VALUING WILLNGNESS TO PAY FOR IMPROVED DAIRY CATTLE

FARMING THROUGH LIVESTOCK INSURANCE SCHEME

A CASE OF MARA REGION TANZANIA

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CERTIFICATION

The undersigned certifies that she has read and here by recommends for acceptance by The Open University of Tanzania a dissertation entitled; **"valuing willingness to pay for improved dairy cattle farming through livestock insurance scheme a case of Mara region Tanzania"** in partial fulfilment of the requirements for the award of degree of Masters of Businesses Administration in Finance (MBA Finance)"

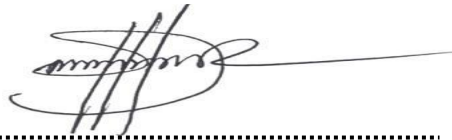...

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DECLARATION

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ABSTRACT

The study sought to determine the willingness to pay for improving dairy cattle farming through livestock insurance scheme in Mara, Tanzania. The specific objectives were; to determine whether household income level affect improved dairy cattle farming, whether number of cattle's affect improved dairy cattle farming, whether credit facilities affect improved dairy cattle farming, whether risk experience affect improved dairy cattle farming and whether after introduction of livestock insurance scheme to pastoralist communities, will increase the willingness to pay to improve dairy cattle farming. A cross-sectional survey was carried out on a sample of 405 respondents from Serengeti and Bunda Districts. Descriptive statistics, correlation, linear and multiple linear regression analysis techniques were applied. The study found that, the factors that positively influence respondents WTP for cattle insurance were distance to the tarmac road, household income, total land size and total livestock owned by respondents. The land and many cattle's increased livestock keepers WTP for cattle insurance. The age of the household head, access to credit facilities, annual sales income derived from milk and vaccine cost negatively influenced the WTP. Also, it was equally observed that there was a positively significantly relationship between farming risk situations like security, theft, drought, fierce animals and conflict between cattle farmers and crop farmers in relation to livestock insurance in improving dairy cattle farming. It is recommended that the need for policymakers and insurers to design programs that will educate herders on risk management tools (e.g., financial literacy) to improve herders' awareness of Livestock Insurance.

Keywords: Climate change, Agricultural risk, livestock Insurance, Number of cattle, willingness to pay, improved diary cattle farming, Mara Region

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LIST OF ABBREVIATIONSAND ACRONYMS

CADP   Community Agriculture Development Programme

CV   Contingent Valuation

CVM   Contingent Valuation Method

DAFCO   Dairy Farming Company

FAO   Food and Agriculture Organization.

FMD   Foot and Mouth Disease.

GDP   Gross Domestic Product

ILRI   International Livestock Research Institute

IMR   Inverse Mills Ratio

NBC   National Bank of Commerce

NDB   National Dairy Board.

OLS   Ordinary Least square

RAS   Regional Administrative Secretary

TIRA   Tanzania Insurance Regulatory Authority

TLU   Total number of Livestock Units

URT   United Republic of Tanzania.

VIF   Variance of Inflation Factor.

WIBI   Weather Index-Based Insurance

WTP   Willingness to Pay

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Agricultural insurance continues to be an important sector of the world economy despite its fluctuations in the production. Agricultural sector is considered to be the main and important source of foods, raw materials and returns of foreign currencies in the developing countries, and also considered the important source of income and this is because more than half of population depends in their live on agricultural sector. Similarly, livestock as a subsector within agricultural sector is an important source of household income in developing countries including Tanzania. Approximately, 25 million households are dependent upon livestock as either the primary or secondary source of income in Tanzania only. This means about 36% of farm households are engaged in livestock-keeping, one percent as pure livestock farmers and 35% as crop-livestock mix farmers (URT,2006). The sub-sector contributes 5.9% of the country's Gross Domestic Product. This is low considering the large numbers of livestock kept.

The low contribution has been associated with low livestock growth rates, high mortality rates, low production and reproductive rates, low off-take rates and poor quality of the final products from the industry (URT,2006). However, it is important to note that contribution of livestock is not limited to its share in GDP. Other contributions are through national food supply and food security, source of income to the smallholders (which may not be captured in the national accounts), and inflation free store of value.

Further, the sub-sector provides manure and animal draught power to the crop production sub-sector. This sector is exposed to too many types of risks which detain its yields and reduce the returns from it (Thornton, 2017). Therefore, protections of this sector are, in fact, protection of national income and ensure economic and social stability. Types of risks in agricultural sector can be divided into natural hazard, institutional, economic and social risks.

The natural hazard risks are attributed to drought, irregular rainfall, high humidity, pests and diseases, floods, higher temperatures, storms, tornadoes, fires and all natural hazards that cannot be controlled (Yu,2019). The institutional risks are related to the management, structures and systems used, weak agricultural research and extension services, problems of holdings, the relationships of production and weak infrastructure. Economic risks related to the macro policies of the economy, rate of inflation, policies of export and import, scarcity of financial resources and prices instability.

The social risks related to the problems associated with human and social relationships, the availability of public services and general understanding of advanced agricultural production, the possibility of transfer of technology, the degree of modern social harmony and the risks resulting from the war, displacement, social disturbance, environmental degradation and illiteracy (Singh, A.J& Hlope, N.M 2017). But the most serious risks that face the agricultural sector risk that related to natural hazard like drought, floods, pest and diseases which result in the displacement of many people from rural areas and death of large number of animals (Teweldemedhin, M.Y & Kafidi, L. 2019).

This is well explained in countries where the performance of agriculture has been increasing over the years. For example, In China and Nepal, the Community Agriculture Development Programme (CADP) for both farmers on crop and livestock is funded by ADB with technical assistance from FAO and provides all risk mortality and loss especially livestock that are purchased on credit. This non-regulated livestock credit insurance program does not carry any form of reinsurance protection. India also has various state-level community-based livestock insurance schemes that have operated successfully, including a program in Andhra Pradesh that has recently attracted insurance protection from Tata Insurance India (FAO,2019).

Like many other developing countries, Kenya and Ethiopia has had a long history in Livestock risk management. In Kenya and Ethiopia, livestock insurance schemes have been piloted by the International Livestock Research Institute (ILRI) in partnership with private insurance companies and humanitarian agencies. Over the last decade, intensive research work has been geared towards the availability of commercially viable insurance products for the pastoralist communities in the arid and semi-arid lands (ASALs). Pilot projects have been introduced in several counties in Northern Kenya and in the Borana area of Ethiopia. The first of such pilot schemes was in Kenya's Marsabit County in 2010. Even though still donor funded, the insurance products are currently commercially available and partnerships have been created with private insurance companies. In Kenya, applications, premium payments and insurance payouts are made by mobile phone (M-pesa system) and banks (Otieno, Ruto, & Hubbard, 2019).

Also, cattle livestock insurance products developed for Rwanda would likely be individual accidental death covers. Farmers would insure individual cows against the

most common diseases, rare catastrophes, and accidents (struck by lightning, poisoning, etc). The product pricing would be based on cow mortality rates in the specific areas. To lower these rates, all insurance policies would be offered with an animal care package of routine, but critical, measures to prevent the most common diseases (Davis *et al,* 2018). There are several organizations working with a large number of dairy farmers that provide dairy cows, organization, training expertise, loans, or a market for milk. These are potential partners or aggregators for the dairy livestock insurance product.

Tanzania is one of the East African countries and Africa continent in general popular for livestock resources. It ranks third after Ethiopia and Ethiopia in livestock population. The main livestock types are cattle, goats, sheep, pigs, chickens, ducks, turkeys, rabbits, and donkeys. Based on the 2018/19 census, cattle are the first in population followed by goats. There are 21,280,875 heads of cattle and 15,154,121 heads of goats. Sheep are the third, with 5,715,549 heads while pigs are the fourth with 1,584,411 heads. Above these all Tanzania has very large number of chickens totaling to 43,745,505 which is almost equal to the total population of the major livestock types (cattle, goats, sheep and pigs) (NBS 2019).

Compared to the 2012/13 census, there has been an increase in the number of all major livestock species. The total number of livestock units (weighted with TLU) was 25,977,665 in 2007/08 representing 43.8 million livestock of different species. This shows a 30% increase from 20,353,866 livestock units in the 2012/13. Cattle showed an annual growth rate of 4% over the period 2012/03 to 2017/18. The annual growth rates of goats, sheep, pigs and chicken over the same period were 5.1%, 7.7%, 10.2% and

5.1%, respectively. However, there were virtually no growth in the number of layers and broilers. Most of the livestock species were of indigenous type (URT,2006)

Tanzania economy has been experiencing gradual and fundamental changes since mid of 1980's toward market-based economy. The macro-economic policy reforms have made necessary for a change of the roles of the public and private sectors in livestock development. These redefinitions have paved the way for the withdraw of the Government participation in direct production, processing and marketing activities, which could be better performed by the private sector (Njombe *et al,* 2016).

In 1983 the first policy was launched with the aim of stimulating livestock development in the national economy. Emphasis was on large scale parasternal institutions for production, processing and marketing. The agricultural livestock policy of 1997, which was the second policy to be formulated, was in line with the ongoing reforms and changes roles of public and private sectors. Though, during implementation of this policy other reforms emerged thus demanding for a review and formulation of a new policy (Njombe *et al,* 2016). The new policy seek to address specific key issues including animal identification, registration and traceability, animal welfare, indigenous methodological knowledge, biotechnology and bio-safety, animal welfare, indigenous technical knowledge, organic livestock farming, emerging diseases, cattle livestock regulatory institutions, expert regulatory institutions, animal genetic resource conservation, livestock stocking, veterinary laboratory system, livestock related disasters and pet animals. The policy aims at motivating in the livestock industry in order to increase rural and nation income, improve food security and environmental conservation.

1.2   Statement of the problem.

Tanzania has the 4th largest cattle herd in Africa after Ethiopia, Sudan and Chad. Almost 31 million cattle kept for meat, milk, savings and draught power. Cattle population is concentrated in lakes area, central Tanzania and southern highlands in which 99% of cattle are indigenous breeds. Improved dairy cattle are found primarily within the northern, southern highlands and the lake region to a lesser extent. Gross production value of cow milk in 2016 was US $196 million (85% total livestock value and 2% total agricultural value) (URT,2006).

The decline in the cattle population due to climate shocks, foot and mouth diseases outbreak has placed a huge strain in Tanzania animal's economy. In particular, the loss of cattle has mostly affected the smallholder farmers as they have few alternative sources of livelihood and therefore highly dependent on government support. For example, according to the 2012 population and house census, Mara region is estimated to have a total of 1,651,355 cows but the diary production is low and poor (URT,2006) One important remedy to insulate the dairy cattle farming against such losses is livestock insurance scheme. The crop insurance has been present in various crops but not in the subsector of livestock at all, the reason for which is not clear. Could it be the conditions of the household income levels? or could it be the condition of the policy exclude the smallholder cattle keepers even though they hold a large number proportion of cattle in Tanzania? or they do not understand anything about the risk associated with animals and how they can be compensated, or how they can pay for the insurance package when joining the livestock insurance scheme? Meanwhile, due to importance

of livestock insurance in Tanzania, it would be important to structure it to make it more customer focused.

