MODERATING EFFECT OF INDEX BASED LIVESTOCK INSURANCE ON FACTORS AFFECTING PERFORMANCE OF LIVESTOCK PROJECTS IN NORTHEASTERN KENYA

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Moderating Effect of Index Based Livestock Insurance on Factors Affecting Performance of Livestock Projects in Northeastern Kenya

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other university.

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To my wife Fatuma Abdi Sanweine, and children - Abdinasir, Abdimalik, Abdikheir, Samira, Shinal, Umul-Kheir, Soham, and Sheymaa.

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ACRONYMS /ABBREVIATIONS

ROI	Return on Investment
ROCE	Return on Capital Employed
USAID	United State Agency for International Development
ALRMP	Arid Lands Resource Management Project.
ASAL	Arid and Semi-Arid Lands.
CIDP	County Integrated Development Plan.
CMF	Center for Microfinance.
DFID	Department for International Development.
DMI	Drought Management Initiatives.
EDRP	Emergency Drought Recovery Programme
FAO	Food and Agricultural Organization.
GOK	Government of Kenya.
HSNP	Hunger Safety Net Project
IBLI	Index Based Livestock Insurance
IBLT	Index Based Livestock Takaful
IFAD	International Fund for Agricultural Development
ILRI	International Livestock Research Institution

KMT	Kenya Market Trust
KNBS	Kenya National Bureau of Statistics
KNCHR	Kenya National Commission for Human Rights
KRDP/ASAL/DM	Kenya Rural Development Program / Arid and Semi-Arid Land Drought Management
NDVI	Normalized Differential Vegetation Index
NICE	National Insurance Corporation of Eritrea
SPSS	Statistical Package for Social Sciences
TLU	Tropical Livestock Unit
UNOCHA	United Nation Office for Coordinating Humanitarian Affairs

DEFINITION OF OPERATIONAL TERMS

Conflicts: Skirmishes which arose among the neighbouring communities in North-eastern Kenya as a result of cattle rustling pasture and water (Mude *et al*., 2009).

Covariate risk: A type of risk that affects a large number of people at one time e.g. drought, flood (Barnett *et al.,* 2008).

Education: The highest level of schooling that a person has reached (Dercon *et al*., 2009).

Groups and Networks: A collection of people who interact with each other and share similar characteristics and a sense of unity (Kotler*et al*., 2008).

Idiosyncratic risk: A type of risk specific to an asset or small group of assets (Barnett *et al.,* 2008).

Index Insurance: An insurance product linked to an index highly correlated to the condition. The contract is written against specific peril or events monitored at regional levels. Payouts are triggered by pre-specified patterns of the index (Skees*et al.,* 1999).

Infrastructure: A composition of road and communication network that enhance effective movement of people and livestock (Kwak*et al*., 2009)

Livestock markets: Marketplaces where livestock are exchanged possession (Menkhaus, 2015).

Moderator variable: Is a qualitative (e.g., sex, race, class) or quantitative (e.g., level of reward) variable that affects the direction and/or

strength of the relation between an independent or predictor variable and a dependent or criterion variable (Baron & Kenny 1986)

Premium: An amount paid periodically to the insurer by the insured for covering risks of livestock such as the death of animals due to drought (Sherrick*et al*., 2003).

Religion: A set of beliefs, feelings, dogmas and practices that define the relations between human being and divinity (Lawan & Zana, 2013).

Technology: A form of skills adopted by people of Northeastern Kenya as a way of linking and integrating livestock management.

Tropical Livestock Unit: A convenient method for quantifying a wide range of different Livestock types and sizes in a standardized manner (1TLU- 250kgs) (Njuki*et al*., 2011).

Vegetation Index: A numerical indicator that uses the visible and nearby Infrared bands of electromagnetic spectrum and is adopted to analyze remote sensing measurement and assess whether target being observed contains live Green vegetation or not (Mcpeak*et al*., 2010).

ABSTRACT

Livestock represents the majority of household wealth and accounts for more than two-thirds of average family income in arid and semi-arid regions of Kenya. In the past century, 28 significant droughts have occurred in northern Kenya, four of which have been in the last decade, resulting in severe livestock mortality. Several projects, with approaches or models for managing risk including provision of micro-insurance for low-income people, were implemented to cushion the pastoralists from loss of livelihood as result of the droughts. This study investigated the moderating effect of Index Based Livestock Insurance on factors affecting the performance of livestock projects in northeastern Kenya and determined how socio-cultural factors, economic features, political situation, and external factors contribute to this effect. The hypotheses formulated are developed around the theories of the push-pull model, risk management and project performance. Statistical models were used in testing the hypotheses and Copies of well-structured questionnaires was administered to the sampled population which was randomly selected using multi-stage random sampling technique. The study used cross-sectional design, targeting household heads. The multistage sampling procedure was used to select the households head within the villages. Quantitative data was collected and analyzed using statistical models such as Analysis of variance (ANOVA), while multiple regression analysis was applied to measure moderating effect of Index Based Livestock Insurance on the factors - political situation, socio-cultural values, and economic features. The study, using Pearson correlation coefficient, found out that there was a weak positive linear relationship between socio-cultural factors and performance of livestock projects in Northeastern Kenya. The study also found out that there was no significant relationship between economic features and performance of livestock projects in north-eastern Kenya. It was equally observed that there was a weak positive relationship between political situations such as security and conflict and

performance of livestock projects in the region under study. This notwithstanding, `external dynamics such as social cultural factors, economic factors and political situations were observed to have significant relationship on the performance of livestock projects. However, upon introduction of moderating variable into independent variables (social cultural factors, economic factors and political situations) the study observed an insignificant impact on the performance of the livestock projects. The study recommends that in order to improve project performance, project managers need to be cognizant of the fact that group norms can affect individuals' behaviour. As such factors such as religion, culture, norms and values should be factored in before any project takes off. Project beneficiaries and participants need to be educated on the benefits of adopting modern risk mitigation

strategies such as offloading livestock during drought seasons. Involvement of community leaders would be key in ending conflicts and enhancing security in the regions. Finally, the study recommends that the government improves transport and communication infrastructure in northern eastern Kenya to facilitate access to markets, coordination of community mobilization, and security, which are essential for project success in the region.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

This section of the study introduces the following sub-sections in the following order, background to the study, statement of the problem, research objectives, research hypotheses, significance of the study, scope and limitations of the study. A large number of the poor people in the world are found in rural areas of their countries. In third world countries, people in rural areas practise either or both livestock and crop production. These forms of livelihoods are threatened by human activity and weather conditions (Tarawali *et al*., 2011; Herrero *et al*., 2010; Yesuf & Bluffstone, 2009). The risks that these people face include human diseases, unstable rainfall patterns, drought and famines, livestock mortality, crop diseases and pests and fluctuating incomes (Yesuf & Bluffstone, 2009; Townsend, 1995; Townsend, 1994). Given the underdeveloped insurance and financial markets in the third world countries, persons in the third world countries are unable to pass the risk to other people (Yesuf & Bluffstone, 2009). They, therefore, become risk averse, shunning even investments with high returns (Yesuf & Bluffstone, 2009). Risk aversion becomes one of the reasons these poor people continue languishing in poverty (Dercon, 2009).

Arid and semi-arid lands (ASAL) cover about 467,200 km2 or 88 percent of Kenya's total landmass, with an Annual rainfall ranges between 125 – 600mm. Quite a large proportion of people living in the arid and semi-arid land (ASAL) in Kenya depend overwhelmingly on livestock (Wambua *et al*, 2014). This represents the vast majority of household wealth and accounts for more than two-thirds of average family income (Chantarat & Mude, 2013). The population of livestock in ASAL areas booms and bursts in a cyclical pattern. The herds grow in large numbers only to deplete during a period of adverse conditions. Pastoralists in these areas have mechanisms in place to ex-ante manage their exposure and cope with the risks post ante (McPeak *et al*., 201; Bollig, 2005; McCabe, 2004; Morton *et al*., 2006; McPeak & Barret 2001). They

move their herds, loan livestock, accumulate herds, diversify species of their herd, diversify markets with a view of minimising losses during the 'bust' period and hasten recovery during 'boom' (Carter, 2009; McPeak, 2004). In the past century, 28 significant droughts have occurred in northern Kenya, four of which have been in the last decade (Dror *et al.*, 2014). Climate change has been linked to drought in Eastern Africa (Ngugi *et al.*, 2015) as shown in Table 1.1.

Table1.1: Number of People affected by Drought

1975–2011 Year	Number of people affected
1975	16,000
1977	20,000
1980	40,000
1984	200,000
1992	1.5 million
1995–96	1.4 million
1999–2000	4.4 million
2004–06	2.5 million
2011	3.8 million
2017	3.0 million

Sources: Republic of Kenya (2004); and Kenya Food Security Steering Group (2017)

Since the occurrence of the 2008-09 droughts in Kenya, there has been increased effort to help communities in ASALs manage their risk better (Channa, 2013). Weather-related risks experienced in the ASALs have driven most pastoralists into destitution (Chantarat *et al.*, 2014) and the situation is exacerbated by the lack of access to adequate risk management tools (Channa, 2013). Communities faced with this challenge are likely to limit their investment in livestock due to the high risks associated, thus lowering their overall accumulated savings (Channa, 2013) and also their access to credit is limited as lenders may be wary of lending due to the risks involved (Barnett *et al.*, 2008).

Several projects with approaches or models for managing risk and promoting sustainable development in the ASAL were implemented. The Emergency Drought Recovery Project (EDRP) was implemented by the Government of Kenya with the

support of World Bank from 1991–1996 in Mandera, Marsabit, Tana River, Turkana and Wajir districts (Johnson &Wambile, 2011). Two main lessons emerged from this experience. The first was that project interventions need to be consistent with local livelihoods strategies, including mobile pastoralism, and responsive to local priorities in order to reduce vulnerability and build resilience to shocks. The second lesson was that projects need to have a long implementation period in order to have a meaningful impact on the lives of the population in these areas. These lessons informed the design of the Arid Lands Resource Management Project phase I and II (ALRMP 1996-2010), a community-based drought management initiative, jointly financed by GoK and the World Bank (Johnson & Wambile, 2011). Other complementary projects were drought management initiative, Kenya rural development project (KRDP) through European Union funding and Hunger safety net project (HSNP) under DFID and GoK funding.

Where a farmer does not have the benefit of a formal mechanism for risk management, they tend to informally insure themselves, which consequently erodes their expected returns and provides insufficient cover (Cole *et al*., 2012). Formal insurance products that target farming, and which indemnify farmers based on their yield or farming area yield exist worldwide. Their success, however, has been limited. Their failure has partly been contributed by the high cost of getting qualified assessors to farms. Additionally, farmers tend to slack in their profit-seeking endeavors when they know that they will be indemnified for any loss suffered. Lastly, adverse selection affects agriculture insurance products (Cole *et al*., 2012).

Provision of micro-insurance, small-scale insurance products aimed at low-income people who are generally excluded from more traditional insurance products, has attracted widespread interest as a means of enhancing the resilience of the rural poor against covariate climate risks (Churchill, 2006; Mechleretal, 2006; de Bock & Gelade, 2012). In particular, recently introduced index-based weather insurance has attracted considerable attention as it is free from information asymmetry problems. An innovative feature of the index insurance is that indemnity payouts are determined based not on actual losses experienced by policyholders, but on easily

observable, objective weather parameters that are highly correlated with expected losses, such as rainfall, temperature, and satellite-measured vegetation level.

Despite sweeping claims that index-based micro-insurance would be the next "revolution" in development practice (Murdoch, 2006) evidence to date shows that unexpectedly low uptake, rarely above 30%, causing many to rethink the attractiveness of the product or suggest ways to improve it (De Bock & Gelade, 2012; Miranda & Ferrin, 2012; Matul *et al*., 2013). For example, Binswanger-Mkhize (2012) provides an argument for why index-based insurance will not proliferate. Through a review of the literature, he finds that higher income farmers are already self-insuring against risk by diversifying their income portfolio. Lower income farmers and landless labourers who are unable to diversify optimally would, therefore, be more likely to gain from index-based insurance, however, the cost of doing so generally prohibits uptake. In this regard, the mediating effects of Index Based Livestock Insurance (IBLI) on factors affecting the performance of livestock projects in northeastern Kenya is of great significance.

1.2 Statement of the Problem

Quite a large proportion of people living in the arid and semi-arid land (ASAL) in Kenya depend overwhelmingly on livestock (Wambua *et al*., 2014). This represents the vast majority of household wealth and accounts for more than two-thirds of average family income (Chantar *et al*., 2013). High livestock mortality is associated with severe drought and diseases. In the past century, 28 significant droughts have occurred in northern Kenya, four of which have been in the last decade (Dror *et al*., 2014). Several projects, with approaches or models for managing risk and promoting sustainable development in the ASAL, were implemented such as the Emergency drought recovery project (1991-1996). Other projects include Arid lands resource management project I (1996-2003) and Arid lands resource management project II (2003-2011), Drought management initiative, Kenya rural development project ASAL –DM and Hunger safety net project are among this (Johnson &Wambile, 2011).

Provision of micro-insurance, small-scale insurance products aimed at low-income people who are generally excluded from more traditional insurance products, has attracted widespread interest as a means of enhancing the resilience of the rural poor against climate risks (Churchill, 2006; Mechler *et al*., 2006; de Bock &Gelade, 2012). In particular, recently introduced Index Based Livestock Insurance uses observable parameters, such as rainfall, temperature, and satellite-measured vegetation level (Banerjee, 2015).

IBLI pays out compensation to clients in the event of livestock mortality occasioned by drought. The payments are made based on an index threshold value ("strike") above which payouts must be made. The index is calculated using the Normalized Differenced Vegetation Index (NDVI) which, in simpler terms, is the pasture availability recorded using satellite imagery and this is correlated to the predicted livestock drought-related mortality based on historical patterns. Unlike traditional insurance, IBLI compensates clients whether losses have been incurred or not provided the strike level has been exceeded. The low uptake the ILBI product in countries where it has been introduced shows that purchasers are doubtful if it really can deliver welfare gains (Gine*et al*., 2008; Cole et al., 2013). While most literature discusses crop insurance schemes and micro-insurance for health and life in developing countries, it however does not cover livestock insurance in arid and semi-arid areas. Also, the existing literature does not indicate the moderating effect of IBLI especially on the performance of livestock projects in Northeastern Kenya.

1.3 Objectives of the study

1.3.1 General Objective

The general objective of the study was to find out the moderating effect of Index Based Livestock Insurance (IBLI) on factors affecting the performance of livestock projects in northeastern Kenya.

1.3.2 Specific objectives

Specific objectives of the study were to:

1. Establish the moderating effect of Index Based Livestock Insurance on socio-cultural factors affecting the performance of livestock projects in Northeastern Kenya.
2. Determine the moderating effect of Index Based Livestock Insurance on economic features affecting the performance of livestock projects in Northeastern Kenya.
3. Explore the moderating effect of Index Based Livestock Insurance on political situations affecting the performance of livestock projects in Northeastern Kenya.
4. Determine the moderating effect of Index Based Livestock Insurance on external factors affecting the performance of livestock projects in Northeastern Kenya.

1.4 Hypotheses of Study

$H0_1$ There is no moderating effect of Index Based Livestock Insurance on socio-cultural factors affecting the performance of livestock projects in Northeastern Kenya.

$H0_2$ There is no moderating effect of Index Based Livestock Insurance on economic features affecting the performance of livestock projects in Northeastern Kenya.

$H0_3$ There is no moderating effect of Index Based Livestock Insurance on political situations affecting the performance of livestock projects in Northeastern Kenya.

$H0_4$ There is no moderating effect of Index Based Livestock Insurance on socio-cultural factors, economic features and political situations affecting the performance of livestock projects in North-eastern Kenya.

1.5 Justification of the Study

This study would be of great importance to livestock owners and other stakeholders in livestock projects because it would be appropriate to the livestock owners to accept and insure their livestock against risks such as drought as a way of improving the performance of livestock projects in Northeastern Kenya. The study recommends to the project managers to be cognizant that group norms would affect the individual's behaviour patterns and therefore they should ensure that religion, culture, norms and values are factored before any project takes off. The study would recommend to the project managers that they should conduct a thorough educational campaign to change the thinking perspective of the pastoralist people of North-eastern Kenya so that they could be willing to sell their livestock in order to be empowered economically.

Identifying the effects of Index Based Livestock Insurance on socio-cultural factors, economic features, political situation, external factors and performance of livestock projects would precisely help improve its momentum and other agriculture insurance programs in general. Finally, the study on Index Based Livestock Insurance would be useful in understanding livestock insurance and influence policy, which hopefully, can improve the livelihoods of pastoralists' thereby ensuring food security and socio-economic development. For example, the study recommends it would be appropriate to the government to support and improve transport network in Northeastern Kenya.

This would enable the accessibility of market and improve the price of livestock. Thus, good infrastructure would improve the performance of livestock projects in North-eastern Kenya.

1.6 Scope of the Study

The study provides insight into moderating effects of Index Based Livestock Insurance on the performance of livestock projects in Northeastern Kenya. The study was conducted among the pastoralist living within the divisions of Garissa (Balambala, Lagdera and Fafi) and Wajir County, (Wajir South, Wajir East and

Tarbaj). The study has limited itself to 1-level analysis as proposed by Anderson *et al*, (2007). That is, to achieve the objectives set out in the study. Research hypotheses were developed and tested using the analysis of variance (ANOVA).

1.7 Limitation of the Study

The study had some limitations. The first limitation was securing the valuable time of respondents to respond to the questionnaires. Therefore the researcher allowed the respondents three weeks to respond to the questionnaires and encouraged the respondents on the benefits and significance of the study. The second limitation was the negative reception of the research by some respondents because the research contained information which they considered critical and confidential to their value of animals and as such some feared that the information could be relayed to their neighbouring communities who they perceived to be rivals, and they can use the information for cattle rustling. To address this, the researcher reassured the respondents that information was only for academic purposes and that research content would be shared with them. The third limitation was that respondents were pastoralists and they move from one area to another in search of pasture for their livestock due to drought effects in the months of March to September 2016, hence a big challenge to the researcher in data collection. But this challenge was addressed by use of community guides who were conversant with terrain and trailed to their grazing fields. The fourth limitation was that majority of the respondents were illiterate due to low education literacy levels among the pastoralists community. The study addressed this challenge by use of local translators who translated the questionnaires from English to Somali in order to collect data.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Literature review provides one with means of getting to the frontier in one's particular field of knowledge. Unless one learns what has been done by others in one's area of study, one may not develop a project that would contribute to additional knowledge (Gall & Borg, 1989). This chapter reviewed theoretical literature on the effect of Index Based Livestock Insurance on the performance of livestock projects, developed a conceptual framework and identified gaps in the body of research.

2.2 Theoretical Framework

This section examines literature on the theoretical framework, the theories of Push and Pull Marketing Strategy, Covariate and Idiosyncratic risks, and theory of project performance.

2.2.1 Push and Pull Marketing Theory

The push-pull theory has been used widely in studies to explain motivation (e.g., Baloglu & Uysal, 1996; Cha *et al*., 1995). Push factors describe the drive for an individual to participate in insurance activities or the internal "igniter" that propel the individual to take up insurance product (Crompton, 1979). Pull factors, on the other hand, are the forces that attract individuals to choose a specific insurance product (Cha *et al*., 1995; Crompton, 1979). In push strategy, the primary aim of marketers is to design marketing strategy in a way that will push products onto the consumers. The main forms of communication mediums used are price inducements, promotions, trade shows, trade promotions, sponsorships and much more that will get the attention of retailers, wholesalers and other businesses to purchase the company's products or services (Segal, 2012). In respect to agriculture insurance, the push factors are different influences that come from outside agriculture and individual entities, which are related to the application of various stimulating

measures of agricultural policy such as subsidizing access to insurance. This is shown in figure 2.1. In pull marketing strategy, marketers try to inspire consumers to demand the company's products or services. In this technique, a lot of money is spent on the tools used to grab customers' attention. Marketing mediums for pull strategy include word of mouth, sponsorships, product placement and advertisement in newspapers, on radio and Television (Segal, 2012). As evidenced in figure 2.1, the pull factors that influence agriculture insurance are the availability of the insurance product, associated costs and potential benefits. The benefits are considered with costs in mind. A farmer will only take up an insurance product if the benefits significantly outweigh the costs.

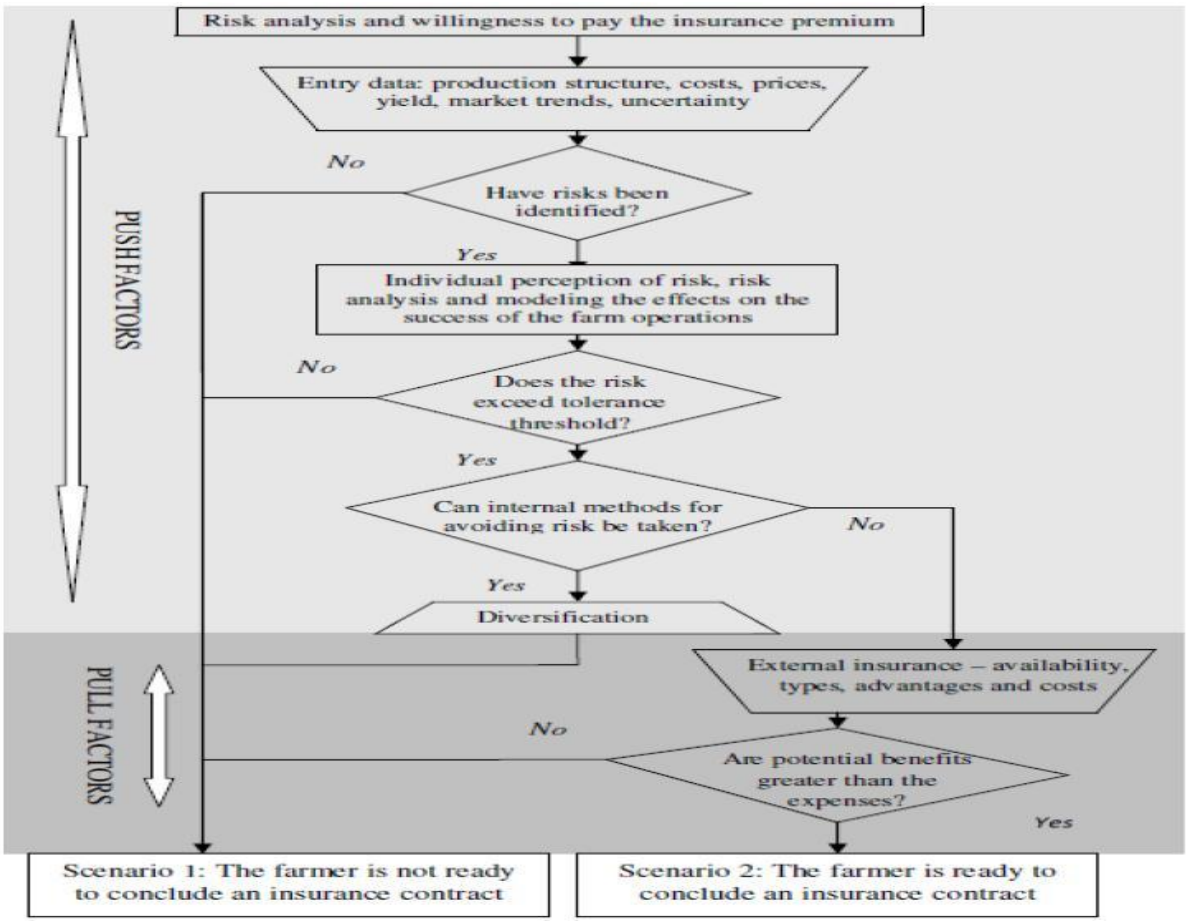


Figure 2.1: Algorithm of How Farmers Make a Decision on Concluding an Insurance Contract

Livestock insurance applies the basic principles of Insurance. However, it needs more precise marketing programs and techniques, which require identification of individual needs of pastoralists and a dialogue with smaller groups of the insured persons/business entities. Insurance marketing in general, and in the agricultural sector as well, applies a complex marketing metric today (Kočović *et al*., 2010).

2.2.2 Covariate and Idiosyncratic Risks

Risks can be categorized into economic, human and asset risks. These can either be covariate risks or individual (idiosyncratic) risks (Skees & Enkh-Amgalan, 2002). The insurers are able to fully cover risks and indemnify clients against significant risks by pooling individual risks of many clients at relatively low premiums (Brown & Churchill, 1999). For a risk to be insurable their occurrence must be determinable and they must lend themselves to specificity (Litzka, 2002).

Vaughan (1989) cites four characteristics of insurable risk: the probability of occurrence must be easily quantifiable, the potential loss must be attributable and its value discernable, the frequency of occurrence must be economically viable for both the insurance company and the insured and no moral hazard. Traditional insurance ideologies consider a fifth characteristic as it should be non-covariant. However, modern insurance companies insure covariate risks such as typhoons, earthquakes, hurricanes and floods (Skees *et al*., 1999). The private sector insurance companies have been reluctant to insure against crop and livestock losses since they do not sufficiently cover the characteristics outlined above (Hazell, 1992). This lack of enthusiasm towards crop and livestock insurance has also spilt over to formal credit institutions when it comes to small peasant farmers.

In practice, idiosyncratic risks can be pooled and turn out profits while covariate risks cannot. The idiosyncratic risks are sanitised after pooling at the macroeconomic level while covariate risks accumulate thus negatively impacting savings and consumption. Thus, at a macroeconomic level, covariate risks should be insured while idiosyncratic can be left to their own. Usually, farmers go against this analysis and insure idiosyncratic shocks instead of the covariate. Notably, covariate risks are

more feasible to an insurer and more common (Collier, 2001). It is unproductive to pool covariate risk since the insurer would be forced to keep reserves at the same level as the insured would keep if uninsured (Priest, 1996).

Examining the ratio of the covariate to total risk at various scales reveals considerable geographic heterogeneity (Jensen *et al*., 2014). Covariate shocks represent only a small portion of households' risk portfolio in some locations, while in others the majority of livestock mortality is associated with covariate shocks. The degree of geographic heterogeneity in the relative importance of covariate shocks points towards regions where IBLI may be well suited and others where it may not offer an appropriate approach for reducing risk associated with livestock mortality. The idiosyncratic risk that index insured households continue to face is mostly the result of random, unobserved household characteristics and events, but is also positively associated with a higher household dependency ratio and income diversification away from livestock-related activities, both of which likely reflect reduced managerial attention to animal husbandry, as well as geographic location (Jensen *et al*., 2014).

2.2.3 Theory of Project Performance

There is a lack of consensus among practitioners and academics on the way to assess project performance and on the elusive concept of value. At the very basic, there are two groups of project performance measurement methods: pragmatic and economic. Pragmatic measurement methods consider other aspects of project performance apart from economic aspects. Performance is determined based on, typically, a pre-specified success criterion (Rosenau & Githens, 2011). At the end of the project, during evaluation, the success criteria set at the beginning is referred to, in determining success or otherwise of a project. For complex projects, it is not feasible for the requirements to be adjusted while on-going.

Economic measurement methods concentrate on the financial aspects of projects. They determine the extent to which a project meets its financial value. Examples of such economic methods are the Return on Capital Employed (ROCE), Return on

Investment (ROI), and Balanced Scorecards (Francis & Minchington, 2002). The limitation with this method is that it dwells on the past with may be rather too late with profound monetary consequences. Although forecasting is available in all of these metrics, true values can only be ascertained at the end of the project (Thomas & Mullaly, 2008).

