PROJECT DESIGN FACTORS, UTILIZATION OF INDIGENOUS KNOWLEDGE, PROJECT LEADERSHIP AND SUSTAINABILITY OF DAIRY GOAT PROJECTS IN THARAKA NITHI COUNTY, KENYA

BY

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DECLARATION

This research thesis is my original work and has not been submitted for academic award in any other University.

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DEDICATION

I dedicate this thesis to my wife Lizbeth Mwikali, son Allan Mumo, daughter Fina Ndanu for their love and care and to Sue Allan and family who were very instrumental in supporting and facilitating my academic journey from my early age.

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ABBREVIATIONS AND ACRONYMS

CBAHW	Community Based Animal Health workers
CDD	Community based development
DFID	Department of International Development
FAO	Food Agriculture organization
FBO	Faith based organization
FBO	Faith based organization
FGD	Focus Group Discussion
IFAD	Agricultural Fund for Agricultural Development
NGO	Non-Governmental Organization
SHG	Self-help groups
TPB	Theory of planned behavior
VFI	voluntary feed intake
IK	Indigenous knowledge
CBO	Community based organizations
GOK	Government of Kenya
HPIK	Heifer Project International-Kenya
KDPG	Kenya Dual-Purpose Goat
MGBA	Meru Goat Breeders' Association
MOLF	Ministry of Agriculture, Livestock and fisheries

ABSTRACT

Evidence from the literature indicates that sustainability of development projects such as dairy goat projects is seldom realized, especially where sustainability predictors are not scrutinized. Dairy goat projects have been designed and implemented in different areas in Kenya, to promote dairy goat subsector, however, their sustainability has been an area of concern. This study examined the project design factors, utilization of indigenous knowledge, project leadership and sustainability of dairy goat projects in Tharaka Nithi County. The following seven objectives guided the study; to establish how project beneficiary selection process influence the sustainability of dairy goat projects, to assess the extent to which community capacity influence the sustainability of dairy goat projects, to establish how institutional linkages influence the sustainability of dairy goat projects, to establish the extent to which dairy goat projects infrastructure influence the sustainability of dairy goat projects, to examine the extent to which the combined project design factors influence the sustainability of dairy goat projects and to establish how combined project design factors influence the sustainability of dairy goat projects. Also to establish how utilization of indigenous knowledge and project leadership moderates the relationship between the combined project design factors and sustainability of dairy goat projects. Guided by the pragmatic paradigm, this study used descriptive cross sectional survey and correlation design supported by the mixed mode approach of data collection, analysis and presentation. The study was anchored on the structural-functional theory, diffusion of innovations theory and collective action theory. Using a combination of multiphase or sequential sampling, stratified random sampling technique, and purposive sampling procedure, a sample size of 196 respondents was selected from a total population of 391 dairy goat farmers. Questionnaires with Likert-type interval scale anchored on a five-point scale was used to collect data. A total of thirteen (13) key informants sub county livestock officer, veterinary officer, social services officer and project officials were selected purposively and interviewed. Six self-help groups were sampled randomly from for focus group discussions. Descriptive statistics were computed for all variables and frequencies, percentages, arithmetic mean and standard deviation presented. Pearson's Product Moment Correlation (r), simple regression, multiple regression and stepwise regression (R squared), F-tests were used to test hypotheses. Results indicates that for objective one, r = 0.224, P=0.002<0.05, F (1,186) =9.850 therefore H_{01} was rejected, objective two r = 0.096, P=0192<0.05, F (1,186) = 1.718) hence H_{02} was accepted, Objective three r = 0.179, P=0.014<0.05, F (1,186) =6.146 therefore H_{03} was rejected. For objective four, r = 0.322, P=0.000<0.05, F (1,186) =21.482 therefore H_{04} was rejected, objective five; r = 0.389, P=0.000<0.05, F (1,183) =8.176 hence H_{05} was rejected, objective six, r = 0.104, 0.489, P=0.000<0.05, F (4,184) =1.856, F (1,187) =6.490, therefore, H_{06} was rejected and finally objective seven; r = 0.494, 0.671, and 0.111, P=0.000<0.05, F=5.271, F=108, F=1.763 thus H_{07} was accepted. From the findings of this study, it can be concluded that project design factors are important in the sustainability of dairy goat project and recommend the integration of authentic selection of project beneficiaries and building their capacities to sustain dairy goat projects. Further components of dairy goat projects require proper linkages to key support institutions and development of the necessary infrastructure for dairy goat's projects. At the same time, the effect of the utilization of indigenous knowledge and project leadership cannot be ignored. Based on the findings of this study, further study is suggested to establish the influence of youth participation in dairy goat projects as well as a study on gender perspectives in dairy goat's project management.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Livestock production is very critical in the agricultural economy of developing countries. Among the livestock production systems, dairy goat production has gained popularity as an important contributor to this important sector. Innovations and adoption of new technologies such as the promotion of dairy goat production, improvement of indigenous goats for better production are poised to make an even bigger contribution to the newly adopted agenda for sustainable development. This agenda comprises of seventeen sustainable development goals which are focused to eliminate poverty, inequality, just as well as tackling climate change by the year 2013.

The livelihoods of the farming communities are a top priority in any undertaking and thus projects implemented in these communities ought to support communities attain sustainable livelihoods. Boyazoglu, Hatziminaoglou, Morand-Fehr, (2005) observe that dairy goats contribute largely to the livelihoods of livestock keeping households of low and medium input farmers. Dairy goat farming has several benefits such as enhanced nutrition from the consumption of milk (Peacock 2008), the creation of jobs through provision of animal health, breeding, and water management services and improved household income from the sale of weaners, culls and breeding stock (Peacock and Hastings 2011). In the year 2010, the higher levels of goat milk production were produced by India, Bangladesh, Sudan, Pakistan, France and Spain, with 62.2 % of the goat milk produced in the world (FAOSTAT 2012).

Development of dairy goat programs in Africa is largely done by Non-Governmental Organizations (NGOs) and to a lesser extent by the governments. The main goat-producing countries in West Africa Region are Nigeria, Niger, Mali, Mauritania and Senegal (Olantunji and Adeyemo 2009). The most important East African countries in dairy goat population are Sudan, Somalia, Kenya, Ethiopia and Tanzania (Luis et al 2012). Kenya did

not lag behind in the development of dairy goat sub-sector which picked up in the 1980s and 90s and has since taken the lead.

1.1.1 Sustainability of Dairy Goat Projects

Project sustainability can be defined as the capability of a project to continue providing the same or better services and respective benefits for a long time and without or less input from the initial. This indicates that a project to continue, it needs to either build its own capacity to provide certain services or be linked to institutions or structures within the project area for continuity. These institutions could be useful in either providing the necessary infrastructures or enabling access to critical services to sustain the dairy goat projects. Kavoi, Mwangi and Kamau (2014) observe that the productivity in Sub-Saharan Africa is on the decline and that this becomes a major bottleneck to the continents agricultural development. This worrying trend requires interventions and programs that assure sustained gains particularly the promotion of appropriate livestock farming technologies among the smallholder farmers. In this sense, therefore, projects are designed, planned and implemented with the sustainability goal as the foremost focus. Bebbington and, Brown (2007) consider critical to integrate the variables of sustainability in projects. Shenhar (2011) postulates that incorporation of sustainability measures in project design is critical and a pre-requisite to project success.

Livestock development face major bottlenecks and more so those in less developing nations where farm inputs are expensive, are unavailable and where livestock farmers lack capacity amongst other challenges. This scenario is more so in developing nations where resource-poor communities live. This explains why there have been a lot of constraints hindering success and sustainability of programs implemented to improve dairy goat production. Unfortunately, Kipserem (2011) confirms that farmer participation and involvement in this process is often ignored.

Based on empirical literature from various sustainability studies, proper and authentic analysis of community needs usually promotes sustainability of projects and programs

geared towards addressing the needs and stimulating community self-emancipation. Therefore, Participation of communities and particularly the project beneficiaries are considered critical. Consequently, development projects such as animal breeding projects should adhere to these criteria if they have to realize sustainability. A study by FAO (2010) says that this brings about the element of community ownership and increased motivation to support the project and also enhances community accountability. For instance, Ogola and Kosgey (2012) says that key sectors like the research, capacity building, value addition, markets and their linkages brings about efficacy and high productivity.

1.1.2 Project Design Factors

Project design stage is an important stage in projects where critical elements and features and deliverables are planned. This phase requires the support of technical experts to assist in making clear the project objectives. The project design process is considered the most relevant for integrating sustainability elements as it is in this early phase that most influence can be taken into consideration.

