60.3% of the ranches do not undertake research on how to improve reproductive performance of their stock. The study also revealed that 63% of ranches have no qualified veterinarian to ensure improvement of livestock health; this is a dangerous trend because livestock will be treated by unqualified personnel. The study also indicated that 84.9% of ranches



do not provide supplementary feeding to their calves; this is likely to increase mortality of calves during dry seasons. Furthermore, 63% of the ranchers do not get research information from government research institutes. This is further affirmed by administrators 60% who states that government research institutes do not provide research information. The study also indicates that there is positive significant and strong correlation between research and growth of ranches.

### **5.3 Discussion of findings**

The study is in line with Grandin (2009) who stated that funding had a significant positive effect on growth of ranches and was found significant in this study. Good management plans for ranch finances will always inspire to confident of both the donors and financial institutions thus enhancing sustainability and performance of ranches. The study is also in line with Kortenhorst (2010) who states that adequate funds should always be availed in time, as inadequate financing will always manifest itself in problems such as poor project management, both at implementation and thereafter poor operation and maintenance. A study by Kessides (2010) indicates that absence of basic infrastructure in ranches impedes their growth. Omiti & Irungu (2012) further states that lack of basic infrastructure service, particularly water, increases the time spent by the poor in processing resources. The results of this study concur with this since infrastructures have positive significant and strong correlation with growth of ranches. This research is in line with Jacobs (2011) who states that availability of feed resources can be increased by improvement of water distribution points, balancing livestock and available feed resources. The study revealed that feed resources have positive significant and strong correlation with growth of ranches.

The study also reveals that livestock marketing has positive significant and strong correlation with growth of ranches. This concur with Milton ( 2011) who states that livestock marketing is considered as an essential part of livestock production in ranches because increased production is unlikely to be sustained unless the product is traded. Its further concurs with Koger (2012) who further states that the key to increase production lies in the motivation of producers through an

efficient marketing system. The study also reveals that research has positive significant and strong correlation with growth of ranches. These concur with Ojango (2012) who states that research has a great effect to livestock reproductive performance. This further concurs with Okeyo (2013) who states that research is a significance factor in livestock development.

#### **5.4 Conclusions**

The research study found that funding, infrastructures, feed resources, livestock marketing and research has a significant positive effect to growth of ranches. The multiple regression models shows the significant strong relationship between five independent variable namely funding, infrastructures, feed resources, livestock marketing and research. However, funding was found to be the most significant independent variable having strong relationship with the dependent variable growth of ranches. The regression coefficient  $R$  shows the value 0.843 which shows 84.3% proportion of variability between independent variable and dependent variable and coefficient of determination  $R^2=0.711$  which shows 71.1% variation dependent variable is explained by independent variable , the rest 28.9% is explained by other factors not in the study. The independent variables that is funding, infrastructures, feed resources, livestock marketing and research explained 62%, 15.2%, 13.1%, 10.7% and 12.9% of variation respectively towards dependent variable growth of ranches. Overall, the results revealed that funding, infrastructures, feed resources, livestock marketing, research and dependent variable growth in ranches were positively correlated.

#### **5.5 Recommendations of the Study**

1. The government through the ministry of agriculture should provide loan to ranchers at a low interest rate. This will help the ranchers improve their funding base to finance most of the ranch operations and come up with more income generating projects. Time series data on livestock supply, demand and prices could be collected at various regional livestock markets

by the department of livestock markets at a marginal cost by deploying already existing field staff to collect this information as part of the routine work.