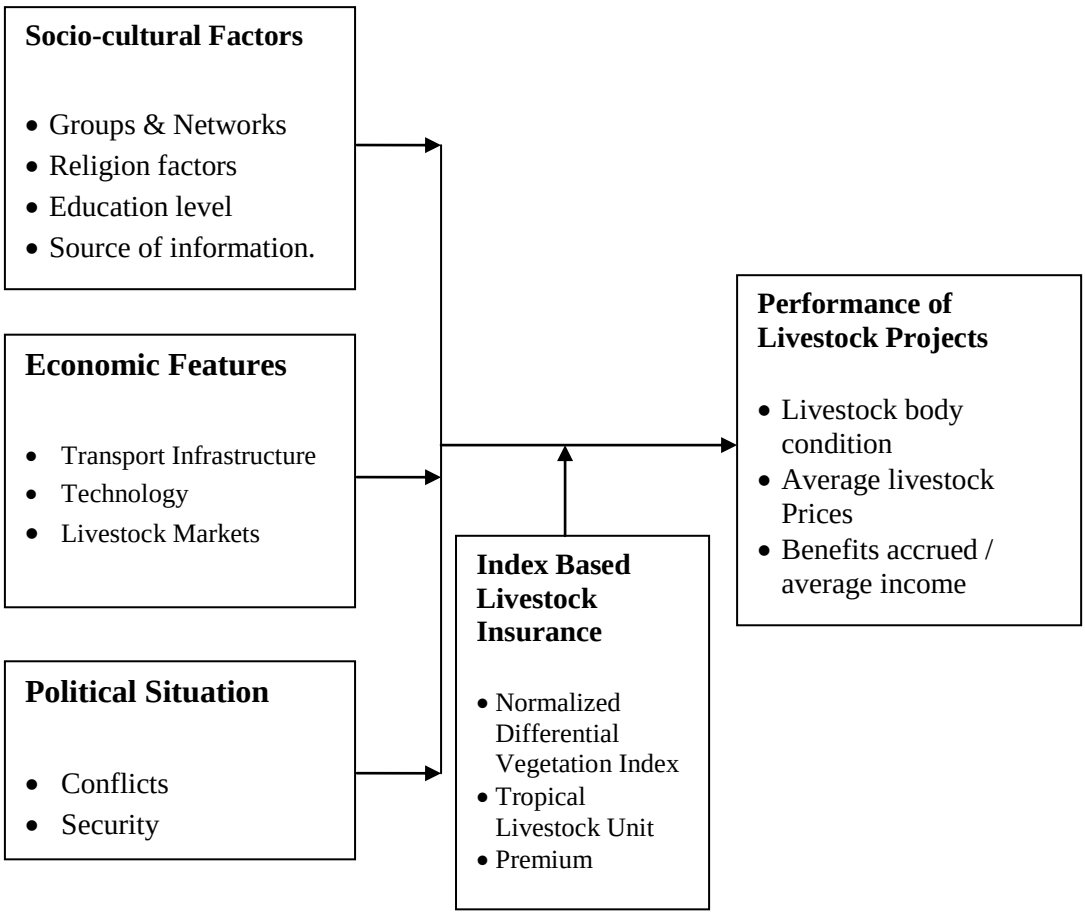
With pragmatic measurement models, project managers are not encouraged to deviate from the success criteria that have been agreed at the outset (Wernham, 2012). They – and the project team – are expected to be assessed against those criteria. There is little room, if any at all, to revisit and amend the success criteria as the project progresses (Grabher & Thiel, 2015). This creates artificial boundaries for the project manager to work within, limiting the opportunities for creative thinking and employing professional judgment to the challenges the project presents as it progresses (Grabher & Thiel, 2015).

While there are a number of different models to determine both success and value, there is little agreement on a clear definition of what success or value looks like in a project environment. 'There does not seem to be a particular value component that is recognized consistently from any one project management implementation or context to another,' conclude Thomas and Mullaly (2008) after researching more than 65 organizations around the world. Aubry and Hobbs (2011) agree. 'There is no consensus on the way to assess either performance or the value of project management,' they report.

2.3 Conceptual Framework

Conceptual framework is a hypothesized model identifying the concepts under study and their relationships (Mugenda & Mugenda, 2003). The framework in Figure 2.2 shows the relationship between the dependent, mediating and independent variables. Index Based Livestock Insurance is the mediating variable. Socio- cultural factors, economic features, political situations and personal characteristics are the independent variables. The performance of livestock projects is the dependent variable. Social-cultural factors of interest in the study consist of group and

networks, religion and education. Factors considered in the economic features are infrastructure, technology and livestock market. Political situation comprise conflict and security in the area of study, and finally, personal characteristics of interest in the study were age and gender, occupation, lifestyle and experience in livestock ownership.



Independent Variable Moderating Variable Dependent Variable

Figure 2.2: Conceptual Framework

2.4 Empirical Review

Previous studies on Index Based Livestock Insurance have dwelled on conceptualizing IBLI either as a financial instrument for hedging; risk (Awel &

Azomahou, 2015). This divorces IBLI from the human aspect of the solution with regard to those individuals who adopt it. The empirical literature has been a testament to the multi-dimensional impact of micro insurance on societies (Arun & Steiner, 2008; Overbye, 2005). The empirical review will be a nexus between the performance of livestock projects through the effect of IBLI on one hand, and socio-cultural factors, economic features, political situation and personal characteristics on the other.

Jensen, Mude and Barrett (2014) point out that social connectedness of IBLI affects demand. The social aspect is seen in two fold. First, Jensen, Mude and Barrett (2014) concluded that there was a correlation between high participation levels in social groups and adoption of IBLI. Secondly, Cai, de Janvry and Sadoulet (2011) show that social networks participation results in higher propensity to learn on IBLI. Subsidization of IBLI premiums can be considered if it is desirable, from a social perspective, to stimulate the uptake of IBLI among disadvantaged populations (Chantarat *et al*., 2009). Social protection includes social assistance and social insurance programs (Bastagli & Harman, 2015). Helping households to cope with covariate shocks is one of the objectives of social protection programs (Bastagli & Harman, 2015). Index-based triggers are applied in social protection programs in order to ensure timely and adequate response when a shock manifests.

Islam is the predominant religion in Northeastern Kenya. Religion forms part of the culture of the people of Northern Kenya (IBLI Marketing Report – Wajir County - ILRI/KMT). Conventional insurance is prohibited in Islam (Mohamed & Patel, 2003). Thus, the performance of IBLI is dependent on the religion practiced. Empirical studies are in agreement on the complexity nature of IBLI to rural population with low literacy levels. Literacy levels affect the demand of Index Based Livestock Insurance as pointed out by Bageant (2014). Mude *et al*., (2010) overcome the literacy hindrance by suggesting the use of experimental games and video documentaries as forms of diffusing information on IBLI. Goodland and Mahul (2011) on their part suggested the use of educational outreach programs, while Bageant (2014) stressed on product education.

Infrastructure increases the cost of offering IBLI according to Jensen, Mude and Barrett (2014). Andrew Mude (2012) indicated that costs related to IBLI can be reduced by utilizing the Information and Communication Technologies (ICTs). He, however, decried the low level of infrastructure development in the IBLI administered areas, an observation corroborated by Chelang'a, Banerjee and Mude (2015). Indeed, the limited infrastructure coupled with an equally ineffective mobile coverage presents a communication problem which affects the performance of Index Based Livestock Insurance (Chelang'a *et al*., 2015).

In a report covering the piloting of IBLI in Marsabit, Wandera, Prashad and Merry (2013), point out the importance of technology utilization in IBLI. They specifically highlight its application in making and confirming premium payments to the IBLI holder. Jensen, Mude and Barrett (2014) closely associates IBLI roll-out experiences to technology than to traditional insurance models. Thus it is clear from empirical studies that technology, either singularly or collectively with other factors has a significant influence on Index Based Livestock Insurance.

While examining data on IBLI in Ethiopia, the USAID notes that Index Based Livestock Insurance has the ability to transform vulnerable pastoralists into resilient and vibrant market participants with high growth potential (USAID, 2015). Livestock market availability determines the levels of household incomes for pastoralists, which impacts on the adoption of Index Based Livestock Insurance, as shown by Jensen, Mude and Barrett (2015). Chantarat *et al*., (2013) conclude that livestock pricing patterns counter-influence the availability of livestock markets.

One of the objectives of IBLI, as intended by ILRI, was to reduce conflicts, the resultant insecurity, among crop farmers and pastoralist caused by forage and water driven migration. Apart from this aspect of conflict/security-IBLI interaction, IBLI is affected when conflicts and incidences of insecurity occur in communities where it has been rolled out. IBLI by itself does not cover loss due to conflicts and insecurity since it is part of the idiosyncratic risk. The influence that conflict and insecurity have on IBLI is its impact on adoption and operationalization (Chantarat *et al*.,

2009). According to Angelsen and Dokken (2001), women of old age were the most affected by the climatic shocks. According to Khalai (2015) women from the Somali side of Northern Kenya had more power in making IBLI related decisions compared to their counterparts in Marsabit.

Further, Bageant and Barrett (2015) in their study on gender and age differences in demand for IBLI, found that both had a positive correlation. In a study from Mongolia, occupation was integral on the performance of IBLI. Occupations of the household members also determine the commitment to keeping livestock which in turn influences the demand for IBLI. Herders typically incorporate incomes from other occupations into their livelihood strategies (Luxbacher *et al*., 2011).

The lifestyle of the pastoralists is nomadism. While this lifestyle is intended to reduce loss due to climatic variations by moving herds to better areas, ILRI reports that the ongoing climatic change has led to its ineffectiveness. This has led to more nomads taking up IBLI. The experiences by pastoralists determine the demand for IBLI (Odongo, 2015). According to experts attending an ILRI hosted workshop in June 2015, the previous effective risk mitigation strategies have failed to lead to the popularity of IBLI. Thus, these experiences have an impact on the performance of IBLI. (Mcpeak *et al*., 2010) underline that the performance of IBLI is critically dependent on awareness level of potential consumers. Cognizant to this, IBLI roll-out in Mongolia was preceded and undertaken with a comprehensive advertising and awareness campaign (Luxbacher *et al*., 2011). From the body of empirical studies, awareness of IBLI among potential consumers is an important determinant of its performance. Livestock mortality due to forage scarcity is the biggest contributor to the risk faced by pastoralists (Mude, 2012).

This type of risk is part of covariate risk, which is covered by IBLI. The pastoralists thus derive benefit from the cover thus impacting on the demand of IBLI as shared in the ILRI June 2015 workshop.

2.4.1 Performance of Livestock Projects

Awareness of IBLI as a concept of insurance is relatively new in Northern Kenya because the conventional insurance models have virtually made the population not to adopt it. The dominant Islamic faith in Northern Kenya forbids the trading on risk unless guided by Sharia Islamic law (IBLI Marketing Report – Wajir County - ILRI/KMT). In a study conducted in Wajir, 70.2% of the respondent interviewed for a survey indicated that they are not aware of Index Based Livestock Insurance or any other insurance livestock product. A discussion on the importance of insuring products indicates that 73% of the respondent would like to learn more on Index Based Livestock Insurance (IBLI Marketing Report –Wajir County-ILRI/KMT).

The IBLI concepts and products are somewhat complex and need to be understood clearly by the pastoralist so that they can sustainably participate in the market. The 'loose link' between the insurance agent and the pastoralist is common in all sites covered by IBLI and has intense implications on the outcome of its uptake (Toth *et al*., 2014). In many areas, it is evident that though residents may be aware of IBLI, they do not sufficiently understand the critical concepts. This, in the long run, will lead to misinformation and declining trust in the institutions providing IBLI, as well as the product. (IBLI Marketing Report 2014 –Wajir County-ILRI/KMT).

While individuals are autonomous and seek their own objectives they are also dependent on groups for containment, guidance and sustenance. Guidance provided by the groups seeks to enhance awareness of a phenomenon through better understanding. Groups tend to make decisions faster and better than lone thinkers (Forsyth, 2015). The awareness of IBLI, as a phenomenon will be dependent on the social groups within communities in northern Kenya. Enhancing the understanding of IBLI by the local population is a key factor in determining its adoption in terms of the number of livestock insured by the target pastoral community. In a study by ILRI/KMT respondents noted that strategies such as village meeting, *barazas*, sensitization through chiefs and religious elders and local radio messages as the best strategies to enhance understanding of the concept of IBLI (ILRI/KMT, 2014). Table

2.1 shows the number of contracts sold and number insured in the January-February sale period in Garissa.

Table 2.1: Number of Contracts sold in Garissa County in the January-February 2015 Sales Period.

No.	Division	No. of Contracts	Shoats	Cattle	Camels	Tlus	Sum Insured
1	SANKURI	24	697	37	-	104.7	1,465,800
2	JARAJILLA	5	164	32	-	48.4	677,600
3	LIBOI TOTAL	7	63	-	5	13.3	186,200
4	DADAAB	11	205	-	-	20.5	287,000
5	SANGAILU	8	132	57	-	39.2	548,800
6	MASALANI	16	313	-	-	31.3	438,200
7	BENANE	4	35	-	-	3.5	49,000
8	BENANE	4	30	-	-	3.0	42,000
9	HULUGHO	4	191	47	-	66.1	925,400
10	IJARA TOTAL	27	183	1	-	19.3	270,200
11	MODODASHE	8	411	16	12	69.9	978,600
12	GARISSA	5	296	30	20	87.6	1,226,400
13	BALAMBALA	143	1,038	49	30	175.7	2,459,800
14	SHANTA	63	755	12	-	77.5	1,085,000
15	BURA TOTAL	60	430	183	11	227.9	3,190,600
16	GARISSA	389	4,943	464	78	987.9	13,830,600

Source: Takaful Insurance, Adeso Garissa, 2015

In a study by Homann and Verlag (2005) on indigenous Knowledge among the Borana in Kenya, it was discovered that adoption of dromedary camels as a new variant of livestock was 100% in large families, 68% in medium sized, and 63% in small families. Thus it is rational to extrapolate that family size will determine the number of livestock insured with IBLI as a new phenomenon. On the benefit accrued

and risk levels, like any insurance product, index-based insurance aims to compensate clients in the event of a loss thus managing their risk exposure levels.

Unlike traditional insurance, which makes payouts based on case-by-case assessments of individual clients' loss realisations, index-based insurance pays policyholders based on an external indicator that triggers a payment to all insured clients within a geographically-defined space (Mude *et al*., 2010). For index insurance to work there must be a suitable indicator variable (the index) that is highly correlated with the insured event. Using a data source that is promptly, reliably and inexpensively available (and not manipulate-able by either the insurer or the insured) an index insurance contract makes the agreed indemnity payment to insured beneficiaries whenever the data source indicates that the index reaches the "strike point," or insurance activation level (Mude *et al*., 2010). For example, if one is insuring against livestock mortality, then rainfall or forage availability may be suitable indicators if drought or a shortage of forage, or a combination of the two, often result in above-normal livestock mortality. The benefits from IBLI are: transfers income from good periods to poor periods, reduces distress sales of assets (livestock), crowd in credit markets (untie collateral and income) and reduce reliance on non-optimal ex-ante risk-reducing production strategies (Chantarat *et al*., 2009).

2.4.2 Index Based Livestock Insurance

The commercial sale of Index Based Livestock Insurance (IBLI) was launched in Marsabit, Northern Kenya in January 2010. At the time, UAP Insurance Company was the underwriter while Equity Insurance Agency was the Insurance agent. Swiss Reoffered Reinsurance for the product. The product has gone through various adjustments since it was launched and is currently being implemented by APA Insurance Company in Marsabit and Isiolo counties. In Marsabit, CARE Kenya is supporting in implementation while World Vision International is supporting the implementation in Isiolo County. In Wajir and Garissa, an Islamic-compliant version of IBLI is currently being implemented by Takaful Insurance Company with support

from Mercy Corps. The sale of IBLI contracts in Wajir and Garissa commenced in August 2013 and 2015 respectively.

IBLI applies the Normalized Difference Vegetation Index (NDVI) which is a numerical indicator that uses the visible and near-infrared bands of the electromagnetic spectrum, and is adopted to analyze remote sensing measurements and assess whether the target being observed contains live green vegetation or not (McPeak *et al*., 2010). Theoretically, NDVI values are represented as a ratio ranging in value from -1 to 1 but in practice, extreme negative values represent water, values around zero represent bare soil and values over 6 represent dense green vegetation.

To determine exchange ratios between species of livestock, IBLI determines a common unit, Tropical Livestock Unit (TLU). Experts in the field of animal insurance have developed different formulae for estimating Total Livestock Unit (TLUs). Globally, different formulae have been used on different breeds of livestock. At the time of this research, there lacks a standard single formula to be applied across different livestock breeds.

Logically, if a species of animal under evaluation is fed on the same feed, the best means of comparing between individual animals is the ratio of their metabolic weights (Njuki *et al*., 2011). Njuki *et al*., (2011) indicate that the common TLU considered as a standard for cattle with a body weight of 250kg is 1 TLU. Insurance price (premium) is the most sensitive element of marketing. Higher premiums discourage demand for insurance products and even if these result in a satisfactory profit during the calendar year, they may yet limit the insurer's growth and cause a reduction in its market share. This is particularly relevant for agricultural insurance because farmers belong to the insured persons/business entities that are very sensitive to these changes (Sherrick *et al*., 2003).

On the other hand, low premiums enable growth but threaten the profitability of an insurance company and its survival in the market. Therefore it is necessary to determine the premium that enables profitability, growth and development. The main factors affecting the amount of insurance premiums in agriculture are costs, demand,

competition and economic measures of the state in the field of agricultural policy. Knowing the characteristics and intensity of the impact of these factors enables the insurer to determine the pricing policy for its products. Of all the above factors, the insurers can influence the level of certain costs most, including the costs of the conclusion of an insurance contract, and administrative expenses (Kočović *et al*., 2010). Premium rates offered under IBLT is derived from the cost and value of services offered to a particular livestock species within on drought season. These values in Kenya shillings are Ksh. 19,500 for a Camel, 14,000 for Cattle and, Sheep and goats are Ksh. 1,400. The various premium rates for various divisions in Garissa County are shown in Table 2.2.

Table 2.2: Premium rates offered in Garissa under IBLT

Division	Premium rates	Camel	Cattle	Goats/sheep
Mudogashe	6.18%	1211	865	87
Shanta –abaq	6.18%	1211	865	87
Balambala	8.02%	1572	1123	112
Sankuri	8.04%	1576	1126	113
Bura	9.43%	1848	1320	132
Jarajilla	8.89%	1742	1245	124

Source: Takaful Insurance, Adeso Garissa.

Like any insurance product IBLI aims to compensate clients in the event of a loss. Unlike traditional insurance which makes payouts based on case-by-case assessments of individual clients' loss realisations, index-based insurance pays policyholders based on an external indicator that triggers a payment to all insured clients within a geographically-defined space (Mude *et al*., 2010). Based on satellite data known as Normalized Difference Vegetation Index (NDVI) that provides estimated readings of forage availability the IBLI product being implemented in Kenya pays out when forage scarcity is predicted to cause livestock deaths in an area.

As livestock in pastoral production systems depends almost entirely on available forage for nutrition, NDVI serves as a strong indicator of the vegetation available for livestock to consume. Using data on livestock mortality that the Arid Lands Resource Management Program has been collecting monthly since 1996, a statistical relationship between livestock mortality and forage availability was modelled. Known as a response function, this relationship allows area-average livestock mortality rates to be predicted form the freely available and regularly updated NDVI data. This predicted livestock mortality serves as the index upon which insurance payments are based.

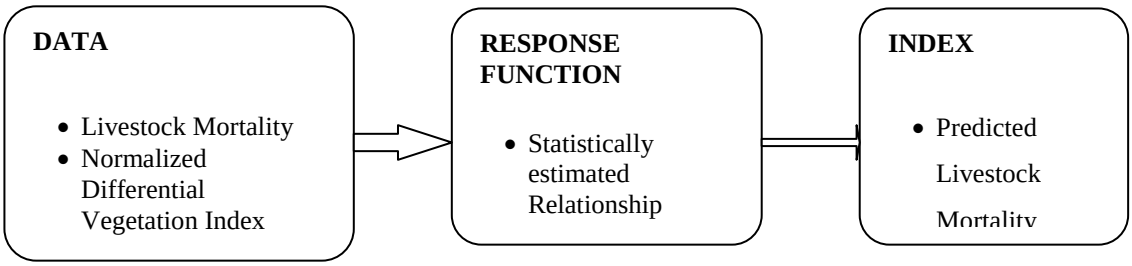


Figure 2.3: Construction Index Source:

(Wandera & Mude, 2010)

Against the risk of drought-related livestock deaths. The insurance contract covers the livestock for one year but has two potential payout periods. These are at the end of both the long dry and the short dry seasons in March and October. The index is measured per division, meaning that the payouts will be made as per the divisional index readings. Clients are only allowed to purchase this insurance in a two-month buying window prior to the rainy seasons. This is because at this time they are unable to predict what the weather conditions will be for the next season (Wandera & Mude, 2010). Figure 2.4 shows the timelines the contract covers.

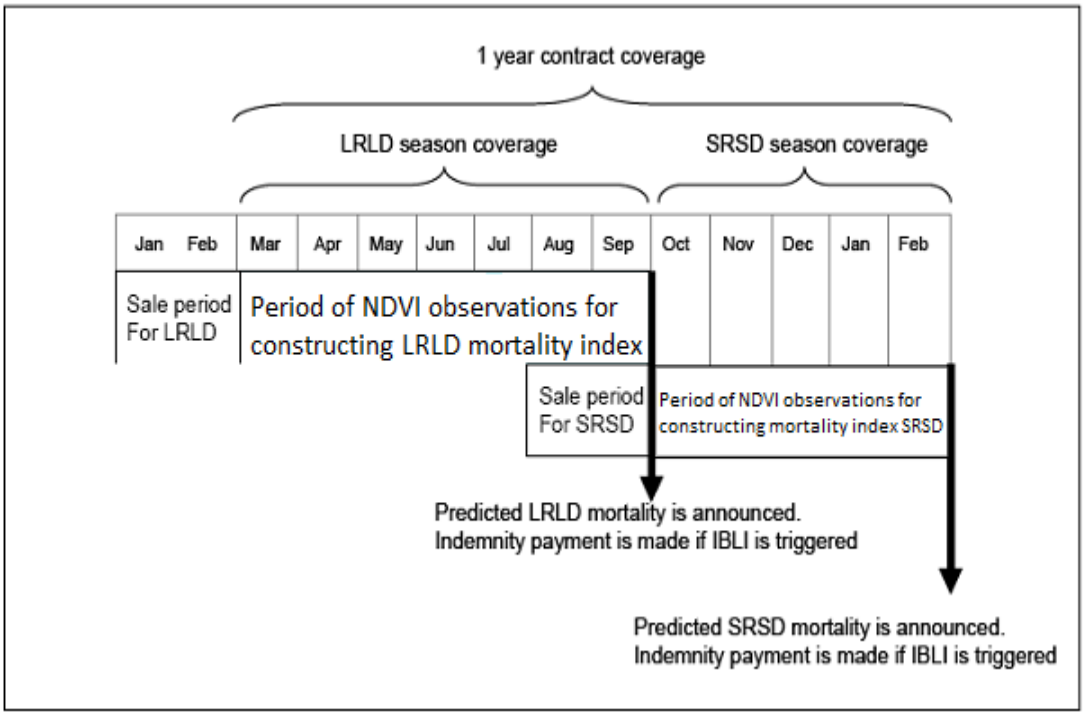


Figure 2.4: Yearly Contract Coverage. Source: (Wandera & Mude, 2010)

Pastoralists pay different premiums depending on the division where their animals are located. The premiums also depend on the level of risk coverage the client chooses. The contract has a strike level this is the level of predicted mortality above which the insurance starts to payout. Different strike level contracts are available and pastoralists are allowed to choose. Lower strike levels signify more risk coverage which means they cost more than the higher strike level contracts (Mude *et al*., 2009). For example, 15% strike level contract the premiums range from 4.9% to 8.1% of the value of the animals each year depending on how drought-prone these divisions are deemed to be. While for a 10% strike contract the premiums range from 8.9% to 14.2% of the value of the animals each year depending on how drought-prone their division is deemed to be. In Wajir, only the 15% contract which is less costly is initially on offer (Wandera & Mude, 2010). For a 15% contract if the predicted mortality index at the payout period reads 35%, the insured will receive 20% (35-15) of the value of their insured livestock as indemnity payment while for a 10% strike contract, if the predicted mortality index at the payout reads 35%, the

insured will receive 25% (35-10) of the value of their insured livestock as indemnity payment (Wandera & Mude, 2010).

The value of the livestock in the different location is predetermined in advance for ease of logistics. This is done in consultation with the community representatives. The livestock covered under this scheme are cattle, camels, goats and sheep. The four livestock types will be transformed into a standard livestock unit known as a Tropical Livestock Unit (TLU) (Wandera & Mude, 2010).

2.4.3 Socio-cultural Factors

Human beings are social in nature so they belong to different groups in order to satisfy their social needs. They observe each other and take cues on how to behave to fit in and please each other in the group (Bishal, 2009) hence group norms affect the individual's behaviour patterns. These norms include rules, regulations, habits and mores. To ensure conformity to group norms, sanctions (rewards or punishment) are used in formal or informal ways (Bishal, 2009). Groups that have a direct influence on a person are called membership groups. Among these membership groups, there are primary groups such as family, friends, neighbors and co-workers in which there are continuous but informal interactions. Secondary groups include religious, professional and trade unions groups where there are more formal and less regular interactions (Kotler *et al*., 2008).

While individuals are autonomous and seek their own objectives they are also dependent on groups for containment, guidance and sustenance. Groups tend to make decisions faster and better than lone thinkers (Forsyth, 2015). The effect of IBLI is a phenomenon dependent on the social groups within communities in Northern Kenya.

Every individual in a society has different roles and status depending on the position and relation that he or she holds in different groups, organizations or clubs. For example, a man employed as a manager in a company could have several roles in several groups (Kotler *et al*., 2008). In his family, he plays the role of son, husband or father and a manager in the company. He, therefore, holds an exclusive role in

different groups where he is supposed to perform certain activities depending on the people around him. Each role affects his buying behaviour during the decision-making process (Kotler *et al*., 2008). His status is a factor he should consider before buying. As a manager, he has a higher status in the society than the role of a husband or a father. He, therefore, should choose the product that shows his status in society. (Kotler *et al*., 2008).

The significance of religious value systems has long been recognized in sociology and psychology. Understanding the influence of religion on consumer behaviour is complicated. Previously religious psychology studies tended to focus on one's commitment to his or her religion as the main indicator for a religion's influence. Almost all factors related to religion are aggregated to form a religious commitment concept thus complicating efforts to unravel the components of religion's influences (Lawan & Zana, 2013). Adoption of IBLI in Northern Kenya would have religion as a fundamental determinant of the number insured and market price. Islam is the predominant religion in northern Kenya (Schlee, 2012). Permissibility of insurance in Islam is a touchy issue. Depending on how it is applied, it can either be Halal (Permitted) or Haram (Forbidden).

Islamic insurance is a relatively new concept in Islam. Pastoralists in Northern Kenya are likely to be skeptical of IBLI due to its insurance aspect and this will impact on the number insured. Though free trade is allowed in Islam, fraud and exploitation is forbidden. Unlike conventional insurance schemes, default on premiums cannot attract interests. Interest is forbidden in Islam (Mohamed & Patel, 2003). Islamic insurance, Takaful**,** applies the 'al-Tabarru' system, making it free from uncertainty, interest and gambling (Mohamed & Patel, 2003). Each participant that needs protection must be present with sincere intention to donate to other participants faced with difficulties.

Islamic insurance, therefore, exists where each participant contributes into a fund that is used to support one another with each participant contributing sufficient amounts to cover expected claims (Mohamed & Patel, 2003). Pastoralism is an old age

engagement which has been handed over generations to the modern generation. It, therefore, has deep rooted beliefs that make up a body of indigenous knowledge. Pastoralists like any other community hold on to norms and customs for practical and nostalgic reasons. IBLI is not introduced to pastoralists in an insurance-vacuum; for centuries communities have had indigenous risk management strategies for their livestock (Dixit *et al*., 2013). A comparatively new phenomenon, IBLI, had gone against the norms and customs of the pastoralists. This affected the number insured under IBLI.