Studies on formal risk mitigating measures adopted by smallholder cattle keepers in Mara region are not virtually non-existent. For example, no study so far has focused on cattle keepers WTP for cattle insurance attributes. Most importantly, the information on smallholder cattle keepers' awareness perceptions on the existing livestock insurance scheme in Tanzania is not known. The study aimed to fill these gaps in knowledge.

1.3 Objective of the Study

1.3.1 General Objective

The research study seeks to achieve its general objective ''to examine factors influencing willingness to pay through insurance scheme for improved dairy farming.by focusing on the following specific objectives;

i. To assess the effect of household income level on improved dairy farming

ii. To assess the effects of number of cattle's in accessing insurance scheme on improved dairy farming

iii. To assess the effect of Access to Credit facilities in accessing livestock insurance scheme on improved dairy farming.

iv. To assess the effect of risk experience in accessing livestock insurance scheme on improved dairy farming.

1.4 Significance of the study

The sustainability of the insurance program was depending on purchase and repurchase year after year. This study was addressing one essential part of it. Most studies determine the factors influencing farmers' willingness to pay for livestock insurance

with few going further to estimate the average premium farmers are willing to pay. Although this study was also analyzing this objective further to determine the factors influencing the amount farmers are willing to pay for insurance.

This study has provided an understanding of dairy livestock households' need for insurance, aiding the enhancement of the product and the search for the best ways to protect farmers' livelihood from risk and the effect of ineffective risk management. It also contributes to a large literature on risk management, technology adoption and has implications for dairy livestock insurance nationally. It can be vital for policy action and the design of insurance contracts by providing information on the demand for insurance, the prospective farmers and locations to target as well as the various risks farmers desire to protect themselves against risks.

The study provided mean willingness to pay for dairy livestock insurance as guidance to policy makers in establishing different policies that can administrate government, insurance agency on livestock insurance investment. Also, the study finding as a supportive document has provided some basics that enable policy makers in the process of establishing other policies on livestock insurance sector.

The study findings comprise of different intensive information that adds knowledge to the researchers on matters patterning the importance of livestock insurance on improving livestock industry in the country and how willingness to pay for livestock insurance can be used as valuation of monetary service and goods. The study has provided a room to researchers in undertaking other researches on matter planning livestock insurance.

The information from this study is hoped to provide a better understanding of "appropriate" public and private policies benefiting both producers, technical staff, researchers and policy makers and also building up on the existing body of knowledge concerning livestock insurance.

1.5 Scope of the Study

The study was conducted in Mara region under two selected districts because the region has good number of cattle farmers involved in both indigenous and dairy farming in daily basis of their activities especially in commercial use, and domestic use, also those districts contain different number of veterinary clinic centers for providing cattle health service and also the program of (KOPA NG'OMBE LIPA NG'OMBE) are taking place. To attain this project, for that case, it was easy to investigate in advance the direct relationship by the farmers on improving dairy farming under livestock insurance.

This study involved the farmers living in Mara especially those from Serengeti and Bunda District, whereby farmers from both indigenous cattle type and dairy cattle type are were studied in order to represent all cattle farming society in Mara region.

1.6 Organization of the study

This study was organized into five chapters; Chapter one presented the introduction and background to the study, statement of the problem and research objectives. It also covered significance of the study, scope of the study and finally organization of the study. Chapter two comprises literature review whereby the definitions of concepts, review of theories was critically presented. Then empirical review, the theoretical review, the conceptual framework and research gap are presented. Chapter three

presents the research methodology whereby this study philosophy, research design was elaborated. Also, the population and sample with sampling techniques are discussed. Data collection issues, research process, are cleared presented. Chapter four dealt with findings and discussion, and last is chapter Five, whereby limitations recommendations with further studies are presented.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction.

The chapter described the literature review of the study of valuing willingness to pay for improved dairy farming through livestock insurance scheme. The chapter also described the literature review of the study consisting of the definition of key terms, theoretical reviews and the empirical studies. Moreover, the chapter highlights the study variables through the conceptual.

2.2 Definition of the Key Terms

2.2.1 Household

A household consists of one or more persons who live in the same dwelling. It may be of a single family or another type of person group. The household is the basic unit of analysis in many social, microeconomic and government models, and is important to economics and inheritance. Household models include families, blended families, shared housing, group homes, boarding houses, houses of multiple occupancy or single room occupancy (Chilonda, 2016).

2.2.2 Willingness To Pay and Willingness To Accept: (WTP&WTA)

Willingness to pay (WTP) and willingness to accept (WTA), are survey methods that are supposed to measure the value of nonmarket goods and are mainly used by cultural and environmental economists. WTP roughly consists of asking consumers (or producers) how much they are willing to pay to avoid a negative or to accept a positive outcome; WTA goes for compensation and asks how much an agent would like to be

paid to accept a negative outcome or to forego a positive one. The two methods lead to different results, although in theory, they should not, which is not the worst that could happen. (Ali, 2013)**.** "What the concept of 'willingness to pay' is telling us is that whatever your willingness to pay for a product might be, and wherever it comes from, you're just not going to pay more than that for it," Willingness to pay can vary significantly from customer to customer. This variance is often caused by differences in the customer population, typically classified as either extrinsic or intrinsic.

Extrinsic differences are observable. They're factors you can generally determine about a person without needing to ask them directly. A customer's age, gender, income, education, and where they live can all be extrinsic differences that impact their willingness to pay.

Intrinsic differences, on the other hand, are a person's characteristics you wouldn't know about without asking them directly. They're hard to observe and often called "unobserved differences." An individual's risk tolerance, desire to fit in with others, and level of passion about a given subject are all examples of intrinsic differences that can impact their willingness to pay.

2.2.3   Contingent valuation (CV) method

Contingent valuation is a stated preference (survey) method in which respondents are asked to state their preferences in hypothetical or contingent markets, allowing analysts to estimate demands for goods or services that are not traded in markets. In general, the survey draws on a sample of individuals who are asked to imagine that there is a market where they can buy the goods or service evaluated. Individuals state their maximum WTP for a change in the provision of the goods or service, or their minimum

compensation (WTA) if the change is not carried out. Socioeconomic characteristics of the respondents such as gender, age, income, education, and demographic information are also obtained. If it can be shown that individuals' preferences are not random, but instead, vary systematically and are conditioned to some observable demographic characteristics, then population information can be used to forecast the aggregate WTP for the goods or service evaluated.

2.2.4 Risk and Uncertainty

Uncertainty is a state where the probability of possible event is not known. Risk can be defined as an incomplete knowledge where the probability of loss or possible outcome or consequence to a specific action is known (Abebe and Bogale, 2014). Agricultural or livestock production is characterized with uncertainty and risk due to uncontrollable factors, such as weather, which plays an essential role.

2.2.5 Premium

Premium is an amount paid periodically to the insurer by the insured for covering his risk. In an insurance contract, the risk is transferred from the insured to the insurer. For taking this risk, the insurer charges an amount called the premium. The premium is a function of a number of variables like age, type of employment, medical conditions, etc. The actuaries are entrusted with the responsibility of ascertaining the correct premium of an insured. The premium paying frequency can be different. It can be paid in monthly, quarterly, semiannually, annually or in a single premium (Jeffrey P., Milton B, & Lysa P. 2015).

2.2.6 Agriculture Insurance

Agriculture insurance it may be defined as "the means of risk management for livestock in order to achieve a production and it is a means to offset part of the farm losses that may result in spite of his follow sound management techniques in the cultivation of the land or in animal breeding (Usuman, M.A & Dodo, H. 2014). Also, another author gave us a comprehensive definition of insurance describe it as "economic organization working to reduce the danger for society and individuals, by assembling a large number of threats under one administration to make it possible to predict future losses that community suffered, and the insurance covers all insurance contracts, which undertakes by the insured versus compensate him for any loss incurred during the period of the contract Sibiko, K.W. et al, 2018).

2.3 Theoretical Frame work

In this part, the overviews of the willingness to pay theory under the concept of livestock insurance were discussed. This chapter also has introduced the concept of willingness to pay for dairy cattle livestock insurance among the farmers.

2.3.1 Willingness to Pay (WTP) theory

Willingness to pay (WTP) for a product may be defined as the amount of money an individual or household is willing to pay for purchasing a product given her/his income, risk preferences and other background characteristics. WTP is analyzed using the contingent valuation method (CVM). CVM helps estimate the value an individual placed on a good, usually an intangible good. The CVM was pioneered by Davis in 1963. This method is mainly used to evaluate environment and health care programmer (Blumenschein et al., 2008). Weather insurance component However, CVM is now

increasingly used to evaluate private market goods and services. Broadly, there are two approaches to studying WTP under CVM. The first is a closed-ended format also called referendum or the 'take-it-or-leave-it' approach. The other method, which is more widely used, follows an open-ended format. As described by Watson and Ryan (2007), this study employs the open-ended CV method. The open-ended contingent valuation technique was applied in this study to accommodate the true amount farmers would be willing to pay for index-based insurance offering coverage for livestock because most of the respondents are small-scale farmers. This approach was adopted firstly because it is free from anchoring bias and does not provide respondents with cues about what the value of the change might be. Secondly, the open-ended technique was used because index insurance is currently not established in Tanzania and all the respondents employed in this study currently use the traditional insurance in mitigating production shocks. The open-ended contingent valuation technique is also important in easily accessing the mean willingness to pay and maximum willingness to pay can be identified for each respondent. One of the major weaknesses of the willingness to pay is affected by factors like demographics, customer behavior and the nation's economy.

However, there are some weaknesses such that, a lack of willingness to pay would also result in scenario misspecification. Avoiding costs may reduce the incentives to misrepresent value in some cases. If a person's willingness to pay exceeds his or her willingness to accept, the person may lose the social surplus generated by the goods traded

2.3.2 Willingness to Accept (WTA) theory

Willingness to accept (WTA) is the amount of money that a person is willing to accept to abandon a good or to put up with something negative, such as pollution. It is the minimum monetary amount required for sale of a good or acquisition of something undesirable to be accepted by an individual. The WTA method makes the subjects sure that if they are losing any level of consumption, that they may want considerable sums of money in order to offset the loss of goods (Knetsch, J. L. 2020).

2.3.3 Contingent Valuation Methods

Contingent valuation method (CVM) refers to the method of valuation used in cost benefit analysis and environmental accounting. It is conditional (contingent) on the construction of hypothetical markets, reflected in expressions of the willingness to pay for potential environmental benefits or for the avoidance of their loss. The method has great flexibility, allowing valuation of a wider variety of non-market goods and services than is possible with any other non-market valuation technique.

Agricultural insurance has characteristics of quasi-public goods. The studies about WTP (Willingness to Pay) for agricultural insurance use Contingent Valuation Method (CVM) (Carson, 2001). The CVM is one of the typical non-market valuation methods. It is a survey based economic technique for the valuation of non-market resources, such as environmental preservation or the impact of contamination. It uses survey questions to elicit farmers' willingness to pay in T-shillings amounts to obtain these goods or their willingness to accept in T-shillings amounts to give up the consumption of this goods/services. From response, the WTP of consumers or potential consumers can be obtained. The WTA can be gotten from the second answer Knetsch, J. L. (2020)

According to (Carson, 2001), goods/services for which ordinary market does not exist, and their price determined arbitrarily or provided freely, are considered as public goods. Accordingly, in Tanzania livestock keeping is controlled by the government through Ministry of Agricultural livestock and fisheries regulatory authority. In literature, the researcher finds different methods to value public or non-marketable goods or services such as livestock insurance.