2. Improvement in cattle marketing infrastructure such as rail to avoid animals trekking to reach final markets and slaughter houses. Trek routes and holding grounds should be gazetted as public property so that they will not be alienated to private use. The government should also provide funds for repair of roads leading to ranches.
3. Livestock marketing information system, hitherto unheeded, should be implemented. The need for this has increased with the deregulation of livestock and meat prices. It is now vital that the ministry acquire and disseminate the information so that participants in the livestock industry have a guide for decision making.
4. Establishment of feed gardens close to bomas and grass planted with a mixture of perennial grasses ( *Panicum Maximum*, *Penniselim Purpureum*) pigeon pea and leucaena together with maize, sorghum, millet and cow pea. Proper management of calves separately from other stock until they are 12months old providing shelter during 1<sup>st</sup> months and reserved grazing later in life their aim being to ensure calf survival. Breed improvement through the introduction of exotic breeds, should be left to the ranchers who have cattle breeding strategies aimed at maintaining the genetic diversity of the herds. Better supervision of suckling could help reduce the high pre-weaning mortality rate, especially in off springs, by improving their nutrition. Calves, lambs and kids should be housed during dry cold and wet conditions to prevent pneumonia and other diseases associated with coccidiosis, enterotoxaemia and enteric colibacillosis.
5. The animal health care could be improved by training operational staff on the correct use and application of veterinary drugs. Return to greater reliance in enzootic stability by allowing small number of ticks to be present on stock rather than relying on intensive and very expensive intensive and very expensive dipping regimes aimed at perfect tick control which encourages accaricide resistance in ticks. The suggested approach is to dip or spray according

to tick burden not with aim of eliminating ticks completely but to keep the tick burden low. This would encourage the buildup of natural immunity reduce tick damage and other sensitive areas yet reduce costs. Making of good quality hay could provide supplementary feed for calves and young small stock during dry season and ease feed shortages.

### **5.6 Suggestions for further research**

The findings of this study were based on a census of ranch managers, administrators and two livestock officers working with the ranchers in Athi River District of Machakos County. The following were suggestions for further study.

1. Influence of Gender on growth in ranches.
2. Influence Technology Transfer on growth in ranches.
3. Influence Government Policies on growth of ranches.
4. Influence of Education and Training on growth in ranches.

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## APPENDICES

### Appendix i: Letter of Transmittal

MARETE C KIMATHI

P.O BOX 37174-00200

NAIROBI.

22<sup>nd</sup> April, 2013

TO THE DISTRICT COMMISIONER

ATHI RIVER DISTRICT

P.O BOX 55-00204

ATHI RIVER

DEAR SIR,

RE: REQUEST TO CARRY OUT RESEARCH IN YOUR AREA

I am a student at the University of Nairobi pursuing a degree of Master of Arts in project planning and management. As part of my course, am required to carry out a research on the determinants for the growth of ranches in Athi River Machakos County. The purpose of this letter is to seek your permission to collect relevant data in your District. Attached herewith are copies of questionnaire to be used in collecting the data. Thank in advance.

Yours faithfully,

Marete C. Kimathi.

## Appendix ii : Questionnaires for Managers

Questionnaire Number:

Date:

### Instructions

Please answer all the questions. You are kindly requested to spare some of your precious time to provide the information asked for as accurately as possible. Your co-operation will be highly appreciated. The information is purely educational purpose and will be treated with utmost confidence. Please do not indicate your name anywhere in this questionnaire.

### SECTION A: DEMOGRAPHIC AND PERSONAL DATA.

Kindly tick the appropriate answer

1. Your gender :

i. Male

ii. Female

2. What is your age group?

i. Below 25years

ii. 25-30years

iii. 31-40years.

iv. 40-45years

v. Above 45years

3. How many years of experience working with the ranch

i) Less than 1years

ii) 1-10 years

iii) 10-20years

iv) Above 20years

4. Your highest level of academic qualification?

- i. Primary
- ii. Secondary
- iii. Diploma
- iv. Bachelor's degree
- v. Postgraduate diploma
- vi. Masters degree

5. What is your level of management at work?

- i) Top Management level
- ii) Middle management level
- iii) Operational Management level

6. Where does your ranch fall in the following categories

- i) Beef ranch
- ii) Dairy ranch
- iii) Dual purpose ranch

7. Kindly state your yearly income for the year.

- i. Below 1,000,000
- ii. Between 1,000,001 to 5,000,000
- iii. Between 5,000,001 to 10,000,000
- iv. Above 10,000,001

**SECTION B**

**Influence of funding on growth of ranches**

8 a) who is your major financier?

- (a) Government  (b) Donors  (c) Partners  (d) Proprietors   
(e) Fundraising  (f) Commercial banks

9) a) Do you have access to loaning facilities in the Agriculture sector?

- i). Yes   
ii). No

b). If Yes, at what rate do you acquire loans from those institutions?