Education is critical to micro-insurance. While micro-insurance can provide much-needed risk management mechanisms to vulnerable low-income households, it is a tool that is undersupplied and underutilized (Dercon *et al*., 2009).Insurers that want to expand into this sector face a range of challenges. Supply-side challenges include limited understanding of target populations' risks and needs, the difficulty of pricing a product with low premiums and high transaction costs, and the problem of finding a suitable delivery channel. These are major hurdles, but progress is being made. Insurers face a certain challenge that may seem surprising, or at least somewhat ironic: low demand (Karla *et al.*, 2010).Reasons for low demand might be that the products on offer are ill-suited to the needs of the households, or simply too expensive. But there is growing concern that this is not all. Demand has been found to be low even for relevant products offered at actuarially fair prices.

Managing risk is a clear need for poor and low-income households, but unlike credit and savings, formal insurance is a new concept. Even though households engage in informal risk management strategies that are, in principle, similar to formal insurance, households are unfamiliar with the language and structure of formal insurance products. Limited, if any, prior experience with formal insurance means that potential clients do not immediately understand the value proposition of insurance, which results in low demand. In this context, insurance education can make an important difference. Education helps individuals to harness new and emergent phenomena. It creates a better understanding of the complex benefits accruing from such phenomena, which translates to better use. The benefit accrued

from IBLI will be dependent on the level of education of the pastoralists. This will be to the extent to which IBLI is simplified since illiteracy levels in Northern Kenya are high (Hadron, 2012).The independent variable addressed in this study had the following hypotheses developed:

H_{01} – there is no moderating effect of Index Based Livestock Insurance on social cultural factors affecting Performance of livestock projects in Northeastern Kenya.

H_{11} – there is moderating effect of Index Based Livestock Insurance on social cultural factors affecting Performance of livestock projects in Northeastern Kenya.

2.4.4 Economic Features

The transport network in Northern Kenya is thin, disjointed, and in places non-existent. An area covering nearly 400,000 Km^2 of land has less than 1,000 Km of tarmac much of which is in disrepair. Key arterial routes linking Kenya to international markets in Ethiopia, South Sudan and Somalia are poorly maintained and prone to periodic closure from flooding or other damage. There are two airports, one of which is being upgraded, several airstrips and no rail network. The energy potential of the north, from solar, wind, biogas and geothermal, is only now starting to be tapped (Vision 2030 Development Strategy for Northern Kenya and other Arid Lands, 2011). Only one county, Isiolo, is served by the national grid. Other large towns rely on expensive and polluting diesel generators. All these increase the cost of delivering the product, particularly as the low population densities means that one must cover large areas to access a relatively small number of potential beneficiaries (Mude *et al*., 2009).

Infrastructure development remains an important force in the economy globally. Governments spend significant amounts of money to provide transportation, ports, and power. Development of infrastructure has a multiplier effect on the economy (Calderon & Serve, 2004). Different sectors of the economy grow and this results in the overall growth of the economy.

The insurance sector remains fundamental in every economy (Kwak *et al*., 2009). Growth in an economy will result to and from growth in the insurance sector. Thus, there is a link between infrastructure development and insurance growth which translates to number insured.

Access to ICTs in Northern Kenya is comparatively poor, although the infrastructure for the fibre optic cable has now reached several locations in the North. Most parts of the region remain reliant on expensive satellite. Mobile telephone operators are expanding their networks, but coverage is still limited beyond the major towns (Donovan, 2013). The DFID-supported Hunger Safety Net Programme, which uses biometric technologies to disburse cash transfers using electronic point-of-sales devices managed by a network of traders, is demonstrating that the penetration of new technologies into remote areas is achievable. Other initiatives in Kenya and across Africa are using ICTs to reduce distance in the health sector, telemedicine makes remote consultation, diagnosis and training possible (Cataly e*t al*., 2013).

Advancement of technology in the past few decades has had an effect in all areas of people's lives. It has changed the way people communicate, work, seek services and do business. Indeed, old institutions like the government have kept themselves abreast with developments in technology and adapted accordingly (Lee *et al*., 2007). The use of mobile phones, specifically, in Kenya has had global recognition in the field of advancement. Insurance companies in the country have harnessed mobile telephony by developing products that ensure the technology is used to attract and retain customers. Technology has had an impact on the number insured mainly due to the convenience it provides.

Lack of designated livestock sale yards and holding grounds in major towns of Northern Kenya and the surrounding area means that traders are often forced to accept a quick sale at disadvantageous prices. Only 5% of the 112 holding grounds in Kenya are currently operational. The livestock sector has been described as the most heavily taxed agricultural business in the region, subject to heavy formal and

informal charges (Vision 2030 Development Strategy for Northern Kenya and other Arid Lands 2011).

There are also supply-side constraints. Pastoralists may sell because of the need for cash, rather than to meet market demand. Moreover, herd diversity is a key survival strategy: by keeping multiple species, pastoralists can achieve the twin goals of subsistence dairy production and contingency meat production.

The type of animals they wish to sell may not, therefore, be of the age, sex or size that the market requires (Vision 2030 Development Strategy for Northern Kenya and other Arid Lands 2011).Livestock market in the northern part of the country, though undeveloped is characterized with traditional intermediaries between buyers and sellers. *Dilaalas* they are known, play a role in the determination of prices (Little, 2005). The availability of markets determines whether a pastoralist will afford premiums. Better market prices will underline the importance to the pastoralists in ensuring that livestock reaches saleable age. Insurance takes care of uncertainties that may impact on attaining that age. The number of livestock insured will be boosted by the ease of availability of markets. The independent variable addressed in this study had the following hypotheses developed:

H_{02} – there is no moderating effect of Index Based Livestock Insurance on economic features affecting Performance of livestock projects in Northeastern Kenya.

H_{12} – there is moderating effect of Index Based Livestock Insurance on economic features affecting Performance of livestock projects in Northeastern Kenya.

2.4.5 Political Situation

The political situation in Northern Kenya can be examined in dual concentration, insecurity and conflict. Since 1990, Kenya has experienced a marked decay in human security, from ballooning petty crime to the advent of ethnic cleansing and terrorism. The local and international press often mentions the phenomenon of rising crime and

insecurity (Brown, 2003). Causal human security factors are dynamic as they are deep-rooted.

Though encompassing about two-thirds of the country's surface area, the north is home to only about 20 percent of Kenya's population, mainly traditionally pastoralist communities such as the Samburu, Turkana, Pokot, Marakwet and Somali (Kumssa *et al*., 2009). It is poorer than the southern part of the country with lack of fertile land and infrastructure. Reports from the media and human rights NGOs clearly points to a worsening security situation in the region including a dramatic rise in murder rates. Far worse and more widespread geographically has been the influx of small arms into Northern Kenya (Kumssa *et al*., 2009). Terrorism is a real threat to human security in Northern Kenya as it is to the rest of the country as shown in Table 2.3.

Table 2.3: Terrorism incidences and resultant fatalities and casualties in Northern Kenya

Date of attack	Place of attack	No. of deaths	No. of injured	Weapon used
1-Jul-12	Two churches in	17	50	Guns & Grenades
25-Jul-12	Wajir		3	Landmines
27-Oct-12	Hagadera- Daabab	1		Gun
20-Nov-12	Garissa	10	35	Gun
27-Dec-12	Mandera		1	Grenade
4-Jan-13	Dagahale-Garissa	2	7	Grenade
10-Jan-13	Garissa	5	3	Grenade
31-Jan-13	Dagahale		3	Grenade
2-Feb-13	Dagahale		1	Gun
5-Feb-13	Garissa		1	Gun
18-Apr-13	Garissa		6	Grenade
18-Jul-13	Wajir in a barber		4	Hand grenade
14-Dec-13	Garissa	4	36	Improvised Explosive
22-Nov-14	Mandera	28	2	Guns.
2-Apr-15	Garissa University	147	2	Guns
Total		214	154	

Source: (KNCHR, 2014; Anderson & McKnight, 2015)

Human security has been cited as a pre-requisite to human development (Chandler, 2012; Donnelly, 2013; Malik, 2013). The northern region of Kenya has lagged behind due to the insecurity that dates back to Shifta war in the 1960s. It is the most marginalized part of the country, in core human development factors (Kumssa *et al*., 2009). Insecurity leads to displacement of persons and impacts on the livelihood of people. When families are displaced livelihoods are impacted, and pastoralists lack the time and freedom to freely mingle and share ideas (Menkhaus, 2008). Insecurity, therefore, prevents awareness creation. In addition, when the livelihoods of pastoralists are affected, their disposable income is reduced and purchasing power limited. Therefore, the number insured also drops.

Cattle raids, inter-communal resource conflicts and banditry are common across much of the arid lands of Northern Kenya where firearms are common among pastoralist communities. However, the northeastern part of the country has not reported livestock raids. In 2009 such violence claimed more than 354 lives according to the UN Office for the Coordination of Humanitarian Affairs (UN-OCHA), Kenya (Whittaker, 2015).

Livestock movement in search of water and pasture remains a driver of conflict. Competition for scarce natural resources is widely understood to be a primary cause of conflict in the region (ODI, 2009). Pastoralist communities across the Horn of Africa frequently cross national borders in search of pasture and water. Although neighbouring states often share ethnic groupings, such migrations can be problematic (Menkhaus, 2015).

According to the ODI (2009), politics is a driver of conflict in pastoralist areas. Since the second half of the last century, pastoralists have been involved in larger conflicts in the region and many have joined armed opposition groups. Some residents say that the conflicts are a ploy to drive away specific communities ahead of national polls. New election constituencies are likely to be created before the polls and ethnically dominant communities stand a better chance of electing a leader from among their own. Communities are the primary victims of conflicts even as they are the main

perpetrators. They are both targets and instruments of conflict. While the effect of conflict on people bears many faces, it is appreciated that it prevents people to benefit from what available to them (Eriksen, 2009). In times of conflict, pastoralists will not benefit from insurance. Their preoccupation will be to save their livestock from raids and themselves from attacks. They will fall back on their premiums and be uninsured. New customers will also not be found. The independent variable addressed in this study had the following hypotheses developed:

H_{03} – there is no moderating effect of Index Based Livestock Insurance on political situation affecting Performance of livestock projects in Northeastern Kenya.

H_{A3} – there is moderating effect of Index Based Livestock Insurance on political situation affecting Performance of livestock projects in Northeastern Kenya.

2.5 Critique of Existing Literature

The body of literature is awash with studies on uptake of insurance. Hanning (2002) in Australia's Victoria Hospital, Priest *et al*., (2015) on Flood insurance in the UK, Giesbert *et al*. (2011) on micro-insurance in Ghana, Tekabe and Tandon (2015) on health insurance in Nepal, and Arun*et al*., (2012) on micro life insurance in Srilanka, as a highlight. From a casual look, it may seem a spent area of research. A keen look reveals a study area as expanding as a universe. Studies have mainly concentrated on the uptake of other forms of insurance. A significant portion is devoted to human insurance. Even when agriculture insurance features, the tendency is to lean towards crop insurance. Raju and Chand (2008) looked at the problems and prospects of agriculture insurance in India, touching on its uptake. While their study headlined 'Agriculture', it had a bias for crop insurance. Livestock insurance got a nondescript one-paragraph feature as 'other insurance schemes' in the study with little mentions elsewhere. Its set up in India, with totally different ecological and socio-political environment, was boosted by the area of study being in Andra Pradesh; a semi-arid area.

On the African continent, akin to the global concentration on agriculture insurance as a whole, studies have concentrated on crop insurance. Patt, Suares and Hess (2010) posed a question which they answered in their study: how do small-holder farmers understand insurance, how much do they want it? They examined evidence from Africa. This evidence was drawn from crop farmers. This was also the case in Mahul and Stutley (2010). As mentioned in the preceding paragraphs, livestock insurance has a comparatively thinner study interest from scholars.On the global scale, studies have been concentrated in Asia and Africa. Livestock insurance is covered in Mongolia (Skees & Amgalan, 2002; Mahul *et al*., 2009). Chizari *et al*., (2003) in Iran, and Fischer and Buchenrieder (2009) in Northern Vietnam.

In the breadth and length of the African continent, Kazianga and Udry (2005) covered Livestock insurance in rural Burkina Faso, and Lieveand Xu (2008) in the larger West Africa, Hess and Syroka (2005) in Southern Africa, and Mohamed and Ortoman (2005) in Eritrea. In eastern Africa, livestock insurance and by extension, Index Based Livestock Insurance has had minimal interest from researchers.

Studies on livestock insurance in Eastern Africa are carried out within a realm of Index Based Livestock Insurance by a group of scholars acting independently or jointly in various combinations. In Ethiopia, there is a single study by International Livestock Research Institute on Index Based Livestock Insurance. The study takes advantage on an earlier study on the same from Kenya. At the time of the publication of this study, studies on Index Based Livestock Insurance, though few, are in Kenya. IBLI studies in Kenya trace back to 2009. Chantarat, Mude and Barrett (2009) studied the willingness to pay for Index Based Livestock Insurance: Results from a field experiment in northern Kenya. In the same year, Mude and Barrett, now with Carter did a project summary of an IBLI Project piloted in Marsabit, Northern Kenya. The year wraps up with Mude, Chantarat, Barrett and Turvey (2009) assessing the performance of IBLI in the presence of a poverty trap.

Subsequent studies of IBLI in Kenya have been carried out by Chantarat *et al*., (2009). These are carried out as pointed before by a combination of these six researchers. This point to a limited pool of experts and researchers, in the field of IBLI. Additionally, it exposes the research to subjectivity even if scientific methods of research are applied. The previous researches on IBLI are all based on a pilot project in Marsabit Northern Kenya. Northern Kenya is vast and covers a significant part of the country. Similar to this expansiveness is its diversity. It has different socio-political and environmental settings. These studies are therefore deprived of experiences within the country and specifically Northern Kenya. While acknowledging strides made by previous research, it is evident that IBLI needs to be studied by a newer crop of researchers and in equally new contexts.

2.6 Research Gaps

The Kenya government session paper 8 of 2012 identified that limited value addition, significant infrastructural and financial constraint face livestock keepers and that the livestock sector lacks institutional support in research, development and marketing, particularly on livestock insurance schemes for pastoralists. Index Based Livestock Insurance is a new phenomenon that has just started recently spreading in developing countries. As formal weather insurance, the products have only recently begun to spread through developing countries. While considering the lag time of publishing this research, the body of peer-reviewed, published literature on the effects of the products on the performance on livestock projects seems to lack, or are quite limited. Specifically, few studies exist on the effect of Index Based Livestock Insurance on the performance of livestock projects in northern Kenya.

Giné *et al*. (2008) have documented insurance based on weather conditions in India. There also exists just a handful studies on index insurance globally (Barnett & Mahul 2007; Mookerjee *et al*., 2011; Skees *et al*., 2007). Other Studies, Mohammed and Ortmann (2005), consider a government-sponsored livestock insurance product, for example, National Insurance Corporation of Eritrea. As discussed previously, these government insurers pursue social welfare oriented objectives rather than self-

sustaining insurance principles. They heavily subsidize premiums and have weak and inefficient insurance contract provisions. In their conclusion, they are unanimous in showing that index insurance scale-ups from pilots to insurance products and solutions are few.

This paper considers the subject at a proverbial bird's eye view as a concept and chronicle of the effects of Index Based Livestock Insurance on the performance of livestock projects in Northern Kenya. Going forward, the research agenda will look carefully at the logic of offering IBLI products as part of a wider development-based social safety-nets that seeks to improve the incentives for investment in livestock by capturing part of the risk and also to stem the tide of persons forced into poverty due to livestock asset losses. Locally Carter, Ikegami and Janzen (2011) studied the dynamic demand of Index-Based Asset Insurance in the presence of poverty traps under the joint collaboration of the University of California and International Livestock Research Institute. They based the research on the IBLI pilot in Marsabit District in northern Kenya. At the moment, no systematic review of high-quality evidence focusing on Index Based Livestock Insurance, first as a commercial profit-oriented product and second, its effects on performance of livestock projects in Northern Kenya, has been attempted so far. Therefore, a significant purpose of this study is to lead the research community in developing a research agenda towards moderating effects of Index Based Livestock Insurance on the performance of livestock projects in the county, region and country.

2.7 Summary of Literature Reviewed

The study examines literature in two frameworks, theoretical and empirical. Theoretical literature covered three theoretical concepts: Push and Pull Marketing Strategy, Covariate and Idiosyncratic risks, and the theory of project performance. These theories provided a framework on which the study was based on.

The push and pull marketing strategy is applied by marketers with regard to the uptake of products through motivation of potential customers (Segal & McGee, 2012; Baloglu & Uysal, 1996, Cha *et al*., 1995; Crompton, 1979). Marketing

strategies are relevant as they help providers of IBLI in their sale of the product. Covariate and idiosyncratic risks is a classification that allows insurers to determine the formulation of insurance products (Skees & Enkh-Amgalan, 2002; Litzka, 2002; Brown & Churchill; 1999). This classification is particularly important in IBLI as it compensates covariate risks. The theory of project performance offers a monitoring and evaluation solution with regard to IBLI. It determines whether a project is progressing within acceptable confines and if it ultimately met its intended objectives (Aubry & Hobbs, 2011). This study sought, as the main objective, to study the performance of livestock projects in Northern Kenya, hence, the theory is relevant to the research.

The empirical framework examined the dependent, independent and intervening variables in the study and illustrated their interrelationships in Figure 2.2. The dependent variable is the performance of livestock projects with regard to awareness, number insured, market prices and benefits accrued with risk levels. Independent variables were broadly classified into four: socio-cultural factors, economic features, political situation, and personal characteristics. The socio-cultural factors included social groups and networks, religion and education factors. Economic features examine infrastructure, technology and livestock markets. The political situation was discussed in terms of security and conflict. Personal characteristics comprise age and gender, occupation, and lifestyle or experience in livestock ownership and product. The intervening variable is Index Based Livestock Insurance which was studied with regard to the Normalized Differential Vegetation Index, Tropical Livestock Unit (TLU) and premium. The theoretical and empirical frameworks determined the literature used. It also helped in having the overview of the research, organization and building an understanding of the study topic (Galvan, 2006).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the research methodologies which are research design, study site, target population, sample size and sampling technique, research instruments, pilot test, and data collection and analysis techniques.

3.2 Research Design

The study was guided by an epistemological research philosophy. Research philosophy relates to the development of knowledge and the nature of that knowledge (Saunders, Lewis &Thornhill, 2009). There are three epistemological positions: realism, interpretivist and positivism (Saunders, Lewis &Thornhill, 2009). This study adopted a positivist research paradigm which is an epistemological position. Positivism is characterized by a belief in theory before research and statistical justification of conclusions from the empirically testable hypothesis, the core of tenets of social science (Cooper & Schindler, 2011).

Research design is a structure, plan and strategy of investigating with an intention of drawing answers to research questions and control variance (Ogula, 2005). The study adopted both quantitative and qualitative research approach. Quantitive research is a generation of data in a numerical form which can be subjected to rigid and formal analysis. In this study economic features and political factors were determined. Qualitative research is the subjective assessment of opinions, attitudes and behaviour (Kothari, 2004). For this study considered social cultural factors and personal characteristics under a qualitative parameter.

The study used the cross-sectional design. Bryman and Bell (2015) define a cross-sectional design as gathering data on more than one case and at a single point time in order to collect a body of quantitative or quantifiable data in connection with two or more variables, which are then examined to detect patterns of association. The study

picked data that was collected over a period of time from 2010 when the program started. This data was sourced from the ministry of livestock, insurance providers and non-governmental organizations involved in this activity. In this case, the Livestock projects had been on-going, and therefore this study sought to establish the mediating effects of Index Based Livestock Insurance on factors affecting the performance of livestock projects over a period of time.

3.3 Target Population

This study targeted pastoralists living in Garissa and Wajir Counties. The reason for targeting them is because of their expansiveness. Garissa and Wajir Counties are estimated to have covered 44,174Km^2 and Wajir at 61,650.8 km^2 (KNBS, 2013). Further, the problem is prevalent in Garissa and Wajir Counties, while Mandera was excluded due to insecurity reasons. However, the findings from the study would generalized for Mandera County because of homogeneity of pastoralists in this region. The target population was the pastoralists' households living in Garissa and Wajir Counties where 90% of total projected populations practise pastoralism, (Government of Kenya, 2008). Thus, the target population was 1,280,921 pastoralists. The sub-counties' spread of the targeted population was shown in Table 3.1.

Table 3.1: Projected total and pastoral population for 2015.

Sub county/ District/ Constituency	2015 KNBS projected population figures	Pastoralist Population (90% of 2015 projection)
Garissa township	147,642	132,878
Balambala	92,293	83,064
Ladgera	116,944	105,250
Fafi	120,196	108,176
Daadab	192,500	173,250
Ijara	116,978	105,280
Tarbaj	135,271	121,744
Wajir south	157,311	141,580
Wajir east	136,149	122,534
Wajir West	110,232	99,209
Eldas	97,729	87,956
Total	**1,423,245**	**1,280,921**

Adapted from KNBS (2013)

3.4 Sampling Frame

The sample frame for this study was determined from the Households of IBLI users and non-users who reside within the six sub-counties of Lagdera, Fafi and Balambala in Garissa County, and Tarbaj, Wajir South and Wajir West Sub-counties in Wajir County. The study excluded Garissa Township since the population concentrated in Garissa town lacks sufficient homogenous number of pastoralists. A joint report by the government of Kenya, Danish and Norwegian embassies on the socio-economic and environmental impact of Dadaab refugee camps on host communities indicated that the majority of the residents of Dadaab sub-county benefit from the host community livelihood programs provided by actors or NGOs. Daadab Sub-county is excluded for this reason. Ijara sub-county was excluded because pastoralists in the area predominantly keep cattle (Mwanyumba, 2014). Their stock lack diversity and hence cannot be representative for IBLI purposes. In Wajir County, Wajir West and Eldas sub-counties were excluded due to the homogenous nature of the population. They are made of pastoralists. Mandera County was wholly excluded due to reported cases of insecurity and terrorist attacks.

3.5 Sample and Sampling Technique

3.5.1 Sample Size Determination

One important advantage of quantitative research methods is that valid inferences can be made on the study population from the findings of the study sample, as far as the sample is selected randomly enough to represent the important characteristics of the study population. The question then was the size of the study sample. The calculated sample size was 138 from the formula by Pfeiffer (2010).

$$\mathbf{n = Z^2 [p (1\text{-}p)/L^2]}$$

Where: n = the sample size;

Z = 1.96, the Standard Normal Deviate at the desired Confidence interval, 95%;

p = 0.9 (90%), the proportion (prevalence) of the households who own livestock (GOK, 2009);

L = 0.05 (5%), the precision.

The calculation of the sample size shown below:

$$\text{Sample size} = 1.96^2 [0.9 (1 - 0.9)/0.05^2]$$

$$= 3.84 [0.9 (0.1/0.0025)]$$
$$= 3.84 [0.9 (40)]$$
$$= 3.84 [36]$$
$$= 138.24$$

The size of the sample was influenced by the main statistical technique to be used in the study i.e. the structural equation modelling. Other factors that affected the sample size decision was related to the complexity (for generalization purposes) of the study, expected rate of missing data, and the estimation procedure used.

According to the generalization of scientific results, guidelines for sample size estimation indicate that: sample sizes larger than 30 and less than 500 are appropriate for most research, and when samples are to be divided into sub-samples, a minimum sample size of 30 for each category is necessary (Hair *et al*., 2006). Table 3.2 shows the sample size in each of the study areas.

Table 3.2: Sample sizes for the study area

Sub county/ district/constituency	Pastoralist Population (90% of projection)	Calculation	Sample Size
Balambala	83,064	(83,064/682,348)*138	17
Ladgera	105,250	(105,250/682,348)*138	21
Fafi	108,176	(108,176/682,348)*138	22
Tarbaj	121,744	(121,744/682,348)*138	25
Wajir south	141,580	(141,580/682,348)*138	29
Wajir east	122,534	(122,534/682,348)*138	25
Total	**682,348**		**138**

Source: Adapted from KNBS (2013)

3.5.2 Sampling Techniques

To come up with a manageable number of selected participants from a fairly large population, and for generalization purposes, multi-stage sampling methods was used together with snowball sampling and simple random sampling. A multistage random sampling was further development of cluster sampling. Cluster sampling groups the population into groups and clusters rather than individual elements (Kothari, 2004). Multistage random sampling technique was used to come up with Divisions where the interview was conducted because of the homogeneity of the sample.

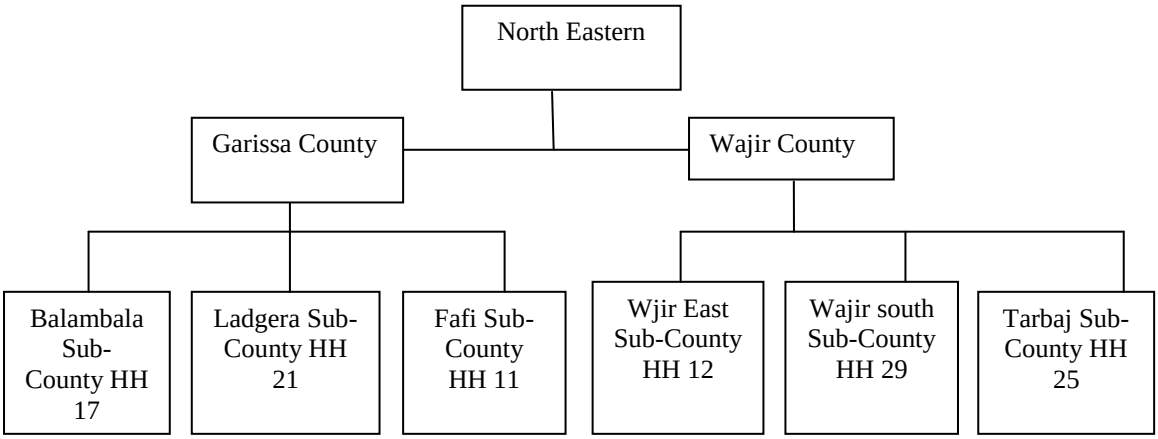


Figure 3.1: Illustration of Multistage Cluster Sampling used in the Study (HH-Households)

In each of the six selected sub-counties as illustrated in figure 3.1, two divisions were randomly sampled. Balambala sub-county had 17 questionnaires administered; 9 in Balambala Division and 8 in Sankuri. In Lagdera sub-county, 21 questionnaires were administered with 11 in Modogashe and 10 in Shanta-Abaq. 11 questionnaires were administered in each of the two selected divisions of Fafi Sub-county, being Bura and Jarajilla. Tarbaj sub-county had 25 questionnaires administered; 13 in Tarbaj Division and 12 in Wargadad. In Wajir West sub-county, 29 questionnaires were administered with 15 in Arbajahan and 14 in Hadado. 13 questionnaires were administered in Barwago and 12 questionnaires administered in Khorof-Harar in Wajir east sub-county. This will make a total of 138 questionnaires.

Snowball Sampling also referred to as referral chain sampling is a non-probability sampling technique for locating research cluster whereby one subject gives the researcher the location of the other cluster who in turn provides the location of the third and so on (Vogt, 1999). It is preferred in studies where subjects are hard to locate. In the case of this study, pastoralists were moving characters.

Since the unit of analysis is an adult household member, the list of households will be obtained from village elders then a simple random sampling will be used so that an enumerator shall be assigned to administer questionnaires to selected households.

3.6 Data Collection Instruments

The research instruments used in this study was questionnaires and focused group discussions. Denzin and Lincoln (2002) emphasized that the use of multiple methods for data collection will guarantee the in-depth understanding of the phenomenon under study. Therefore this study used multiple sources of Evidence triangulation from a different source that increased construct validity (Yin, 2009). Moreover, Creswell and Clark (2007) informed that using more than one technique for data collection is beneficial where one technique is weak the other may be strong and therefore the two will complement each other. Consequently, several data collection instruments were used i.e. the questionnaire, focus group discussion and content analysis.

A set of questionnaires for pastoralists (Both IBLI & non-IBLI users) consisting of open-ended and closed-ended responses was used. Kombo and Tromp (2006) notes that questionnaires gather data of a large sample, saves time, confidentiality is upheld and there is no opportunity for interview bias. The household questionnaires were both open and closed ended and on a Likert scale of 1 to 5. The first section of the questionnaires was designed to capture demographic data of the respondents and section two contains questions on moderating effects of Index Based Livestock Insurance on factors affecting the performance of livestock projects. The respondents were expected to respond to the interviewer administered questionnaires there after collected by the researcher and checked for quality.