These include those relying on revealed preferences [indirect methods such as Hedonic pricing and the household production function on livestock (e.g., operation cost method and averting behavior] and stated preferences (direct methods) but Contingent valuation method, being a direct valuation method, has become a common practice (Carson et al., 2001) for assessing the economic value of public projects. It uses surveys with respondents from a representative sample of the farmer's population that was affected by a project. Its flexibility facilitates valuation of a wide variety of non-market goods (including those not currently provided). Moreover, it represents the most promising approach yet developed for determining the public's (farmers) willingness to pay for dairy cattle livestock insurance as a public goods Carson, R. T, et al (2001) since it is capable of measuring types of benefits that the other methods cannot measure.

2.4 Empirical Literature Review

2.4.1 General Studies

Employing the Probit model, Ali (2019) identified household income, land and asset holdings, type of livestock kept, access to credit and extension services as the factors influencing the WTP for livestock insurance in Pakistan. These variables were found to have a positive and significant effect on farmers' willingness to pay. The index-based

insurance was also found to have an impact on food and other dairy cattle product since farmers' willingness to increase these livestock areas were significantly positive. Farmers involved in non-farm activities who therefore earned extra income were found to be less willing to pay for insurance.

Another study by Long et al. (2017) pointed out that households' total value of assets, size of field and ability to borrow had positive correlations with farmers' willingness to buy livestock insurance. The study found a negative correlation between households' expenditure per capita as well as coping strategies and their willingness to participate and pay for livestock insurance.

Also, Gulseven (2018) surveyed 200 farmers in Anatolian basin, Turkey, to determine their willingness to pay for livestock insurance. The study performed a dual empirical analysis, first using the logit model to determine farmers' demand for insurance and a contingent valuation open ended and take it or leave it type questions to derive farmers' WTP amounts. Education and farm income were shown to have positive and significant effects on farmers WTP but household size and union membership were not found to be statistically significant. The authors found strong evidence that, demand is downward sloping with farmers' willingness to pay declining sharply with lower coverage levels. Results show that most farmers were willing to pay a reasonable amount for full coverage and also found greater willingness to pay for livestock insurance than crop insurance.

Also, from the study of Singh, A.J& Hlope, N.M (2017) based on a survey of farm households in the Pondicherry district, India found that 56% of the farmers who were predominantly older, educated and owned lands, were aware of crop and livestock

insurance. The majority obtained information about the scheme mostly from banks and financial institutions.

2.4.2   Empirical Studies in African Countries

Abebe & Bogale, (2014) revealed in a study among farmers in the Central Rift Valley of Ethiopia that the income of the household and ownership of a radio have positive and significant effects on the willingness to pay for insurance. Off-farm income and age on the other hand were found to have negative and significant influences on WTP. The ownership of a radio probably represents a farmer's physical asset holding and also indicates farmers' value and need for information.

Usman and Dodo (2017) studied with 120 farmer's participants in agriculture insurance in Nigeria to identify the socioeconomic factors influencing farmers' willingness to continue insuring their rice production. Based on the logistic regression farm size and formal education were identified as the influencing socioeconomic factors influencing farmers' willingness to continue to take insurance. (Bullock et al., 2016) studied risk and factors associated with risk in sugarcane with 110 farmers in South Africa. The study found that education was negatively related to farmers WTP for insurance as educated farmers have a different range of options for managing risk.

2.4.3   Empirical Studies in Tanzania.

Sarris A, et al (2016) identified a number of factors influencing Tanzanian households' willingness to pay for crop insurance. These were noted as higher incomes, safety mechanisms adopted exposure to rainfall decline and exposure to markets mostly for farmers sensitive to income instability. Mvuna JK (2010) maintained in a study that

crop insurance is one of the important instruments which can aid in mitigating production risk caused by climate change. Tanzania is most affected by food production variability and food price volatility. The latter has created risks and uncertainties for producers, processors and traders, resulting in an increase in food insecurity for consumers. The eradication of extreme poverty and hunger in Tanzania should be the first goal of the sustainable development goals (UN, 2015). Agricultural production is essential for achieving food security how the issue of Agriculture insurance should be considered (Godfrey et al., 2010).

Increasing investments in the agricultural sector are needed to boost food security and production and also to restrain the harmful effects of climate change (FAO, 2015). Nelson et al. (2019) report that climate change in Tanzania has a potential to transform food production, particularly food patterns and the productivity of crops, livestock and fishery systems. It also has the potential to reconstruct food distribution markets and food access. However, rural and urban communities' adaptive capacity is usually faced with economic and social shocks which needs ongoing, strong support (Adger et al., 2007). According to Godfrey et al. (2010), the effects of climate change will cause more difficulties to the millions of people for whom attaining food security is already a huge problem. This affects food and agricultural development and the adoption of technology in developing countries like Tanzania (FAO, 2016). Risk management is therefore imperative in coping with the adverse effects of risks. Agricultural insurance lowers the effects of the risks faced by farmers by compensating them for losses, thus allowing them to invest more in agriculture in order to gain increased income Nelson et al. (2019). According to Godfrey et al. (2010) a household which has a high possibility of

losing its income and assets due to risks followed by a limited chance is more likely to purchase agricultural insurance.

2.5   Research Gap identified

In developing countries like Tanzania, it's a tradition that pastoralist communities have been herding their animals as a source of pride and not knowing that the animals is an asset that if properly managed can be economically viable. The valuing willingness to pay for improved dairy cattle farming through livestock insurance scheme made these communities see animals as a resource of income as discussed from Sarris A, et al (2016).

Some countries in Africa like Nigeria have begun to realize the importance of having livestock and agricultural insurance even though there are social and economic factors that affect farmers' willingness to continue to ensure their production of milk and other crops, however there are also other same constraints such as education, economy of farmers and herders and even the government's failure to influence farmers' and the public in general the willingness to continue insuring their improved cattle diary production and knowing the importance of livestock insurance (Usman & Dodo, 2017).

(Gulseven, 2018) and (Ali, 2019) in their study with the objectives of identifying the factors affecting the adoption of livestock insurance found that formal education of the farmer and the farmer's awareness of livestock insurance increased the probability of insurance adoption, whereas, farming experience, poor location and use of alternative risk management strategies, such as off-farm investments and farm enterprise diversification reduced the probability of livestock insurance adoption.

In Tanzania it has become very difficult for pastoralist communities to use their livestock as a security for getting loans from banks, get veterinary medicine, and trade their own livestock simply because their livestock is uninsured. The valuing willingness to pay for improved dairy cattle farming through livestock insurance scheme has not received adequate research in Tanzania. This means that, the study filled the research gap by examining the situation in Tanzania and providing empirical evidence on the valuing willingness to pay for improved dairy cattle farming through livestock insurance scheme towards small herders and large herders, and Mara region was as used as a case study.

2.6   Conceptual Framework.

A conceptual framework is a research tool which postulates the relationships among study variables it helps the researcher and readers be familiar and understand how valuation of household willing to pay for dairy livestock insurance depend on various variables. The basic features of conceptual framework include independent variables and dependent variables. Independent variables are a variable which does not depend on others variables and dependent variables are variables that depend on variation of other variables. In this study willingness to pay for dairy livestock insurance   depends on farmers (households) affected by factors such as livestock diseases, operation cost, number of cattle, mean willingness to pay for livestock insurance control variables such as age, sex, marital status, and education level of respondents.
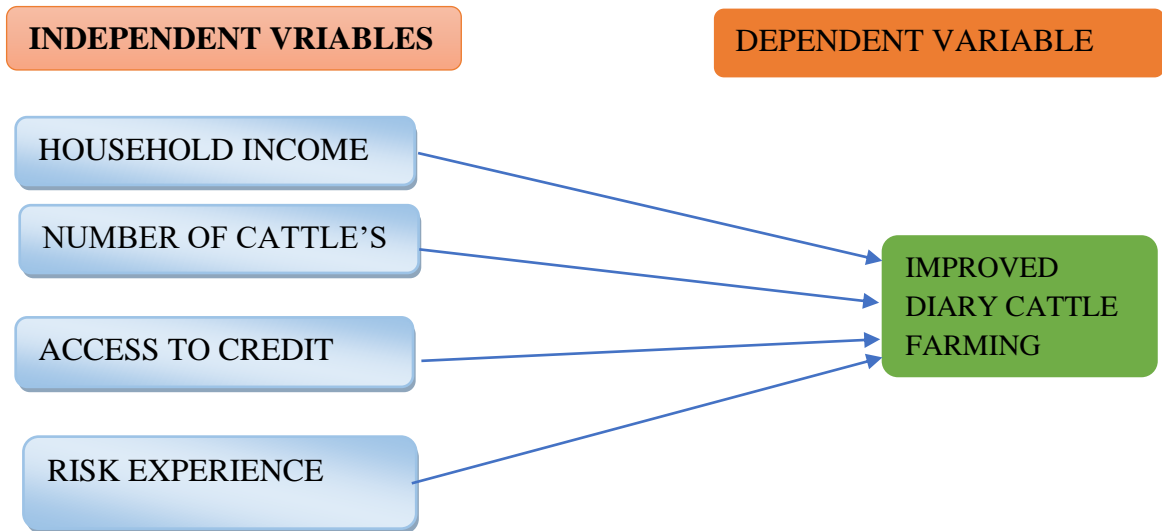
Figure 2. 1 Conceptual Framework

Source; Researcher (2022)

2.7 Measurement model

Table 2. 1 Measurement model for valuing willingness to pay for improved dairy cattle farming through livestock insurance scheme

Type of Variable	Latent Variable	Indicator/manifest/Observable variable	Other authors who used the scale
Independent	Household income	• Insurance scheme • Ownership of Radio for information	Alli, (2013), Abebe & Bogale (2014),
Independent	Number of Cattles	• Value of the assets • Ability to borrow • Size of the field	Long et al.., (2017)
Independent	Access to Credit	• Numbers of diary Cattles • Financial Education	Long et al.., (2017), Gulseven (2014)
Independent	Experience with Risk	• Climate Change • Exposure to Markets	Sarris A, et al (2016). Mvuna JK (2010), (2017),

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The chapter presents research philosophy, paradigm, strategy and design used in the study. It also covers the research study area and population, sampling procedures, data collection methods, variable measurements and data analysis procedures and techniques used in the study. Lastly are ethical issues.

3.2 Research Philosophy

Tsung, E.W.K. (2016) define research philosophy as a system of beliefs and assumptions on knowledge development. The knowledge is generated when a researcher wants to answer a specific question. The positivist research philosophy was applied in this study. (Levin, D. M. (2014)) Positivists believe that reality is stable and can be observed and described from an objective viewpoint without interfering with the phenomena being studied. Survey method was applied. Survey is defined as the act of examining a process or questioning a selected sample of individuals to obtain data about a service, product, or process.