.....

c) Do you find it difficult to pay back the interest stated?

- i) Yes   
ii) No

d) If yes, why.....

10. a) Do you have a finance department in your ranch?

- i) Yes   
ii) No

b) If No, who controls your spending? .....

11.a) Do you have a bank account?

- i) Yes   
ii) No

b) If No, who handles your funds? .....

12. a) Do you keep financial records?

i) Yes

ii) No

b) If Yes, who ensures their safe custody? .....

13. To what extent does funding influence growth in your ranch?

(i) Large  (ii) Average  (iii) Low  (iv) Very low  (v) No influence

Explain.....

.....

### **Influence of Infrastructure on growth of ranches**

14 a). Tick the source of energy you use in your premise?

i). Electric power

ii). Solar energy

iii) Generator

iv). Fuel, Firewood.

15 a). The road leading to your business is:-

i). Tarmac road

ii). Murram road

iii). Muddy road

b). What is the state of the road mentioned above?

i). Well maintained

ii). Maintained

iii). Poorly maintained

c). Does the type of transport system mentioned above affect your firm performance?

i) Yes

ii) No

d) If Yes, how.....

16 a). Identify sources of water in your area?

- i). Piped
- ii). Well
- iii). Borehole
- iv). Rain harnessed
- v). Others.....

b). Is the sources stated above reliable?

- i). Yes
- ii). No

c). If no, how does it affect your business?

.....

d) . To what extent does the energy stated above affect your enterprise?

- (i) Large  (ii) Average  (iii) Low  (iv) Very low  (v) No influence

Explain.....

.....

**Influence of feed resources on growth of ranches.**

17. What type of grazing practise do you undertake in your ranch?

- a) Paddocking
- b) Free range
- c) Zero grazing

18. What is the source of water for your livestock?

- a) Boreholes
- b) Dams

c) Springs

d) Pipe water

19. What is the approximate distance between your water points?

i) 0 – 5Km

ii) 5-10Km

iii) 10-15

iv) 15-20

v) 20 and above

20.a) Do you have feed gardens in your ranch?

i) Yes

ii) No

b) If yes how do they help in supplementary feeding .....

21.a) Do you experience any dry seasons in your ranch?

i) Yes

ii) No

b) If yes how do you conserve forage to be used during dry period?.....

22.a) Do you have any degraded area in your ranch?

i) Yes

ii) No

b) If yes what steps do you undertake to rehabilitate degraded areas in your ranch.....



23 a). To what extent do feed resources influence growth in your ranch?

(i) Large  (ii) Average  (iii) Low  (iv) Very low  (v) No influence

b) Explain.....

**Influence of livestock marketing on growth of ranches**

24.a) Do you have a marketing department in your ranch?

i) Yes

ii) No

b) If No, who markets the ranch products?.....

25. How do you get market information for your ranch?

a) Radio

b) Internet

c) Television

d) Networking with association

26. Who are your main customers?

a) Butchers

b) Farmers

c) Supermarkets

d) Kenya Meat Commissioner

e) Other ranches

27a).Do you have marketing channels for your products?

i) Yes

ii) No

b) If yes, how many middlemen are there in the channels.....

28. a) Do you have pricing methods in your ranch?

i) Yes

ii) No

b) If No, why?.....

29. a) Do your ranch offer promotion services to your customers?

i) Yes

ii) No

b) If No, why?.....

30. To what extent does livestock marketing influence growth in your ranch?

(a) Large  (b) Average  (c) Low  (d) Very low  (e) No influence

Explain.....

.....

### **Influence of research on growth of ranches**

31. a) Do you have a research department in your ranch?

i. Yes

ii. No

b) If yes, who funds the research projects?.....

32. What types of breeds do you keep in your ranch?

a) Pure breeds

b) Cross breeds

c) Both

33.a) Do you undertake any research on how to improve reproductive performance of your stock?

i) Yes

ii) No

b) If yes how does the research undertaken influence reproductive performance of stock?.....

.....

34.a) Do you have a qualified veterinarian in your ranch?

i) Yes

ii) No

b) If yes how do they ensure improvement of livestock health

.....