Project designers could adopt different project designs but of critical concern is how the design factors are integrated. Projects such as dairy goat development projects may adopt top-down design approach, bottom-up design approach or any other approach but they must carefully consider the most significant drivers of project success and sustainability. Empirical literature confirms some of the drivers as the project beneficiary selection process and beneficiary targeting, how the capacity of the community is enhanced, how the support institutions are engaged and how supportive infrastructure is put in place. For instance, Barasa and Jelagat (2013) considers community participation as very important in project designs and management. Likewise, Kosgey and Okeyo (2007) observes that authentic community participation encourages fairness, makes critical decision-making process acceptable, builds synergy among beneficiaries, and promotes a democratic culture within the community.

Project beneficiary selection is a critical factor in project design as it allows proper targeting of project beneficiaries. Beneficiary selection is aimed at incorporating all the relevant key actors benefiting from the project. However, Contzen and Böker (2014) reiterates that the core challenges in contemporary development practice are to select specific groups that face the challenge in the management of the existing resources and to classify them into different groupings based on their social economic status. Another key design consideration in projects is how the capacity of the community is developed as a driver to the sustainability of these projects. Community capacity can be understood from the perspective that the community possesses the necessary human capital to drive their development agenda and that the community has the necessary structures to assist in harnessing community resources for project implementation.

1.1.3 Utilization of Indigenous Knowledge

The importance of indigenous knowledge has been realized in the design and implementation of sustainable development projects, little has been done to incorporate this into formal climate change adaptation strategies.(Ajani, Mgbenka and Okeke 2013). The terms Indigenous Knowledge and local knowledge generally refer to knowledge systems embedded in the cultural traditions of regional, indigenous, or local communities. Indigenous knowledge has been defined as institutionalized local knowledge that has been built upon and passed on from one generation to the other by word of mouth (Warren 1992). Indigenous Knowledge needs to be understood "in the broadest of terms to encompass not only people's understandings of the social universes they inhabit, but also of their rights and this can be perfectly illustrated by the fact that it is increasingly being found in indigenous rights discourse (Laurie, Nina, Andolina and Radcliffe 2005).

Recent debates on indigenous knowledge have tended to focus on building up even more case study material of good practice in indigenous knowledge at the local level; the integration of indigenous and scientific knowledge; and the trend towards increased co-option of indigenous knowledge into the current neoliberal discourse (Briggs 2013). The integration of appropriate IK systems into development programs has already contributed

to efficiency, effectiveness, and sustainable development impact. IK, like any other knowledge, needs to be constantly used, challenged, and further adapted to the evolving local contexts.

Indigenous knowledge (IK) is used at the local level by communities as the basis for decisions pertaining to food security, human and animal health, education, natural resources management, and other vital activities. IK is a key element of the social capital of the poor and constitutes their main asset in their efforts to gain control of their own lives. Briggs (2005), Briggs (2013) observes that utilizing IK helps to increase the sustainability of development efforts because the IK integration process provides for mutual learning and adaptation, which in turn contributes to the empowerment of local communities. Since efficiency, effectiveness, and sustainability are key determinants of the quality of development work, harnessing indigenous knowledge has a clear development business case. Early indications point to significant improvements in development project quality if IK is leveraged with modern technologies.

Knowledge held by farmers in different agricultural systems has largely been distinguished as either local or native knowledge. This knowledge is distinctive to a given culture or civilization. Indigenous knowledge (IK) cuts across the communities' diversity and to a large extent dictates the way of life of communities. Western science and indigenous knowledge are represented as two different, competing knowledge systems, characterized by a binary divide, a divide arguably evolving out of the epistemological foundations of the two knowledge systems (Briggs 2005). In recent times, there has been an encouraging trend of acknowledging the complementarities and synergies of local and formal scientific knowledge. There also exists a broad base of knowledge and techniques in animal products that have been developed formally and scientifically.

If this knowledge is appropriately integrated with traditional and informal farmers' knowledge, sustainability in animal production can be achieved. This therefore makes indigenous knowledge an indispensable factor to consider when designing and

implementing dairy goat projects. However, for this knowledge to be meaningful, community involvement and participation in project decision making is critical. Amir (2014) says that active public participation is believed to be a significant component of interventions and it is considered directly proportional to the success of development projects. Reed and Dougill (2004) argues that by utilization of the indigenous knowledge, this additional comprehensive information can result to healthy local solutions. This means that indigenous knowledge requires to be intertwined with the scientific knowledge. Western science is seen to be open, systematic and objective, dependent very much on being a detached center of rationality and intelligence, whereas indigenous knowledge is seen to be closed, parochial, unintellectual, primitive and emotional (Sillitoe 2004)

1.1.4 Project Leadership

Dairy goat projects are designed and implemented within a community set up with functional, dynamic and progressive social structures that supports the sustainability of these projects. Fariborz, Aref; Ma'rof, and Zahid, (2009) observes that project leadership is very key in promoting the capacity of the community to assemble resources for development projects. Effective project leaders believe that people want to excel, so they create an environment in which success is not only possible, but also contagious. Kouzes and Posner (2002) points out that good leaders exhibit a set of explicit attitudes, behaviors and best practices. This is the reason Karami (2006) advises that agricultural and livestock growth will be sustained by highly motivated and committed leaders. Project leaders who interact daily with farmers can, influence their perceptions, attitudes and performance and eventually inspire the overall capacity of rural community to achieve sustainability.

1.1.5: Dairy Goat Projects in Kenya

Dairy goat production system is not a new phenomenon and its adoption by livestock farming communities has advance progressively. Dairy goats were first introduced in Kenya in 1950s by British settler farmers in the highlands of Kenya (Shivairo et al 2013). Ahuya, Okeyo, Njuru and Peacock (2005), Dairy goat development in Kenya started with the introduction of exotic dairy goat breeds but major projects to improve the dairy goat

sector were not realized until the late 1970s under United Nations Development Programmes (UNDP) funded and FAO executed projects, which lasted until the mid-1980s. The initial projects were mainly government station-based, and aimed at multiplying improved stock for distribution to farmers. Elaborate and intensive promotion of dairy goat farming kicked off in the 1990's.

The use of exotic dairy goats in breeding programmes for smallholder production systems is popular in Eastern Africa. However, information on the performance of exotic breeds within these systems is scarce Ahuya, Ojango, Mosi, Peacock, and Okeyo (2009). About 25 years ago the population was estimated at 6,000. Peacock and Hastings (2011) posits that as at 2006, the dairy goat population in Kenya was reported to be 153,200 out of which 6,900 were found in Tharaka-Nithi. The most recent estimate puts the dairy goat population in Kenya at 175,000 (Shivairo et al 2013). Development of dairy goat sector in Kenya is mainly supported by Non-Governmental Organizations (NGOs), Community based organizations (CBO) and to a lesser extent by the Government of Kenya (GOK. This progressive introduction of dairy goats into Kenya has placed an emphasis on the consumer-driven market development of its products such as milk, skin, and meat.

Goat milk consumption accounts for a small but growing percentage of the Kenyan dairy market. FAO (2011) estimates that over 70% of the milk that is sold in Kenya originates from dairy cows with only 0.02% from dairy goats. Unlike in dairy cow milk where markets are organized, Alemayu (2011) observes that markets for dairy goat milk are dispersed with remote markets lacking price information. However, the continued development of dairy goat sub-sector in Kenya will lead to an improvement in this statistics. Unfortunately, this minimal performance of dairy goats and the skewed adoption of the dairy goat breeding technology by the farming communities places dairy goat at a disadvantage with regard to policy consideration and resource allocation.

Historical perceptive of dairy goat production in Kenya has not been so promising, perhaps because of inadequate research in this field and or poor dairy goat project designs and

implementation. Dairy goat production in Kenya was introduced in the early 90's by Non-Governmental Organizations. Heifer Project International-Kenya (HPIK) was among the pioneers of introducing dairy goats to Kenya's livestock sector. HPIK initiated a dairy goat project in 1994 aimed at improving the livelihoods of communities through the community-based dairy goat multiplication programme in Kenya. Ogola and Kosgey (2012) explains that dairy goat beneficiaries were provided with a female dairy goat (Doe) and were expected to in return give out the first two female offspring to the next listed beneficiaries. Another research-based project supported by USAID on small ruminant collaborative research was initiated in 1980 to 1992. The projects aim was to develop a goat breed known as Kenya Dual-Purpose Goat' (KDPG). This breed was suitable for smallholder systems in East Africa (Farm Africa 2007).

Another NGO, The Farm Africa designed and implemented a dairy goat project running from 1997 and 2004 and based in the Meru region. The prime objective of the project was to promote dairy goat production and improvement of the East African native goats. Peacock and Hastings (2011) explains that the project's objectives that were to be achieved through the community-based cross-breeding of local goats with exotic Toggenburg goats as; the formation and training of autonomous self-help groups to undertake breeding activities; strengthened community management of breed improvement activities through capacity building for the Meru Goat Breeders Association (MGBA); development of CAHWs, AHAs, and a private veterinary and drug supply service; improvement of fodder supplies through community bulking and on-farm planting of suitable additional fodders; development of an effective extension support service through the existing Ministry of Agriculture and Livestock Development staff and extension system.