Data collection surveys collect information from a targeted group of people about their opinions, behavior, or knowledge. Common types of example surveys are written questionnaires, face-to-face or telephone interviews, focus groups, and electronic (e-mail or website) surveys (James, D., et al (2020). In this case questionnaires were used. Quantitative data analysis also was used. It involved the use of computational and statistical methods that focuses on the statistical, mathematical, or numerical analysis of

datasets. Two data analysis techniques for quantitative data the researcher used were regression analysis which examined the relationships between two variables and hypothesis analysis which tests whether a hypothesis was true.

3.3 Research Paradigm

A research paradigm is an approach or a model or a pattern to conduct research. It is a framework of thoughts or beliefs or understandings within which theories and practices operate. It acts as a function of how a researcher thinks about the

development of knowledge. In simple words, a research paradigm is a process of creating a blueprint of research (Morgan, D.L. (2007).

Most of the quantitative research use positivism as a conceptual framework for research. Quantitative research always follows positivist approach because positivists believe in the empirical hypothesis testing. In this quantitative research, the researcher follows probabilistic models that were determined by previous research. Positivists believe that the findings of one study can be generalized to another study of a similar kind regardless of it is conducted in a different environment and situations or country. Therefore, the researcher tested the validity and reliability using quantitative method and validation of instruments thereof. Data analysed in this manner were argued to have more consistency and adopts generalization better than using small sample sizes

3.4 Research Design and strategy

The research plan of this study was descriptive quantitative, where a cross-sectional survey was used. This design is usually used when a researcher plans to use a deductive approach. Survey strategy enabled a researcher to collect data from a large population

Abdi, H., & Williams, L.J. (2010). A cross sectional is an observational in nature and linked to descriptive research. It was used to describe the characteristics that exist among cattle farmers. The cross sectional was used because it offered the study to be undertaken a single point in time. Also, it does not involve manipulation of variables. Furthermore, it allowed checking numerous population characteristics like age, gender, marital status, education level, academic rank and tenure. Lastly it helped to provided information about what was happening at that time during data collection of the dairy cattle farmers. Economically, also it was easy to understand and explain the phenomenon (Tsung, E.W.K. (2016).

3.5   Description of the study area

The Mara region is located in the northern part of mainland Tanzania. It is located between latitudes 1° 0' and 2° 31' and between longitudes 33° 10' and 35° 15'. It contains 30,150 sq kilometers total, 10,584 sq kilometers of such being water area. To the north the Mara region borders Uganda and Kenya. It is also bordered by the Arusha Region to its East, Simiyu Region to its South, as well as the Mwanza Region in the Southwest and West. There are ten administrative Districts within the region: Musoma Rural, Musoma Urban, Bunda Rural, Bunda Urban, Butiama, Mwibara, Serengeti, Tarime Rural, Tarime Urban and Rorya. The districts are thought to be ideal for studying livestock activities due to its high number of livestock farmers (URT, 2014). And the pilot surveys were conducted into two districts of Serengeti and Bunda districts

3.6   Target population

Burns (2012) defines target population as the entire group of people, objects or events which of all have at least one characteristic in common and must be defined specifically

and unambiguously. Also, this is supported by Msabila and Nalaila (2013) as a complete set of elements (person or objectives) that possess some of the common characteristics defined by the sampling criteria established by the researcher. The targeted populations of this study were all household conducting livestock farming in Mara region which has a population of 126,780 livestock farmers in census of agriculture Mara region (URT 2013).

3.7   Sampling design

Sampling refers to the process of drawing a sample from the large population. Or can be defined a sample design as a definite plan for obtaining a sample from a given population (Kothari 2009). In order for researcher to collect data during the study, the researcher chooses to use proportional stratified random sampling technique to ensure a balance of respondent from each household farmers, in this method the researcher divided the population into strata (groups) according to the number of specific groups of population, then from each stratum a sample were random drawn.

3.7.1   Sample Size

The selection of sample size in this study was based on the rule given by (Curry and Rick, 2016) that recommended a sample of 10% for a population of 101-1000 respondents for descriptive studies. The sample selected were enabled the researcher to provide answers to the research questions and came up with comprehensive, reliable and accurate data. The study was involved a population of 126,780 livestock farmers in (National sample census of agriculture 2012/2013 Mara region) in the study area from which the sample size were 405 respondents. The sample size was determined by applying the formula given by Kothari, 2009.

$$n = \frac{NZ^2pq}{(N-1)e^2 + Z^2pq}$$

Where:

n= Size of sample

N = Size of population targeted

e = acceptable error (0.05)

Z = confidence level 95%, for statistical value of 1.96

P = sample proportion of the problem to occur

q = sample proportion of the problem to not occur (q=1-p)

$$n = \frac{126,780 * 1.96^2 * .5 * .5}{(126,780 - 1).05^2 + 1.96^2 * .5 * .5}$$

$$n = 405$$

3.8   Data Collection Methods

Designed for this study, both primary and secondary data sources were used the most important factor to be taken into account when determining the sample number on valuing the willingness to pay for improved dairy livestock insurance through livestock insurance.

3.8.1   Primary Data

In this study, primary data were collected through questionnaires and correspondence by means of a contingent valuation questionnaire. Soliciting farmers' willingness to use and pay livestock insurance as the major objective of the contingent valuation survey, other socioeconomic and demographic questions as well as their preferences to the forms of payment for the insurance service are also were included in the survey.

The elicitation method in this study followed the discrete choice with a follow-up approach, in which the respondent is asked a yes or no answer question regarding his/her willingness to use as well as willingness to pay for livestock insurance in Mara Tanzania. The later were followed by other question/s using a higher price insurance package if the respondent says yes until he says 'no.' Likewise, if the respondent says no, a lower price insurance package is used in the follow-up question until he says 'yes.'

3.8.2   Questionnaire

There was various definition of the term questionnaire, and different authors on research (researchers) have defined it in different ways. Under (White 2002) defined the term questionnaire as a series of questions, and each providing a number of alternative answers from which the respondent can choose. In this study the dichotomous choice questionnaires were signed in a single way basing on research questions. Through this tool, the respondents within two districts of the study were in position to answer the questions concerning the study.

3.9   Model specification

This study planned to adopt probit model to estimate willingness to pay for cattle livestock insurance whereby WTP which is the dependent variable generates a binary outcome by considering Yes answer for those who are willing to pay and No answer for those who are not willing to pay per time (Yes = 1 and 0 0therwise). After data collection if the researcher will find that all respondents are willing to pay for livestock insurance, thereafter WTP was be measured through using Ordinary Least Squares Models (OLS) under multiple regression models whereby the answers were on WTP bids in TZS by respondents/farmers (pastoralists) were used as dependent variable.

Every farmer had different answers on how much amount respondents are willing to pay referring to bids included on dichotomous choice questions. Therefore, the model explains the relationships between WTP bids and factors affecting WTP bids for cattle livestock insurance viable for the stakeholders involved.

3.10 Data Analysis Plan

The process of data analysis was determined whether the observations support the research questions before going into the field to collect the information. With regards to this study, the data collected were edited for accuracy and completeness before they were subjected to analysis. Descriptive analysis method by excel under pivoting operational and STATA was also adopted.

3.11 Data reliability and validity

In this study contingent valuation method were employed where by farmers had to make choices through dichotomous choice questions, respondents they asked if he or she is willing to pay for the proposed bid (amount in TZS). If he or she says'' yes'', to the initial bid, then the corresponding bid greater than the initial bid were asked and if he or she says ''no'' to the initial bid, then the lower bid less than the initial bid was asked. In designing and conducting the survey, attempt was made to minimize biases that may arise in using CVM such as interviewer bias, strategic, hypothetical and compliance biases, and scenario specification. Before the main survey conducted, the researcher made cross check trainings in order to solve inconveniences that might happen. Hence a pretest survey helped the enumerator to administer contingent valuation survey as well as to check the wording and structuring of the questionnaire was conducted.

Also, different tests patterning with multiple regression models were conducted in order to make validity of the data analyzed. This was done by Checking for Violation of Ordinary Least Square (OLS) Assumption in which; Multicollinearity were tested, in doing so Variance of Inflation Factor VIF was used for this test. Whereby if a Mean VIF value is greater than 10 means there might the problem of Multicollinearity and when VIF is less than 10 for each variable indicating that there is no Multicollinearity. Furthermore, the tolerance defined by 1/VIF also was used to check the degree of collinearity (Gujarat, 2009).

3.12 Ethical Considerations

It is argued that "ethical concerns are paramount when planning, conducting and evaluating research" (Cozby, 2007). The researcher observed that the study should abide by human rights and national policies. Therefore, attention was paid on observing the rules and regulations during the process of preparation and conducting the research by considering the following;

3.12.1 Observing protocol

Before going to the field for data collection, the researcher requested for a research clearance form from the Open University that introduced him to Mara Regional Administrative Secretary (RAS). The Regional then write a letter that introduced the researcher to the respondents in the study area that is the districts that have the most herders.

3.12.2 Informed Consent of Respondents

After securing the research permit, the researcher introduced himself to the respondents under study. The participants were informed verbally on the aim and the significance of

the study, timing of the interviews and for whom the results will intended (Cozby, 2007). The researcher also will inform the respondents that participating in the study is voluntary. As such they are free to withdraw their consent at any stage during the data collection process.

3.12.3 Confidentiality of the Information Sources

The researcher will ensure confidentiality of the information sources such that the respondents are guaranteed that the information provided will only be used for the research purpose and were treated confidentially. None of the participants were identified by names in the research report; instead, abbreviations were used. Furthermore, all the quotations were used with the permission of the respondents.

CHAPTER FOUR

PRESENTATION OF THE RESEARCH FINDINGS

4.1 Introduction.

This section presents the findings of the contingent valuation pilot survey using a descriptive and econometric analysis. Also, the chapter presents the nature of data which were collected in the field. The data concerning for improved dairy farming through dairy farming livestock insurance schemes in Mara Tanzania.

4.2 Respondents Profile

The section describes the overview of the respondents as beneficiaries using the variables of age, gender, type of cattle's farmers owned and education levels of the respondents. In that note, table 4.1 illustrates the findings as follows.

4.2.1 Gender

Gender of respondents was sought by the researcher in order to examine the valuing willingness to pay for improved dairy farming livestock insurance scheme. The findings revealed that 33% were females, and 67% were male (Table 4.1). The sample was drawn at random; it can be concluded that there were more male household compared to the female household. Livestock is owned by both male and female pastoralists in Mara region; however, is a culture of the pastoralist of this Region that, the numbers of males who own livestock are higher than female. This business of pastoralism has been done by male to a large extent and this means the demand for livestock insurance schemes will be required to at large by male because cattle are important and preferably business for them.

Table 4. 1 Distribution of Respondents by gender.