The focus group discussion is preferred over interviews when the study sample is large, difficult and expensive to interview (Orodho, 2008). Focus group discussion (FGD) is a form of a group interview where participants interact, make arguments and joint examination on the topic at hand, instead of individualized contribution

(Bryman, 2008). FGD was used to gather information from the community leaders who are both in the sub-county and Division levels

3.6.1Measurement of Variables

Livestock projects performance: the study looked at the performance of livestock projects as a dependent variable. The performance was determined by ascertaining the average prices of livestock, gave the body condition of livestock using body score 1-5, average income from livestock and livestock products, income from livestock insurance and if the household does any destocking or off-take during drought.

Socio-Cultural factors: the socio-cultural dimension in this study was an independent variable. It was studied in three aspects: social, cultural and education. To measure the social effects, a 5-point Likert scale, (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree) was used to determine the effects the social dimension has on the performance. A mean score was calculated as the average of the 5 items on the social dimension and specifically its impact on the performance of livestock projects. If the score is high, it indicated high effects. The cultural effects were studied with concentration on the culture and norms of the pastoralists. A 5-point Likert scale, (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree) was used to determine the effects cultural dimension has on the performance. A mean score was calculated as the average of the 5 items on the cultural dimension and specifically its impact on the performance of livestock projects. If the score is high, it indicated a high effect. The level of education attained was measured using a choice-by-ticking option. The options were 'Form Four and above', Class 8, and Gambaro (adult education). A statistical model was used to determine the option with the highest score, and a ranking was deduced.

Political situation: the political dimension in this study was an independent variable. It was studied in two aspects: conflicts and security. Conflicts effects on the performance of IBLI utilized a5-point Likert scale, (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree). Security was also measured

using the same Likert scale. A mean score was calculated as the average of the 5 items on the political dimension and specifically its effects on performance of livestock projects. If the score is high, it indicated a high impact.

Index Based Livestock Insurance: IBLI was considered as a moderating variable in this study. To examine it further, relationship between variables were tested .a measuring using a5-point Likert scale, (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree). A mean score was calculated as the average of the 5 items on the IBLI dimension and specifically its impact on the performance of livestock projects. If the score is high, it indicated a high impact.

3.7 Pilot Testing

A pilot study was conducted in both Wajir and Garissa counties to preliminarily measure the existing scale and modify it to suit the context of this present study. The research identified issues with the tools and the issues were rectified immediately, for example, in education level category Form1-4 was missing and was later inserted. The research also identified necessary to intensely retrain the research assistant before sending them for data collection. Pilot test is an activity that assists the study in finding out if there are flaws, limitations, or other weaknesses within the interview design and allows the researcher to make necessary revisions prior to the implementation of the study (Saunders, Lewis and Thornhill, 2009). Cooper and Schindler (2011) indicate that a pilot test is done to detect weaknesses in design and instrumentation so as to provide proxy data for selection of a probability sample. Thus, in this study piloting was done purposely to ascertain the reliability and validity of the questionnaire.

During the pilot testing, the clarity of the research instruments was assessed. The study looked for items that may confuse respondents. Pre-testing helped to identify sensitive or annoying items and this helped to modify or omit. The information gathered was used to revise the instrument (Saunders, Lewis &Thornhill, 2007). A pilot study was conducted by interviewer administered questionnaires to 18 people with an intention of pre-testing the questions.

The procedures used in pre-testing the questionnaire were identical to those that were used during the actual study or data collection, and that the number in the pre-test was be small, about 1% to 10% of the target population (Mugenda&Mugenda, 2003). Baker (1988) states that the size of a sample to be used for piloting testing varies depending on time, costs and practicality, but the same would tend to be 5-10 percent of the main survey. Cooper and Schindler (2006) points that the respondents in a pilot test do not have to be statistically selected when testing the validity and reliability of the instruments.

A pilot study is usually carried out on members of the relevant population but not on those who will form part of the final sample. This is because it may influence the later behaviour of research subjects if they have already been involved in the research Bryman (2012). A pilot study involving 18% of the entire sample size was used in the pilot study. This translates to 28 pastoralists respondents both IBLI users and non-IBLI users from both Garissa and Wajir counties. From the feedback obtained questionnaires were refined and several measures which require revisions were done to make them more theoretically meaningful (Mugenda&Mugenda, 2003; Kothari, 2004). And the revised instruments used to collect data. According to Sekaran (2003), as cited by Gathenya (2012), data analysis in a study sought to achieve three objectives: getting a feel of the data, test of goodness of the data and test the hypothesis developed for the research.

3.7.1 Reliability and Validity Tests

Reliability is the extent to which results are free from error or degree to which a research instrument yields consistent results (Cooper & Scindler, 2003). Test of reliability was generalized carried out to check the internal consistency of data measurement instrument. Cronbach alpha was used to ascertain the reliability of the research instruments. Cronbach's Alpha is important to a researcher since they are able to know if the instruments will give reliable and consistent responses even if the questions are replaced with similar ones. A variable is stable if it gives a stable response from a similar set of questions.

Cronbach's Alpha indicates reliability by giving a true score of the 'base' or 'underlying' construct (Valencia-GO, 2015). A construct is defined by Sushil and Verma (2010) as a broad concept or topic of study. The true score also referred to as 'Alpha' has values ranging from 0 to 1. It can also be used to express reliability on questions with two possible answers (dichotomous questions) and/or questionnaires with rating scales. A high score indicates high reliability. 0.7 has been accepted as an acceptable coefficient of reliability or value of Alpha (Valencia-GO, 2015).Cronbach's basic equation for alpha by (Streiner, 2003)

$$\alpha = \frac{n}{n-1}\left(1 - \frac{\sum Vi}{Vtest}\right)$$

n = number of questions

Vi= variance of scores on each question

V test = total variance of overall scores (not %'s) on the entire test

It was important for a researcher to carry out reliability tests on the instruments especially when the derived variables were used in predictive analyses. A poor scale of reliability forces the researcher to modify or do away with items or questions. Exploratory factor analysis is one good way of screening for inefficient items that did not show high reliability.

The validity of an instrument relates to the ability of the instrument to measure the construct as purported. Construct validity is to measures whether the operational definition of variables actually reflects the true theoretical meaning of a concept. The questionnaire was developed based on similar prior studies with modifications aimed at addressing the study objectives. Content validity was confirmed through the guidance of the expert opinion (Cooper &Scindler, 2003). This included the supervisors whose scrutiny and competent opinions were ensured that the questionnaire covered all the study variables. They also double checked the document to ensure that the theoretical dimensions emerge as conceptualized.

3.7.2 Goodness of Fit Test

Jarque–Bera test (JB) (1987) is a goodness-of-fit test of whether sample data has the skewness and kurtosis matching a normal distribution.

$$JB = \frac{n-k+1}{6}\left(S^2 + \frac{1}{4}(C-3)^2\right)$$

Where *n* was the number of observations (or degrees of freedom in general); *S* is the sample skewness, *C* was the sample kurtosis, and k was the number of repressors.

$$S = \frac{\hat{\mu}_3}{\hat{\sigma}^3} = \frac{\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^3}{\left(\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2\right)^{3/2}},$$

$$C = \frac{\hat{\mu}_4}{\hat{\sigma}^4} = \frac{\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^4}{\left(\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2\right)^{2}},$$

Therefore for normal distribution skewness = 0 and kurtosis = 3

where $\hat{\mu}_3$and $\hat{\mu}_4$are the estimates of third and fourth central moments, respectively, $\bar{x}$is the sample mean, and $\hat{\sigma}^2$is the estimate of the second central moment's variable. The variance for normal distribution, the *JB* statistic asymptotically has a chi-squared distribution with two degrees of freedom, so the statistic can be used to test the hypothesis that the data are from a normal distribution. The null hypothesis is a joint hypothesis of the skewness being zero and the excess kurtosis being zero. Samples from a normal distribution have an expected skewness of 0 and an expected excess kurtosis of 0 (which is the same as a kurtosis of 3). As the definition of *JB* shows, any deviation from this increases the *JB* statistic.

3.8 Data Processing and Analysis

Data processing involves editing, coding, classification and tabulation of collected data so that they are amenable to analysis. The data was entered in CSPRO (Census

and Survey Processing System) then exported to SPSS for further analysis. On receiving the data the response rate was checked first to see how efficient it was that is the extent to which the administered questions were responded to the rule of thumb for an efficient response rate being 60%. The validity test was then carried out to determine the reliability of the instruments used in this case the questionnaire and was interpreted based on the rule of thumb of 0.7 being good (Mugenda, 2008).

3.8.1 Descriptive Statistics

The researcher carried out descriptive statistics which involved computation of mean, frequency distribution, standard deviation and percentages for independent variables (social cultural factors, economic features, political situation and personal characteristics) included in the study.

3.8.2 Multiple Regression Analysis

The purpose of multiple regression is to predict a single variable from one or more independent variables. Multiple regression with many predictor variables is an extension of linear regression with two predictor variables. A linear transformation of the X variables is done so that the sum of squared deviations of the observed and predicted Y is a minimum, interrelationships among all the variables must be taken into account in the weights assigned to the variables. The researcher, therefore, applied multivariate regression analysis to measure how the mediating variable (Index Based Livestock Insurance) affect the factors (political situation, socio-cultural values, personal characteristics, economic features) affecting the performance of livestock projects in northern Kenya. Below is the outline of each objective, hypothesis and data analysis.

1. To establish the moderating effect of Index Based Livestock Insurance on socio-cultural factors affecting the performance of livestock projects in Northeastern Kenya.

H_{01} – there is no moderating effect of Index Based Livestock Insurance on social cultural factors affecting Performance of livestock projects in Northeastern Kenya.

H_{11} – there is moderating effect of Index Based Livestock Insurance on social cultural factors affecting Performance of livestock projects in Northeastern Kenya.

Multiple regression and moderated hierarchical regressions model:

OLS Equation $\mathbf{Y = \beta 0 + \beta_1 X_1 + \varepsilon}$

MMR Equation $\mathbf{Y = \beta 0 + \beta_1 X_1 Z_1 + \varepsilon}$

Where:

Y= Performance of Livestock Projects

$\beta_{0=}$ constant term, β_1 = Beta coefficient forSocio-cultural Factors

X_1= Socio-cultural Factors

Z_1= Index Based Livestock Insurance,

$\boldsymbol{\varepsilon}$ = error term.

2. To determine the Moderating effect of Index Based Livestock Insurance on economic features affecting performance livestock projects in Northeastern Kenya.

   H_{02} – there is no Moderating effect of Index Based Livestock Insurance on economic features affecting Performance of livestock projects in Northeastern Kenya.

H_{12} – there is Moderating effect of Index Based Livestock Insurance on economic features affecting Performance of livestock projects in Northeastern Kenya.

Multiple regression and moderated hierarchical regressions model:

OLS Equation $\mathbf{Y = \beta 0 + \beta_2 X_2 + \varepsilon}$

MMR Equation $\mathbf{Y = \beta 0 + \beta_2 X_2 Z_1 + \varepsilon}$

Where:

Y= Performance of Livestock Projects

$\beta_{0=}$ constant term, β_2 = Beta coefficient for Economic Features

X_2= Economic Features

Z_1= Index Based Livestock Insurance,

$\boldsymbol{\varepsilon}$ = error term.

3. To explore the moderating effect of Index Based Livestock Insurance on political situations affecting performance livestock projects in Northeastern Kenya.

   H_{03} – there is no moderating effect of Index Based Livestock Insurance on political situations affecting Performance of livestock projects in Northeastern Kenya.

   H_{13} – there is moderating effect of Index Based Livestock Insurance on political situations affecting Performance of livestock projects in Northeastern Kenya.

   Multiple regression and moderated hierarchical regressions model:

   OLS Equation $\mathbf{Y = \beta 0 + \beta_3 X_3 + \varepsilon}$

MMR Equation $\mathbf{Y = \beta 0+\beta_3 X_3 Z_1+\varepsilon}$

Where:

Y= Performance of Livestock Projects

$\beta_{0=}$ constant term, β_3 = Beta coefficient for Political Factors

X_3= Political Factors

Z_1= Index Based Livestock Insurance,

$\boldsymbol{\varepsilon}$ = error term.

4. To determine the moderating effect of Index Based Livestock Insurance on external factors affecting the performance of livestock projects in Northeastern Kenya.

   H_{04} – there is no moderating effect of Index Based Livestock Insurance on external factors affecting Performance of livestock projects in Northeastern Kenya.

   H_{14} – there is moderating effect of Index Based Livestock Insurance on external factors affecting Performance of livestock projects in Northeastern Kenya.

   Multiple regression and moderated hierarchical regressions model:

   OLS Equation $\mathbf{Y = \beta 0 +\beta_4 X_4+ \varepsilon}$

   MMR Equation $\mathbf{Y = \beta 0+\beta_4 X_4 Z_1+\varepsilon}$

   Where:

   Y= Performance of Livestock Projects

   $\beta_{0=}$ constant term, β_4 = Beta coefficient for external factors

   X_4= External factors

Z_1= Index Based Livestock Insurance,

ε = error term.

The general hypothesis was:

H_0 – there is no moderating effect of Index Based Livestock Insurance on factors affecting Performance of livestock projects in Northeastern Kenya.

H_1 – there is moderating effect of Index Based Livestock Insurance on factors affecting Performance of livestock projects in Northeastern Kenya.

OLS Equation **Y = β0+β1X1+β2X2+β3X3+β4X4+ε**

MMR Equation **Y = β0 +β1X1Z+β2X2Z+β3X3Z+β4X4Z+ε**

Where; Y = Performance of Livestock Projects

β_0 = Constant or coefficient of intercept

X_1 = Socio-cultural Factors

X_2 = Economic Features

X_3 = Political Factors

X_4 = External factors

$\beta_1 ... \beta_4$ = Corresponding coefficients for the respective independent variables

Z = Corresponding coefficients for the moderating variable

ε = Error term

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1Introduction

This chapter presents the results of data analysis and the interpretations. The study's main objective was to find out the moderating effect of Index Based Livestock Insurance (IBLI) on factors affecting the performance of livestock projects in Northeastern Kenya.

4.1.1 Response Rate

The study analyzed 153 questionnaires administered to pastoralist communities living in Garissa and Wajir Counties. Table 4.1 indicates that all the distributed questionnaires were returned. A total of 21 questionnaires were from Lagdera, 14 from Balambala, 35 from Fafi, 5 from Garissa, 11 from Wajir South, 36 from Wajir West, 29 from Tarbaj, 1 from Wajir North and 1 from Wajir East. The study achieved an overall response rate of 100 % which was acceptable as suggested by Fosnacht (2013).

Table 4.1: Response rate

Category	Frequency	Percentage
Responded	153	100
Did not Respond	0	0
Total	**153**	**100**

4.1.2 Demographic Characteristics

This section discusses the results of the general information about the respondents including the gender, age bracket, education level, and the duration of employment.

a Respondents Gender

The respondents were asked to indicate their gender. The findings were as indicated in Table 4.1. Among the overall respondents, 29.6% were female while 70.4% were male. Since the sample was drawn at random, it can be concluded that there were more male household head compared to the female household head. Livestock is owned by both male and female pastoralists, however, the number of males who own livestock are higher than female and therefore the demand for IBLI would differ on the basis of gender (Bageant& Barrett, 2015). The apparent influence of gender on the acquisition of IBLI products was reported by Khalai (2015) whose study reported that women from the Somali side of northern Kenya had more power in making IBLI related decisions compared to their counterparts in Marsabit.

Table 4.2: Gender of the respondent

Gender	Frequency	Percent
Female	45	29.6
Male	107	70.4
Total	**152**	**100**

b Age Bracket

The respondents were asked to indicate their age. As shown in table 4.3, 2% of the respondents indicated that they belonged to the 20-29 age brackets while 25.8% fell in the 30-39 age brackets. 51.7% were in the 40-49 age brackets, 17.9% were in the age bracket 50-59 years with 2.6% being over 60 years. The results in Table 4.3 showed that majority of the respondents were between 30-49 years. The demand for IBLI still differs with age as reported by Bageant (2014) who conclude that the younger the population the greater the awareness of IBLI as a new form of insurance.

Table 4.3: Age bracket

Age bracket	Frequency	Valid Percent	Cumulative Percent
20-29 years	3	2	2
30-39 years	39	25.8	27.8
40-49 years	78	51.7	79.5
50-59 years	27	17.9	97.4
60 years or more	4	2.6	**100**
Total	**151**	**100**	

c Main Occupation

The respondents were asked to indicate their main occupation. As indicated in Table 4.4, 97.4% were livestock keepers, 0.7% were crop farmers and 2% were salaried employees. Occupation influences the performance of IBLI and since the main occupation was livestock keeping this would, in turn, influence the demand for IBLI. This is expected because the lifestyle of the pastoralists is nomadism and due to climatic changes experienced, most nomads would tend to take up IBLI.

Table 4.4: Main occupation

Main occupation	Frequency	Percent
Livestock keeper	148	97.4
Crop farmer (types of crops)	1	0.7
Year-round wage/salaried employee	3	2
Total	**152**	**100**

d Level of Education

The level of education is important in determining the literacy level of the respondents. The level of academic competencies influences the understanding of IBLI as a new and emerging option in insurance and risk management strategies (Katz *et al*., 2005). The study, as indicated in Table 4.5, established that 56.8% of the respondents had no education, 8.1% had gone through the lower primary, 25.7% of the respondents had attended Adult Education, and 4% had gone through upper primary while 5.4% had gone through secondary education. The majority of respondents had no education, indicating that the respondents had little knowledge of Index Based Livestock Insurance and this would, in turn, affect the demand of IBLI. This result justifies that the literacy level in the county is about 19% with a lot left to be desired in terms of infrastructure and institutions.

Table 4.5: Level of Education

Level of Education	Frequency	Percent
None	84	56.8
Class 1-4	12	8.1
Gumbaru (Adult Education)	38	25.7
Class 5-8	6	4.1
Form I-IV	8	5.4
Total	**148**	**100**

In addition, the literacy level in the county is about 19% with a lot left to be desired in terms of infrastructure and institutions.

e Number of Livestock Owned

The study sought to establish the number of livestock owned by the respondents. The study established that majority of the respondents (55.9%) owned between 1-30

camels,34.3% owned between 1-30 cattle's, 23.5% owned between 1-30 goats, 36.1% owned between 1-30 sheep and 58.8% owned between 1-30 donkeys. The number of livestock owned has been reducing over time due to the adverse drought experienced by the pastoralists. A study by Gertel and Le Heron, (2011) reported that the number of livestock has been reducing drastically due to the inability of livestock traders to pre-emptively sell their livestock in the face of imminent risk.

Table 4.6: Number of livestock

Type/ Species	0 (%)	1-30 (%)	31-60 (%)	61-90 (%)	91-120 (%)	>120 (%)
Camel	14.2	55.9	18.9	8.7	1.6	0.8
Cattle	5.1	34.3	25.5	16.1	8.8	10.2
Goat	0	23.5	22.9	19.6	13.1	20.9
Sheep	2.8	36.1	12.5	11.8	8.3	28.5
Donkeys	2.9	58.8	2.9	20.6	5.9	8.8

4.1.3 Index Based Livestock Insurance Contract Holders

The majority of respondents (65.6%) were not IBL contract holders while 34.4% were IBL contract holders as indicated in Table 4.7. The low coverage was an indicator that households were unfamiliar with the language and structure of IBLI. This concurred with IBLI Marketing Report (2014) done in Wajir County that reported that the pastoralists were not aware of IBLI or had insufficient understanding of IBLI which would lead to misinformation and declining trust for IBLI.

Table 4.7: Index Based Livestock Insurance contract holder

IBL contract holder	Frequency	Percent
No	84	65.6
Yes	44	34.4
Total	**128**	**100**

Also, this study corresponds to findings of Jensen, Barrett and Mude (2015) who found out that demand and uptake for IBLI in Borana and Marsabit areas was slow since the introduction of IBLI products. For example, in the sales periods following the launch, there was a continued upward trend in cumulative adoption but there was also a substantial rate of disadoption.Some disadoption is not surprising as households experiment with the product, especially if they do not receive indemnity payments early on that build their trust in the underwriter. Logistical complications also dampened demand.

a) Proportion of Livestock Under Insurance Cover

As indicated in Table 4.8, 53.8% of the respondents had insured a quarter of their camels, 54.1% had insured a quarter of their cattle, 64.9% had insured a quarter of their goats and 64.7% had insured a quarter of their sheep. The majority of respondents had only insured a quarter of their livestock, which indicates that they have not yet fully embraced the Index Based Livestock Insurance. This is also an indication that livestock insurance market has not been fully tapped. The cost of IBLI could result in the small proportion of livestock insured. This agreed with Karlan *et al*. (2010) whose study reported that expensive insurance products offered would lead to low penetration and low demand.

Table 4.8: Proportion of livestock under insurance cover

Type/Species	All (%)	Three-quarter (%)	Half (%)	Quarter (%)	None (%)
Camel	3.8	23.1	3.8	53.8	15.4
Cattle	0	21.6	24.3	54.1	0
Goat	1.8	14	19.3	64.9	0
Sheep	2	2	29.4	64.7	2

b) Reasons for Covering or not Covering Livestock under Insurance

The study sought to investigate the reason for not covering for livestock. As indicated in Table 4.9, 23.9% of the respondents who owned camels, 13.5% of those who owned cattle, 19.5% who owned goats and 19.4% who owned sheep were not aware of IBLI. This could be due to low literacy levels among the pastoralists (Bageant, 2014). The study revealed that 17% of the respondents who owned camels, 19.8% of those who owned cattle, 18.2% who owned goat and 16.7% who owned sheep had not covered their animals because IBLI was expensive and this lead to the low subscription (Karlan *et al*., 2010).

The results indicate that 5.7 % of the respondents who owned camel, 19.8 % of those who owned cattle, 18.2% who owned goat and 16.7%who owned sheep had not covered their animals as IBLI product was against their will. The findings agree with Kotler *et al*. (2008) whose study reported that every individual has different roles and status that in turn affects his buying behaviour. This would also influence the purchase of IBLI. The study showed that 3.4% of the respondents who owned camel, 2.1% of those who owned cattle, 3.9% who owned goat had not covered their animals because their neighbors had not covered. This might be due to the direct influence of the pastoralist group that he belongs to. The study concurs with Forsyth (2015) who posited that social groups within communities in northern Kenya affect the subscription of the IBLI.

The study showed that 9.1% of the respondents who owned camel, 10.4% of those who owned cattle and 9.1% who owned goat had not covered their animals because their religion did not allow them to engage in insurance. Mohamed and Patel (2003) study on insurance concluded that Conventional insurance is prohibited in Islam and thus would affect the performance of IBLI. This partly could explain the low penetration of the IBLI product. Respondents were asked the reason for covering their livestock as indicated in Table 4.9.The study showed that 12.5% of the respondents who owned camel, 7.3% of those who owned cattle and 2.6% who owned goat had covered their animals to mitigate the risk of attack by wild animals. The results showed that 26.1% of the respondents who owned camel, 30.2% of those who owned cattle, 35.1% who owned goat and 55.6% who owned sheep had covered their animals to prevent loss due to drought. This agrees with Mude *et al*. (2010) who stated the purpose for IBLI was to compensate the clients in the event of a loss.

The results indicated that 1.1% of the respondents who owned camel, 8.3% of those who owned cattle, 1.3% who owned goat had covered their animals to gain payouts bonus. The results indicated that 1.1% of the respondents who owned camel and 1.3% who owned goat had covered their animals to prevent their animals from theft.

Table 4. 9: Reason for covering or not covering livestock

Reason for not covering	**Camel (%)**	**Cattle (%)**	**Goat (%)**	**Sheep (%)**
Very expensive	17	19.8	18.2	16.7
Against my will	5.7	8.3	6.5	8.3
Am not aware	23.9	13.5	19.5	19.4
Neighbours are not registered	3.4	2.1	3.9	0
Religion not allowed	9.1	10.4	9.1	0
Covering reason	**Camel (%)**	**Cattle (%)**	**Goat (%)**	**Sheep (%)**
Prevent attacks by wild animals	12.5	7.3	2.6	0
To prevent loss	26.1	30.2	35.1	55.6
To gain payout bonus	1.1	8.3	1.3	0
Prevent from being stolen	1.1	0	3.9	0

4.1.4 Reliability and Validity Measurement Results

In order to measure the internal consistency of the study variables, Cronbach's Alpha was used. Reliability should be (0.60) or higher to indicate adequate convergence or internal consistency (Sekaran&Bougie, 2010: 184). The results of the reliability test for the study variables used are indicated in Table 4.10.

Table 4.10: Reliability of the Study Variables

Construct	Number of items	Cronbach's Alpha
socio-cultural factors	8	0.649
Economic Features	5	0.676
Political Factors	6	0.668
Index Based Livestock Insurance	24	0.945

The Cronbach's Alpha for socio-cultural factors, which had 8 items was 0.649. Economic factors which had 5 items indicated a Cronbach's Alpha of 0.676. The Cronbach's Alpha for political factors that comprised of 6 items was 0.668. Lastly, the Cronbach's Alpha for the index based livestock insurance construct that had 24 items was 0.945. All the constructs had a Cronbach's Alpha value above 0.6 which indicated adequate convergence or internal consistency.

4.1.5 Linear Relationship between Independent and Dependent Variables

From the study findings, it was established that the lowest significant correlation was between Security and Conflict and Economic factors ($r=0.166$, $p<0.05$) as shown in Table 4.11. The highest significant correlation was between Security and Conflict and Religion, culture, norms and values ($r=0.495$, $p<0.05$). A correlation of above 0.90 is a strong indication that the variables may be measuring the same thing (Tabachnick & Fidell, 2013). The fact that all the correlations were less than 0.90

was an indication that the factors were sufficiently different measures of separate variables, and consequently, this study utilised all the variables.

Table 4.11: Correlation Analysis

Variable	Measure	Religion, culture, norms and values	Economic Features	Security and Conflict	Performance
Religion, culture, norms and values	Pearson Correlation	1	0.099	.495**	0.191
	Sig. (2-tailed)		0.228	0	0.019
	N	152	151	150	152
Economic Features	Pearson Correlation	0.099	1	.166*	-0.023
	Sig. (2-tailed)	0.228		0.043	0.778
	N	151	151	149	151
Security and Conflict	Pearson Correlation	.495**	.166*	1	.325**
	Sig. (2-tailed)	0	0.043		0
	N	150	149	150	150
Performance	Pearson Correlation	.191*	-0.023	.325**	1*
	Sig. (2-tailed)	0.019	0.778	0	
	N	152	151	150	153

4.1.6 Normality Test

The normality of data distribution was assessed by examining its skewness and kurtosis (Kline, 2005). A variable with an absolute skew-index value greater than 3.0 is extremely skewed while a kurtosis index greater than 8.0 is an extreme kurtosis (Kline, 2005). Cunningham (2008) stated that an index smaller than an absolute value of 2.0 for skewness and an absolute value of 7.0 is the least violation of the assumption of normality. The results of the normality test of the study variables indicated skewness and kurtosis in the range of -1 and +1 as shown in Table 4.12. This implied that the assumption of normality was satisfied**.**

Table 4.12: Normality Test

Factor		Statistic	Std. Error
Performance	Mean	2.537	0.065
	Skewness	0.162	0.199
	Kurtosis	-0.375	0.395
Religion, culture, norms and values	Mean	3.439	0.028
	Std. Deviation	0.342	
	Skewness	-0.480	0.199
	Kurtosis	1.067	0.395
Economic Features	Mean	3.554	0.054
	Std. Deviation	0.654	
	Skewness	-0.824	0.199
	Kurtosis	0.642	0.395
Security and Conflict	Mean	3.393	0.060
	Std. Deviation	0.726	
	Skewness	-0.573	0.199
	Kurtosis	-0.125	0.395

a Normality Test using Shapiro-Wilk

Normality is tested by use of Kolmogorov-Smirnov and Shapiro-Wilk test. Kolmogorov-Smirnov is used for large samples while Shapiro-Wilk test is used for small samples (Thode, 2002). The study used Shapiro-Wilk test. The tests results show that the p-values for the variables <0.05 as shown in Table 4.13. The test rejects the null hypothesis of normality. Illustrating that the variable significantly deviated from normality.