1.1.6: Dairy Goat Projects in Tharaka Nithi County

Farm Africa's dairy goat project implemented in Meru and Tharaka Nithi sought to improve the productivity of the local goats, the Galla, and the East African goat breeds. Ogola and Kosgey (2012) observes that the Galla and the East African goat breeds found in Kenya are less productive. Farm Africa project sought to address this problem by

introducing the Toggenburg dairy goat from stocks in the United Kingdom (UK) to upgrade the genetic potential of the two native breeds in Meru and Tharaka. The project expected to create a system that facilitates quick adoption of the new breeding technology, enhance multiplication of dairy goats and promote ownership of dairy goats among the poor of the poorest beneficiaries.

The project design promoted participatory approach where communities were involved from the initial stages of the project. Ahuya et al (2005) explain that the project formed community farmer groups each with a membership of between 20 and 30. Peacock and Hastings (2011), Ogola and Kosgey (2012), two dairy goat farmers from each group were trained on basic dairy goat husbandry and management. The trained farmers were each given four purebred Toggenburg Does and one Buck which formed a breeding unit. Ojango, Ahuya, Okeyo and Rege (2010) posits that the community-owned and managed the buck station however the Does belonged and managed by individual group members.
To further the objectives of the project, Farm Africa established the Meru Goat Breeders' Association (MGBA) and later formed Tharaka Nithi Dairy goat breeder's association (TDGBA) to oversee the breeding and management of the dairy goat project. The management of the project, all decisions concerning the project was handed over to the two associations. The association comprises small self-help dairy goat groups of the majority with between 20 and 30 members. The association has a leadership structure to enable management of the project. Key activities of the project management are monitoring of the dairy goat breeding process, ensuring health services are in place, coordinating the market value chain, linking farmers with support institutions including with the government and promoting growth and development of self-help groups.

Dairy goat project design model propagated by farm Africa and handed over for implementation by Tharaka Nithi dairy goat breeders association integrated key components that are of interest to the current study. First, project beneficiary selection process was put in place referred to as resource poor farmers. Ojango, Ahuya, Okeyo and Rege (2010) says that to ensure that the project had impact on the poor, participatory

techniques involving community leaders, extension staff, development workers, and FARM-Africa were used to identify resource poor farmers who were to benefit from the project. The model had community capacity component where key project actor was trained and supported to support in the project implementation. Key institutions such as health services, markets and other support institutions were identified and incorporated in the project design model.

Peacock & Hastings (2011) present the project process as the formation and training of autonomous self-help groups, strengthened community management of breed improvement activities through capacity building, development of CAHWs, AHAs, and a private veterinary and drug supply service, improvement of fodder supplies through community bulking and on-farm planting of suitable additional fodders, development of an effective extension support service through the existing Ministry of Agriculture, Ministry of Livestock Development staff and extension system. Project infrastructure such as breeding unit was also put in place.

A review of different project models from other Counties in Kenya indicated a lack of consistent and well-structured dairy goat project model like what is found in Tharaka Nithi. The model supported the requirement of this study thus the choice of Tharaka Nithi as the County of study area. This study sought to investigate the moderating effect of utilization of indigenous knowledge, Project leadership on the relationship between project design factors and sustainability of dairy goat projects in Tharaka Nithi County.

1.2 Statement of the Problem

Livestock production systems in Kenya play a critical role in the support of livelihoods of many people. Yet Adejobi and Kassali (2013), observes that declining livestock productivity among livestock farmers in Kenya, in particular, remains a major concern. The Kenya Ministry of Agriculture, Livestock, and fisheries (MOLF) in collaboration with Non-Governmental Organizations have been on the forefront in implementing policies and strategies on livestock improvement where dairy goat production has been prioritized.

Studies by Adejobi and Kassali (2013), McDermott et al (2010) among others have provided empirical information on development progress in this sector of dairy goat's production, however, gaps still exist pointing to the need for further research. A study by Chenyambuga and Lekule (2014) found that dairy goat projects are implemented by men and women who are mature and with the property like land against which the dairy goats can be kept and fed. On the contrary, the current study concentrated on investigating project design factors influencing the sustainability of dairy goat's project within a dairy goat project based on the poor of the poorest communities.

Further, Kavoi et al (2014) in his study found major gaps in dairy goat development as poor documentation, lack of understanding and poor decision making on dairy goat production. Ahuya et al (2009) confirm that information on the performance of exotic breeds within these systems is scarce. A study by Ngongoni (2013) dwelled more on the viability differences in dairy farming and found that access to markets, services, financial performance, enterprise viability, nutrition and breeding practices were the main constraints. In a different study, McDermott et al (2010) looked at sustaining intensification of smallholder livestock systems to meet increasing demand for future. Other studies by IFAD (2010) zeroed in on scaling up results in livestock development.

The scope of these studies did not cover the design factors and sustainability of dairy goat projects which this study considers very key in dairy goat sector development. Ogola and Kosgey (2012) indicates that dairy goat projects take into consideration key factors that contribute to the sustainability of such projects and especially those that target to improve the livelihoods of developing countries. These studies did not address design factors such as project beneficiary selection, community capacity, institutional linkages and project infrastructure as important predictors of sustainability. Even where project design studies are conducted, proper analysis and linkage to sustainability have not been addressed.

Other studies on the sustainability of livestock development projects such as Sanders and Binder (2010), Amimo (2011) recommends co-designing of projects with host

communities taking advantage of their indigenous knowledge. This utilization of indigenous knowledge is perceived here to have an influence on sustainability. This current study looked at the utilization of indigenous knowledge a moderator on the relationship between project design and sustainability of dairy goat projects. A study by Fariborz et al. (2009) found out that projects require authentic leadership to be sustainable, however, this study did not consider project leadership as a moderator rather than a predictor variable.

From the empirical literature reviewed, studies have focused on various aspect of dairy goat project implementation but did not pay specific attention to project design and sustainability of the projects. Further, empirical studies on the moderating effect of the utilization of indigenous knowledge and project leadership on the sustainability of dairy goat project is missing. Therefore, it is against this backdrop that this study sought to investigate the project design factors, utilization of indigenous knowledge, project leadership and sustainability of dairy goat projects.

1.3 Purpose of the Study

The purpose of this study was to investigate the influence utilization of indigenous knowledge, project leadership on the relationship between project design factors and sustainability of dairy goat projects in Tharaka Nithi County.

1.4 Objectives of the Study

This study was guided by the following objectives.

i. To establish how project beneficiary selection process, influence the sustainability of dairy goat projects in Tharaka Nithi County
ii. To assess the extent to which community capacity influence the sustainability of dairy goat projects in Tharaka Nithi County
iii. To establish how institutional linkages, influence the sustainability of dairy goat projects in Tharaka Nithi County
iv. To establish the extent to which project infrastructure influence the sustainability of dairy goat projects in Tharaka Nithi County

v. To Examine the extent to which the combined project design factors influence the sustainability of dairy goat projects in Tharaka Nithi County
vi. To establish how utilization of indigenous knowledge moderates the relationship between the combined project design factors and sustainability of dairy goat projects in Tharaka Nithi County
vii. To establish how project leadership moderates the relationship between the combined project design factors and sustainability of dairy goat projects in Tharaka Nithi County

1.5 Research Questions

The following are the research questions;

i. How does the project beneficiary selection process influence the sustainability of dairy goat projects in Tharaka Nithi County?
ii. To what extent does community capacity influence the sustainability of dairy goat projects in Tharaka Nithi County?
iii. How does the institutional linkage influence the sustainability of dairy goat projects in Tharaka Nithi County?
iv. To what extent does project infrastructure influence the sustainability of dairy goat projects in Tharaka Nithi County?
v. To what extent does the combined project design factors influence the sustainability of dairy goat projects in Tharaka Nithi County
vi. How does utilization of indigenous knowledge moderate the relationship between the combined project design factors and sustainability of dairy goat projects in Tharaka Nithi County
vii. How does project leadership moderate the relationship between the combined project design factors and sustainability of dairy goat projects in Tharaka Nithi County

1.6 Research Hypothesis

This study sought to test the following hypotheses:

i. **H_1** Project beneficiary selection process has a significant influence on the sustainability of dairy goat projects in Tharaka Nithi County
ii. **H_1** Community capacity has a significant influence on the sustainability of dairy goat projects in Tharaka Nithi County
iii. **H_1** Institutional linkage has a significant influence on the sustainability of dairy goat projects in Tharaka Nithi County
iv. **H_1** Project infrastructure has a significant influence on the sustainability of dairy goat projects in Tharaka Nithi County
v. **H_1** The combined project design factors has a significant influence on the sustainability of dairy goat projects in Tharaka Nithi County
vi. **H_1** The strength of the relationship between project design factors and sustainability of dairy goat projects depend on the utilization of indigenous knowledge in Tharaka Nithi County
vii. **H_1** The strength of the relationship between project design factors and sustainability of dairy goat projects depend on the project leadership in Tharaka Nithi County

1.7 Significance of the Study

Findings from this study may be significant in providing empirical evidence on project design factors, utilization of indigenous knowledge, project leadership and sustainability of dairy goat projects. This study may provide information on the significance of project beneficiary selection process as a factor in project design on the sustainability of the projects. As such, project designers will be cognizance of the project beneficiary selection elements such as selection tools and processes, beneficiary needs and beneficiary composition to enhance sustainability.