Gender	Frequencies	Percentages
Male	67	67%
Female	33	33%
Total	**100**	**100%**

Source: Field data (2022)

4.2.2 Age

The study question was asked to respondents to know the age distributed where by the findings indicates that 2% of the respondents indicated that they belonged to the 18-24 age brackets while 26% fell in the 25-34 age brackets. 17% were in the 35-44 age brackets, 52% were in the age bracket 45-54 years with 3% being above 55 years. The results in figure 4.2 showed that majority of the respondents were between 25-54 years (Table 4.2). The demand for livestock insurance schemes still differs with age as reported by Alexander, J. T., et al. (2010).) then we can conclude that the maturity age was more populated compared to others, this indicate great awareness of livestock insurance schemes as far as education from insurance stakeholder are provided.

Table 4. 2 Distribution of Respondents by Age Group

Age	Frequencies	Percentages
18-24 Years	2	2%
25-34Yesrs	26	26%
35-44Yesrs	17	52%
45-54Yesrs	52	17%
55[+] Years	3	3%
Total	**100**	**100%**

Source: Field data (2022)

4.2.3 Educational Level

The question was posed to the respondents about the level of education. The findings revealed that, 9% had informal education, 42% had primary education, 30% had secondary education level, 9% attained non-degree, 8% are degree level and 2% was Master's degree levels (Table 4.3). Most of the respondents had a primary education, this shows that the respondents had not enough education to understand the meaning of livestock insurance, insurance stakeholders and the government together with Tanzania Insurance Regulatory Authority (TIRA) they had a task to explain the benefits of having livestock insurance so as to improved their dairy farming.

Table 4. 3 Level of Education of Respondents

Education level	Frequencies	Percentages
Informal education	9	9%
Primary education	42	30%
Secondary education	30	42%
No- Degree	9	9%
Degree	8	8%
Master's Degree	2	2%
Total	**100**	**100%**

Source: Field data (2022)

4.2.4 Cattle Type

Lastly, the question also was posed to the respondents about the type of cattle owned. The findings revealed that about 42% of household own dairy cattle livestock and 58% own indigenous cattle (Table 4.4). Therefore, the majority of cattle owned are the indigenous cattle. Research shows that, indigenous cattle farming was preferred by most cattle farmers (families) compared to dairy cattle farmers. Indigenous livestock are

raised in large numbers and it is easy to experience various risks such as being stolen and even attacked by wild animals, so livestock insurance is very important for these communities and the research showed that most farmers they are willing and ready to insure their livestock for better diary productions.

Table 4. 4 Cattle type owned by respondents

Cattle type	Frequencies	Percentages
Dairy cattle	42	42%
Indigenous Cattle	58	58%
Total	**100**	**100%**

Source: Field data (2022)

4.3   Analysis on Study Variables

The analysis on study variables was described through mean and standard deviation and also through inferential analysis by using correlation and multiple regression with the ilustration conducted to suit the intended variables.

4.4   Mean and Standard Deviation

The analysis was described to show the predicting variable with strong influence towards dependent variable and opinion level of the respondents. In that case, various tables based in the variables express the results.

4.4.1 Effect of household income level

Table 4. 5 Household Income level factors on improving dairy cattle farming

Factors	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

Source: Field Data (2022)

The findings in table 4.5 describe results on mean and standard deviation that determine the Effect of household income level on improving dairy cattle farming in Mara Region. The economic features were determined on the basis of quantitative analyses of the performance of livestock projects measures. The findings were presented and discussed as quantitative analysis test of hypothesis (stepwise multiple regression) as quantitative analysis.

The effect of household income on improving dairy cattle farming in Mara region, by looking in income 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 4.5 Indicates that most 96% expressed their opinion that road infrastructure is important for good mobility.

About 95% of the respondents unanimously expressed their opinion that the area's vastness contributes to grazing the livestock to distance. Few of the respondents 38% have 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 permanent livestock market. 68% of the respondents agreed that they had embraced the use of Technology in livestock management. Also 63.3% of the respondents agreed that road infrastructure was too bad to be useful in accessing markets.

4.5   Regression analysis on Income factor

The regression results in Table 4.6 shows the relationship between income factors and performance of dairy cattle farming in Mara region which indicates that it is statistically significant since the p-value (<0.05) i.e. ($F=0.08$, p-value=0.000). This means that a predictor that has a low p-value is likely to be a meaningful addition to the model because changes in the predictor's value are related to changes in the response variable.

Table 4. 6 Model Summary

Model R	R Square	Adjusted R Square	Std. Error of the Estimate		
0.68ᵃ	0.84	-0.006	0.79733		
ANOVAᵃ					
Model	**Sum of squares**	**Df**	**Mean Square**	**F**	**Sig.**
Regression	0.51	1	0.051	0.08	0.001ᵇ
1 Residual	94.725	404	0.636		
Total	94.776	405			
Coefficientsᵃ					
Model	**Unstandardized coefficients**		**Standardized coefficients**	**T**	**Sig.**
	B	Std. Error	Beta		
(Constant)	2.641	0.359		7.359	0.0000
1 income Factors	-0.028	0.099	-0.023	-0.282	0.000

Source: Researcher, 2022.

4.6 Multiple Regression Model for income factors

The first specific objective of this study was to determine Effect of household income level on improving dairy cattle farming and how it affects the performance of livestock insurance scheme in Mara Region.

In model there is an insignificant relationship between the predictor (income factors) and improving dairy cattle farming in Mara. (R^2= 0.86, $F (1, 126) = 0.006$, p=0.943). The results in Model 2 present the results for the independent variable (income factors) and the moderator (improving dairy cattle farming). The results in Model 2 indicate that economic features have an insignificant relationship with improving dairy cattle farming in Mara region (β= 0.002, t=0.015, p=0.000). Furthermore, there was a

significant relationship between Livestock Insurance and improving dairy cattle farming in Mara region (β= -0.05, t= -0.335, p=0.000).

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

Where Y is improving dairy cattle farming in Mara region, X_2 is income features, X_5 is Livestock Insurance.

In model 3, the moderation is tested by introducing the interaction term income factors * Livestock Insurance. There was a significant relationship between relationship income factors and improving dairy cattle farming in Mara region (β= 0.037, t= 0.247, p=0.006). The β changed from 0.002 to 0.037 after moderation. Also, there was an insignificant relationship (β= -0.052, t= -0.347, p=0.000) between Livestock Insurance scheme and improving dairy cattle farming in Mara region. The interaction term income factors *Livestock Insurance scheme is significant (β= -0.070, t= -0.333, p=0.000). There was no change in R^2 (p-value 0.740). In this regard, the study failed to reject H_{01}.

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

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 0.00, 0.00 and 0.003 respectively. On adding Livestock Insurance scheme variable on the model containing income factors, the change in F was not significant (F-change =0.112, p=0.000) indicating that Livestock Insurance scheme as a predictor has significant influence on the improving dairy cattle farming in Mara region. On adding the interaction term (income factor*livestock insurance scheme) to the model containing income factors and livestock insurance scheme as predictors, the change in F was not significant (Fchange

=0.111, p=0.74) meaning that livestock insurance scheme is a significant moderator of the relationship between income factors and improving dairy cattle farming in Mara region.

4.7   Access to credit facilities

Table 4. 7 Descriptive Statistics of credit facilities in accessing livestock insurance

VARIABLE	MEAN	SD
I have enough assets to use as security when accessing loan from financial institutions for livestock activities.	3.05	1.344
I am able to easily repay my loan from livestock activities	3.12	1.159
Due to lack of collateral from livestock, I get loans from other sources	3.63	1.092
The use of group financing has helped me pay my loan easily	3.44	1.119
I do not like to apply for loans due to complex application procedures	3.23	1.109
Businesses that are registered are able to access loan easily	3.09	1.109
I consider the amount of interest rates charged before seeking finance	3.51	.985
I do not take loans due to short loan repayment	3.09	1.109
Micro financial intuitions transaction costs are usually higher thus, making me not apply for loans	3.47	.767
I am usually discouraged to apply for a loan because they usually give me less money than what I requested	3.44	1.031
I face challenges accessing finance due to high interest rate	3.26	1.136
Micro financial institutions charge high penalties on credit default	3.26	1.217
Aggregate Value	**3.29**	**1.098**

Source: Field data, 2022

The findings in table 4.6 also describe results on mean and standard deviation on credit facilities in accessing livestock insurance. The survey found that cattle farmers agreed that due to the lack of collateral respondents receiving loans from other sources had a mean of 3.63 and a standard deviation of 1.092 and respondents considered the interest rate charged before claiming cash had a mean of 3.51 and a standard deviation of. 985. However, respondents who were unable to reach the agreement on the cost of making small cattle financial proposals are generally higher, thus, making the respondents not apply for a loan with a definition of 3.47 and a standard deviation of .767. The use of

group support helped respondents to repay their loans easily with a mean of 3.44 and a standard deviation of 1.119. Respondents are generally not encouraged to apply for a loan for their livestock activities because they usually give them less than the requested amount of 3.44 and a standard deviation of 1.031.

The findings also showed that respondents faced financial access challenges for improving their livestock activities due to the high interest rate with mean of 3.26 and the average deviation of 1.136. Minor credit institutions charge high fines for debt default with a mean value of 3.26 and a standard deviation 1.217. Respondents who are reluctant to apply for a loan due to complex application procedures have a mean of 3.23 and a standard deviation of 1.109. Respondents can easily repay their loans with a mean of 3.12 and a standard deviation of 1.159. Respondents who do not take out loans due to short-term loan payments have a mean of 3.09 and a standard deviation of 1.109 and the respondents have sufficient assets to use as collateral when accessing loans from financial institutions with a mean value of 3.05 and a standard deviation of 1.344. As shown in Table 4.4.

4.7.1 Statistical Tests

The objective was set to analyze the effect of access to credit facilities in accessing livestock insurance scheme on improved dairy farming. A regression analysis was done to determine if access to credit facilities in accessing livestock insurance improve dairy cattle farming.

4.7.2 Correlation on access to credit facilities

The study conducted an integrated analysis to determine the access to credit facilities relationships and improved dairy cattle farming. It was pointed out that there was a

positive and significant relationship between credit facilities and improved dairy cattle farming (r = .388 *, p <0.010). This indicates that with every development of the access to credit facilities there is an increase in cattle farming performance.

Table 4. 8 Correlation between access to credit facilities and improved dairy cattle farming

		Correlations	
		Improved cattle farming	Access to credit facilities
Improved cattle farming	Pearson Correlation	1	.388[*]
	Sig. (2-tailed)		.010
Access to credit facilities	Pearson Correlation	.388[*]	1
	Sig. (2-tailed)	.010	

Source: Researcher, 2022

4.7.3 Regression Analysis of access to credit facilities and improved dairy cattle farming

The findings indicated that R^2 was 0.851 indicating that 15% of cattle farming is determined by the access to credit facilities set out in Table 4.6.

Table 4. 9 Regression; access to credit facilities and improved cattle farming

			Model Summary		Change Statistics				
Model	**R**	**R²**	**Adjusted R²**	**Std. Error of the Estimate**	Change Statistics				
					R Square Change	**F Change**	**df1**	**df2**	**Sig. F Change**
1	.388[a]	0.151	0.85	0.71516	0.151	7.267	1	293	0.01
a.	**a. Predictors: (Constant), access to credit facilities**								

Source: Researcher, 2022

4.7.4 ANOVA

An ANOVA analysis was done between access to credit facilities and improved cattle farming and at 95% confidence level, the F value=7.267, P<0.001. This shows that credit facilities have a significant effect on performance.