Table 4.13: Normality test using Shapiro -Wilk

Variables	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Performance	0.138	149	<0.001	0.971	149	0.003
Religion, culture, norms and values	0.103	149	0.001	0.968	149	0.001
Economic Features	0.226	149	<0.001	0.921	149	<0.001
Security and Conflict	0.122	149	<0.001	0.938	149	<0.001

a) QQ plots for Independent and Dependent Variables

Although the Shapiro-Wilktest indicated that data deviated from normality, the study further explored normality using Quantile-Quantile (Q-Q) plot. The Q-Q plot showed the line representing the actual data distribution closely follow the diagonal in the normal Q-Q plot as shown in figures 4.1 to 4.4, suggesting normal distribution (Hair, *et al.,* 2006). In q-q plot or the normal probability plot, the observed value for each score is plotted against the expected value from the normal distribution, where, a sensibly straight line suggests a normal distribution (Pallant, 2007). By and large, if

the points in a q-q plot depart from a straight line, then the assumed distribution is called into question (Aas & Haff, 2006).

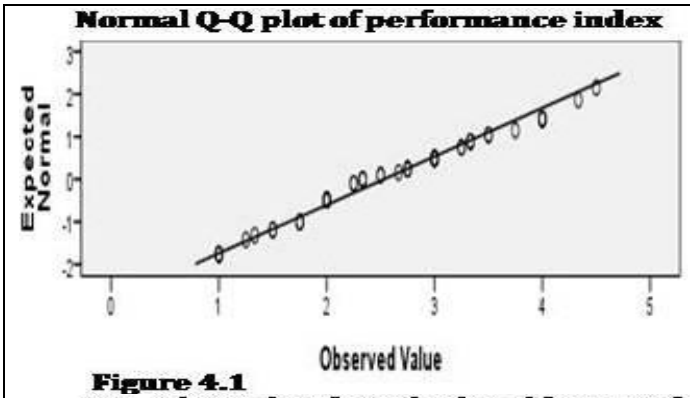


Figure 4.1

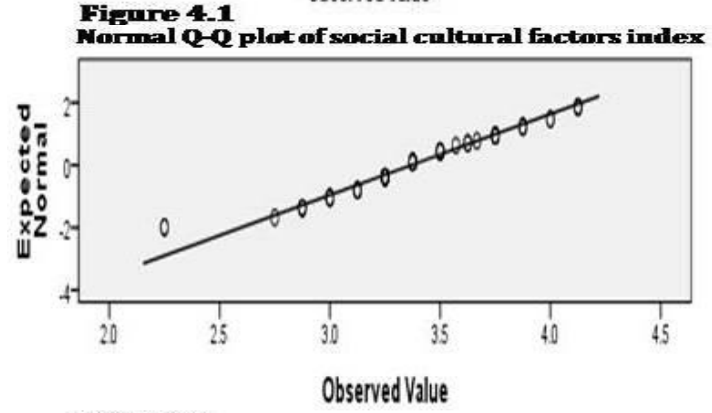


Figure 4.2

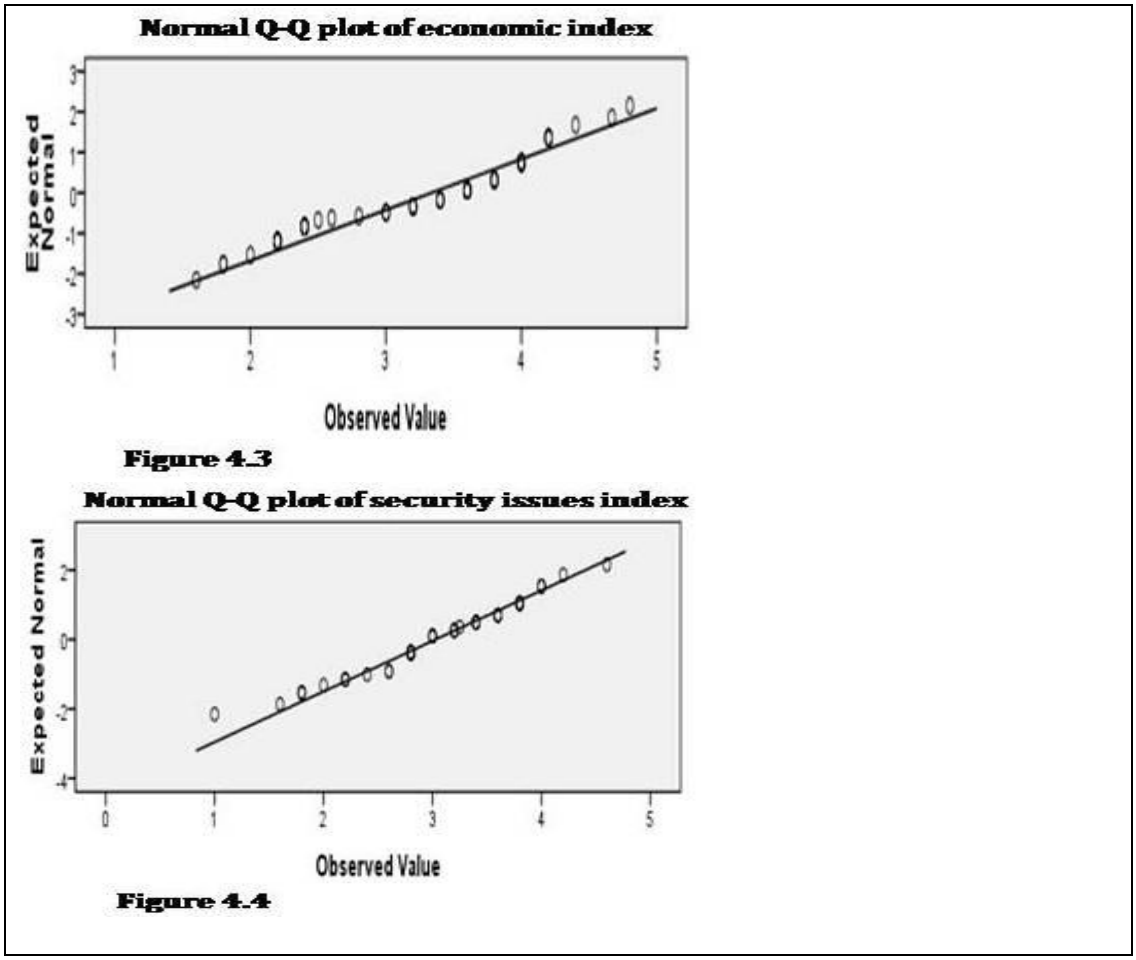


Figure 4.1: Normal Q-Q plot of performance index

Figure 4.2: Normal Q-Q plot of social cultural factors index

Figure 4.3: Normal Q-Q plot of economic index

Figure 4.4: Normal Q-Q Plots of security issues index

4.2 Effect of social –cultural factors and performance of livestock

The purpose of descriptive statistics is to enable the researcher, to meaningfully describe a distribution of scores or measurements using indices or statistics. The type of statistics or indices used depends on the types of variables in the study and the scale of measurements. The study used mean average; percentages and deviations to present the study findings.

4.2.1 Descriptive Analysis of Socio-Cultural Factors

The objective of the study was to establish the moderating effect of Index Based Livestock Insurance on socio-cultural factors affecting the performance of livestock projects in Northeastern Kenya. The socio-cultural factors were explored on the basis of qualitative and quantitative analysis against the performance of livestock projects measures. The findings were presented and discussed as (a) quantitative and qualitative analysis of insurance source information; religion, cultural, norms and (b) value insurance (c) test of hypothesis (correlational analysis and stepwise multiple regression) as quantitative analysis.

a) Insurance Source of Information

From the study findings, the majority of the respondents indicated that (78.4%) did view that friends were a major source of information on social-cultural factors. A large percentage of the respondents (53.6%) unanimously opined that neighbors were a source of information. Most of the respondents (66%) did not view that a religious leader/Imam at the mosque was as sources of information about social and cultural factors. A significantly large number (77.8%) shared this opinion about politicians (MP, MCAs). A majority (68.6%) did not consult administrative leader (DC, Chief, Government official) for information. A significantly large number (97.4%) did not view radio as a source of information. The majority of the respondents (93.5%) did not view newspapers as a source of information. The majority of the respondents (78.4%) did not view insurance agents as a source of information. A significant number (91.5%) did consult information from age mates around them as shown in Table 4.14.

Table 4.14: Source of Information on Insurance

Source of information	No (%)	Yes (%)
From friends	21.6	78.4
Neighbours	46.4	53.6
Through a religious leader/Imam at the mosque	66	34
Through politicians(MP, MCAs)	77.8	22.2
Through administrative leader (DC, Chief, Government official)	68.6	31.4
Through Radio	22.2	77.8
Through TV	97.4	2.6
Through Newspapers	93.5	6.5
Through insurance agents	78.4	21.6
Through age mates	91.5	8.5

From the study findings, it shows that the major source of information regarding insurance for the pastoralist's community is from focused groups. Intensive sensitization on the importance of IBLI is essential for up-scaling because providing regular and consistent information leads to better understanding. Pastoral communities are 'oral societies' and thus face-to-face engagement is highly preferred and radio and mobile phones are popular. This study is in agreement with the study of Kotler*et al*., (2008) who alluded that focused groups that have a direct influence on a person are called membership groups. Among these membership groups, there are primary groups such as family, friends, neighbors and co-workers in which there are continuous but informal interactions. Secondary groups include religious, professional and trade unions groups where there are more formal and less regular interactions.

b) Socio-cultural factors

A social cultural factors was measured using the Likert scale and the results, expressed as percentages, mean and standard deviation. The results in Table 4.15 indicates that majority of the respondents cumulatively, 93.7% of agreed that they have the full confidence of the Sheikh/Imam in their area. A few 23.4 % of the respondents agreed that they trust their friends fully. 78.1% of the respondents agreed that they are strong followers of community's culture and norms. 51.6% of the respondents agreed that the educated members of their household determine the decision they make. A few 28.9% of the respondents agreed that the decision made is a determinant of the group they belong. A significant small number32%) of the respondents agreed that the decision they make is influenced by the network they belong to. A large number of respondents 86.8% agreed that the community culture and norms influence their decision making.

Table 4.15: Social-cultural factors

	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)	Mean	Std. Deviation
Confidence of the Sheikh/Imam	0	0.7	2	32.2	65.1	4.62	0.563
Trust in your friends	2.7	30.7	43.3	12.7	10.7	2.98	0.986
Strong follower of the culture and norms	1.3	8.6	11.9	29.8	48.3	4.15	1.025
Educated members of household determines the decision you make	2.6	18.5	27.2	48.3	3.3	3.31	0.903
Group belong determine decision making	0.7	8.6	61.8	26.3	2.6	3.22	0.66
Network belong influences decision	0.7	6.7	60.7	21.3	10.7	3.35	0.786
Culture and norms of community influence decision making	2.6	9.2	1.3	59.2	27.6	4	0.949
Culture and norms of community doesn't influence decision making	0.7	8.8	0	56.8	33.8	4.14	0.857

Based on the study findings**,** the study found out that religion, culture, norms and values influence the decision making for the people of North-eastern Kenya. But the study found out that people had the full confidence of the Sheikh/Imam in their area and the majority of people are strong followers of community's culture and norms (Bishal, 2009). Also, the educated members of their household determine the decision they make and the community culture and norms influences their decision making such as livestock insurance. This result was in harmony with the study of Lawan and Zana (2013) who noted that the significance of religious value systems has long been recognized in sociology and psychology. Understanding the influence of religion on consumer behaviour is complicated. Previously religious psychology studies tended to focus on one's commitment to his or her religion as the main indicator for a religion's influence. Also, it was found from the study that the mean values represent points of convergence of the different respondents' opinions regarding the Religion, culture, norms and values. The low standard deviations of the opinions indicated a high clustering around the mean of the distribution. This implied that there was a close agreement in the opinions among the respondents.

4.2.2 Performance of Livestock Projects

a) Average Livestock Price

Based on the study findings, it was found out that livestock average price was Ksh 42,258 for camel, Ksh 21,600 for Cattle, Ksh 2,874 for sheep and Ksh 3,532 for goat as shown in Table 4.16.

Table 4.16: Livestock Average price

Species	N	Minimum	Maximum	Mean	Std. Deviation
Camel	112	14,000	60,000	42,258.04	9,754.395
Cattle	131	1,600	32,000	21,600.00	5,515.851
Sheep	147	1,700	9,000	2,874.83	936.683
Goat	152	1,000	5,000	3,532.57	792.186

The study showed very high standard deviations which demonstrate a wide dispersion around the mean of the distribution, implying that livestock average price differs widely. The study recorded that camels are the most costly livestock with a minimum recorded cost of Ksh 14,000 and a maximum recorded cost of 60,000. This result corresponds with the Marshall *et al*., (2014) who noted that camel was the most prestigious species hence the most expensive livestock as it was kept for the sale of milk, domestic consumption, carrying of loads and breeding purposes. Also, camels are drought resistance animals and hence preferred for domestication in arid and semi-arid areas.

b) Livestock Body Condition

The study sought to establish the body condition score of the livestock. 42.9% of the camels had their bone visible faintly, ribs not visible, body outline almost smooth. 42.9% of the cattle hip bone visible faintly, ribs not visible, body outline almost smooth, 39.2% of the sheep had their backbone visible, hip and shoulder bone visible, ribs slightly visible and 38.3% of the goats had their backbone visible, hip and shoulder bone visible, ribs slightly visible as shown in Table 4.17. The time for data collection was in November at the onset of the short rains in Garissa County.

Table 4.17: Livestock Body condition

body condition score	Camel (%)	Cattle (%)	Sheep (%)	Goat (%)
Backbone prominent, hip and shoulder bone prominent, ribs clearly visible	10.7	15	13.5	12.8
Backbone visible, hip and shoulder bone visible, ribs slightly visible	31.3	22.6	39.2	38.3
Hip bone visible faintly, ribs not visible, body outline almost smooth	42.9	42.9	37.2	35.6
Hip bone not visible, ribs well covered, body outline rounded	12.5	16.5	8.1	11.4
Hip bone showing fat deposits, ribs very well covered, body outline bulging due to fat	2.7	3	2	2

The study showed that many of the animals' body were fair conditions. This information was important because the animal body is used to determine the insurance IBLI premiums to be charged. This study agreed with the study of Njuki *et al*. (2011) who alluded that body weight of a cow was used to determine the IBLI premium.

c) Average Annual Income from Livestock

From the results, it showed that the mean value of the average yearly income from livestock and livestock products was Ksh 73,042 for camel, Ksh 44,424 for Cattle, Ksh 22,539 for sheep and Ksh 27,379 for a goat as shown in Table 4.18.

Table 4.18: Average yearly Income from Livestock

Species	N	Minimum	Maximum	Mean	Std. Deviation
Camel	110	2,000	12,0000	73,042	35555
Cattle	131	2,000	16,0000	44,424	25212
Sheep	147	2,000	15,0000	22,539	18684
Goat	148	2,000	16,0000	27,379	25078

Based on the results, it was found out that there were high standard deviations which demonstrated a wide dispersion around the mean of the distribution implying that actual average yearly income from livestock and livestock products differ widely. The high incomes of the camels are because of their prestige and hence fetch high revenue. The study also showed that animal was the major economic live hood of the pastoralists' communities.

d) Average Annual Income from Livestock Insurance

The mean value of the average yearly income from livestock insurance was Ksh 40480 for camel, Ksh 26205 for Cattle, Ksh 19746 for sheep and Ksh 11925 for goat as shown in Table 4.19. The high standard deviations demonstrate a wide dispersion around the mean of the distribution, implying that actual average yearly income from livestock insurance differ widely.

Table 4.19: Average yearly income from livestock insurance

	N	Minimum	Maximum	Mean	Std. Deviation
Camel	20	2,000	12,0000	40480	35275
Cattle	40	2,800	80,000	26,205	22102
Sheep	41	1,500	90,000	19,746	27274
Goat	44	1,000	80,000	11,925	15591

e) Livestock Off taking or Destocking

The study showed the results of livestock off taking or destocking during the drought.40.1% of the respondents do not destock their livestock during the drought while 59.9% off take their livestock during drought in Table 4.20.

Table 4.20: Livestock off taking or destocking during the drought

	Frequency	Percent
No	61	40.1
Yes	91	59.9
Total	**152**	**100**

Based on the study findings, the pastoralists are attached to their animals and are unwilling to sell them even if the drought is severe they would rather see their

animals die than sell them. This study agreed with the of Whittaker (2014) who noted that reduction in livestock herds through sale or mortality leads to the impoverishment of not only material wealth but also social status.

4.2.3 Linear Relationship between Social-cultural factors and Performance of Livestock Projects

The regression results in Table 4.21 shows the relationship between social-cultural factors (religion, culture, norms and values) and performance of livestock projects in north-eastern Kenya was significant (F=5.659, p-value=0.019). With R^2=0.036, the model implied that about 3.6% variation in performance of livestock projects in North-eastern Kenya is explained by variation in social-cultural factors. The model equation for the relationship between social-cultural factors (religion, culture, norms and values) and performance of livestock projects in North-eastern Kenya is therefore

$Y=1.025+0.44X_1$. Where Y is the performance of livestock projects in North-eastern Kenya and X_1 is social cultural factors (religion, culture, norms and values). The path coefficient β was positive and statistically significant (β =0.44, t=2.379, p=0.019) indicating that, for one unit increase in social cultural factors (religion, culture, norms and values), the performance of livestock projects in north-eastern Kenya increases by 0.44 units. The findings implied that social cultural factors (religion, culture, norms and values) significantly affect the performance of livestock projects. This finding corresponds to the study of Dixit *et al*. (2013) who noted that pastoralism is an old age engagement which has been handed over generations to the modern generation. It, therefore, has deep rooted beliefs that make up a body of indigenous knowledge. Pastoralists, like any other community, hold on to norms and customs for practical and nostalgic reasons. IBLI is not introduced to pastoralists in an insurance-vacuum; for centuries communities have had indigenous risk management strategies for their livestock.

Table 4.21: Regression results of socio-cultural factors on Performance of livestock projects

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.191[a]	0.036	0.03	0.7815		
ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	3.456	1	3.456	5.659	.019[b]
	Residual	91.611	150	0.611		
	Total	95.067	151			
Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.025	0.639		1.605	0.111
	Religion, culture, norms and values	0.44	0.185	0.191	2.379	0.019

a. Dependent Variable: Performance of livestock projects in Northeastern Kenya.

4.2.4 Moderated Regression Model for Social-cultural Factors and Livestock Performance

The first specific objective of this study was to establish the moderating effect of Index Based Livestock Insurance on socio-cultural factors affecting the performance of livestock projects in Northeastern Kenya.

The hypothesis to test for this specific objective was:

H_{01} – there is no moderating effect of Index Based Livestock Insurance on social cultural factors affecting the performance of livestock projects in Northeastern Kenya.

A hierarchical moderated multiple regression (MMR) was done to determine if Index Based Livestock Insurance moderates the relationship between social-cultural factors and Performance of livestock projects in Northeastern Kenya. Using the MMR analysis the moderating effect of the Index Based Livestock Insurance was analyzed by interpreting 1) the R^2 change in the models obtained from the model summaries and 2) the regressions coefficients for the product term obtained from the coefficients tables. This was undertaken in a three step process. At the first step the independent variable, at the second step, the independent variable i.e. social cultural factors and the hypothesized moderator (Index Based Livestock Insurance) were entered as predictors. At the third step, the cross product of each independent variables and Index Based Livestock Insurance were regressed on the outcome variable to test for interaction effects each step had model 1, 2 and 3.The results are shown in Table 4.22.

In model1 there was a significant relationship between the predictor (social-cultural factors) and performance of livestock projects in Northeastern Kenya. (R^2= 0.06, F (1, 126) = 8.105, p =0.005). The R^2= 0.06 showed that social cultural factors explain 6% of the variation in performance of livestock projects in Northeastern Kenya. The remaining 94% is due to other factors not captured in this model. The result in Model 2 presents the results for the independent variable (social-cultural factors) and the moderator (Index Based Livestock Insurance). The results in Model 2 indicated that social cultural factors have a significant and positive relationship with the performance of livestock projects in Northeastern Kenya (β= 0.545, t=2.680, p=0.006). The β of 0.545 indicates that a unit change in social cultural factors increased the performance of livestock projects in northeastern Kenya by 0.185 units, Index Based Livestock Insurance being constant. Further, there is an insignificant

relationship between Index Based Livestock Insurance and performance of livestock projects in Northeastern Kenya (β= -0.021, t= -0.185, p=0.885).

$$\mathbf{Y=0.608+0.545X_1-0.021X_5}$$

Where Y is the performance of livestock projects in northeastern Kenya, X_1 is social cultural factors (religion, culture, norms and values), X_5 is Index Based Livestock Insurance.

In model 3, the moderation is tested by introducing the interaction term social cultural factors * Index Based Livestock Insurance. There was a significant relationship between relationship social cultural factors and performance of livestock projects in northeastern Kenya (β= 0.668, t= 2.680, p=0.008). Therefore β= 0.668 indicated that a unit change in social cultural factors is associated with a 0.668 increase in performance of livestock projects in northeastern Kenya, Index Based Livestock Insurance being constant. The β changed from 0.545 to 0.668 after moderation. Further, there was a negative insignificant relationship between Index Based Livestock Insurance and performance of livestock projects in northeastern Kenya. The interaction term social cultural factors*Index Based Livestock Insurance is insignificant (β= -0.310, t= -0.784, p=0.434). There was a change in R^2 from 0.061 to 0.065 giving a R^2change of 0.005 which was small and insignificant (p value 0.434). In this regard, the study failed to reject H_{01}.

$$\mathbf{Y=0.183+0.668X_1-0.027X_5-0.310X_{1*}X_5}$$

The three models were significant as indicated by their F-values were (8.105, 4.032 and 2.884) and their corresponding p values were 0.005, 0.020 and 0.038 respectively. On adding IBLI variable on the model containing social cultural factors, the change in F was not significant (F-change =0.021, p=0.885) indicating that IBLI as a predictor has no significant influence on the performance of livestock projects. On adding the interaction term (social cultural factors*IBLI) to the model containing social cultural factors and IBLI as predictors, the change in F was not significant (F-change =0.615, p=0.434) meaning that IBLI is not a significant moderator of the

relationship between social-cultural factors and performance of livestock projects. This study finding corresponds with the study of Forsyth (2015) who observed that the interaction term social cultural factors and Index Based Livestock Insurance was insignificant. This is because conventional insurance is forbidden in Islam because it contains elements contradictory to Islamic Shariah.

Table 4.22: Moderated multiple regression for social cultural factors

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.246[a]	0.06	0.053	0.76631	0.06	8.105	1[a]	126	0.005
2	.246[b]	0.061	0.046	0.76931	0	0.021	1[b]	125	0.885
3	.255[c]	0.065	0.043	0.7705	0.005	0.615	1[c]	124	0.434

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.76	1	4.76	8.105	.005[b]
	Residual	73.992	126	0.587		
	Total	78.752	127			
2	Regression	4.772	2	2.386	4.032	.020[c]
	Residual	73.98	125	0.592		
	Total	78.752	127			
3	Regression	5.137	3	1.712	2.884	.038[d]
	Residual	73.615	124	0.594		
	Total	78.752	127			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	0.594	0.663		0.895	0.373		
	Religion, culture, norms and values	0.547	0.192	0.246	2.847	0.005	1	1
2	(Constant)	0.608	0.673		0.903	0.368		
	Religion, culture, norms and values	0.545	0.193	0.245	2.817	0.006	0.995	1.005
	Has IBLI	-0.021	0.144	-0.013	-0.145	0.885	0.995	1.005
3	(Constant)	0.183	0.865		0.212	0.833		
	Religion, culture, norms and values	0.668	0.249	0.3	2.68	0.008	0.601	1.664
	Has IBLI	-0.027	0.144	-0.016	-0.185	0.854	0.992	1.008
	IBLI*Social	-0.31	0.396	-0.088	-0.784	0.434	0.6	1.668

Although the model did not provide sufficient evidence of IBLI moderation on the relationship between social-cultural factors and performance of livestock projects, further investigations using scatter plot roughly suggested some form of moderation. As shown in Figure 4.5 the crossover point for the two regression lines occurs on the right side of predictor and therefore the moderator influenced the relationship narrowly. The performance of people with lower values of the social cultural index was below those who were holders of IBLI but for people with higher values of the social and cultural index, their performance of livestock projects was higher than the holders of IBLI.

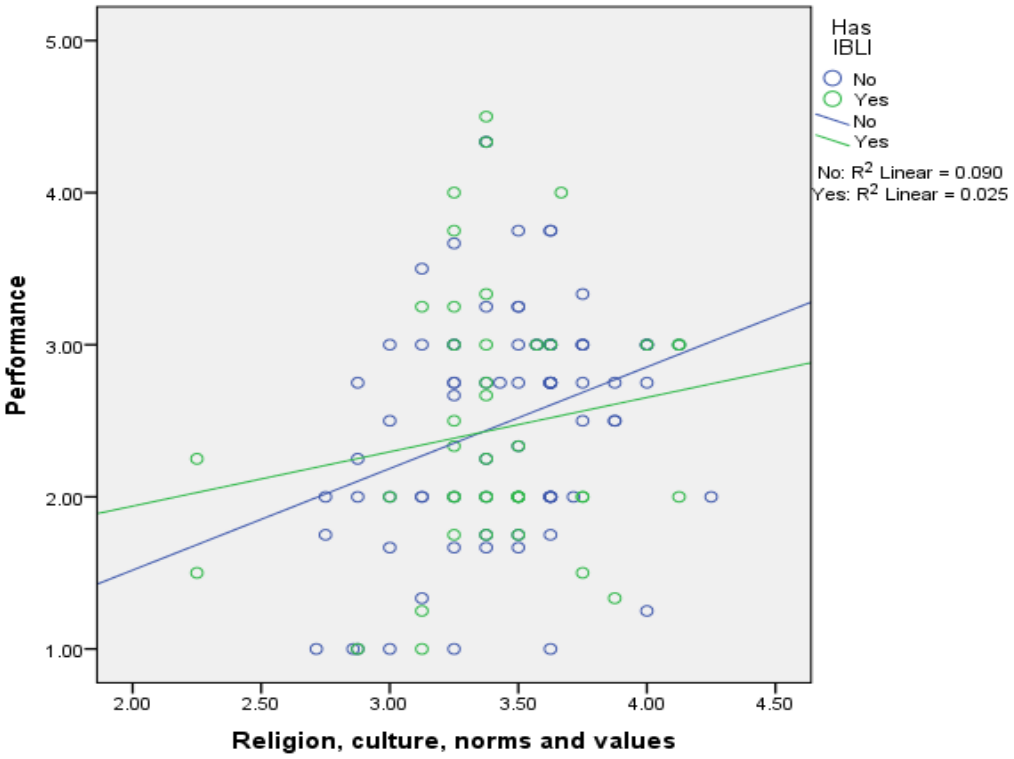


Figure 4.5: Slope of Moderated socio-cultural factors

Based on the findings from the scatterplot roughly suggested some form of moderation effect of IBLI and socio-cultural factors. IBLI affects slightly positive the performance of livestock projects because a community with educated people are likely to accept to insure their livestock against risks. This study agreed with the study of Heidorn (2012) that education helps individuals to harness new and

emergent phenomena. It creates a better understanding of the complex benefits accruing from such phenomena, which translates to better use. The benefit accrued from IBLI will be dependent on the level of education of the pastoralists. This will be to the extent to which IBLI is simplified since illiteracy levels in Northern Kenya are low.