Findings from this study will inform project designers be they from governments, private sectors including non-governmental organizations and community-based organization on the significance of entrenching community capacity building in development project

designs. Community capacity indicators such as community human capital, community capacity to contribute resources and the capacity of community social structures are adequately investigated so that project designers are cognizance of their influence on the sustainability of dairy goat projects.

Projects require external support and linkages with other projects and institutions. As such, this study will be significant in providing information on the influence of institutional linkage on the sustainability of dairy goat projects. This component is key in project designs and will inform future project designing process so that sustainability is achieved. On the same breadth, project infrastructure is like the backbone of the project without which projects may not progress. Therefore, this study becomes significant in enlightening project designers on the role and influence of project infrastructure on the sustainability of their projects.

The findings of this study will be significant in providing information on project leadership, and how important project leadership is in promoting project sustainability. Without this understanding, projects may not yield the projected achievement despite having considered all the other factors in the design. Likewise, utilization of indigenous knowledge by the project beneficiaries may be a hindrance to project sustainability. This study is expected to shed light on the use of indigenous knowledge and how this may affect the sustainability of dairy goat projects.

Further, project designers, decision makers and policy maker both at County and National level and in the field of livestock development may find this study useful to inform key considerations in livestock policy provisions. This study is also expected to add to the existing pool of knowledge on project management and offers recommendations for implementation and future research.

1.8 Delimitation of the Study

The study was carried out in Tharaka Nithi County. The focus on Tharaka Nithi County was informed by a review and assessment of dairy goat projects implemented in various many Counties across the Country by Non-governmental organizations, Community organizations and County governments. These particular projects in Tharaka Nithi County satisfied the requirement of this study as they had been in existence for more than five years, the project was implemented through self-help groups and a good representative groups were still active at the time of the assessment. In addition, the projects had the essential elements of a project in their design, planning, and implementation. Majority of the dairy goat self-help group are spread across three of the four sub-counties of Tharaka Nithi County namely Tharaka South, Meru South and Maara Sub-counties. Since information obtained from Tharaka Nithi dairy goat breeders association and from the livestock showed that there were few self-help groups in Tharaka North, the sub-county was not considered in this study. However, a sample of 30 respondents was also sampled from this sub-county for the purposes of study piloting.

This study was delimited to dairy goat projects designed and implemented by Farm Africa in collaboration with the Tharaka Nithi Dairy goat breeders Association in Tharaka Nithi County. The targeted self-help dairy goat farmer group were residents of the study sub-counties and a majority of the groups must have been in operation for more than one year to enable them to have the necessary exposure to the project to give authentic and reliable information. This study was delimited to the study of the relationship between project design factors and sustainability of dairy goat projects and the moderating effect of the utilization of indigenous knowledge and project leadership on this relationship.

1.9 Limitations of the Study

This study covered three sub-counties of Tharaka Nithi County namely Maara, Tharaka South and Meru South sub-counties. Some of the localities are too remote and road network is very poor. Movement from one place to the other was a challenge and expensive for the researcher. To address this limitation, the researcher trained enough (four) enumerators so

that less time was taken in one place. In addition, the researcher sought the assistance of one of the Tharaka dairy goat breeder's association official who guided the researcher and the enumerators.

Tharaka Nithi County especially Tharaka South is characterized by poor communication infrastructure. As such telecommunication connectivity is not there or is limited and consequently not all the targeted respondents have mobile phones. To mitigate this challenge, the researcher allocated adequate time for data collection and ensured good advance planning and booking of appointments were done effectively. In addition, Meru dairy goat breeder's association assisted the researcher to establish reliable contact persons in all the locations. These people had mobile phones, were reachable and also had motorbikes thus being very mobile.

Some of the targeted respondents could only understand and speak their local language. This limitation was anticipated and consequently informed the selection of the enumerators. Three of the enumerators came from Meru and Tharaka Nithi Counties and thus were able to communicate effectively with such respondents. Conducting focus group discussion raised high expectation for financial gains from the participants. This is because dairy goat project in this region has a component of community meetings and focus group discussions. When they are called for such, they are usually given a fare refund and lunch by the respective project. To address this problem, the researcher while mobilizing participants explained their entitlement in advance so that before they came, they were aware of the nature of the meeting and what to expect.

1.10 Assumptions of the Study

The assumption of this study was that the respondents will be willing to give information on project design and its relationship with sustainability as well as on the utilization of indigenous knowledge and project leadership as asked. It was assumed that the respondents will, therefore, respond to information correctly and honesty. Since Tharaka Nithi is very

remote, characterized by rough terrains and poor infrastructure, this study also assumed that all the respondents will be reachable without many problems.

1.11 Definition of Significant Terms Used in the Study

This section gives the operational definition of significant terms as used in the study.

Beneficiary selection process	This study defines project beneficiary selection as a process of determining project beneficiaries based on their needs, gender composition as guided by the participatory tools and processes.
Community Capacity	Community capacity is the situation where the community has the required skills, knowledge, technology, and motivated to spearhead its development agenda. This study looks at community capacity from the level of community human capital, ability of community to contribute resources to the project and strength of community social structure (groups) to manage dairy goat project.
Project Infrastructure	Infrastructure is defined as those facilities necessary to support dairy goat projects. In this study, the term infrastructure is defined as t Housing infrastructure, breeding infrastructure and transport and markets infrastructure
Institutional Linkages	This study considers institutional linkage as a situation where institutions that are significant to dairy goat farming are linked to the dairy goat farmers for service provision and other support. For this study, institutional linkages is defined in terms of linkages to animal health services institutions, animal markets institutions and social institutions

Project Design factors	This study defines project design from the perspective of beneficiary selection process, community capacity, institutional linkages, and project infrastructure.
Project Leadership	This study looks at project leadership from three types namely transactional leadership, transformational leadership and servant leadership.
Sustainability of dairy goat projects	This study considers project sustainability as the situation where a project achieves its expected outcome progressively. This study defines sustainability as attaining good level of project resilience, level of community project ownership, level of project multiplier effect and level of project support by community institutions
Utilization of Indigenous knowledge	This study considers indigenous knowledge of communities as the informal knowledge that is utilized by the community to inform dairy goat husbandry and management.

1.12 Organization of the Study

This study is organized into five chapters. In the first chapter on introduction, the following is covered: the background of the study and the statement of the problem. This is followed by the purpose of the study, objectives of the study, research questions, and research hypothesis. Other sections covered in chapter one includes significance of the study, limitations of the study, delimitations, basic assumptions of the study, definitions of significance terms used in the study and the organization of the study.

Chapter one covers the background of the study, statement of the problem, the purpose of the study, research objectives, research questions, research hypothesis, Operational Definition of Terms, assumptions and delimitation of the study. Chapter two is a review of empirical literature on the sustainability of dairy goat project, project design factors, project

leadership and utilization of indigenous knowledge. Further, the chapter shows the theoretical framework, conceptual framework, summary of research gaps and summary of the reviewed literature.

Chapter three covers research methodology showing research paradigm, research design, target population, sampling procedure, sample size, data collection instruments, validity and reliability of instruments, data collection procedure, methods of data analysis, the operational definition of variables and ethical issues. Chapter four covers data analysis, presentation, interpretation and discussions of findings, while chapter five contains the summary of findings, conclusions, and recommendations.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

Chapter two is a review of empirical literature relevant to all the variable in this study. Key literature relates to project beneficiary selection process, community capacity, institutional linkages, project infrastructure, utilization of indigenous knowledge, project leadership and sustainability of dairy goat project. To explain the relationship between these variables, three theories have been reviewed to underpin and ground this research. These theories include the collective action theory, Structural-Functional Theory and the Diffusion of Innovations Theory. This chapter also includes the conceptual framework, knowledge gap analysis and finally a summary of the chapter.