35. a) Do you provide supplementary feeding to your calves?

i) Yes

ii) No

b) If yes, do you undertake any research before you provide supplementary feeding?.....

36.a) Do you get any information from government research institutes?

i. Yes

ii. No

b) If Yes, What kind of information do you get?.....

37. To what extent does research influence growth in your ranch?

(i) Large  (ii) Average  (iii) Low  (d) Very low  (e) No influence

Explain.....

.....

### Appendix iii: Questionnaires for Administrators

Questionnaire Number:

Date:

Please answer all the questions. You are kindly requested to spare some of your precious time to provide the information asked for as accurately as possible. Your co-operation will be highly appreciated. The information is purely for educational purpose and will be treated with utmost confidence. Please do not indicate your name anywhere in this questionnaire.

#### SECTION A. DEMOGRAPHIC AND PERSONAL INFORMATION

Kindly tick the appropriate answer.

1. Your gender:

- i) Female
- ii) Male

2. What is your age group?

- vi. Below 25years
- vii. 25-30years
- viii. 31-40years.
- ix. 40-45years
- x. Above 45years

3. How many years of experience working with provincial administration?

- v) Less than 1 years
- vi) 1-10 years
- vii) 10-20years
- viii) Above 20years

4. Your highest level of academic qualification?

- vii. Primary
- viii. Secondary
- ix. Diploma
- x. Bachelor's degree
- xi. Postgraduate diploma
- xii. Master's degree

5. What is your job designation?

- i. D.O
- ii. Chief
- iii. Sub chief

6 a). What is the level of your administrative unit?

- i. Division
- ii. Location
- iii. Sub location

7 ).Where is your administration area located in Athi river District?

- i). Eastern part
- ii). Western part
- iii). Central part
- iv). Northern part
- v) Southern part

**SECTION B**

**Influence of funding on growth of ranches**

8a) Does the government fund the ranches in your area?

i) Yes

ii) No

b) If yes, how much does the government fund each ranch?

i) 500,000/-

ii) 1,000,000/-

iii). 2,000,000/-

iv). Above 2,000,000

**Influence of infrastructure on growth of ranches**

9a) Which type of road is found in your area?

i). Murram road

ii). Tarmac road

iii). Muddy road

b) What is the condition of roads in your area?

i). Well maintained

ii). Not maintained

c) Do you think well maintained roads have influence on growth in your area?

i) Yes

ii) No

d) If Yes, how?.....

10 a). Tick the source of energy you use in your area?

- i). Electric power
- ii). Solar energy
- iii) Generator
- iv). Fuel, Firewood.

b). How is power supply in your area?

- i). Very reliable
- ii). Reliable
- iii). Not reliable

**Influence of feed resources on investment growth**

11. What type of grazing method is practised in your area?

- i) Paddocking
- ii) Free range
- iii) Zero grazing

12.a) Do you experience any dry seasons in your area

- i) Yes
- ii) No

b) If yes, how often.....

**Influence of Livestock marketing on growth in ranches.**

13.a) Do your office provides any market information to ranches?

- i) Yes
- ii) No

b) If No, why?.....

14.a) Do you help ranchers to market their products?

i) Yes

ii) No

b) If No, why?.....

**Influence of research on growth of ranches**

15. a) Does the government provide research information to ranches in your area?

i. Yes

ii. No

b) If No, why?.....

16. a) Does research institute provide research information to ranches in your area?

i) Yes

ii) No

b) If No, why?.....



**Appendix iv: Interview Schedule for District Veterinary Officer and District Vaccination Officer.**

1. How do the ranches benefit from governments sponsors/aids?.....  
.....
2. What is the state of roads found in the area in relation to the ranching and activities?.....  
.....
3. Identify the type of ranches found in your area?.....  
.....
4. What step is government undertaking to help ranchers conserve forage in the area?  
.....
5. How does the government help ranches to market their products.....?  
.....
6. What steps is government taking to reduce middlemen on the market channels used by ranchers?.....  
.....
7. What steps in the ministry of livestock undertaking to ensure that proper diagnosis of diseases is carried out in ranches?.....  
.....
8. Briefly explain the influence of funding, infrastructure feed resources, marketing and research on growth of ranches.....  
.....