4.2.5 Discussion of Findings of Socio-cultural Factors

This section discusses the research findings presented in the previous section and based on the study objective 1 that focuses on insurance source information, religion, culture, norms and value against the performance of livestock projects.

i. **Performance of livestock projects:** the study records that camel are the most costly livestock with a minimum recorded cost of Ksh 14,000 and a maximum recorded cost of 60,000. The camel was the most prestigious species hence the most expensive livestock as it was kept for the sale of milk, domestic consumption, carrying of loads and breeding purposes (Marshall *et al*., 2014). Camels are also drought resistant animals. The study also showed that livestock off taking or destocking during the drought.40.1% of the respondents do not destock their livestock during the drought while 59.9% off take their livestock during drought. The pastoralists are attached to their animals and are unwilling to sell them even if the drought is severe they would rather see them die than sell. Whittaker (2014) study revealed that reduction in livestock herds through sale or mortality leads to the impoverishment of not only material wealth but also social status.

ii. **Linear relationship between socio-cultural factors and performance of livestock projects:** The model equation for the relationship between social-cultural factors (religion, culture, norms and values) and performance of livestock projects in North-eastern Kenya is therefore: $Y=1.025+0.44X_{1,}$ were Y is the performance of livestock projects in north-eastern Kenya and X_1 is social cultural factors (religion, culture, norms and values). The path coefficient β was positive and statistically significant (β =0.44, t=2.379, p=0.019) indicating that,

for one unit increase in social cultural factors (religion, culture, norms and values), the performance of livestock projects in north-eastern Kenya increases by 0.44 units. The findings implied that social cultural factors (religion, culture, norms and values) significantly affect the performance of livestock projects. These findings concurred with Kotler *et al*. (2008) that groups that have a direct influence on a person are called the membership groups. Among these membership groups are primary groups such as family, friends, neighbors and co-workers in which there are continuous but informal interactions. People of northern Kenya community are pastoralists and the new generations tend to remain pastoralists hence increase the performance of livestock projects.

iii. **Multiple regression model for social cultural factors and performance of livestock:** On adding IBLI variable on the model containing social cultural factors, the change in F was not significant (F-change =0.021, p=0.885) indicating that IBLI as a predictor has no significant influence on the performance of livestock projects. On adding the interaction term (social cultural factors*IBLI) to the model containing social cultural factors and IBLI as predictors, the change in F was not significant (F-change =0.615, p=0.434) meaning that IBLI is not a significant moderator of the relationship between social-cultural factors and performance of livestock projects. These study findings corresponded with other studies reviewed in the literature that conventional insurance is forbidden in Islam because it contains elements contradictory to Islamic Shariah (Mohamed & Patel, 2003). There is uncertainty where the amount and time is not known gambling where the participant contributes a small amount of premium in hope to gain a large sum and interest where an element of interest exists as is in conventional insurance products (Mohamed & Patel, 2003). Also, IBLI is taken negatively by the Northern people of Kenya because it is expensive in designing and delivery of social protection funds. Hence one needs to have a sense of the opportunity cost of those funds; that is, how the expected benefit/cost ratio compares to other prospective interventions.

4.3. Effects of Economic Features and performance of livestock projects

The study was guided the following of objective: To determine the moderating effect of Index Based Livestock Insurance on economic features affecting performance livestock projects in Northeastern Kenya. The economic features were determined on the basis of qualitative and quantitative analyses of the performance of livestock projects measures. The findings were presented and discussed as (a) quantitative and qualitative analysis on infrastructure, technology and livestock market (b) market statistics and (c) test of hypothesis (stepwise multiple regression) as quantitative analysis.

4.3.1 Descriptive analysis of Economic features

a) Infrastructure /Technology /Livestock markets

Economics feature factors were measured using the Likert scale and the results expressed as percentages, mean and standard deviation. The mean values represented points of convergence of the different respondent's opinions regarding the economics features. The low standard deviations of the opinions indicated a high clustering around the mean of the distribution. This implied that there was a close agreement in the opinions among the respondents. The results in Table 4.23 Indicates that majority 96% were of the opinion that road infrastructure is important in effective mobility. 95% of the respondents unanimously opinioned that the area's vastness contributes to grazing the livestock to distance. Few of the respondents 38% agreed that the distance to marketplace was quite long. 54.7 % of the respondents agreed that accessibility of market had been a great challenge. 55.3% of the respondents agreed that it's very challenging to survive without fixed livestock market days. 68% of the respondents agreed that they had embraced the use of Technology in livestock management. 63.3% of the respondents agreed that road infrastructure was too bad to be useful in accessing markets.

Table 4.23: Infrastructure /technology /livestock markets

Economic Features	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std. Deviation
Road infrastructure assist household to easily move from one area to another	4	0	0.7	75	21	4.08	0.753
Vastness of the area contributes to grazing distances of livestock	0.7	0	4.6	74	21	4.15	0.546
Distance to market place is quite long	5.3	31	25	27	11	3.08	1.12
Accessibility of market is a challenge	4.8	20	21	52	2.7	3.28	0.971
It is challenging to survive without fixed livestock market days	5.3	20	19	52	3.3	3.28	0.997
Embraced use of Technology in livestock management	1.3	16	15	53	15	3.64	0.963
Road infrastructure is too bad to be useful in accessing markets	7.9	11	15	57	9.3	3.49	1.064
Roads are quite fine, we have no infrastructure problem.	1.3	17	12	41	29	3.8	1.081

Key: SA - Strongly Agree; A - Agree; N - Neutral; D - Disagree; SD - Strongly Disagree

From the study findings, it was established that road infrastructure was important in effective mobility. This study agreed with the study of Donovan (2013) who noted that road infrastructure was important for economic development of a region. Also, the study established that accessibility of market has been a great challenge to the people of North-eastern Kenya and this study finding corresponded with the study of little (2005) who explained that major challenge in Northern part of Kenya is the

inability to access markets because of poor road infrastructure. On average, the livestock is taken once to the market per month and one is to cover was about 18km. Likewise, the study established that the people of North-eastern Kenya do not have fixed livestock market days and this had been a big challenge for them to sell their animals. However, majority of the respondents agreed that they have embraced the use of Technology in livestock management.

b) Market Statistics

The mean value of the distance covered to the marketplace was 18.69 Km. On average, the livestock is taken once to the market per month as indicated in Table 4.24.

Table 4.24: Market Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Distance (in KM) covered to the market place	152	.50	120.00	18.69	21.65
Number of times livestock are taken to the market per month	149	1	6	1.23	.586

4.3.2 Linear relationship between economic features and performance of livestock projects

The regression results in Table 4.25 shows the relationship between economic features and performance of livestock projects in north-eastern Kenya was not significant (F=0.08, p-value=0.778).

Table 4.25: Regression results of economic features on performance livestock projects

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.023[a]	0.001	-0.006	0.79733		
ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	0.051	1	0.051	0.08	.778[b]
	Residual	94.725	149	0.636		
	Total	94.776	150			
Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.641	0.359		7.359	0
	Economic Features	-0.028	0.099	-0.023	-0.282	0.778

4.3.3 Multiple Regression Model for Economic Features

The second specific objective of this study was to determine the moderating effect of Index Based Livestock Insurance on economic features affecting performance of livestock projects in Northeastern Kenya. The hypothesis to test for this specific objective was:

H_{02} – there is no moderating effect of Index Based Livestock Insurance on economic features affecting Performance of livestock projects in Northeastern Kenya.

In model1 there is an insignificant relationship between the predictor (economic features) and Performance of livestock projects in Northeastern Kenya. (R^2= 0.00, F (1, 126) = 0.006, p=0.943). The results in Model 2 present the results for the independent variable (economic features) and the moderator (Index Based Livestock Insurance). The results in Model 2 indicate that economic features have an insignificant relationship with Performance of livestock projects in Northeastern Kenya (β= 0.002, t=0.015, p=0.988). Further, there is an insignificant relationship between Index Based Livestock Insurance and Performance of livestock projects in Northeastern Kenya (β= -0.05, t= -0.335, p=0.738).

$$Y=2.484 +0.002X_2-0.05X_5$$

Where Y is Performance of livestock projects in northeastern Kenya, X_2 is economic features, X_5 is Index Based Livestock Insurance.

In model 3, the moderation is tested by introducing the interaction term economic features * Index Based Livestock Insurance. There was an insignificant relationship between relationship economic features and performance of livestock projects in northeastern Kenya (β= 0.037, t= 0.247, p=0.806). The β changed from 0.002 to 0.037 after moderation. Further, there was an insignificant relationship (β= -0.052, t= -0.347, p=0.729) between Index Based Livestock Insurance and Performance of livestock projects in Northeastern Kenya. The interaction term economic features *Index Based Livestock Insurance is insignificant (β= -0.070, t= -0.333, p=0.740).

There was no change in R^2 (p-value 0.740). In this regard, the study failed to reject H_{02}.

$Y=2.356+0.0.037X_2-0.347X_5-0.333X_{2*}X_5$

The three models were not significant as indicated by their F-values were (0.006, 0.059 and 0.076) and their corresponding p values were 0.937, 0.943 and 0.973 respectively. On adding IBLI variable on the model containing economic factors, the change in F was not significant (F-change =0.112, p=0.738) indicating that IBLI as a predictor has no significant influence on the performance of livestock projects. On adding the interaction term (economic factors*IBLI) to the model containing economic factors and IBLI as predictors, the change in F was not significant (F-change =0.111, p=0.74) meaning that IBLI is not a significant moderator of the relationship between economic factors and performance of livestock projects.

Table 4.26: Moderated Multiple Regression for Economic features

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		Change Statistics		
					R Square Change	F Change	df1	df2	Sig. F Change
1	.007[a]	0	-0.008	0.79056	0	0.006	1[a]	126	0.937
2	.031[b]	0.001	-0.015	0.79336	0.001	0.112	1[b]	125	0.738
3	.043[c]	0.002	-0.022	0.79619	0.001	0.111	1[c]	124	0.74

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.004	1	0.004	0.006	.937[b]
	Residual	78.748	126	0.625		
	Total	78.752	127			
2	Regression	0.074	2	0.037	0.059	.943[c]
	Residual	78.677	125	0.629		
	Total	78.752	127			
3	Regression	0.145	3	0.048	0.076	.973[d]
	Residual	78.607	124	0.634		
	Total	78.752	127			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.444	0.372		6.576	0		
	Economic Features	0.008	0.102	0.007	0.079	0.937	1	1
2	(Constant)	2.484	0.392		6.339	0		
	Economic Features	0.002	0.104	0.001	0.015	0.988	0.966	1.035
	Has IBLI	-0.05	0.15	-0.03	-0.335	0.738	0.966	1.035
3	(Constant)	2.356	0.55		4.283	0		
	Economic Features	0.037	0.148	0.032	0.247	0.806	0.482	2.076
	Has IBLI	-0.052	0.151	-0.032	-0.347	0.729	0.964	1.037
	IBLI*Econ	-0.07	0.209	-0.043	-0.333	0.74	0.486	2.059

Although the model did not provide sufficient evidence of IBLI moderation on the relationship between economic factors and performance of livestock projects, however on investigations using scatterplot roughly suggested some form of moderation. The crossover point for the two regression lines occurs on the right side of predictor and therefore the moderator influenced the relationship narrowly. The performance of people with lower values of economic factors index was lower than those who were holders of IBLI but for people with higher values of economic factors index, their performance of livestock projects was higher than the holders of IBLI as shown in Figure 4.6.

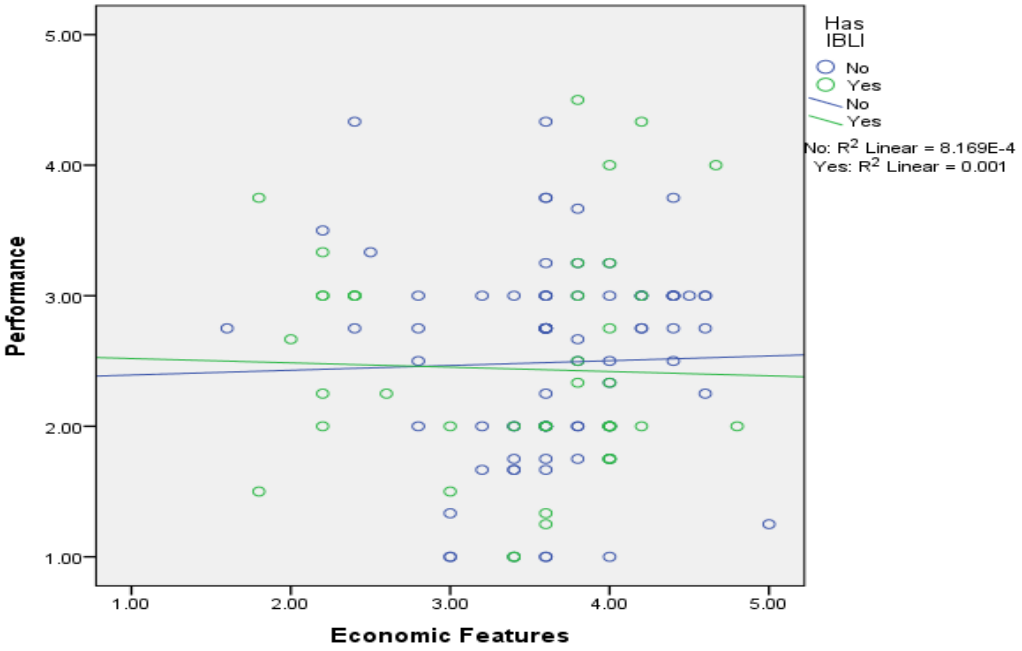


Figure 4.6: Slope of Moderated Economic Features

The scatter plots suggest some form of moderation effect. This is might be because of the existence of poor livestock market in the northern known as *Dilaalas*, which do not offer better market prices and increase the uptake of insurance of livestock. This study is in harmony with the study of little (2005) who noted that the availability of markets determines whether a pastoralist will afford premiums. Better market prices will underline the importance to the pastoralists in ensuring that livestock reaches saleable age. Insurance takes care of uncertainties that may impact

on attaining that age. The number of livestock insured will be boosted by the ease of availability of markets.

4.3.4 Discussion of Findings and of Economic Features and Performance of Livestock Projects

This section discusses the research findings presented in the previous section and based on the study objective 2 that focuses on infrastructure, technology and livestock markets on the performance of livestock projects.

i. Linear relationship between economic features and performance of livestock projects:

The regression results in Table 4.25 showed the relationship between economic features and performance of livestock projects in North-eastern Kenya was not significant (F=0.08, p-value=0.778). The insignificance of the model may be attributed to the natural attachment of the pastoralist to their animals that makes them unwilling to sell them and consequently locking up potentially valuable income that could be an economic empowerment means (Marshall *et al*., 2014). The transport network in northern Kenya is thin, disjointed, and in places non-existent. Key arterial routes linking Kenya to international markets in Ethiopia, South Sudan and Somalia are poorly maintained and prone to periodic closure from flooding or other damage. All this increases the cost of delivering the product particularly as the low population densities means that one must cover large areas to access a relatively small number of potential beneficiaries (Mude*et al*., 2009). Hence the reason economic features do not increase the performance of livestock projects in Northeastern Kenya.

ii. Multiple Regression Model for Economic Features

When the moderation was tested by introducing the interaction term economic features and Index Based Livestock Insurance. There was an insignificant relationship between relationship economic features and performance of livestock projects in northeastern Kenya (β= 0.037, t= 0.247, p=0.806). The β changed from

0.002 to 0.037 after moderation. Further, there was an insignificant relationship (β= -0.052, t= -0.347, p=0.729) between Index Based Livestock Insurance and Performance of livestock projects in northeastern Kenya. The interaction term economic features *Index Based Livestock Insurance is insignificant (β= -0.070, t= -0.333, p=0.740).

There was no change in R^2 (p-value 0.740). In this regard, the study failed to reject H_{02}.

$Y=2.356+0.0.037X_2-0.347X_5-0.333X_{2*}X_5$

The three models were not significant as indicated by their F-values were (0.006, 0.059 and 0.076) and their corresponding p values were 0.937, 0.943 and 0.973 respectively. On adding IBLI variable on the model containing economic factors the change in F was not significant (F-change =0.112, p=0.738) indicating that IBLI as a predictor has no significant influence on the performance of livestock projects. On adding the interaction term (economic factors*IBLI) to the model containing economic factors and IBLI as predictors, the change in F was not significant (F-change =0.111, p=0.74) meaning that IBLI is not a significant moderator of the relationship between economic factors and performance of livestock projects.

Further investigations using scatterplot roughly suggested some form of moderation. As shown in Figure 4.7 the crossover point for the two regression lines occurs on the right side of predictor and therefore the moderator influenced the relationship narrowly. The performance of people with lower values of economic factors index was lower than those who were holders of IBLI but for people with higher values of economic factors index, their performance of livestock projects was higher than the holders of IBLI.

4.4. Effects of Political Situation and performance of livestock projects

The objective of the study was to explore the moderating effect of Index Based Livestock Insurance on political situations affecting performance of livestock

projects in Northeastern Kenya. The political situations were determined on the basis of qualitative and quantitative analyses of the performance of livestock projects measures. The findings were presented and discussed as (a) quantitative and qualitative analysis on conflicts and security (b) test of hypothesis (stepwise multiple regression) as quantitative analysis.

4.4.1 descriptive analysis of political situation

a) Insecurity and Conflicts

Insecurity and Conflicts factor was measured using the Likert scale and the results expressed as percentages, mean and standard deviation. The mean values represent points of convergence of the different respondent's opinions regarding the insecurity and Conflict construct. The low standard deviations of the opinions indicated a high clustering around the mean of the distribution. This implied that there was a close agreement in the opinions among the respondents. The results in Table 4.27 indicates that majority of the respondents 63% agreed that terrorism is exposed to their district/religion, 56.3% agreed that predominant nature of insecurity in their area is gang related or Shifta, 91.7 agreed that the predominant nature of conflicts in their area is family or clan related, 55% were afraid that their livestock could be stolen, 37.4% are careful not to stock so many livestock for fear of insecurity, 22% agreed that security apparatus are good enough to make them comfortable, 96.5% use community measure to address insecurity and 3.4% don't use community measure to address insecurity. These results agree with the reviewed literature that since 1990, Kenya has experienced a marked decay in human security, from ballooning petty crime to the advent of ethnic cleansing and terrorism. The local and international press often mentions the phenomenon of rising crime and insecurity (Brown, 2003).

Table 4.27: security issues

Political Factors	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std. Deviation
District/Religion is exposed to Terrorism	17.3	11.3	8	51	12	3.29	1.314
The predominant nature of insecurity your area is gang related or Shifta	19.3	15.3	8.7	49	7.3	3.1	1.309
The predominant nature of conflicts your area is family or clan related	2	1.3	5.3	49	42.7	4.29	0.797
You are always afraid that your livestock could be stolen	0.7	18	26.7	51	4	3.39	0.851
You are careful not to stock so many livestock for fear of insecurity	10.1	26.4	26.4	36	1.4	2.92	1.04
The security apparatus are good enough to make you comfortable	22.7	44.7	10.7	22	0	2.32	1.058
You use community measure to address insecurity	2	1.3	0	73	23.5	4.15	0.672
You don't use community measure to address insecurity	31.1	65.5	0	1.4	2	1.78	0.708

Key: SA-Strongly Agree; A-Agree; N- Neutral; D-Disagree; SD-Strongly Disagree

From the study it was found out that terrorism is exposed to the people of Northeastern Kenya districts and agreed that there was a predominant nature of insecurity in their areas such gang related, Shifta, family or clan related conflicts and this study findings corresponds to the study of Brown (2003) who noted that the people of Northeastern Kenya are exposed to insecurity in their areas such shifta, terrorism and clan conflicts. The study equally established that the people of Northeastern Kenya were afraid that their livestock could be stolen. The majority of respondents also agreed that security apparatus are not good enough to make them comfortable and therefore they are forced use community measure to address insecurity which concurred with the studies of Menkhaus (20150 and Kumssa*et al*. (2009).

b Index Based Livestock Insurance

Statements by Index Based Livestock Insurance holder construct were measured using the Likert scale and the results, expressed as percentages, mean and standard deviation. The mean values represent points of convergence of the different respondent's opinions regarding the Statements of Index Based Livestock Insurance holder construct. The low standard deviations of the opinions indicated a high clustering around the mean of the distribution. This implied that there was close agreement in the opinions among the respondents. The results in Table 4.28 indicates 80.6% of the respondents agreed believe groups/networks have significantly contributed to performance of their livestock keeping, 81.8% believe groups/networks supported by insurance contributed to performance of their livestock keeping, 93.3% believe religious leaders/imams have significantly contributed to performance of their livestock keeping, 90% believe religious leaders/imams supported by insurance contributed to performance of their livestock keeping, 91.7% believe education of your household have significantly contributed to performance of their livestock keeping, 88.3% believe education of their household supported by insurance contributed to performance of their livestock keeping.

Also, 98.3% believe infrastructural/road networks of their area have significantly contributed to the performance of their livestock keeping, 91.7% believe infrastructure/road networks of their area supported by insurance contributed to the performance of their livestock keeping, 93.3% believe technology development in their area contributed to the performance of their livestock keeping. 84.5% believe technology development in their area is supported by insurance contributed to the performance of their livestock keeping, 91.6% believe livestock markets in their area have significantly contributed to the performance of their livestock keeping, 93.2% believe livestock markets in their area is supported by insurance contributed to the performance of their livestock keeping. 91.5% believe conflicts in their area is significantly affected the performance of their livestock keeping, 89.8% believe conflicts in their area supported by insurance significantly affects the performance of

their livestock keeping, 91.6% believe insecurity in their area significantly affects the performance of their livestock keeping.

Likewise, 91.5% believe insecurity in their area supported by insurance significantly affects the performance of their livestock, 86.5% believe that age significantly contributes to the performance of their livestock keeping. 93.2% believe that age supported by insurance significantly contributes to the performance of their livestock keeping, 91.5% believe that gender significantly contributes to the performance of their livestock keeping, 91.5% believe that gender supported by insurance significantly contributes to the performance of their livestock keeping, 89.9% believe occupation of their household members significantly contributes to the performance of their livestock keeping, 91.5% believe occupation of their household members supported by insurance significantly contributes to the performance of their livestock keeping. 93.3% believe their experience in livestock ownership significantly contributes to the performance of their livestock keeping and 91.7% believe their experience in livestock ownership supported by insurance significantly contributes to the performance of their livestock keeping as shown in appendix IV.

4.4.2 Linear Relationship Between Political Situations and Performance of Livestock Projects

The regression results in Table 4.29 shows the relationship between political situations (Security and Conflict) and performance of livestock projects in North-eastern Kenya was significant ($F=17.509$, p-value<0.001). With $R^2=0.106$ the model implied that about 10.6% variation in performance of livestock projects in North-eastern Kenya is explained by variation in political situations.

The model equation for the relationship between political situations (Security and Conflict) and performance of livestock projects in North-eastern Kenya is therefore:

$$\mathbf{Y=1.321+0.357X_3}$$

Where Y is the performance of livestock projects in North-eastern Kenya and X_3 is political situations (Security and Conflict). The path coefficient β was positive and statistically significant (β =0.357, t=4.184, p<0.001) indicating that, for one unit increase in political situations (Security and Conflict), the performance of livestock projects in north-eastern Kenya increases by 0.357 units. The findings also implied that political situations (Security and Conflict) affect the performance of livestock projects. This agrees with Chantarat*et al*. (2009) whose study concluded that conflict and insecurity has an impact on adoption and operationalization of IBLI. Also, the study agreed with other studies reviewed in the literature that human security has been cited as a pre-requisite to human development (Chandler, 2012; Donnelly, 2013; Malik, 2013). The northern region of Kenya has lagged behind due to the insecurity that dates back to the shifta war in the 1960s. It is the most marginalized part of the country, in core human development factors (Kumssa*et al*., 2009). Thus, if security is improved in northeastern, there will be an increase of performance of livestock projects.

Table 4.28: Regression results of political situations on performance of livestock projects

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.325[a]	0.106	0.1	0.75684		
ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	10.03	1	10.03	17.509	.000[b]
	Residual	84.776	148	0.573		
	Total	94.806	149			
Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.321	0.296		4.456	0.000
	Insecurity and Conflict	0.357	0.085	0.325	4.184	0.000

4.4.3 Multiple Regression Model for Political Situations

The third specific objective of this study was to explore the moderating effect of Index Based Livestock Insurance on political situations affecting the performance of livestock projects in Northeastern Kenya.

The hypothesis tested for this specific objective was:

H_{03} – there is no moderating effect of Index Based Livestock Insurance on political situations affecting Performance of livestock projects in Northeastern Kenya.

In model1 there is a significant relationship between the predictor (political situations) and Performance of livestock projects in Northeastern Kenya. (R^2= 0.137, F (1, 126) = 19.66, p <0.001). The R^2= 0.137 shows that political situations explain 13.7% of the variation in Performance of livestock projects in Northeastern Kenya. The remaining 86.3 % is due to other factors not captured in this model.

The results in Model 2 present the results for the independent variable (political situations) and the moderator (Index Based Livestock Insurance). The results in Model 2 indicate that political situations have a significant and positive relationship with Performance of livestock projects in Northeastern Kenya (β= 0.423, t=4.534, p < 0.001). The β of 0.423 indicates that a unit change in political situations increases the performance of livestock projects in Northeastern Kenya by 0.423 units, Index Based Livestock Insurance being constant. Further, there is an insignificant positive relationship between Index Based Livestock Insurance and Performance of livestock projects in Northeastern Kenya (β= 0.143, t= 0.991, p=0.323).

$$\mathbf{Y=1.003+0.423X_3+0.143X_5}$$

Where Y is Performance of livestock projects in northeastern Kenya, X_3 is political situations, X_5 is Index Based Livestock Insurance.

In model 3, the moderation is tested by introducing the interaction term political situations * Index Based Livestock Insurance. There was a significant relationship

between relationship political situations and performance of livestock projects in northeastern Kenya (β= 0.437, t= 3.819, p < 0.001). Therefore β= 0.437 indicates that a unit change in political situations is associated with a 0.437 increase in performance of livestock projects in northeastern Kenya, Index Based Livestock Insurance being constant. The β changed from 0.423 to 0.437 after moderation. Further there was an insignificant relationship (β= 0.134, t= 0.896, p=0.372).between Index Based Livestock Insurance and performance of livestock projects in northeastern Kenya.

The interaction term political situations *Index Based Livestock Insurance is insignificant (β= -0.042, t= -0.209, p=0.834). In this regard, the study failed to reject H_{03}.

There was a change in R^2 from 0.007 to 0.0000 giving a R^2change of 0.007 which was small and insignificant (p-value 0.834).

$$\mathbf{Y=0.955+0.437X_3+0.134X_5-0.042X_1{*}X_5}$$

The three models were significant as indicated by their F-values were (19.666, 10.323 and 6.843) and their corresponding p values were <0.01, <0.01and <0.01respectively. On adding IBLI variable on the model containing Insecurity and conflict, the change in F was not significant (F-change =0.983, p=0.323) indicating that IBLI as a predictor has no significant influence on the performance of livestock projects. On adding the interaction term (Insecurity and conflict *IBLI) to the model containing insecurity and conflict and IBLI as predictors, the change in F was not significant (F-change =0.044, p=0.834) meaning that IBLI is not a significant moderator of the relationship between insecurity and conflict and performance of livestock projects.