2.2 Sustainability of Dairy Goat Projects

Evidence on the sustainability of development projects shows that sustainability is seldom achieved. A review of the literature that has sprung up around the concept of sustainability of projects indicates, however, a lack of consistency in its interpretation. Divergent views on what constitutes and or indicates achievement of sustainability have been advanced. Mog (2004) points out that it is important to view the communities' innovativeness, and ability to learn and adapt as very important factors in the sustainability of development programs. Gilbert (2014) indicates that sustainability is a process of change brought about by the implementation of sustainable projects that ensure that the utilization of resources, investment options, the focus of technological advancement and institutional capacity are all aligned to trigger the capability of the projects achieving both current and future needs. Based on the literature, even though the general and common definition of sustainability exist, to a large extent, sustainability is context specific. Thomson, El-Haram, Emmanuel (2011) assert that projects lead to the production of goods and services to address specific community needs that require to be inconsonant with the social and environmental context. In this sense, therefore, a dairy goat projects need to adhere to these sustainability criteria to pass the test of sustainable projects. Key indicators of dairy goat project sustainability

could be the multiplier effect component, community ownership, project resilience, social-economic and environmental viability and breeding plans and strategies.

Multiplier effect in development sector has a similar connotation and application as the ultimate outcome is the improvement in productivity, improvement in incomes and positive livelihood change. Viewed from this perspective, dairy goat project is expected to trickle down and benefit many beneficiaries as a result of the initial input. Such projects are considered as the triggers necessary for the multiplier effect to be realized. Multiplier effect in dairy goat production is achieved when an injection of a single goat ownership result to a multiple ownership from the original owner. A study by Kosgey, Ogola and Nguyo (2010) established that dairy goat keeper's capacity to attain the projected "pass – on" was low resulting in fewer multiplication levels limiting the impact of the multiplication programmes.

For a project to be sustainable, its existence comes along with both social economic and environmental benefits attributable to the project (Kosgey, Rowlands, van Arendonk, and Baker 2008). Similarly, Chenyambuga and Lekule (2014) indicates that social economic usefulness of dairy goats cannot be underestimated. Also Bossio (2009) notes that rearing of dairy goats is significant in livestock farming systems as they provide prospects to adjust to hazards and risk, farm broadening the scope of farming and intensification for improved livelihoods. Koskey et al (2008) conducted a study in Coast, Nyanza and the Rift Valley provinces regions involving 108 dairy goat farmers to investigate practices influencing the sustainability of the multiplication of dairy goats. Results show that the income from dairy goats played a key role in household support in education, health, and improvement in infrastructure and purchase of more livestock.

Dairy goat farming remains a key contributor to family livelihoods and a source of community support. A study by Chenyambuga and Lekule (2014) in Babati and Kongwa districts of Tanzania, involving 160 farmers revealed that the 28% dairy goat milk and live animal's proceeds catered for children's education in most households. Similarly, Kosgey

et al (2008) indicate 32% of dairy goat income being used to cater for school fees. Both studies are also in agreement that dairy goat proceeds are used for household health needs, purchase of other livestock and also as an insurance during hardship periods.

2.3 Project Design Factors and Sustainability of Dairy Goat Projects

Project design is the starting point that involves systematic and theoretical conceptions, tried primary assumptions, and credible information that which enable the delivery of a project within a specified timeline. Sanoff (2000) posits that designing of a project requires a calculative thinking and investment because failure to this expose the project to a higher risk of failure or poor quality of implementation. Due to the complexity and uniqueness of projects, Sanders and Binder (2010) posits that it is important to carefully select the most appropriate design method, tools, and techniques to apply in a specific project.

To make project design effective, Hussain and Sanders, (2012) advises that projects need to remain sensitive to the history and culture of the community where the project is implemented. This requirement will be achieved if community participation in the project design in promoted. Kim (2006) point out that top-down approach to project design where experts dictate the process is an impediment to active project beneficiary participation. Very often projects are designed at the national level, based on considerations such as political priorities, technical concerns, and macroeconomic targets. These national-level considerations by project designers can actually be in conflict with the factors affecting change behavior of villagers which in turn affect the overall success of rural development projects.

Laah, Adefila and Yusuf (2013) explain that to achieve success in projects, there is need to involve beneficiaries in the design and implementation of the projects. Participatory project design is a design approach where the project designers, project beneficiaries, and users together with the relevant stakeholders work together to design a project (Sanders and Binder, 2010). This is what (Sanders and Binder (2010) refers to as co-designing which needs to take full advantage of the knowledge system of the host community.

2.3.1 Project Beneficiary Selection and Sustainability of Dairy Goat Projects

Projects are planned and implemented to bring a positive change to a community and more specifically to a group of individuals sharing common social economic attributes. This, therefore, demands a rigorous beneficiary assessment as a way of selecting the right group. Swanepoel and de Beer (2006) points out that different groups of people may be concerned about different needs or that may have different perceptions about the same needs and in this case grouping becomes necessary so that they address different needs. In this front, Ravallion (2003) asserts that central to the identification of eligible program participants is the issue of asymmetric information.

Beneficiary selection can be authentic if conducted within the democratic framework particularly through a participatory process. The success of a project lies therefore not in the fact that it is necessarily targeted, but rather in how it is targeted (Kilic, Whitney and Winters 2013). Conning and Kevane (2002) argues that appropriate selection is beneficial in the sense that it lowers the cost of administration and attracts the right project beneficiaries. Beneficiary selection can be looked at from the perspective of how different groups are selected such that gender issues are considered, people who are abled differently as well as the priority needs of the community.

The dynamics of communities necessitates the use of language, tools, and processes that are mutually understood by the participants. This can effectively be achieved by following an appropriate process, tools, and methodology. Sanders and Binder (2010), Muriithi and Crawford (2003) posits that tools and technics employed in project design are key to the success of any project. Booher and Innes (2002) asserts that seeking the opinion and views of the project participants can greatly make easy the planning and design processes and bring understanding among beneficiaries.

Design tools and processes involved are important elements in beneficiary selection. Therefore, project design experts should modify the design tools to make them usable for in each step of the project process. This is so because for a process to be participatory, a

universal understanding of critical. Hyun-Chan Ahn and So-Hyun Park (2007), proposed a three-step participatory design process as public information, a design workshop and community feedback. Participatory beneficiary need analysis requires to be driven by the people who experience the need and not by outsiders.

A study was done by Düvel (2002) on a comparative evaluation of some participatory needs assessment methods in extension revealed that needs are time-specific, which emphasizes the importance of remaining sensitive to changing needs as situations change. Swanepoel and de Beer (2006) explains that needs identification exercise should be a participatory process because it is the beneficiaries who must identify their needs before they organize themselves to do something about their situation. However, Blackman (2003) observes that in spite of the clamor for 'bottom-up' approach to rural development projects approach; beneficiaries are still being deprived of their involvement in the project process. Gender equity, gender parity and gender mainstreaming are buzz terms in the contemporary development arena. Development project designs are being scrutinized with the inclusivity lenses now than before. Inclusiveness, where men, women, youth are involved, is of ultimate importance in enhancing democracy in development projects. FAO (2012) points out that men and women are challenged differently as relates to livestock production system. Therefore, when designing resource use plans, it is critical to consider the gender perspective in order to achieve optimal results. In this sense, gender issues in dairy goat production are key and must be addressed. This process involves recognizing and appreciating needs, priorities, and interest of women and men as well as the youth.

A study by Narmatha et al (2015) on gender in sheep and dairy goat keeping conducted in Namakkal district of Tamil Nadu – India to assess gender roles in participation and decision making, indicates that women participated in most of the activities as watering, care of pregnant does/ewes, taking goats for grazing, identification sick animal, cleaning shed, feeding of marketing stock, collecting fodder and feeding of breeding bucks. In another study conducted in Ethiopia by Mulugeta and Amsalu (2014) found that the greatest percentage of rural women were involved in the cleaning of livestock shelter, milking, and

related tasks, collecting manure, and selling of milk and milk products. These studies provide insights into the significance of gender mainstreaming in project cycle management as a contemporary issue in project management.

The significance of gender perspective in project design, planning, and implementation notwithstanding, Nicola, Chanamuto, Stephen and Hall (2015) say that livestock projects have not adequately to integrated a gender perspective, which has, in turn, affected their efficiency. Malyadri and Sumana (2013) points out that addressing gender issues goes beyond training and advancing loan facilities but rather recognizing the social construction of gender and appropriately assigning roles and responsibilities across the gender divide. A study by Nassif (2008) found that although technical development in smallholder dairying in Morocco increased milk production, it also imposed additional labor burdens on women. This brings into focus the issue of gender roles in dairy goat's management.

Projects have tended to be informed, rather than led, by an awareness of gender roles and relations in a community and a goal of enhancing the efficiency of household livelihood systems; opportunities to enhance the status of women, to create more sustainable projects, are lost. Nicola et al (2015) observe that context-specific, up-to-date knowledge of gender roles and power relations in daily life is critical to the design of livestock-focused development projects. The tendency has been to address gender issues by integrating gender analysis into research and follow this through in project design which attempts to promote enhanced productivity in livelihoods by focusing on extending and enhancing, women's role in the production. For instance, Nicola et al (2015) posit that participation of women in the selection of animals and breeds is paramount to the success of any such initiatives vis-à-vis poverty and sustainable livelihood goals.