4.7.5 Coefficients of access to credit facilities and Improved cattle farming1

The findings in Table 4.7 indicates that access to credit facilities has a positive and significant effect on improving cattle farming (β= 0.388, p<0.010).

Table 4. 10 Coefficients of access to credit facilities and Improved cattle farming

Model	Unstandardized coefficients St. Error	Unstandardized coefficients St. Error		t	Sig.
	B	**Std. Error**	**Beta**		
Improved cattle farming Access to credit facilities	1.455	0.764		1.904	0.064
	0.618	0.229	0.388	2.696	0.01

Source: Researcher, 2022

4.8 Risk experience in improving dairy cattle farming

Table 4. 11 Mean and Standard Deviation on Risk and security experienced

Factors	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std. Deviation
District is exposed to violences	17.3	11.3	8	51	12	3.29	1.314
The predominant nature of insecurity your area is gang related	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 is 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

Source: Field data, 2022.

The findings on third objective (Table 4.7) were to explore the risk experience in accessing insurance scheme on improved dairy cattle farming and on how affecting performance of livestock projects in Mara Region. The findings were presented and discussed as analysis on conflicts and security.

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 4.8 indicates that majority of the respondents 63% agreed that violence is exposed to their district, 56.3% agreed that predominant nature of insecurity in their area is gang related, 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, Tanzania has experienced a marked decay in human security, from ballooning petty crime to the advent of ethnic cleansing and violences. The local and international press often mentions the phenomenon of rising crime and insecurity (Brown, 2013).

4.8.1 Regression analysis on risk and improved dairy cattle farming

The regression results in Table 4.9 shows the relationship between farming risk and improved dairy cattle farming in Mara region was significant (F=17.509, p-value<0.001). With R^2=0.106 the model implied that about 10.6% variation in improved dairy cattle farming in Mara region is explained by variation in risk experience situations.

The model equation for the relationship between risk experience (Security and Conflict) and improved dairy cattle farming is therefore:

$$Y=1.321+0.357X_3$$

Where Y is the improved dairy cattle farming in Mara region and X_3 is risk experience (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 risk experience (Security and Conflict), the improvement dairy cattle farming in Mara region increases by 0.357 units. The findings also implied that risk experienced (Security and Conflict) affect the performance of livestock insurance projects.

Table 4. 12 Model Summary

Model R	Adjusted R Square R Square		Std. Error of the Estimate		
.325[a]	0.86	0.1	0.75684		
ANOVA[a]					
Model	**Sum of Df Squares**		**Mean Square**	**F**	**Sig.**
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		
(Constant)	1.321 0.296			4.456	0
Insecurity and Conflict	0.357 0.085		0.325	4.184	0

Source: Researcher, 2022.

4.8.2 Multiple Regression Model for Risk experience

The specific objective of this study the effect of risk experience (Security and Conflict) in accessing livestock insurance scheme on improved dairy cattle farming. In model1 there is a significant relationship between the predictor (risk experience) and improved dairy cattle farming in Mara region. (R^2= 0.137, F (1, 126) = 19.66, p <0.001). The R^2=

0.861 shows that risk situations explain 13.7% of the variation in improved dairy cattle farming in Mara region. 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 (risk experience) and the moderator (Livestock Insurance scheme). The results in Model 2 indicate that risk experience have a significant and positive relationship with improved dairy cattle farming (β= 0.423, t=4.534, p < 0.001). The β of 0.423 indicates that a unit change in farming risk increases the improvement of dairy cattle farming in Mara region by 0.423 units, Livestock Insurance scheme being constant. Further, there is an insignificant positive relationship between Livestock Insurance scheme and improved dairy cattle farming in Mara region (β= 0.143, t= 0.991, p=0.323).

$$Y=1.003+0.423X_3+0.143X_5$$

Where Y is improved dairy cattle farming in Mara region, X_3 is risk experience, X_5 is Livestock Insurance scheme.

In model 3, the moderation is tested by introducing the interaction term farming risk experience * livestock Insurance scheme. There was a significant relationship between relationship risk experience and improved dairy cattle farming in Mara region (β= 0.437, t= 3.819, p < 0.001). Therefore β= 0.437 indicates that a unit change in cattle farming risk is associated with a 0.437 increase in improvement of dairy cattle farming in Mara Region livestock Insurance scheme 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 Livestock Insurance and improved dairy cattle farming of projects in Mara region. The

interaction term risk experience situations * Livestock Insurance scheme is insignificant (β= -0.042, t= -0.209, p=0.834). In this regard, the study failed to reject H_{04}.

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).

$$Y=0.955+0.437X_3+0.134X_5-0.042X_{1*}X_5$$

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 livestock insurance variable on the model containing Insecurity and conflict, the change in F was not significant (F-change =0.983, p=0.323) indicating that livestock insurance as a predictor has no significant influence on the improving dairy cattle farming in Mara. On adding the interaction term (Insecurity and conflict *livestock insurance) to the model containing insecurity and conflict and livestock insurance as predictors, the change in F was not significant (F-change =0.044, p=0.834) meaning that livestock insurance is not a significant moderator of the relationship between insecurity and conflict and improved dairy cattle farming.

4.9   Number of cattle's on improving dairy cattle farming

Table 4. 13 Number of cattle's improving dairy cattle farming

Factors	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std. Deviation
Animals lose a lot of energy by walking long distances searching for grazing area, and thus take long time to grow and reach slaughter weight and diary products.	17.3	11.3	8	51	12	3.29	1.314
It is difficult to get social services due to the migration of herders.	19.3	15.3	8.7	49	7.3	3.1	1.309
This system causes damage to the environment if there are too many livestock.	2	1.3	5.3	49	42.7	4.29	0.797
A decrease in the variety of grasses and plants in the pastures.	0.7	18	26.7	51	4	3.39	0.851
This system has been a major source of conflict between pastoralist communities and farmers.	10.1	26.4	26.4	36	1.4	2.92	1.04
It is easy for cows to be stolen or lost.	22.7	44.7	10.7	22	0	2.32	1.058
It is easy for livestock to be attacked by wild animals.	2	1.3	0	73	23.5	4.15	0.672

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

Source: Researcher, 2022

The fourth specific objective of the study (Table 4.13) were to explore the Effects of number of cattle's in accessing insurance scheme on improved dairy cattle farming and how it may affect the performance of livestock projects in Mara. The findings were presented and discussed as analysis on conflicts and security.

The impact due to the number of cattle 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 number of cattle's 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 4.11 indicates that majority of the respondents 63% agreed that Animals lose a lot of energy by walking long distances searching for grazing area, and thus take long time to grow and reach slaughter weight and diary, 56.3% agreed that It is difficult to get social services due to the migration of herders, 91.7 agreed that the This system causes damage to the environment if there are too many livestock., 55% A decrease in the variety of grasses and plants in the pastures, 37.4% the system has been a major source of conflict between pastoralist communities and farmers., 22% agreed that It is easy for cows to be stolen or lost., 96.5% and It is easy for livestock to be attacked by wild animals.

4.10 Inferential Analysis

Analysis was performed to describe the relationship between the study variables using correlation and multiple regression. In that case, model summation was first performed to determine the overall influence of the predictors on the dependent variable. Therefore, various tables based on variables explained the results.

4.11 Discussion of Findings

4.11.1 Household income level on improving dairy cattle farming

The three models were significant as indicated by their F-values were (0.006, 0.059 and 0.076) and their corresponding p values were 0.00, 0.00 and 0.003 respectively. On adding Livestock Insurance scheme variable on the model containing income factors, the change in F was not significant (F-change =0.112, p=0.000) indicating that Livestock Insurance scheme as a predictor has significant influence on the improving dairy cattle farming in Mara region. On adding the interaction term (income factor

livestock insurance scheme) to the model containing income factors and livestock insurance scheme as predictors,

The regression results showed the relationship between income factors and improved dairy cattle farming is not significant (F=0.08, p-value=0.00). The significance of the model may be attributed to the natural attachment of the pastoralist to their animals that makes them willing 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 Mara region is not friendly to cattle farmers, disjointed, and in places non-existent. Key arterial routes linking Mara region to markets 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.*, 2019). Hence this is the reason why income factors cannot influence the improvement of dairy cattle farming in Mara.

From the study findings, it was established that road infrastructure was important in effective mobility. This study agreed with that of Donovan (2013) who noted that road infrastructure is important for the economic development of a region. The study also showed that market accessibility was a major challenge for Mara residents and this study finding corresponded with the study of little Pius (2015) who explained that the main challenge in Mara is the inability to access markets due to poor road infrastructure. On average, cattle are taken to market once a month and one has to travel about 18 km. Likewise, the study found that the people of Mara do not have permanent cattle market and this was a big challenge for them to sell their animals.

4.11.2 Credit access facilities improved dairy cattle farming

It was pointed out that there was a positive and significant relationship between credit facilities and improved dairy cattle farming (r = .388 *, p <0.001). This indicates that with every development of the access to credit facilities there is an increase in cattle farming performance. It was decided that due to a lack of collateral the respondents' received loans from other sources. This is in line with a study by Abdinor (2015) which found that most livestock keepers do not have collateral, ending up looking for money from cheap sources. It is recommended that government and other financial institutions should facilitate access to credit for small and medium enterprises in small financial institutions and reduce lending conditions. SMEs should also be encouraged to use group funding to reduce debt default. Hongbo et al, (2019) stated that due to the lack of collateral and reassured Chinese cattle farmers find it difficult to obtain loans from financial institutions thus preventing them from participating in the country's economic development.

The study found that the cost of developing microfinance intuitions is often high, making it difficult for farmers to apply for a loan. Dairy farmers often face high financing costs and are required to build collateral; cattle farmers have few assets to offer as collateral (Berger & Udell (2018). Loan support to cattle farmers has decreased due to the inability of small financial institutions to raise debt to farmers due to lack of information, higher transaction costs, higher interest rates and lower profits from investments (Olutunla & Obamuyi, 2018). Findings showed that respondents who disagree with respondents' opinion are usually discouraged from applying for a loan because they usually give them less money than they requested. Cassar (2017) stated

that it is costly dairy farmers to resolve information asymmetries with debt providers. Therefore, cattle farmers were offered less debt capital compared to larger firms. Transaction costs may also be higher. In addition, smaller firms are also unable to raise capital because they cannot reach capital markets due to their size.

Respondents were found to be facing financial access problems due to high interest rates. According to a study by Kimaiyo (2016), it was concluded that most dairy farmers did not apply for credit due to complicated application procedures, high interest rates and lack of collateral and poor record keeping. A number of small financial institutions are considering starting to provide financial services to low-income clients and entrepreneurs who have access to banking and other services. In addition, the ability to provide credit services to clients through credit institutions was determined by the amount of credit, payment records, interest rates and savings that the customer had (Lumumba, 2016). Bett (2016) reported that most dairy farmers are afraid to apply for credit due to high interest rates and lack of information on affordable services offered.