Table 4.29: Moderated Multiple Regression for political situations

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	Change Statistics F Change	df1	df2	Sig. F Change
1	.370[a]	0.137	0.13	0.73868	0.137	19.666	1[a]	124	0
2	.379[b]	0.144	0.13	0.73873	0.007	0.983	1[b]	123	0.323
3	.380[c]	0.144	0.123	0.74162	0	0.044	1[c]	122	0.834

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.731	1	10.731	19.666	.000[b]
	Residual	67.661	124	0.546		
	Total	78.391	125			
2	Regression	11.267	2	5.633	10.323	.000[c]
	Residual	67.124	123	0.546		
	Total	78.391	125			
3	Regression	11.291	3	3.764	6.843	.000[d]
	Residual	67.1	122	0.55		
	Total	78.391	125			

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.14	0.306		3.725	0		
	insecurity and Conflict	0.397	0.09	0.37	4.435	0	1	1
2	(Constant)	1.003	0.336		2.987	0.003		
	insecurity and Conflict	0.423	0.093	0.394	4.534	0	0.921	1.086
	Has IBLI	0.143	0.144	0.086	0.991	0.323	0.921	1.086
3	(Constant)	0.955	0.408		2.344	0.021		
	insecurity and Conflict	0.437	0.114	0.407	3.819	0	0.618	1.619
	Has IBLI	0.134	0.15	0.081	0.896	0.372	0.856	1.169
	IBLI*insecurity and Conflict	-0.042	0.199	-0.023	-0.209	0.834	0.577	1.734

Although the model did not provide sufficient evidence of IBLI moderation on the relationship between political situations and performance of livestock projects further investigations using scatterplot revealed no form of moderation as shown in Figure

4.7, the difference in slopes between respondents with IBLI and those without is not huge. The performance of people with lower values of insecurity and conflict index was below those who were holders of IBLI and for people with higher values of insecurity and conflict index, their performance of livestock projects is still lower than the holders of IBLI.

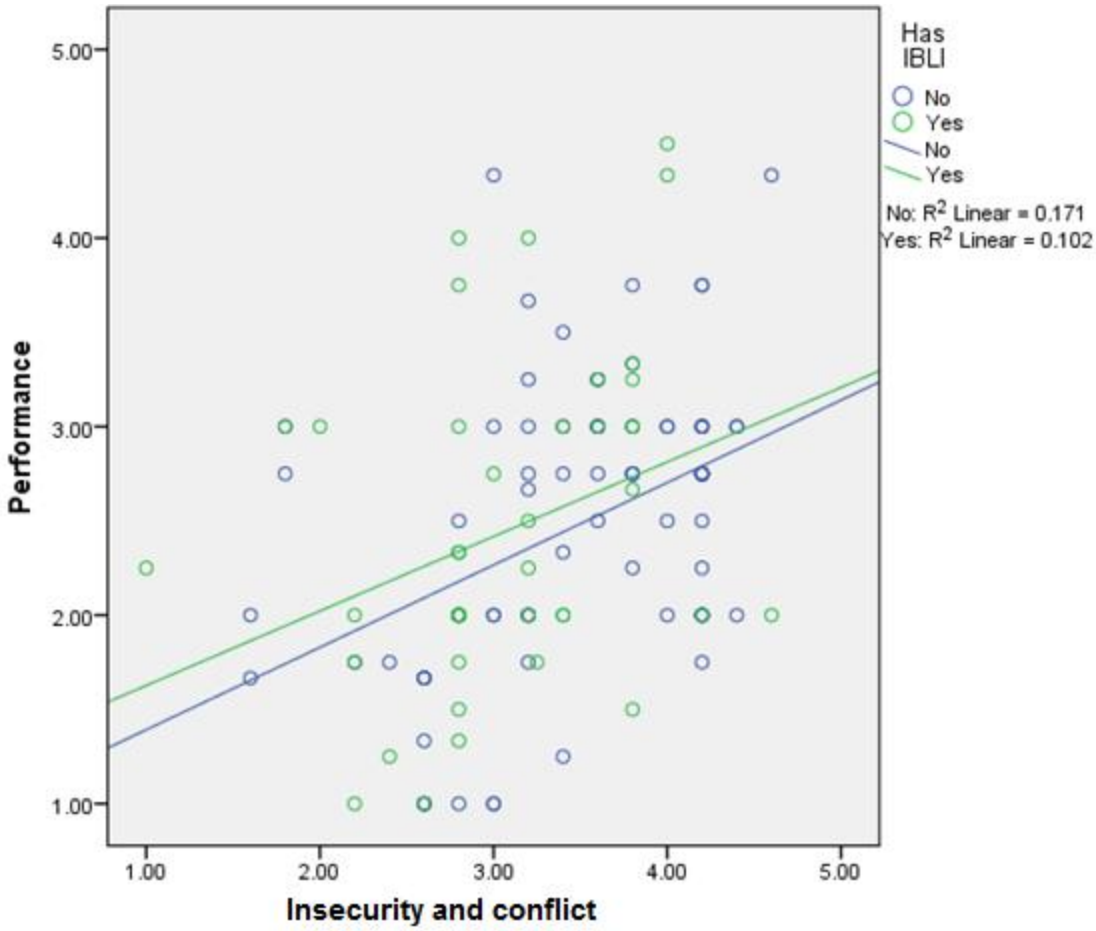


Figure 4.7: Slope of Moderated security issues.

From the scatterplot, it clearly showed that no form of moderation effect between political situations and livestock performance. This finding was in harmony with the study of Eriksen (2009) who noted that communities are the primary victims of conflicts even as they are the main perpetrators. They are both targets and instruments of conflict. In times of conflict, pastoralists will not benefit from

insurance. Their preoccupation will be to save their livestock from raids and themselves from attacks. They will fall back on their premiums and be uninsured. New customers will also not be found.

4.4.4 Discussion of Findings and of Political Situations and Performance of Livestock Projects

This section discusses the research findings presented in the previous section and based on the study objective 3 that focuses on conflicts and security on the performance of livestock projects.

i. Linear relationship between political situations and performance of livestock projects

The regression results showed the relationship between political situations (Security and Conflict) and performance of livestock projects in North-eastern Kenya was significant ($F=17.509$, p-value<0.001). With $R^2=0.106$ the model implied that about 10.6% variation in performance of livestock projects in North-eastern Kenya is explained by variation in political situations. The findings also implied that political situations (Security and Conflict) affect the performance of livestock projects. This agrees with Chantarat*et al*. (2009) whose study concluded that conflict and insecurity has an impact on adoption and operationalization of IBLI. The study also agreed with other studies reviewed in the literature that human security has been cited as a pre-requisite to human development (Chandler, 2012; Donnelly, 2013; Malik, 2013). The northern region of Kenya has lagged behind due to the insecurity that dates back to Shifta war in the 1960s. It is the most marginalized part of the country in core human development factors (Kumssa*et al*., 2009). Thus, if security is improved in Northeastern there will be an increase of performance of livestock projects.

ii. Multiple regression model for political situations

The moderation was tested by introducing the interaction term political situations * Index Based Livestock Insurance. There was a significant relationship between

political situations and performance of livestock projects in Northeastern Kenya (β= 0.437, t= 3.819, p < 0.001). Therefore β= 0.437 indicates that a unit change in political situations is associated with a 0.437 increase in performance of livestock projects in northeastern Kenya, Index Based Livestock Insurance being constant. The β changed from 0.423 to 0.437 after moderation. Further, there was an insignificant relationship (β= 0.134, t= 0.896, p=0.372) between Index Based Livestock Insurance and performance of livestock projects in Northeastern Kenya.

The interaction term political situations *Index Based Livestock Insurance is insignificant (β= -0.042, t= -0.209, p=0.834). In this regard, the study failed to reject H_{03}.

There was a change in R^2 from 0.007 to 0.0000 giving a R^2change of 0.007 which was small and insignificant (p-value 0.834).

$$\mathbf{Y=0.955+0.437X_3+0.134X_5-0.042X_1{*}X_5}$$

The three models were significant as indicated by their F-values were (19.666, 10.323 and 6.843) and their corresponding p values were <0.01, <0.01and <0.01respectively. On adding IBLI variable on the model containing Insecurity and conflict, the change in F was not significant (F-change =0.983, p=0.323) indicating that IBLI as a predictor has no significant influence on the performance of livestock projects. On adding the interaction term (Insecurity and conflict *IBLI) to the model containing insecurity and conflict and IBLI as predictors, the change in F was not significant (F-change =0.044, p=0.834) meaning that IBLI is not a significant moderator of the relationship between insecurity and conflict and performance of livestock projects. Further investigations using scatter plot revealed no form of moderation as shown in Figure 4.7, the difference in slopes between respondents with IBLI and those without is not huge. The performance of people with lower values of insecurity and conflict index was below those who were holders of IBLI and for people with higher values of insecurity and conflict index, their performance of livestock projects is still lower than the holders of IBLI.

4.5. Moderating effect of Index Based Livestock Insurance on External Factors

Objective 3: Determined the moderating effect of Index Based Livestock Insurance on external factors affecting performance livestock projects in Northeastern Kenya.The external factors were determined on the basis of qualitative and quantitative analyses of the performance of livestock projects measures. The findings were presented and discussed as (a) quantitative and qualitative analysis on conflicts and security (c) test of hypothesis (stepwise multiple regression) as quantitative analysis.

4.5.1 Multiple regression between external factors and Performance of Livestock Projects

A multiple regression analysis was conducted to find out the linear relationship between all the independent variables and the dependent variable. As shown in Table 4.30, the multiple regression analysis indicated that there was a significant relationship between social-cultural factors (religion, culture, norms and values), economic factors, political situations (security and conflict) and performance of livestock projects in North-eastern Kenya ($F(3,145)=6.578$, $p<0.001$). The resulting goodness of fit was $R^2=0.106$ indicating that 10.6% of the variability in performance of livestock projects in North-eastern Kenya is explained by the combined effect of social cultural factors (religion, culture, norms and values), economic factors, political situations (Security and Conflict).

The model equation for the relationship between social-cultural factors (religion, culture, norms and values), economic factors, political situations (Security and Conflict) and Performance of livestock projects in Northeastern Kenya is therefore:

$$\mathbf{Y=1.331+0.114X_1-0.110X_2+0.335X_3}$$

Where Y is the performance of livestock projects in North-eastern Kenya, X_1 is social cultural factors (religion, culture, norms and values), X_2 is economic factors and X_3 is political situations (Security and Conflict). The path coefficient for social

cultural factors was statistically insignificant (β =0.114, t=0.544, p=0.587). The path coefficient for economic factors was statistically insignificant ($\beta = -0.11$, t=-1.14, p=0.256).The path coefficient for political situations was positive and statistically significant (β =0.355, t=3.574, p<0.01) indicating that for one unit increase in political situations (security and conflict), Performance of livestock projects in north-eastern Kenya increases by 0.355 units.

Overall, it was found out that there was no moderating effect of Index Based Livestock Insurance on external factors affecting the performance of livestock projects in Northeastern Kenya. This could be as a result of high premiums which discourages demand for insurance products. This study is in harmony with the study of McPeak *et al*. (2010) who noted that premium rates offered under IBLT are derived from the cost and value of services offered to a particular livestock species within on drought season. Kočović *et al*. (2010) explained that the IBLI product being implemented in Kenya pays out when forage scarcity is predicted to cause livestock deaths in an area. This makes it difficult to compute using normalized difference vegetation index (NDVI) that provides estimated readings of forage availability. In addition, the index is measured per division meaning that the payouts will be made as per the divisional index readings. Clients are only allowed to purchase this insurance in a two-month buying window prior to the rainy seasons and hence make insurance unpopular to the performance of livestock projects in Northern eastern Kenya.

Table 4.30: Overall Regression Model

Model Summary								
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate				
1	.346[a]	0.12	0.102	0.75747				
ANOVA[a]								
Model		Sum of Squares	Df	Mean Square	F	Sig.		
1	Regression	11.323	3	3.774	6.578	.000[b]		
	Residual	83.196	145	0.574				
	Total	94.519	148					
Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.331	0.688		1.934	0.055		
	Religion, culture, norms and values	0.114	0.209	0.049	0.544	0.587	0.756	1.323
	Economic Features	-0.11	0.097	-0.09	-1.14	0.256	0.972	1.029
	Security and Conflict	0.355	0.099	0.323	3.574	0.000	0.743	1.345

4.5.2 Multiple regression model for external factors and performance of livestock

The first specific objective of this study was to establish the moderating effect of Index Based Livestock Insurance on external factors affecting the performance of livestock projects in Northeastern Kenya. The hypothesis to test for this specific objective was:

H_{01} – *There is no moderating effect of Index Based Livestock Insurance on external factors affecting the performance of livestock projects in Northeastern Kenya.*

A hierarchical moderated multiple regression (MMR) was done to determine if Index Based Livestock Insurance moderates the relationship between social-cultural factors and Performance of livestock projects in Northeastern Kenya. Using the MMR analysis the moderating effect of the Index Based Livestock Insurance was analyzed by interpreting 1) the R^2 change in the models obtained from the model summaries and 2) the regressions coefficients for the product term obtained from the coefficients tables.

This was undertaken in a three step process. At the first step the independent variable, at the second step, the independent variable i.e. social cultural factors and the hypothesized moderator (Index Based Livestock Insurance) were entered as predictors. At the third step the cross product of each independent variables and Index Based Livestock Insurance were regressed on the outcome variable to test for interaction effects each step had model 1, 2 and 3.The results are shown in Table 4.31.

In model1 there is a significant relationship between the predictor (social-cultural factors) and performance of livestock projects in Northeastern Kenya. (R^2= 0.06, F (1, 126) = 8.105, p =0.005). The R^2= 0.06 showed that social cultural factors explain 6% of the variation in performance of livestock projects in Northeastern Kenya. The remaining 94% is due to other factors not captured in this model. The result in Model 2 presents the results for the independent variable (social-cultural factors) and the

moderator (Index Based Livestock Insurance). The results in Model 2 indicated that social cultural factors have a significant and positive relationship with the performance of livestock projects in Northeastern Kenya (β= 0.545, t=2.680, p=0.006). The β of 0.545 indicates that a unit change in social cultural factors increased the performance of livestock projects in Northeastern Kenya by 0.185 units Index Based Livestock Insurance being constant. Further, there is an insignificant relationship between Index Based Livestock Insurance and performance of livestock projects in Northeastern Kenya (β= -0.021, t= -0.185, p=0.885).

$$Y=0.608+0.545X_1-0.021X_5$$

Where Y is the performance of livestock projects in Northeastern Kenya, X_1 is social cultural factors (religion, culture, norms and values), X_5 is Index Based Livestock Insurance.

In model 3 the moderation is tested by introducing the interaction term social cultural factors * Index Based Livestock Insurance. There was a significant relationship between relationship social cultural factors and performance of livestock projects in Northeastern Kenya (β= 0.668, t= 2.680, p=0.008). Therefore β= 0.668 indicated that a unit change in social cultural factors is associated with a 0.668 increase in performance of livestock projects in Northeastern Kenya, Index Based Livestock Insurance being constant. The β changed from 0.545 to 0.668 after moderation. Further, there was a negative insignificant relationship between Index Based Livestock Insurance and performance of livestock projects in Northeastern Kenya.

The interaction term social cultural factors*Index Based Livestock Insurance is insignificant (β= -0.310, t= -0.784, p=0.434). There was a change in R^2 from 0.061 to 0.065 giving a R^2change of 0.005 which was small and insignificant (p-value 0.434). In this regard, the study failed to reject H_{01}.

$$Y=0.183+0.668X_1-0.027X_5-0.310X_{1*}X_5$$

The three models were significant as indicated by their F-values were (8.105, 4.032 and 2.884) and their corresponding p values were 0.005, 0.020 and 0.038 respectively. On adding IBLI variable on the model containing social cultural factors, the change in F was not significant (F-change =0.021, p=0.885) indicating that IBLI as a predictor has no significant influence on the performance of livestock projects. On adding the interaction term (social cultural factors*IBLI) to the model containing social cultural factors and IBLI as predictors, the change in F was not significant (F-change =0.615, p=0.434) meaning that IBLI is not a significant moderator of the relationship between social-cultural factors and performance of livestock projects.

Table 4.31: Moderated multiple regression for external factors

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		Change Statistics		
					R Square Change	F Change	df1	df2	Sig. F Change
1	.246[a]	0.06	0.053	0.76631	0.06	8.105	1[a]	126	0.005
2	.246[b]	0.061	0.046	0.76931	0	0.021	1[b]	125	0.885
3	.255[c]	0.065	0.043	0.7705	0.005	0.615	1[c]	124	0.434

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.76	1	4.76	8.105	.005[b]
	Residual	73.992	126	0.587		
	Total	78.752	127			
2	Regression	4.772	2	2.386	4.032	.020[c]
	Residual	73.98	125	0.592		
	Total	78.752	127			
3	Regression	5.137	3	1.712	2.884	.038[d]
	Residual	73.615	124	0.594		
	Total	78.752	127			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	0.594	0.663		0.895	0.373		
	Religion, culture, norms and values	0.547	0.192	0.246	2.847	0.005	1	1
2	(Constant)	0.608	0.673		0.903	0.368		
	Religion, culture, norms and values	0.545	0.193	0.245	2.817	0.006	0.995	1.005
	Has IBLI	-0.021	0.144	-0.013	-0.145	0.885	0.995	1.005
3	(Constant)	0.183	0.865		0.212	0.833		
	Religion, culture, norms and values	0.668	0.249	0.3	2.68	0.008	0.601	1.664
	Has IBLI	-0.027	0.144	-0.016	-0.185	0.854	0.992	1.008
	IBLI*Social. C	-0.31	0.396	-0.088	-0.784	0.434	0.6	1.668

4.5.3 Discussion of findings of external factors and performance of livestock projects

Multiple regression analysis indicated that there was a significant relationship between social-cultural factors (religion, culture, norms and values), economic factors, political situations (security and conflict) and performance of livestock projects in North-eastern Kenya ($F(3,145)=6.578$, $p<0.001$). The resulting goodness of fit was $R^2=0.106$ indicating that 10.6% of the variability in performance of livestock projects in North-eastern Kenya is explained by the combined effect of social cultural factors (religion, culture, norms and values), economic factors and political situations (Security and Conflict).

When the external factors were also moderated all the three models were significant as indicated by their F-values were (8.105, 4.032 and 2.884) and their corresponding p values were 0.005, 0.020 and 0.038 respectively. On adding IBLI variable on the model containing social cultural factors, the change in F was not significant (F-change =0.021, p=0.885) indicating that IBLI as a predictor has no significant influence on the performance of livestock projects. On adding the interaction term (social cultural factors*IBLI) to the model containing social cultural factors and IBLI as predictors, the change in F was not significant (F-change =0.615, p=0.434) meaning that IBLI is not a significant moderator of the relationship between social-cultural factors and performance of livestock projects.

These study findings corresponded with other studies reviewed in the literature that conventional insurance is forbidden in Islam because it contains elements contradictory to Islamic Shariah (Mohamed & Patel, 2003). These are uncertainty where the amount and time is not known gambling where the participant contributes a small amount of premium in hope to gain a large sum and interest where an element of interest exists as is in conventional insurance products (Mohamed & Patel, 2003).

4.6 Optimal Model

From the research findings above, the variable economic features were insignificant and completely dropped and The rest of the variables and their corresponding hypothetical causal path were all significant and were accepted. Therefore, the revised study model is as in Figure 4.8.

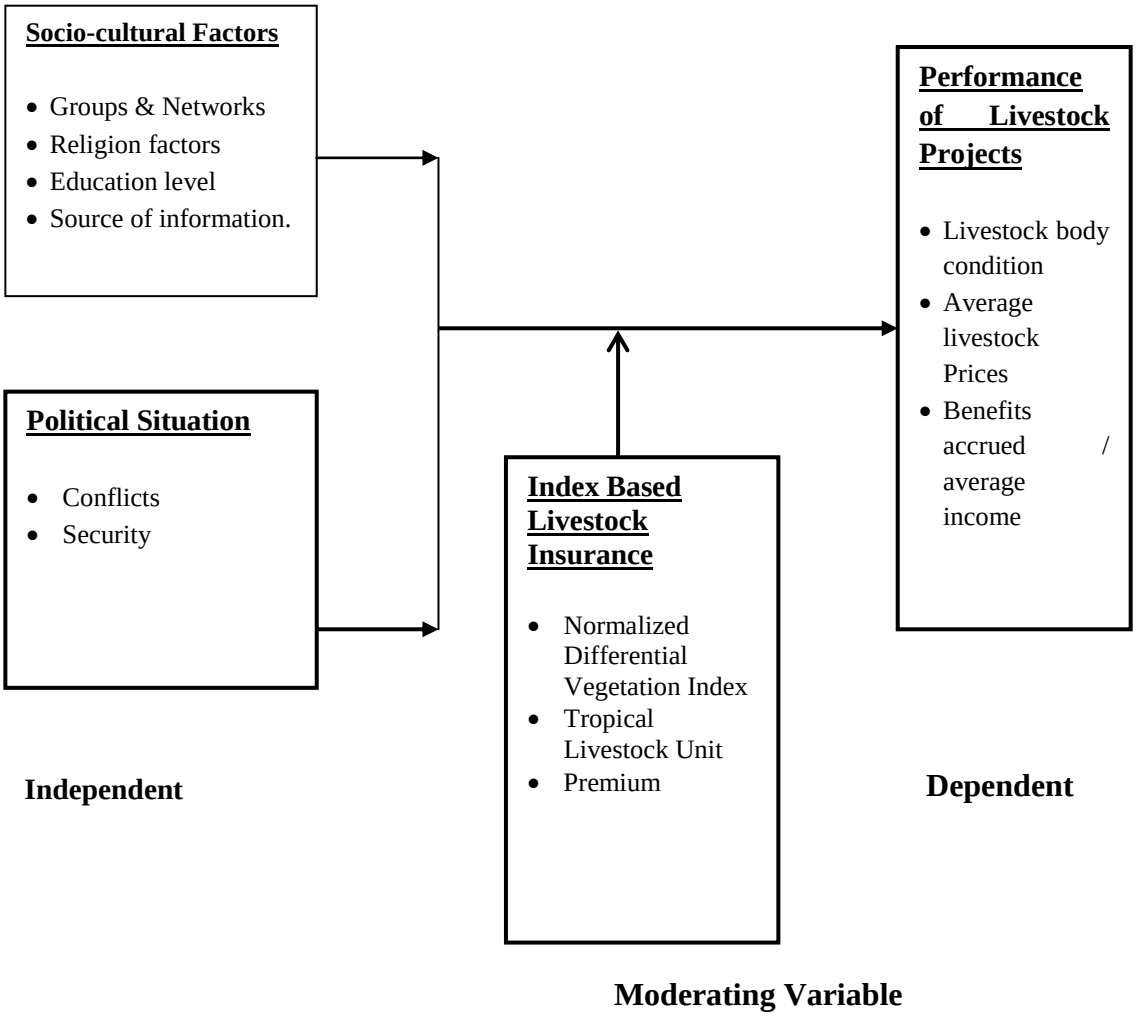


Figure 4.8: Revised study Model

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATION

5.1 Introduction

This chapter provides a summary of the major findings of this study and also sets to draw conclusions and make recommendations for practice and suggestions for further research based on the results of this study. The purpose of this study was to find out the moderating effect of Index Based Livestock Insurance (IBLI) on factors affecting the performance of livestock projects in northeastern Kenya.

5.2 Summary

The overall objective of this study was to find out the moderating effect of Index Based Livestock Insurance (IBLI) on factors affecting the performance of livestock projects in Northeastern Kenya. In particular the study sought to establish the moderating effect of Index Based Livestock Insurance on socio-cultural factors affecting performance of livestock projects in Northeastern Kenya to determine the moderating effect of Index Based Livestock Insurance on economic features affecting performance livestock projects in Northeastern Kenya, to explore the moderating effect of Index Based Livestock Insurance on political situations affecting performance of livestock projects in Northeastern Kenya and to determine the moderating effect of Index Based Livestock Insurance on external factors affecting performance of livestock projects in Northeastern Kenya.

5.2.1 Effect of Index Based Livestock Insurance on Socio-cultural Factors

In this study, socio-cultural factors were operationalized using sourcing information, religion, culture, norms and values. The study found out that the major sources of information to the people of North-eastern Kenya regarding Index Based Livestock Insurance included friends, neighbours and radio. This implied that the people of North-eastern Kenya had limited sources of information regarding Index Based Livestock Insurance and hence could be the reason for small uptake of the insurance

cover for their livestock. In regard to religion, culture, norms and values the study established that the people of North-eastern Kenya had the full confidence of the Sheikh/Imam in their area and majority of people are strong followers of community's culture and norms. Also, the educated members of their household determine the decision they make and the community culture and norms influences their decision making such as livestock insurance.

In addition, the study found out that there was a weak positive significant linear relationship between socio-cultural factors and performance of livestock projects in Northeastern Kenya using Pearson correlation coefficient. This implied that social cultural factors (religion, culture, norms and values) significantly affect the performance of livestock projects. Further, there was a negative insignificant relationship between Index Based Livestock Insurance and performance of livestock projects in Northeastern Kenya. The interaction term social cultural factors and Index Based Livestock Insurance was insignificant. This is because conventional insurance is forbidden in Islam because it contains elements contradictory to Islamic Shariah. However, investigations using scatter plot showed that the performance of people with lower values of the social cultural index was below those who were holders of IBLI but for people with higher values of the social and cultural index, their performance of livestock projects was higher than the holders of IBLI.

5.2.2 Effect of Index Based Livestock Insurance on Economic Features

Economics feature factors were operationalized using infrastructure, technology and livestock markets. The study established that road infrastructure was important in effective mobility. The study also established that accessibility of market has been a great challenge to the people of North-eastern Kenya and this had been a major challenge in accessing markets because of poor road infrastructure. On average, the livestock is taken once to the market per month and one is to cover was about 18km. Likewise, the study established that the people of North-eastern Kenya do not have fixed livestock market days and this had been a big challenge for them sell their animals.

However, the majority of the respondents agreed that they have embraced the use of Technology in livestock management. Based on the regression results the study showed that the relationship between economic features and performance of livestock projects in North-eastern Kenya was not significant. The insignificance of the model may be attributed by the natural attachment of the pastoralist to their animals that makes them unwilling to sell them and consequently locking up potentially valuable income that could be an economic empowerment means. Also, the transport network in northern Kenya is thin, disjointed, and in places non-existent. Key arterial routes linking Kenya to international markets in Ethiopia, South Sudan and Somalia are poorly maintained and prone to periodic closure from flooding or other damage.

Further on moderating economic features and Index Based Livestock Insurance there was an insignificant relationship between Index Based Livestock Insurance and performance of livestock projects in Northeastern Kenya. However on investigations using scatterplot roughly suggested some form of moderation. The crossover point for the two regression lines occurs on the right side of predictor and therefore the moderator influenced the relationship narrowly. The performance of people with lower values of economic factors index was lower than those who were holders of IBLI but for people with higher values of economic factors index, their performance of livestock projects was higher than the holders of IBLI.

5.2.3 Effect of Index Based Livestock Insurance on Political Situations

Political factors were operationalized using insecurity and conflict. From the study, it was found out that terrorism is exposed to the people of Northeastern Kenya districts and agreed that there was a predominant nature of insecurity in their areas such gang related, Shifta, family or clan related conflicts. The study equally established that the people of Northeastern Kenya were afraid that their livestock could be stolen. The majority of respondents agreed that security apparatus are not good enough to make them comfortable and therefore they are forced use community measure to address insecurity.

On the regression results, the study established that the relationship between political situations (Security and Conflict) and performance of livestock projects in North Eastern Kenya was significant. The model implied that about 10.6% variation in performance of livestock projects in North Eastern Kenya is explained by variation in political situations.The findings also implied that political situations (Security and Conflict) affect the performance of livestock projects. Thus, if security is beefed up in North Eastern Kenya, the performance of livestock projects would be enhanced. This is because conflict and insecurity has an impact on the adoption and operationalization of IBLI. However, on moderating political situations and Index Based Livestock Insurance there was an insignificant relationship on the performance of livestock projects. This could be as a result of Index Based Livestock Insurance product only covers the insured's against the risk of drought-related livestock deaths and do not cover risks of livestock as a result of the loss of theft hence the reason no moderating effect between political and Index Based Livestock Insurance on the performance of livestock projects.

5.2.4 Effect of Index Based Livestock Insurance on External Factors

In general, there was a significant relationship between the predictors (social-cultural factors (religion, culture, norms and values), economic factors, political situations) and performance of livestock projects. The study showed that the combined effect of social cultural factors (religion, culture, norms and values), economic factors, and political situations had a small variation in performance of the projects. However, the introduction of moderating variable into an independent variable (social-cultural factors), there was an insignificant relationship with performance of livestock projects. Economic features had no significant relationship with Performance of livestock projects and on political situations had a significant and positive relationship with the performance of livestock projects. Further, there was an insignificant relationship between Index Based Livestock Insurance and Performance of livestock projects.