Beneficiary targeting where resource-poor communities are involved, their needs must adequately be addressed. Project planning process helps to analyze and prioritize the problems concerning the project thematic, identify the needs of the beneficiaries' communities and identify the appropriate strategy and interventions to address them.

Matiwane and Terblanché (2012) observes that projects are motivated by a specific need that must be clearly outlined as a pre-requisite to proper project planning. Swanepoel and de Beer (2006) shares similar sentiments that the success of a project is determined by the clarity of the need being addressed. A participatory process where the community takes a center stage and given an opportunity to make the final decision is needed. Werhane, Kelley, Hartman and Moberg (2010) point out that project beneficiaries understand the processes that bring them together and the challenges affecting them and therefore have possible solutions to addressing these challenges.

Community participation in need analysis is important as the needs are collectively conceived and prioritized paving the way for the process of addressing them (Barasa and Jelagat 2013). A study was done by Düvel (2002) on the comparative evaluation of some participatory needs assessment methods in extension revealed that needs are time-specific, which emphasizes the importance of remaining sensitive to changing needs as situations change. The importance of beneficiaries' participation is reinforced by Swanepoel and de Beer (2006) by saying that people are not going to rally together around needs that have been identified by some expert and that do not match or support their own needs. Therefore, needs identification is a prerequisite before any action; it should be the first undertaking before a project commences. However, Thwala (2010) observes that even when an element of ‘participation' is built into projects, it is often largely in terms of local investment of labor and not necessarily participating in decision-making.

2.3.2 Community Capacity and Sustainability of Dairy Goat Projects

Sustainable development can only be achieved if the community is empowered and able to provide a local solution to their own problems. Such achievement is possible where beneficiary participation is guaranteed mobilization and establishment of community change structures like self-help groups. It is through these structures that the capacity is built as a set of assets and attributes that propel communities to be proactive.

Overall, the success and sustainability of dairy goat multiplication and breeding programs depend on the level of adoption and rate of production of dairy goats. Such will be demonstrated through their level of human capital, their ability to contribute to the project and the strength of sustainability structures such as groups and social networks. Human capital like the other forms of capital is an important factor in sustainable development. The abilities, skills, and knowledge assumed by individuals, groups or a community that facilitate achievement of expected goals are referred to as human capital.

Noting that dairy goat production system and the respective projects in Kenya is purely human labor supported, it is very crucial to develop the necessary human capital for its sustainability. Akintoye and Adidu (2008) posits that capacity building helps to develop the capabilities that are useful in propelling the economic growth and development. This, therefore, means that for dairy goat improvement projects to succeed community human capital capacity in totality must be ensured such that self-help groups are strong and focused, have the necessary technical skills and knowledge available with the community, the community is empowered to make financial and material contributions to the program. A study by Lubungu, Chapoto and Tembo (2012) revealed that level of education is very critical in enabling families to use market information and take advantage of the market opportunities. Lyles, Saxton and Watson (2004) examined the managerial competencies and found that entrepreneurs who attained higher education and experience achieved higher returns. A study by Philemon and Maitho (2017) on factors influencing uptake of exotic dairy goats in kitui found that households with higher education had the likelihood of increasing the dairy product consumption. Males were likely to control resources in the households and influence farming decisions-making due to the view that they have more access to information, extension and credit services than females.

Access of amenities, services and key facilities, infrastructure and advanced technology has been a major problem to many rural communities. Michèle and Colverson (2014) advances that livestock producers require appropriate information and technology so that they are able to sustain an improved production and satisfy the ever-increasing demand for

livestock products. Generally, dairy goat sector in developing nations needs a strategic and well-organized system of production and management where husbandry, health, and breeding technologies are properly assembled. Luis et al (2012) observe that this arrangement provides for maximum utilization of resources, increased productivity and capacity to mitigate risks. Ndoro, Mudhara and Chimonyo, (2016) studied the participation in livestock extension programs in KwaZulu Natal province and found that the level of education influenced the extent of participation of livestock farmers in extension programs. Project designs that create an opportunity for the project beneficiaries to make a contribution, material or in-kind have a better chance of succeeding. Khwaja (2004) reviewed 132 projects on the impact of community participation on development projects in Northern Pakistan. Results indicate that projects where beneficiaries made either cash or in-kind contribution registered high level of success than those without. Another study by Breslin (2010) on the adoption of the use of latrines in Bolivia indicated that projects without community cash-contributions from the community did not prove successful. Dongier et al. (2003) observe that community cash contributions help reduce dependency on external support, promote community confidence and ownership, ensure community priority needs are addressed and those genuine beneficiaries are targeted.

Strong social structures, referred to as sustainability structures and drivers such as self-help groups are considered critical for integration in development project designs. This facilitate pooling resources together, advocating for common community interest and provision of public goods which cannot be achieved by individual community members. Associations between groups are emerging to ease access to resources which are beyond the capacities of individual smallholder groups. Such associations involve various actors with varying expectations, thereby acting as platforms that enable these actors to intensify their production systems and adapt to continuous sudden changes in their environment which presuppose continuous innovation.

Nederlof, Mariana and Femke (2011) define smallholder innovation platforms as associations of various actors brought together by their mutual interests to exchange

knowledge and develop joint action which brings about positive change in their livelihoods, enterprises and or other interests. The purpose of these platforms is usually to strengthen the involved actors through acquiring resources or providing services which the various actors are interested in, but which they cannot individually provide (Ahuja, 2000).

Development projects are implemented within a social framework that must be well structured to allow the desired change to happen. Such can only be achieved if the structures are strong to overcome the challenges that come along with the change. Akudugu (2014) says that self-help groups (SHG) are fronted as effective vehicles to fight poverty. The concept of Self-Help groups is understood for pooling resources together for the ultimate goal of self-emancipation, in all aspects of social –political and economic conditions (Akudugu 2014). This will enhance the sense of belonging and collective responsibility necessary for authentic social and economic development. However, Mulwa (2004) observes that majority of the self-help groups found in rural areas do not have the required capacity to manage their affairs making them vulnerable to manipulation by the rural elites.

2.3.3 Institutional Linkages and Sustainability of Dairy Goat Projects

Adequate linkage and involvement of relevant key actors and institutions in a project at a different level are very significant. This is considered directly proportional to the success of development projects (Amir (2014). Ahuja (2000) posits that key actors play a crucial role in linking projects and providing channels for knowledge sharing. The level and nature of institutional linkage change with the change in the project implementation stage. Mostly, the nature and number of linkages increase as the initiative evolves. Linkage to institutions allows dairy goat farmer access essential inputs and services necessary for the management of the dairy goat's program Dairy goat production requires a sustained flow of right information and support in skills development. A project will be sustainable if dairy got farmers are able to readily access this information cheaply and timely.

Bett et al conducted a study in Rift valley on institutional and organizational challenges confronting dairy goat management in Kenya found that supportive government policies on regulation and facilitation of animal breeding and veterinary services, coordination of research and extension, market organization and monitoring and evaluation of projects and programmes are lacking. Dairy goat requires good quality and accessible and reliable health services for related projects to be sustainable. Amir (2014) sees that as a significant component of interventions and it is considered directly proportional to the success of development projects. This is because animal diseases and lack of knowledge on animal husbandry and management contribute significantly to the failure of such projects. Improving veterinary service delivery to combat and control emerging and re-emerging animal disease is a critical measure for unraveling the benefits of increased demand for dairy goat products to rural poor farmers and reducing associated animal and human health-related risks (Wymann et al. 2007).

Following the introduction of structural adjustment program by the World Bank, which proposed privatization of veterinary services, the growth of private veterinary delivery system was not uniform across different livestock systems (Oruko et al. 2000 in Onono, Wieland, Rushton and 2015). Under the arid and semiarid areas, where the government veterinary services had never been properly organized, the growth of private veterinary delivery system faced several constraints including lack of opportunities for diversification of veterinary services and poor cash flows, and therefore, few practitioners established veterinary practices in these areas. The idea of community-based animal health-care workers (CBAHWs) who were facilitated by the non-governmental organizations emerged to fill the gap left by this inadequate veterinary service delivery. Onono et al (2015) observes that to date, the economic sustainability of CBAHWs still remains unknown; besides, policy on the delivery of animal healthcare still has not incorporated their role despite the idea gaining momentum in the arid and semiarid areas within Kenya.