The results showed that the respondents did not take out loans because of the short repayment period. Bragg (2016) pointed out that the short time given to entrepreneurs to repay their loans reduces the risk of non-repayment of the bank, which will result in the business's assets declining so far in the short term that it will not be able to repay the loan while the bank was protected from long-term fluctuations in interest rates.

4.11.3 Risk experience on improved dairy cattle farming

On adding livestock insurance variable on the model containing Insecurity and conflict, the change in F was not significant (F-change =0.983, p=0.003) indicating that livestock insurance as a predictor has significant influence on the improving dairy cattle farming

in Mara. On adding the interaction term (Insecurity and conflict *livestock insurance) to the model containing insecurity and conflict and livestock insurance as predictors, the change in F was not significant (F-change =0.044, p=0.004) meaning that livestock insurance is significant moderator of the relationship between insecurity and conflict and improved dairy cattle farming.

The coefficient β was positive and statistically significant (β =0.357, t=4.184, p<0.001) indicating that, for one unit increase in farming risk situations (Security and Conflict), the improved dairy cattle farming in Mara region increases by 0.357 units. The findings also implied that risk situations (Security and Conflict) affect the improvement of dairy cattle farming. This agrees with Chantarat *et al.* (2013) whose study concluded that conflict and insecurity have an impact on adoption and operationalization of livestock insurance. 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 shift war in the 1960s. It is the most marginalized part of the country, in core human development factors (Kumssa *et al.*, 2019). Thus, if security is highly improved in Mara region, performance of dairy livestock farming will increase.

These results agree with the peer-reviewed literature that since 1990, Tanzania has experienced a significant decline in human security, from inflated petty crime to the advent of ethnic cleansing and violence. Local and international press often mention the phenomenon of increasing crime and insecurity (Brown, 2014).

The study found that the Mara people are exposed to violence and they agreed that the nature of insecurity such as gang, family or clan related conflicts is prevalent in their areas and these findings of the study are in line with the study of Brown (2014) who noted, that some people from the Mara region are exposed to insecurity in their areas such as clan conflicts. The study also showed that the smallholder cattle keepers were afraid that their cattle might be stolen or taxed. Most of the respondents also agreed that the security apparatus is not good enough to ensure their comfort and therefore they are forced to use community measures to deal with insecurity, which is in agreement with studies (Kumssa et al. 2009).

4.11.4 Effects of number of cattle's on improved dairy cattle farming

This study finding corresponds with the study of Forsyth (2015) who observed that the interaction due to the increase number of cattle factors and Livestock Insurance was insignificant. The dairy cattle were the most prestigious species hence the most expensive livestock as it was kept for the sale of milk, domestic consumption, and breeding purposes (Angelsen, A. & Dokken T. (2015). Dairy cattle are also not a drought resistant animal so should be kept at reasonable number. 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.

CHAPTER FIVE

SUMMAY, CONCLUSIONS AND RECOMMENDATIONS

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 factors willingness to pay for dairy cattle livestock insurance, the case study was at Mara region as a pilot region selected to start this insurance scheme.

5.2 Summary of the findings

The main aim of this study was to asses the factor affecting willingness to pay for improved diary cattle farming through livestock insurace scheme . Specifically, the study aimed at answering questions on assessing the effect of household income level on improved dairy cattle farming, assesing the effects of number of cattle's in accessing insurance scheme on improved dairy cattle farming, assess the effect of access to credit facilities in accessing livestock insurance scheme on improved dairy cattle farming, assessing the effect of risk experience in accessing livestock insurance scheme on improved dairy cattle farming through livestock insurance scheme a case of Mara region.

The study survey 405 livestock farmers as a representative sample of a cross section of residents. Multiple regression model (OLS) was used to evaluate the surveyed data. Accordingly, on the regression results the study showed that the relationship between income factor and improving dairy cattle farming in Mara 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 what they ought mostly to be the diary its self should be source of income so as if they sell them, it should be able to produce income for insuring their cattle's.

However, respondents were unable to agree on the cost of the overall increase in financing mechanisms and thus respondents were reluctant to apply for credit. The use of group funds helped the respondents to repay loans easily. Respondents urged they are usually not encouraged to apply for a loan because they usually give them less amount than they requested. The results also showed that dairy farmers faced problems accessing finance due to high interest rates. Applicants are reluctant to apply for a loan because of the complicated application process, the procedures of getting a loan requires a lot of things until you get that loan. Dairy farmers do not take loans for short-term loan repayments, the majority of the small livestock keepers wanted their livestock to be used as collateral for loans to financial institutions, but some also said that they are engaged in other activities apart from livestock keeping, such as agriculture, which also brings them income that can provide them income to pay for the insurance of their livestock. All this was due to the difficulty and conditions of obtaining loans from financial institutions, however the knowledge about finance also is very limited for most of the livestock. Regression analysis was conducted and it was found that there is a positive and significant relationship between access to credit and improved livestock farming through livestock insurance scheme ($r = 0.388$ *, $p < 0.010$).

On the regression results, the study established that the relationship between risk situations (Security and Conflict) and perf improved cattle farming was significant. The

model implied that about 10.6% variation in improved cattle farming is explained by variation in risk situations. This could be as a result of Livestock Insurance product only covers the insured 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 effect between risk experience and Livestock Insurance on the improved cattle farming.

5.3   Conclusion.

The results and finding of the present study show that there is significant willingness to pay for improved dairy cattle farming through livestock insurance scheme in all the districts of the Bunda and Serengeti. Besides other reasons such as the possession of small livestock assets that impedes participation in Livestock Insurance, a majority of herders indicated that the knowledge at their disposal on livestock insurance is inadequate to decide on the purchase of it although they WTP. This demonstrates that herders need to know more about Livestock Insurance to make decisive decisions about it. It was further discussed that households' livestock losses due to catastrophic events were higher for adult sheep and cows than other livestock species and classes, with a perceived economic effect on household livestock income. This suggests the potential need for Livestock Insurance to cushion the economic shock that can be anticipated from such losses when catastrophic events occur.

Similarly, the binary logistic regression model results showed that the willingness to purchase livestock insurance is positively influenced by education level, livestock number, risk perception level, awareness, and contracted grassland area. The result suggests the need for policymakers and insurers to design programs that will educate herders on risk management tools (e.g., financial literacy) to improve herders'

awareness of Livestock Insurance and help them make an informed decision when purchasing insurance products. In addition, government and other stakeholders such as research institutes should make a concerted effort towards policies and outreach programs that will enhance the factors that influence willingness to pay for insurance as found in this study. Insurance products and programs designed to communicate to the herders should be flexible enough to meet the target audience's need concerning product design, channels of information delivery, etc. The findings from this study narrow down the knowledge gap related to the promotion of Livestock Insurance uptake in the study area and recommend scaling-up awareness about livestock insurance to enhance its acceptance by herders.

The study also underline the need for creating awareness among livestock farmers and linking them to urban markets for enhancing the value of livestock keeping and creating sustained demand for these services. In case of livestock insurance, if insurance agencies were ready to bear all the extra charges, reduce the paper work and the liability ratio of claim is increased from 50 per cent to 65 per cent of the sum insured, the farmers were willing to pay premium at rate more than 8 per cent while the existing rate of premium was only five per cent. The challenges faced by insurance providers and livestock insurance buyers in Tanzania were high transaction costs in getting the policy and settling the claim. Another factor that could reduce the cost of livestock insurance for farmers is the government's subsidy to livestock keepers, this will help reduce the insurance rate and thus livestock keepers many join livestock insurance scheme. This requires a re-examination of the government's current strategy and plans for livestock service delivery and for overall development of this sector. In particular, this will

require providing room for private practitioners in high potential areas with relatively good access to markets. In the low potential backward areas, government will have a more direct role. In the long term, as the livestock services sector develops and service delivery becomes more commercial and self-sustainable, the government will need to dedicate itself towards public good provision such as disease surveillance, disease prevention and food hygiene, zoonosis control, sanitary control, compliance monitoring, market regulation and so on.

5.4   Policy Implications

The significance of factors that affecting livestock insurance for improving dairy cattle farming   in modal choice decision making of famers suggest that government should pay more attention and consider these attributes important when providing guidance in supervising livestock insurance scheme in Mara region and other regions in Tanzania. However, when implementing improving dairy cattle farming through livestock insurance scheme. Priority and particular attention should be given to the order of importance of the attributes for effective delivery of livestock insurance coverage to the farmers.

Generally, policy makers and decision makers should be aware of the number of cattle, cattle type, average income to the farmers and access to veterinary clinic service when providing livestock insurance package charges, taking into account the economic condition of insurers. Also, policy maker must consider that most of cattle farmers' population is dominated by low, moderate and higher income earners. Only through provision of livestock insurance services which characterized by good veterinary services, better cattle medical price with good customer care services under a

respectively insurance chargess will improve dairy cattle farming through livestock insurance scheme be sustainable and attractive to its prospective insurance users.

5.5   Recommendations and implications

A very large proportion of livestock farmers are willing to pay for for improved diary cattle farming through livestock insurace scheme although the programme is a relatively new concept. The farmer's experience, age, education, marital status and awareness of insurance significantly influence their willingness to pay for livestock insurance, which could serve as an adaptation strategy and/or agricultural risk management strategy against climate change variabilities, such as drought and extreme weather conditions. Consequently, the number of household dependents had a negative impact on the number of live stocks to be insured in the programme. Thus, awareness of willing to pay for for improved diary cattle farming through livestock insurace scheme should be created among livestock farmers as a means of risk management that can offer them a much-needed channel to cope with the contrariness associated with the variability's climate change. Livestock farmers should be educated on livestock insurance and the benefits of paying the insurance premium. Dissemination of livestock insurance knowledge should be shared and communicated through the right channels to the livestock farmers. Correspondingly, the policymakers and the stakeholders should consider the introduction of the livestock insurance concept as an agricultural climate risk policy. Also, government should intervene by offering agricultural grants or subsidies which takes care of or subsidizes the amount to be paid for livestock insurance.

5.5.1   Stimulate adoption of the scheme

It is vital for a government through TIRA to ensure that the farmers are aware of the cattle livestock insurance program and the benefits of acquiring insurance. The lack of information can make cattle livestock insurance scheme seem like a very risky venture for farmers thus deterring participation. Knowledge dissemination to farmers through the media particularly through radio broadcasts and in the form of extension services offers the prospect of increasing the awareness of the benefits of cattle livestock insurance. This could increase the participation rate. Based on farmers' perception about cattle livestock insurance, in periodic training sessions should emphasize the main objective of cattle livestock insurance that is to decrease production risk, and the company's client base i.e. number of cattle's and its discount on insurance. Also, the inefficiency of informal risk management strategies as well as the benefits of crop insurance should be provided to farmer's knowledge, skills and resources to improve on farm and off-farm cattle productivity.