Overall, the study found out that there was no moderating effect of Index Based Livestock Insurance on external factors affecting the performance of livestock projects in Northeastern Kenya. This could be as a result of high premiums discourages demand for insurance products. For example, premium rates offered under IBLT is derived from the cost and value of services offered to a particular livestock species within drought season. Also, the IBLI product being implemented in Kenya pays out when forage scarcity is predicted to cause livestock deaths in an area. This makes it difficult to compute using normalized difference vegetation index (NDVI) that provides estimated readings of forage availability. In addition, the index is measured per division meaning that the payouts will be made as per the divisional index readings. Clients are only allowed to purchase this insurance in a two-month buying window prior to the rainy seasons and hence make insurance unpopular to the performance of livestock projects.

5.3 Conclusions

From the study findings, it could be concluded that there was a weak positive linear relationship between socio-cultural factors and performance of livestock projects in Northeastern Kenya using Pearson correlation coefficient. Thus the study concludes that social cultural factors such as religion, culture, norms and values significantly affect the performance of livestock projects. Further, the study concluded that there was a negative insignificant relationship between Index Based Livestock Insurance and performance of livestock projects in Northeastern Kenya. The interaction term social cultural factors and Index Based Livestock Insurance was insignificant. This is because conventional insurance is forbidden in Islam because it contains elements contradictory to Islamic Shariah. Further investigations using scatterplot, the study concluded that the performance of people with lower values of the social cultural index was below those who were holders of IBLI but for people with higher values of the social and cultural index, their performance of livestock projects was higher than the holders of IBLI. IBLI affects slightly positive the performance of livestock projects because a community with educated people is likely to insure their livestock against risks. The benefit accrued from IBLI will be dependent on the level of

education of the pastoralists. This will be to the extent to which IBLI is simplified since illiteracy levels in Northern Kenya are high.

Regarding economic features, the study concluded that there was no significant relationship between economic features and performance of livestock projects in Northeastern Kenya. The insignificance of the model may be attributed by the natural attachment of the pastoralist to their animals that makes them unwilling to sell them and consequently locking up potentially valuable income that could be an economic empowerment means. Also, the transport network in northern Kenya is thin, disjointed, and in places non-existent. Key arterial routes linking Kenya to international markets in Ethiopia, South Sudan and Somalia are poorly maintained and prone to periodic closure from flooding or other damage.

Further, on moderating economic features and Index Based Livestock Insurance, the study concluded that there was an insignificant relationship between Index Based Livestock Insurance and performance of livestock projects in Northeastern Kenya even though on investigations using scatterplot roughly suggested some form of moderation. The study concluded that there is poor road infrastructure in North Eastern and this has hindered the accessibility of market and hence decreasing the performance of livestock projects. This relationship mighty be because of the existence of poor livestock market in the northern known as *Dilaalas* which do not offer better market prices and increase the uptake of insurance of livestock. The availability of markets determine whether a pastoralist will afford premiums. Better market prices will underline the importance to the pastoralists in ensuring that livestock reaches saleable age. Insurance takes care of uncertainties that may impact on attaining that age. The number of livestock insured will be boosted by the ease of availability of markets.

Concerning political factors, the study concluded that there was a weak positive relationship between political situations such as security and conflict and performance of livestock projects in North-eastern Kenya was significant. Thus the study concluded that variation in performance of livestock projects in North-eastern

Kenya is explained by variation in political situations. The study concluded that if security is beefed up in North-eastern Kenya, the performance of livestock projects in North-eastern would be enhanced. However, on moderating political situations and Index Based Livestock Insurance there was an insignificant relationship on the performance of livestock projects in Northeastern Kenya. This could be as a result of Index Based Livestock Insurance product only covering the insured's against the risk of drought-related livestock deaths and do not cover livestock risks against the loss of theft hence the reason why there insignificant moderating effect between political and Index Based Livestock Insurance on the performance of livestock projects.

The study also concluded that terrorism, Shifta and cattle rustling were major challenges exposed to the people of Northeastern Kenya districts and could affect the performance livestock projects negatively. Conflicts and insecurity arose because of scarce resources such as water and pasture and these issues would be solved politically. Hence the study found out that security apparatus are not good enough to make them comfortable and therefore they are forced use community measure to address insecurity.

Lastly, the study found that external factors such as social cultural factors, economic factors and political situations had a significant relationship and the performance of livestock projects in Northeastern Kenya. The study concluded that the combined effect of social cultural factors, economic factors, and political situations had a small variation in Performance of livestock projects in Northeastern Kenya. However, with the introduction of moderating variable into independent variables (social cultural factors, economic factors and political situations there was an insignificant relationship with the performance of livestock projects in Northeastern Kenya. This mighty because of lack of awareness of IBLI or had insufficient understanding of IBLI which would lead to misinformation and declining trust for IBLI.

Also, the result indicated that only a quarter of their livestock insured and therefore pastoralists have not yet fully embraced the Index Based Livestock Insurance. This is because the cost of IBLI is expensive. Generally, from literature, Index insurance

shows considerable promise, especially in settings where conventional insurance to cover potentially catastrophic herd losses does not exist. However, index insurance products cannot practically provide complete risk coverage to policyholders and uptake of some index insurance products has been low, raising questions about their attractiveness, scalability and sustainability.

5.4 Recommendations

5.4.1 Recommendations to Project Managers

From the study, it was established that social cultural factors such as religion, culture, norms and values affect positively the performance of livestock projects Northeastern Kenya. The study recommends to the project managers to be cognizant that group norms would affect the individual's behaviour patterns and therefore they should ensure that religion, culture, norms and values are factored before any project takes off. For example, people of Northeastern Kenya are believed to be pastoralists and because of this, it is believed they would hold this practice and pass it to the next generations. Hence the reason why social cultural factors affect the performance of livestock projects in Northeastern Kenya.

The study also recommends to the project managers that they should never moderate social cultural factors with Index Based Livestock Insurance. The interaction of social cultural factors and Index Based Livestock Insurance would affect the performance of livestock project insignificantly. This is because conventional insurance is forbidden in Islam because it contains elements such as interest which is contradictory to Islamic Shariah and insurance products implemented in Northeastern Kenya like modern banking products should conform to Islamic shariah. In addition, the study recommends that efforts should be made to ensure acceptance of IBLI by local institutions including ensuring its cultural and religious compliance through a continuous process of engagement with religious and community leaders.

Regarding economic features, the study recommends to project managers that they should conduct a thorough educational campaign to change the thinking perspective

of the pastoralist people of North-eastern Kenya so that they could be willing to sell their livestock in order to be empowered economically. Livestock production is essential to the pastoralist Somali people. Their animals are an important component of social prestige and wealth. They represent the main means of compensating social wrongdoing (*severrherr*) and payment of dowry (*Maharr*).

On political situations, the study recommends to the project managers to work as a team with the area leaders and community to beef up security and reduce conflict. Security and conflict management would improve the performance of livestock projects in North Eastern. Likewise, the study recommends to project managers be cautious not to moderate political situations with Index Based Livestock Insurance since it affects is insignificant in the performance of livestock projects in Northeastern Kenya. This could be as a result of Index Based Livestock Insurance product only covering the insured's against the risk of drought-related livestock deaths and do not cover livestock risks as a result of loss through theft.

5.4.2 Recommendations to Policy Makers

The study recommends it would be appropriate to the government to support and improve transport network in Northern Eastern Kenya. This would enable the accessibility of market and improve the price of livestock. Thus good infrastructure would improve the performance of livestock projects in North Eastern Kenya. Also, the study recommends it would be appropriate to the government to provide adequate security through the involvement of all stakeholders such as politicians and community to find a lasting solution to security. Equally, recommends it would be appropriate for the government to provide necessary resources such as water, livestock health and pasture to the North Eastern Kenya. Provision of these resources would improve significantly the performance of livestock projects. Also, the study recommends to the policy makers in insurance companies to provide clear policy and operational framework that will enhance insurance provision from government, partners and private investors as a way of encouraging high uptake of insurance in arid and semi-arid areas. In order to synergy this efforts there is need for

collaboration between the two levels of government and other partners in this processes. For sustainability purpose the government should consider subsidy on the premium for drought vulnerable livestock species and may combine it with other drought preparedness initiatives such as cash transfer, cash for asset and hunger safety nets.in arid and semi-arid areas.

Lastly, given the infrastructural and other challenges in Northeastern Kenya, the study recommends that the government of Kenya subsidize IBLI product to enable local people to take protection against herd loss. Therefore, if IBLI is commercialized, then it will be a promising option for addressing poverty traps that arise from catastrophic drought risk. Also, uptake of IBLI will benefit for those insured, including improved well-being and a reduction in drastic coping strategies when drought strikes.

5.4.3 Recommendations to Livestock owners and other Stakeholders

The study recommends it would be appropriate to the livestock owners to accept and insure their livestock against risks such as drought as a way of improving the performance of livestock projects in Northeastern Kenya. Also, the study established that social cultural factors such as education significantly affect the performance of livestock projects. This is because it presumed educated population accept uptake of insurance cover against loss of their livestock. Therefore, the study recommends to the pastoralists to educate their people because it would improve the performance of livestock projects in Northeastern Kenya. Likewise, the study recommends would be appropriate to the owners of livestock to dispose or destock of their livestock during a dry spell to empower them economically and then restock later when there is adequate water and pasture. This would improve the performance of livestock projects in Northeastern Kenya. Lastly, it would be appropriate to the donors support the performance of livestock projects through the provision of funds to buy pasture for livestock during drought seasons, subsidize insurance premium against loss of livestock and peace building/conflict resolution among the worrying communities.

5.5 Areas for Further Research

The study was confined to a literature review that only proposes social cultural factors, economic features and political situations and the theories that support these three variables. Thus, empirical work that actually demonstrates the whole of the moderating effect of Index Based Livestock Insurance on external factors such as social cultural factors, economic features and political situations affecting the performance of livestock projects in Northeastern Kenya is beyond the scope of the three variables identified in the study. Therefore, a similar study should be conducted using different variables to establish which other variables moderating effect of Index Based Livestock Insurance (IBLI) on factors affecting the performance of livestock projects in Northeastern Kenya. Similarly, the data was collected from Wajir and Garissa Counties. Thus, informant representatives of participating two Counties may be biased and cannot be generalized. This study recommends a similar research to be conducted from multiple informants groups by involving many Counties in order to come up with a variety of outcomes.

Likewise, the study adopted cross-sectional research design which was limited to point-in-time assessment. Therefore, future research can be conducted using longitudinal research so as to identify factors which contribute to the performance of livestock projects in Northeastern Kenya across a number of years. Lastly moderating effect of Index Based Livestock Insurance (IBLI) on external factors affecting the performance of livestock projects in Northeastern Kenya was insignificant and thus the study recommends a similar study to be conducted using a different moderating factor.

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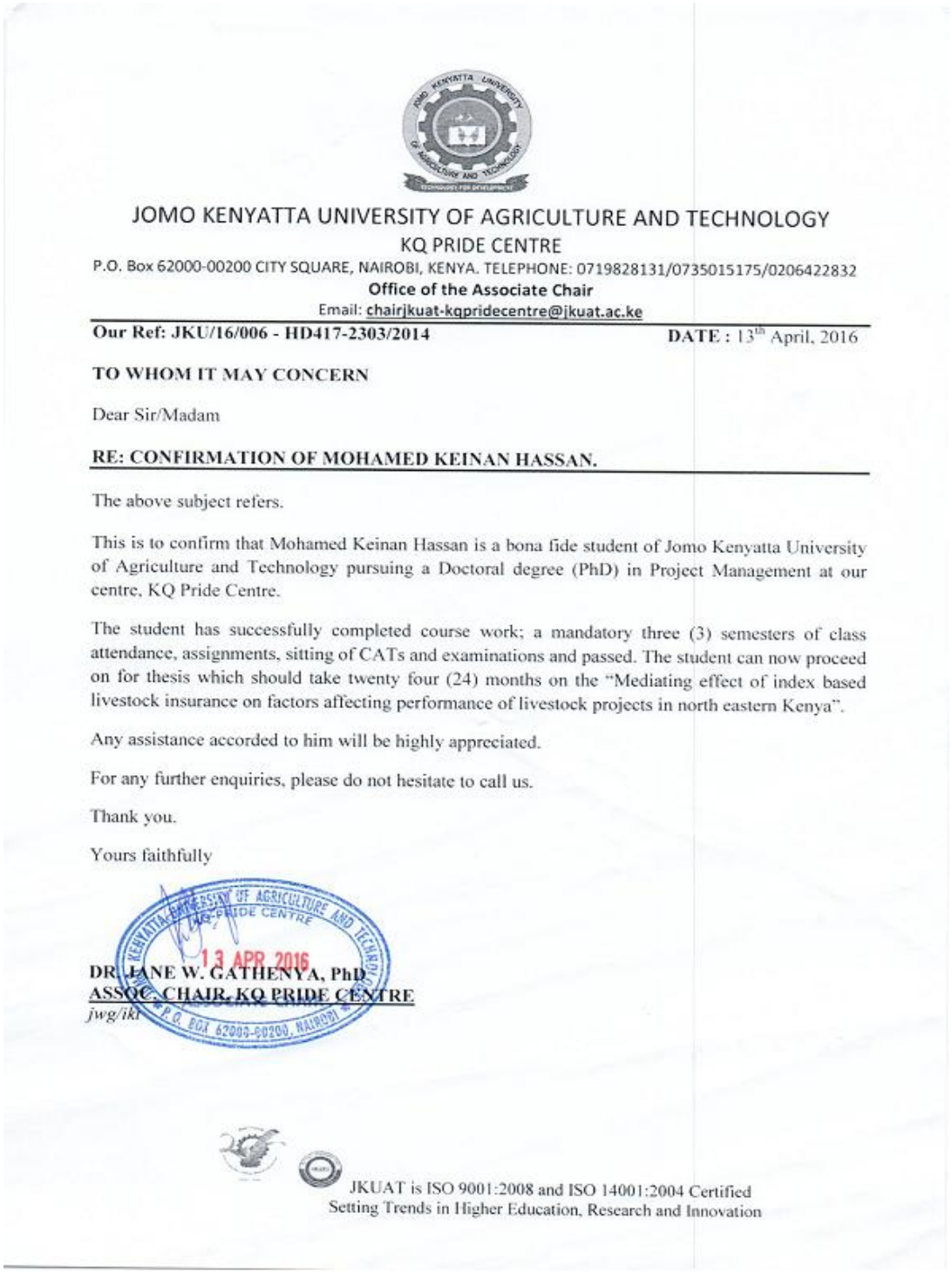
APPENDICES

Appendix I: Letter of Introduction



JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY
KQ PRIDE CENTRE
P.O. Box 62000-00200 CITY SQUARE, NAIROBI, KENYA. TELEPHONE: 0719828131/0735015175/0206422832
Office of the Associate Chair
Email: chairjkuat-kqpridecentre@jkuat.ac.ke

Our Ref: JKU/16/006 - HD417-2303/2014 **DATE :** 13th April, 2016

TO WHOM IT MAY CONCERN

Dear Sir/Madam

RE: CONFIRMATION OF MOHAMED KEINAN HASSAN.

The above subject refers.

This is to confirm that Mohamed Keinan Hassan is a bona fide student of Jomo Kenyatta University of Agriculture and Technology pursuing a Doctoral degree (PhD) in Project Management at our centre, KQ Pride Centre.

The student has successfully completed course work; a mandatory three (3) semesters of class attendance, assignments, sitting of CATs and examinations and passed. The student can now proceed on for thesis which should take twenty four (24) months on the "Mediating effect of index based livestock insurance on factors affecting performance of livestock projects in north eastern Kenya".

Any assistance accorded to him will be highly appreciated.

For any further enquiries, please do not hesitate to call us.

Thank you.

Yours faithfully

13 APR 2016

DR. JANE W. GATHENYA, PhD
ASSOC. CHAIR, KQ PRIDE CENTRE
jwg/ikl

JKUAT is ISO 9001:2008 and ISO 14001:2004 Certified
Setting Trends in Higher Education, Research and Innovation

Appendix II: Household Questionnaire

A. GENERAL INFORMATION

Please mark your selection with an (X)

1. Please indicate the gender of your household head □Male □ Female

2. Please indicate the age category of the household head

□ Less than 20 years □ 20 – 29 years □ 30 – 39 years

□ 40 – 49 years □ 50 – 59 years □ 60 years or more

3. Please indicate the name of your Sub-county …….

4. Please indicate your main occupation

□ Livestock keeper □ Crop farmer (types of crops)……

□ Year-round wage/Salaried employee □ Business Owner/trader

□ Others (Specify)……

5. What highest level of formal education did you attain?

□ None. □Class 1-4 □ Gumbaru (Adult Education)
□Class 5- 8 □Form I-IV

□Above Form IV (specify).....

6. What type (species) and number of livestock do you keep? (please tick for all species you keep)

Type/Species	0	1-30	31-60	61-90	91-120	>120
Camel						
Cattle						
Goat						
Sheep						
Others (Specify) ……..						

7. Is your household an Index Based Livestock Insurance contract holder? □ No □ Yes

8. *If your answer is "**yes**" in question 7*, what number or proportion of your livestock is under insurance cover.

Type/Species	All	Three-quarter	Half	Quarter	None
Camel					
Cattle					
Goat					
Sheep					
Others, Specify …….					

9. Why have you covered or not covered your livestock under insurance

Type/Species	Reason
Camel	
Cattle	
Goat	
Sheep	
Others Specify …….	

B. SOCIO-CULTURAL FACTORS

10. What is the source of information for your household:

(Tick all appropriate options)

(a)From friends	
(b) Neighbours	
(c)Through a religious leader/Imam/at the mosque	
(d)Through politicians (MP, MCAs)	
(e)Through administrative leader (DC, Chief, Government official)	
(f)Through Radio,	
(g)Through TV	
(h)Through Newspapers	
(i)Through insurance agents	
(j)Through NGOs	
(k)Through age mates	
(l)Others (specify)	

11. Regarding religion, culture, norms and values

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
(a)You have full confidence of the Sheikh/imam in your area.					
(b)You have full trust in your friends					
© You are a strong follower of the culture and norms of your community					
(d)Educated members of your household determines					

the decision you make					
(e)The group you belong to determine your decision making					
(f)The network you belong to greatly influences your decision making					
(g) Culture and norms of your community does influence your decision making					
(h) Culture and norms of your community doesn't influence your decision-making					

C. **ECONOMIC FEATURES**

12. Infrastructure /technology /livestock markets

	Never Important	**Rarely important**	**Neutral**	**Important**	**Very Important**
(a)Road infrastructure assist your household to easily move from one area to another					
(b)Vastness of the area contributes to grazing distances for your livestock					
©Distance to marketplace is quite long					
(d)Accessibility of market has been a great challenge					
(e)It would be very challenging to survive without Fixed livestock market days					
(f)Nowadays, we have embraced us of Technology in livestock management					
(g)Road infrastructure is too bad to be useful in accessing markets.					
(h) Roads are quite fine we have no infrastructure problems.					

13 (a) What is the average distance covered to the marketplace?……..KM

(b) How many times do you take the livestock to the market per month? ……

D. POLITICAL FACTORS

14. Security and Conflicts

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
(a) Your District/Region is exposed to Terrorism					
(b)The predominant nature of insecurity your area is gang related or shifta					
©The predominant nature of conflicts your area is family or clan related					
(d)You are always afraid that your livestock could be stolen					
(e)You are careful not to stock so many livestock for fear of insecurity					
(f)The security apparatus are good enough to make you comfortable					
(g)You use community measure to address insecurity.					
(h)You don't use community measure to address insecurity.					

PERFORMANCE OF LIVESTOCK PROJECTS

15. What is the average Price of your livestock

Type/Species	Camel	Cattle	Sheep	Goat	Others (Specify)
Average Price in Ksh.					

16. Giving direct observation give the body score of the most of the livestock owned by your household

Condition 1: Backbone prominent, hip and shoulder bone prominent, ribs clearly visible

Condition 2: Backbone visible, hip and shoulder bone visible, ribs slightly visible

Condition 3: hip bone visible faintly, ribs not visible, body outline almost smooth

Condition 4: Hip bone not visible, ribs well covered, body outline rounded

Condition 5: Hip bone showing fat deposits, ribs very well covered, body outline bulging due to fat

Using the above guideline of the body condition, can you score the livestock body condition of your household

Type/Species	Camel	Cattle	Sheep	Goat	Others (Specify)
Score (1-5)					

17. What is your average yearly income from livestock and livestock products

Type/Species	Camel	Cattle	Sheep	Goat	Others (Specify) ……
Average yearly income from livestock and livestock products in Ksh.					
From livestock insurance in Ksh.					

18. Does your household do livestock offtake or destocking during drought?

□ No □ Yes

F. RELATIONSHIPS BETWEEN VARIABLES

19. This question (Part F) is Only for index based livestock insurance holder

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
(a)You believe groups/networks have significantly contributed to performance of your livestock keeping					
(b)You believe groups/networks supported by insurance contributed to performance of your livestock					

keeping.					
©You believe religious leaders/Imams have significantly contributed to performance of your livestock keeping					
(d)You believe religious leaders/Imams supported by insurance contributed to performance of your livestock keeping.					
(e)You believe education of your household have significantly contributed to performance of your livestock keeping					
(f)You believe education of your household supported by insurance contributed to performance of your livestock keeping.					
(g) believe infrastructure/road networks of your area have significantly contributed to performance of your livestock keeping					
(h)You believe infrastructure/road networks of your area supported by insurance contributed to performance of your livestock					

keeping.					
(i)You believe technology development in your area has significantly contributed to performance of your livestock keeping					
(i)You believe technology development in your area supported by insurance contributed to performance of your livestock keeping.					
(j)You believe livestock markets in your area have significantly contributed to performance of your livestock keeping					
(k)You believe livestock markets in your area supported by insurance contributed to performance of your livestock keeping.					
(l)You believe conflicts in your area significantly affects performance of your livestock keeping					
(m)You believe conflicts in your area supported by insurance significantly affects performance of your livestock keeping.					
(n)You believe insecurity in					

your area significantly affects performance of your livestock keeping					
(o)You believe insecurity in your area supported by insurance significantly affects performance of your livestock keeping.					
(p)You believe your age significantly contributes to the performance of your livestock keeping					
(q)You believe your age supported by insurance significantly contributes to the performance of your livestock keeping					
®You believe your gender significantly contributes to the performance of your livestock keeping					
(s)You believe your gender supported by insurance significantly contributes to the performance of your livestock keeping					
(t)You believe occupation of your household members significantly contributes to the performance of your livestock keeping					

(u)You believe occupation of your household members supported by insurance significantly contributes to the performance of your livestock keeping					
(v)You believe your experience in livestock ownership significantly contributes to the performance of your livestock keeping					
(w)You believe your experience in livestock ownership supported by insurance significantly contributes to the performance of your livestock keeping					

20. Rate your satisfaction with performance of your livestock (considering all aspects; income, health, sustainability etc)

□ Very poor □ Poor □ Fair □ Good □ Very Good

Focus Group Discussion Guide Notes for Community Leaders

Community ……. Location ……. Subcounty …….

1. What are most common hazards that occur in this Division/Sub-County? (cattle rustling, pest and diseases, drought, lack of market, declining pasture land, others-specify).
2. What were the main causes of livestock death (diseases, drought, conflict, predation,other – specify
3. What is the most trusted source of information to disseminate Index Based Livestock Insurance in your Division /Sub-County?
4. What is the communities' opinion on index Based Livestock Takaful? (Not likely to have any effect/ Likely to reduce livestock loss through drought/ Likely to speed recovery / Not Sure)
5. What strategies can be used to enhance/motivate the uptake of Index Based Livestock Takaful by the communities? (lower premium, government subsidy, quick claim settlement, offer insurance literacy, simplify documentation process.)

Appendix III: Committal letter from National Drought Management Authority

National Drought Management Authority

Email: info@ndma.go.ke
Fax No.: 254 (20) 2227982
Telephone: 254 (20) 2227496/2227168
254 722200656/ 734652220
When replying please quote:

P.O. Box 53547 - 00200
NAIROBI
KENYA

REF: NDMA/ADM/1/16

14th March, 2016

The BOARD OF POST GRADUATE STUDIES
JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY
P.O.BOX 62000-00200,
NAIROBI

RE: MOHAMED KEINAN HASSAN: Reg no HD 417/2303/2014, Ph.D. RESEARCH WORK

Drought is the single most damaging natural hazard in Kenya that occurs in more than 80% of Kenya landmass classified as arid and semi-arid. Droughts cause emergencies because the basic conditions needed for a secure life and a sustainable livelihood in drought prone areas are often weak. People need security, better infrastructure and services, and investment in their livelihoods in order to cope with drought and climate change.

The National Drought Management Authority (NDMA) is a government institution that operates in 23 arid and semi-arid counties in Kenya. NDMA provides coordination and leadership of Kenya's management of drought risks and adaptation to climate change. Its key functions are:

- Guide planners in mainstreaming drought risk reduction (DRR) & climate adaptation;
- Provide monthly drought early warning bulletin communicating current level of drought risk;
- Facilitate development & implementation of drought contingency plans;

- Ensure effective coordination across all stakeholders (County Steering Group & sub-county structures in responding to drought risk;
- Encourage and facilitate collaborative learning that Contribute to NDMA knowledge bank.
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Mohamed Keinan's Ph. D research will provide technical support to policy and reforms that will contribute to facilitate our commitment to Ending Drought Emergencies -Common program framework by 2022 at both the national and county levels.

The purpose of this letter is therefore to confirm that NDMA will provide the necessary support to enable him complete this studies

JAMES ODUOR
CHIEF EXECUTIVE OFFICER

Appendix IV:Index Based Livestock Insurance Holders

Index Based Livestock Insurance holder.	SA (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std. Deviation
Groups/networks have contributed to performance of livestock keeping	0	6.5	12.9	80.6	0	3.74	0.571
Groups/networks supported by insurance contributed to performance of livestock	0	3.3	14.8	14.8	67	4.46	0.867
Religious leaders/imams have contributed to performance of livestock	0	1.7	5	85	8.3	4	0.451
Religious leaders supported by insurance contributed to performance of livestock	0	0	10	18.3	72	4.62	0.666
Education household have contributed to performance of livestock	0	6.7	1.7	85	6.7	3.92	0.591
Education household supported by insurance contributed to performance of livestock	0	1.7	10	15	73	4.6	0.741
Road networks contributed to performance of r livestock keeping	0	0	1.7	90	8.3	4.07	0.312
Road networks supported by insurance contributed to performance of livestock	0	1.7	6.7	20	72	4.62	0.691
Technology development contributed to performance of livestock keeping	0	3.3	3.3	85	8.3	3.98	0.504
Livestock markets have contributed to performance of your livestock keeping	0	1.7	6.8	81.4	10	4	0.491
Livestock markets supported by insurance contributed to performance of your livestock	0	0	6.8	23.7	70	4.63	0.613
Conflicts affects performance of livestock keeping	0	1.7	6.8	84.7	6.8	3.97	0.454

Conflicts supported by insurance affects performance of livestock keeping	0	1.7	8.5	20.3	70	4.58	0.724
Insecurity affects performance of livestock keeping	0	3.4	5.1	78	14	4.02	0.572
Insecurity supported by insurance affects performance of livestock	0	1.7	6.8	18.6	73	4.63	0.692
Age contributes to the performance of livestock keeping	0	8.5	5.1	76.3	10	3.88	0.697
Age supported by insurance contributes to the performance of livestock keeping	1.7	3.4	1.7	20.3	73	4.59	0.833
Gender contributes to the performance of livestock keeping	0	5.1	3.4	84.7	6.8	3.93	0.553
Gender supported by insurance contributes to the performance of livestock keeping	1.7	1.7	5.1	23.7	68	4.54	0.816
Occupation of household members contributes to the performance of livestock	0	3.4	6.8	78	12	3.98	0.572
Occupation of household members supported by insurance contributes to the performance of livestock keeping	0	0	8.5	25.4	66	4.58	0.649
	0	1.7	5	80	13	4.05	0.502