The delivery of animal health services has been hampered by several challenges including lack of resources by government and the low incentives for setting up private practices

(Ngeiywa and Masake 2009). Likewise, Ahuya and Okeyo (2004) in their study established that inadequate veterinary services led to premature deaths and fewer dairy goats reared by farmers. In addition, dairy goat farmers were not the prime targets in the development of the service provision. Onono et al (2013) conducted a study in Narok Kenya on determinants for the choice of animal health providers the results indicate that most livestock farmers obtained veterinary services from drug stockists (87.76 %), while only 12.24 % were seeking government services. The average distance covered while seeking services from the drug stockists and government veterinarians was 10.93 and 12.56 km, respectively. Narok County, drug stockists dominated delivery of animal health services under this pastoral area over the government veterinarians. This indicated a shortage of veterinary services, a factor that could lead to failure in projects.

The ultimate goal of projects is the maximization of benefits to the beneficiaries with minimal cost possible without compromising the quality and productivity of the project. Peacock and Hastings (2011) observes that advancement in livestock production and linkage to markets by smallholder farmers in Africa provides a good opportunity for poverty eradication for many families. However, the efforts by farmers to promote livestock production is affected by inaccessibility to crucial services such as veterinary services and breeding services. The progressive introduction of dairy goats into Kenya has placed an emphasis on the consumer-driven market development of its products. One of the products that can influence the success of the goat enterprise is goat's milk. Goat milk consumption accounts for a small but growing percentage of the Kenyan dairy market. Alemayu (2011) observes that markets are dispersed with remote markets lacking price information.

Dairy goat projects are designed and implemented to address a need within a social community and consequently are supported by the social structures within the community. The extent to which these social structures are connected and linked to each other may influence the success of a project. This linkage referred to as social network is a crucial factor in dairy goat production projects. Easley and Kleinberg (2010) says that social

networks progress as a result of the relationship between actors as a result of kinship, affection or familiarity between them. The major component of the promotion of dairy goat technology is information transfer.

According to Villanueva et al (2016), social networks are connections that link people and have an influence on the dissemination of information and adoption of technology. Therefore, social networks are organized type of social capital formed through linkages among individuals and organizations. (White 2002). Social networks are key in information and innovation transfer as well as enabling communication and coordination within the network (Tatlonghari et al 2012). Functional social networks provide the necessary conduits for social learning to livestock producers, a situation that fastens adoption of technology (Pali et al 2013).

2.3.4 Project Infrastructure and Sustainability of Dairy Goat Project

Recent literature indicates the significant role played by rural infrastructure in improving agricultural productivity in developing economies. Infrastructure is simply the structures, systems, and facilities necessary for any economy to function. Yadav, Chadel, and Sirohi (2014), asserts that infrastructure is a pre-condition for development and that better Infrastructure lead to improvement in livestock sector development. Majumdar (2004), Shah (1970), Prakash (1977) studied the relationship between project infrastructure and development and found a positive and significant relationship. Sarah (2012) defines infrastructure as "the physical constituents of connected systems that offer goods and services necessary to maintain a societal livelihood. Therefore, infrastructural development is a prerequisite to sustainable development is all sectors including production, mining, agricultural, livestock and other sectors that support development. Majumdar (2004) says that development level of a region is substantially determined by the level of infrastructure available. Shah (1992) indicates that Infrastructural development settings have a great importance in developing countries because they can enhance the living standard of the local population and help them to have access to scarce resources like water or education.

Tewari (1983), Majumder (2004) studied the relationship between development and infrastructure and found a significant relationship. They noted that with an improvement in infrastructure, the marginal cost decreases and given the market prices of outputs, a higher level of input is produced. Another study by IFAD (2006) found that project infrastructure is important in the linkage between isolated rural communities and the external world thus making transaction cost lower in the agricultural economies. Gilberto (2012) confirms that productivity increase in agriculture, which is an effective driver of economic growth and poverty reduction, depends on good rural infrastructure, well-functioning domestic markets, appropriate institutions, and access to appropriate technology.

Infrastructural development for dairy goat production is of paramount importance to promote sustainability of dairy goat projects. Iklihu (2008) asserts that inadequate infrastructure has been cited as the contributing factor in the inefficiency of livestock development projects. The dairy goat production system is an even more complex system as compared to other livestock thus require appropriate infrastructure. This implies that dairy goat management requires specialized tools and infrastructure. Zewdie and Welday (2015) points out that a good understanding of the requirements for the dairy goats is a pre-requisite for designing successful breeding projects. This consideration is important and assembling all the necessary equipment's, tools, structures like proper housing, and other support infrastructures like roads is key to the sustainability of dairy goat projects.

A study conducted by Aklihu (2008) found that in places where livestock infrastructure was in place, most they were dilapidated or nonexistent and no system was put in place to make them self-financing for maintenance or upgrading. Another study by Zewdie and Welday (2015) found that lack of infrastructure leads to dairy goats generally being walked for long distances to markets without adequate feed and water. This suggests that project design should consider infrastructure as a key consideration to promote success and sustainability of dairy goat projects. Where infrastructure like roads, communication, housing, feeding and breeding and market facilities are available, the survival rate of dairy

goats is high. Majumder (2004) posits that reduction in transaction costs, improved diffusion of technology, a new combination of input and output all realized through infrastructure development.

2.4. Utilization of Indigenous Knowledge, Project Design Factors, and Sustainability of Dairy Goat Projects.

Indigenous knowledge is the informal knowledge utilized by communities to support their decision-making process. Indigenous knowledge includes information that pertains to the local contexts of a community including their knowledge of specific community characteristics and relationships. Ajani, Mgbenka and Okeke (2013) further observe that this knowledge dictates our connection to our environment and is generally influenced by the past generations perceptions and experiences. Amir (2014) explains that active public participation is believed to be a significant component of interventions and it is considered directly proportional to the success of development projects. For this success to be achieved, Sanders and Binder (2010) recommends co-designing of projects which needs to take full advantage of the knowledge system of the host community. In addition, Amimo (2011) observes that rural livestock improvement projects must take into consideration the local indigenous knowledge, socio-economic situation, and attitudes of the rural farmers.

Integration of informal local and indigenous knowledge with contemporary science is an important process which enables practitioners and scientists to implement activities to increase resilience in communities. The intricate and vibrant nature of development environment needs a decision-making process that recognizes the diversity of knowledge and values (Mark 2008). This recognition facilitates a clear understanding of the complexities of the process and triggers positive attitudes and ownership. Lindsay et al (2006) point out that people identify with their socio-ecological environment through a continuous process of experimentation, trial and error method. Project planning decisions that overlook or underestimate the local knowledge and skills may luck the necessary impetus for project success and sustainability. This integration also makes it possible for decision-makers to put into practice policies that support such activities. Such actions

promote the use of local and indigenous knowledge and empower communities to use their knowledge supplemented with outside knowledge, to continue to make informed decisions about managing their adaptation.

One of the key arguments in favor a decentralized targeting approach, such as community-based targeting (CBT), has been based on its potential to identify potential program beneficiaries accurately by drawing on local knowledge and preferences that might otherwise be unknown to the program administrators at the central level (Mansuri and Rao, 2012). Reed and Dougill (2004) argues that utilizing local knowledge makes knowledge complete and thus providing a clear local solution. In other words, those seen as unprofessional have the mastery of their local world as they understand all the dynamics that the "expert" may not comprehend.

2.5. Project Leadership, Project Design Factors and Sustainability of Dairy Goat Projects

Leadership is one of the critical element in project management and considered key in project sustainability. Livestock development requires motivated and committed leaders to steer livestock projects to success and keep the momentum over the long-term thus sustainability of the projects. Leadership practices can be seen as routinized types of behavior displayed by individuals or collectives with the goal of producing leadership (Reckwitz 2002). Pasmore et al (2009) define leadership as the evident and collective behaviors that influence and largely determine the leadership culture.

Leadership is seen as the pillar of any development project without which the projects collapse and fail to achieve the desired goals. Rubin and Rubin (2001) observes that community development is achieved when community ties are made stronger in the neighborhood that leads to a coherent community organization that brings about a long-term capacity to address local problems. Leadership here is important to facilitate the necessary environment for this to happen. Fariborz et al. (2009) argued that just like informal organizations, local communities require authentic leadership for them to

develop. Further, this success is depended on the innovativeness, quality, and commitment of project leaders.

The nature and type of leaders will determine the progression of a project and eventually its sustainability. A study conducted by Ezatollah and Karami (2006), on the selection of leaders for agricultural projects, came up with the key trait that a leader must possess an interest in leadership, sympathy with people, religious belief, and self-confidence. Other traits revealed by the same study was understanding of social aspects of leadership, their business motivation, sense of responsibility, literacy and education level.

This study considers three types of project leadership namely transactional, transformational and servant leadership. It is viewed that project designs must be cognizant of these forms of leadership for them to succeed. Transactional leadership and transformational leadership represent two complementary points of view. In transactional leadership, there must be some work or action that is rewarded in exchange. Equally, transformational leadership focuses more on empowerment and aligning the aspirations of the people with the organizational higher goal (Tyssen 2013). Theory and practice indicate that both types of leadership are important in different business environments (McCleskey 2014).