5.5.2   Collaboration with another insurance provider or financial institution

Efforts should also be made to ensure collaboration between the insurance providers, financial and agricultural institutions and the government as well as other stakeholders to provide demand oriented and sustainable insurance products to farmers. An example would be to research was based on selected communities in one region in the country. This was because the data used for the analysis was not originally gathered for this study and it focused on only a limited number of communities in Mara due to time and resource constraints. Also, the data gathered for the study is cross sectional data and therefore may not generate a great deal of information about changes over time since

they are not considered. The cross sectional data assessed cattle farmers' behavior at a specific period of time but evaluating farmers' behavior over time could present different results and much more findings. In addition, using a larger sample size and covering only one type of agriculture crop production would have improved the results. This was a limitation as the present study used data obtained from only 405 cattle farmers.

5.5.3 Expansion on the program

Finally, it is worth noting that cattle livestock insurance is not a panacea for all production hazards, since it may not be suitable for all groups of farmers. There is a need in collaboration with District Executive Directors to complement this program with other infrastructure, products and services that suit the country's diverse climate, topography, cropping system and the needs of varied crop and livestock farmers. The government could benefit from the results of this study by gaining more understanding on farmers behavior towards agricultural insurance. Although cattle livestock insurance is new, it has the possibility of transforming production and the lives of farmers.

5.6 Limitations of the study

In any research, limitations and obstacles are inevitable, but more importantly the researcher should address them to achieve the research objectives. As a case study, more time was needed to study and pass each village and reach some of the farmers and give them information so that they can understand the data you need before questioning them.

i.   Due to time constraints, the study focused only on two districts that is Serengeti and Bunda in Mara Region. The time given was insufficient due to the fact that

the researcher needed to get enough data to reach almost all the cattle farmers, also the researcher is a government employee; he has other duties to the employer that he had to attend at the same time. So, in order to deal with that problem, the schedule of research activities was carefully planned, the purpose was to complete the research on time. Therefore, the results of this study were limited to targeted population and generalization cannot be made to other districts in Mara Region.

ii.   Some important information the researcher had needed but it was difficult to get due to bad believes of some cattle farmers who felt their livestock are going to be stolen or taxed. Although some of them responded with great cooperation and I was able to get the important data I needed. So, the researcher tried to explained to them the importance of doing this research in their areas not stealing their livestock or taxed them but how their livestock will be insurance to improve or increase milk production values as well as not suffering from losses when disasters happen to their livestock and how many of them are willing to pay for livestock insurance scheme and the benefit of it.

5.7   Areas for Future Studies

Due to various constraints such as financial and time, the study focused only on the valuing willingness to pay for improved dairy cattle farming through livestock insurance scheme although there are areas that can be considered more. The following are recommended for considerations as they require further studies.

i.   The study adopted a quantitative approach to examine valuing willingness to pay for improved dairy cattle farming through livestock insurance scheme in Mara. Future studies may be conducted to determine the effects of valuing willingness

to pay for improved beef cattle farming through livestock insurance scheme, and other species such as goat and sheep particularly now that after my research has been published, the Government of Tanzania through its regulatory authority they should start implement that insurance policy.

ii. The current study focused on smallholder cattle keepers on valuing willingness to pay for improved dairy cattle farming through livestock insurance scheme. Future studies may look on small and large holder cattle keepers and should be done on the agricultural sector in general as well as forestry.

iii. The current study used structured questionnaires as a source of collecting data from smallholder cattle keepers. Future studies may decide to apply an interview in order to get in-depth perceptions of the feelings of respondents by so doing and better results based on the study as far as it concerned.

To generalize the results, more studies that will involve larger samples are needed. It is recommended that more research from other districts should be conducted to generalize the findings.

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APPENDIXIES

Appendix I: Questionnaires

Dear Mr./Mrs./Ms.,

Habari za kazi/Greetings!

Thank you for accepting to participate in the research project. Your participation in this research is voluntary, and you may change your mind about being involved in the research at any time, and without giving a reason.

My name is **ISAAC JOHN** a student at Open University of Tanzania pursuing Master's degree of Businesses Administration in Finance. I am conducting research to understand willingness to pay for improved dairy cattle farming through livestock insurance scheme a case of Mara region Tanzania.

Kindly complete the attached field survey which may take about 10-15 minutes of your time. Your response were anonymous and treated in the strictest confidence. The date collected is very essential in getting the findings which will reflect the actual scenario of the problem. There is no right or wrong answer and information derived from this questionnaire, it were used for research purposes only and will not be shared with any third parties or organization.

Thank you for your participation.

Yours Sincerely,

ISAAC JOHN

Reg No: PG201985699
Email: isaacj205@gmail.com
Mob: +255765148409

SECTION A: PERSONAL PROFILE

[1] What is your gender?

- ☐ Female

- ☐ Male

[2] Please specify your age group:

- ☐ 18-24 years

- ☐ 25-34 years

- ☐ 35-44 years

- ☐ 45-54 years

- ☐ 55 years and above

[3] What is your education background and experience?

- ☐ Informal education

- ☐ Primary Education

- ☐ Secondary Education

- ☐ Non – Degree

- ☐ Degree

- ☐ Other...Advance reading

- ☐ Other……………………………………...

- ☐ Employed and Agriculture

[4] Cattle type ownership description

- ☐ Keep dairy cattle

- ☐ Indigenous cattle

SECTION B: EFFECT OF HOUSEHOLD INCOME LEVEL ON IMPROVING DAIRY CATTLE FARMING

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
(a) Road infrastructure assist your household to easily move from one area to another					
(c) Vastness of the area contributes to grazing distances for your livestock					
Distance to market place 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.					

SECTION C: THE EFFECTS OF NUMBER OF CATTLE IN ACCESSING INSURANCE SCHEME IMPROVED DAIRY CATTLE FARMING

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
(a) Animals lose a lot of energy by walking long distances searching for grazing area, and thus take long time to grow and reach slaughter weight and diary					
(b) It is difficult to get social services due to the migration of herders.					
(c) This system causes damage to the environment if there are too many livestock.					
(d) A decrease in the variety of grasses and plants in the pastures.					
(e) This system has been a major source of conflict between pastoralist communities and farmers.					
(f) It is easy for cows to be stolen or lost.					
(g) It is easy for livestock to be attacked by wild animals.					

SECTION D: THE EFFECT OF ACCESS TO CREDIT FACILITIES IN ACCESSING LIVESTOCK INSURANCE SCHEME ON IMPROVED DAIRY CATTLE FARMING.

Please indicate your opinion on the basis of the disagreement or agreement with the draft statement using 1 to 5 scale guidelines. 5= Strongly Agree 2- Agree, 3= Neutral, 4 =Disagree, 1= Strongly Disagree.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	I have enough assets that I can use as collateral when I get a loan from a financial institution for expanding livestock activities.					
2	I can easily repay the loan					
3	Due to the lack of collateral, I get loans from other sources in order to save cattles					
4	The use of group funds helped me pay off my debts					
5	I do not like to apply for a loan because of the complicated process of applying					
6	Registered businesses have easy access to credit					
7	I look at the amount of interest rates charged before claiming finances					
8	I am not taking out a loan because of a short loan repayment					
9	The cost of transactions with Micro-credit intuitions is often higher that way, making me not apply for a loan					
10	I'm usually reluctant to apply for a loan because they usually give me less money than that I asked					
11	I am facing financial challenges because of the high interest rate					

SECTION D: CAPACITY BUILDING

SECTION D: THE EFFECTS OF RISK EXPERIENCE IN ACCESSING INSURANCE SCHEME ON IMPROVED DAIRY CATTLE FARMING

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
(a) Your District/Region is exposed to Violence					
(b) The predominant nature of insecurity your area is gang related or shift					
(c) 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 is good enough to make you comfortable					
(g) You use community measure to address insecurity.					
(h) You don't use community measure to address insecurity.					

Thank you for your good cooperation

Appendix II: Research clearance letter

THE OPEN UNIVERSITY OF TANZANIA

DIRECTORATE OF POSTGRADUATE STUDIES

P.O. Box 23409
Dar es Salaam, Tanzania
http://www.openuniversity.ac.tz

Tel: 255-22-2668992/2668445
ext.2101
Fax: 255-22-2668759
E-mail: dpgs@out.ac.tz

Our Ref: PG201985699

Date: September 23rd, 2022

Director,

Mara Regional Office,

P.O.BOX 81

MUSOMA

RE: RESEARCH CLEARANCE

The Open University of Tanzania was established by an Act of Parliament No. 17 of 1992, which became operational on the 1st March 1993 by public notice No.55 in the official Gazette. The Act was however replaced by the Open University of Tanzania Charter of 2005, which became operational on 1st January 2007.In line with the Charter, the Open University of Tanzania mission is to generate and apply knowledge through research.

To facilitate and to simplify research process therefore, the act empowers the Vice Chancellor of the Open University of Tanzania to issue research clearance, on behalf of the Government of Tanzania and Tanzania Commission for Science and Technology, to both its staff and students who are doing research in Tanzania. With this brief background, the purpose of this letter is to introduce to you Mr. Isaac John, Reg.No: PG201985699 pursuing Master of Business Administration (MBA).We hereby grant this clearance to conduct a research titled *"Valuing Willingness to Pay for Improved Dairy Cattle Farming through Livestock Insurance Scheme.A case of Mara Region Tanzania".* He will collect his data at your area from 25th, September 2022 to 24th, October 2022.In case you need any further information, kindly do not hesitate to contact the Deputy Vice Chancellor (Academic) of the Open University of Tanzania, P.O.Box 23409, Dar es Salaam.Tel: 022-2-2668820.We lastly thank you in advance for your assumed cooperation and facilitation of this research academic activity.

With kind regards,

Prof. Magreth Bushesha

DIRECTOR OF POSTGRADUATE STUDIES

Appendix III: Research Permit letter

THE UNITED REPUBLIC OF TANZANIA
PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION & LOCAL GOVERNMENT

MARA REGION
Tel. No.028-2622005, 2622004,
2622305

Fax No.028-2622324/2622764
E-mail: ras.mara@pmoralg.go.tz

REGIONAL COMMISSIONER'S OFFICE,
MARA REGION,
P.O. BOX 299,
MUSOMA.

Ref. No. FA 190/270/01/81

30ᵗʰ Septemba, 2022

District Exceoutive Director,
Bunda and Serengeti District

<u>RE: INTRODUCTION OF ISSAC JOHN.</u>

Please refer to the above mentioned subject.

2. The above named is a student of The Open University of Tanzania with **Reg. No. PG201985699**, pursuing Master of Business Administration (MBA).

3. With this letter, you are informed that, permission has been granted to the named student to conduct his research in Banda District and Serengeti from 25ᵗʰ September, 2022 to 24ᵗʰ Oktoba, 2022. The title of his research is "**Valuing Willingness to Pay for Improved Dairy Cattle Farming through Livestock Insurance Scheme**". The case study of Bunda District and Serengeti District.

4. Please accord him with necessary support.

Benjamin M Ogahga
Ag. REGIONAL ADMINISTRATIVE SECRETARY

Copy: District Administrative Secretary,
        Bunda and Serengeti District

        Vice Chancellar,
        The Open University of Tanzania,
        P. O. BOX 23409,
        DAR ES SALAAM.

        Issac John,
        The Open University of Tanzania,
        P.O BOX 23409,
        DAR ES SALAAM.