Transformational leader's strife to challenge the status quo and initiate more dynamic ones that promote greater enthusiasm and promise. Nikezić, Purić and Purić (2012) came up with four characteristics of transformational leadership as charisma, inspiration, individual support, and intellectual motivation. Transactional and transformational leadership contrasts with the servant leadership in the sense that servant leadership is more personalized and belief in service first. Lubin (2001) explains that servant leaders prioritize relationships with the work and the output coming last. Stone, Russell and Patterson (2003) say that servant leadership is oriented to building the people with the expectation that organizational goals and objectives will be achieved eventually. A study done by Harwiki, (2015) found that servant leadership have a significant influence on the organizational

culture and that that servant leadership is highly effective style of leadership for empowering followers and affects the organizational commitment levels.

2.6. Theoretical Framework

This study is grounded by the three theories namely Structural-Functional Theory, Diffusion of innovations theory, and Theory of collective action. These theories have been presented based on their relevance in explaining the relationship between the study variables and their applicability.

2.6.1 Structural-Functional Theory

Structural Functionalism is a sociological theory by Herbert Spencer 1968. The theory explains how society functions focusing more on the linkages between different social institutions that form the society. Harper (2011) explains that Spencer contends that a society is similar to a human body. Moreover, a healthy body is determined by how well the organs perform assigned function. Spencer argues that a society's existence relies upon tasks performed by similar ‘organ-type' institutions. For example, in a modern community, access to clean water, food, infrastructure, and healthcare may well be essential to survival of its citizens. Thus, we could view institutions engaged in such activities as 'functional' organs serving a need. Therefore, Spencer's argument would imply that a community, being a self-contained system, has needs of its own; separate from the needs of individuals. Harper (2011) indicates that in Spencer's view, human organs perform functions deemed critical to the body's survival and, in this sense; society's institutions perform similar roles. This study is shaped by perspective that for sustainability of projects to be achieved, the community has to be organized in a certain way and assume supportive community traits and characteristics. Dairy goat projects are designed to promote clear community structures, with the necessary capacity and linked in a social network to function fully for sustainability of the projects. These structures are also linked to key institutions that provide essential services for their survival. Therefore, the strength of community structures, networks, their capacity and how institutions are closely linked for mutual support and co-existence is crucial. Structural-functional theory views society as a

complex, but the interconnected system, where each part works together as a functional whole to promote solidarity and stability.

2.6.2 Diffusion of Innovations Theory.

This theory by Rogers (1962) remains relevant for this study in the investigation of the behavior and practices of users in adopting a new technological innovation. Rogers (2003) says that an innovation is any knowledge or anything seen as new by an individual. When the paramount decision is the absolute utilization of an innovation, adoption is said to have taken place. Rogers see diffusion when different channels are involved in propagating the innovation within a social set up.

Communities have relied on the traditional goats as a source of their livelihoods and consequently perfected the skills and technics of keeping these local dairy goats. Introduction of dairy goats which are exotic and new breeds to the livestock farming communities is a new innovation and technology to the receiver communities. Inadequate forums and networks that are necessary for promoting adoption of breeding programs are poised as the main challenge facing livestock farmers.

This theory gives five stages in the decision innovation process as shown in Figure 2.1.

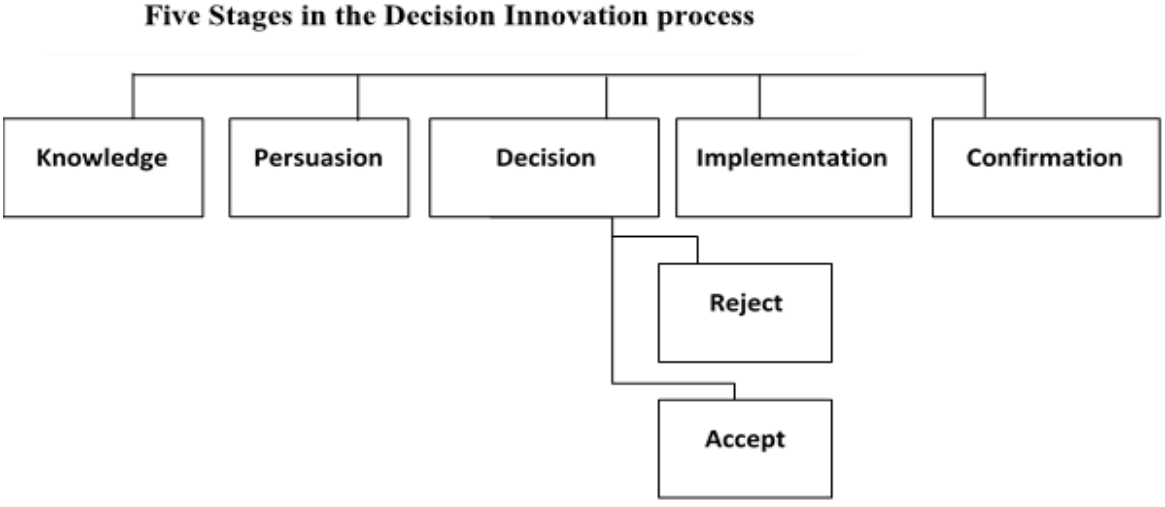

Figure 2.1.A Model of five stages in the innovation - decision making process

According to Rodgers (2003), an innovation may not be new since it was invented long time ago, however, if it is new to an individual, it remains an innovation. Knowledge, Persuasion, and Decision process are the three main steps related to innovation which are threatened by uncertainty. Accepting or rejecting an innovation may bring along unexpected outcomes leading to uncertainty (Rogers, 2003). To reduce the uncertainty, Rodgers advises that individuals must seek the right information about the innovation so that they make informed decisions.

According to this theory, knowledge is a precursor to adoption of any new technology, followed by persuasion and then making the ultimate decision to accept or reject. Dairy goat project designs integrate a process of community capacity building to improve knowledge and awareness of the project beneficiaries and enlightening the relevant institutions about the objective of the project, as well as building synergy and collaborations to improve sustainability of the project.

2.6.3 Theory of Collective Action.

This theory was established by Mancur in 1965. Mancur (1965) says that efficient provision of public goods comes along with many challenges. He argues that provision of public good requires a large size of a group which is difficult to optimally mobilize and also notes that there are those individuals who do not want to participate but looks forward to taking advantage of others. In line with Mancur theory, Marshall (1998) explained that collective action is the direct or indirect group action geared towards achieving a specified shared goal. Meinzen-Dick, Di Gregorio and McCarthy (2004) give a more comprehensive definition that considers the people's participation, people common interest, voluntary action to pursue the defined goals.

In order to analyze the performance of collective action related to natural resources and, more generally, to the public and collective goods, Agrawal (2001) came up with four factors that relate to resource utilization, community organization, organizational arrangement and external environment. Bandiera (2005) says that successful

implementation of livestock projects requires communities to be adequately organized and motivated to participate collectively in achieving the goals of the project.

Dairy goat projects are designed and implemented to address specific community needs identified in a participatory manner. The needs must be jointly felt and a common emphasis to address them enhanced through a collective process. The theory of collective action becomes critical in explaining how a group of people with common problem team up to bring change to their current situation while focusing on a better future. Improvement of local goats and adoption of dairy goat breeding technology is perceived to be a better option and a concern to those interested. Through the collective action process, dairy goat farmers are able to select the appropriate project beneficiaries, understand their needs, build their capacity, mobilize resources for the project and create the necessary linkages with relevant institutions for support.

2.7 Conceptual Framework

Based on the theoretical discussions and guided by the proposed objectives, the inter-relationship among variables of this study is conceptualized as illustrated in Figure 2.2. The Conceptual framework shows the relationship between project design factors as an independent variable (IV) and the sustainability of dairy goat projects as the dependent variable (DV). This relation is conceptualized as being moderated by the utilization of indigenous knowledge and project leadership. The model shows four project design factors; Project beneficiary selection process explained by the project beneficiary selection tools, beneficiary needs analysis and beneficiary composition as the indicators. Community capacity is the second project design variable explained by human capital capacity, capacity to contribute resources and the capacity of social structures. Institutional linkages are explained by linkages to health institutions, linkages to markets and linkages to social institutions. Finally, project infrastructure is explained by Housing, breeding and market infrastructure.

This model also shows the relationship between the combined project design factors and sustainability of dairy goat project as well as the moderating effect of the utilization of indigenous knowledge to this relationship. Utilization of indigenous knowledge is explained by knowledge on medicine, husbandry and value addition. Project leadership is the other moderator explained by the transactional, transformational and servant leadership. It is conceptualized that any changes of these either positive or negative will result in a change in the sustainability of dairy goat project.

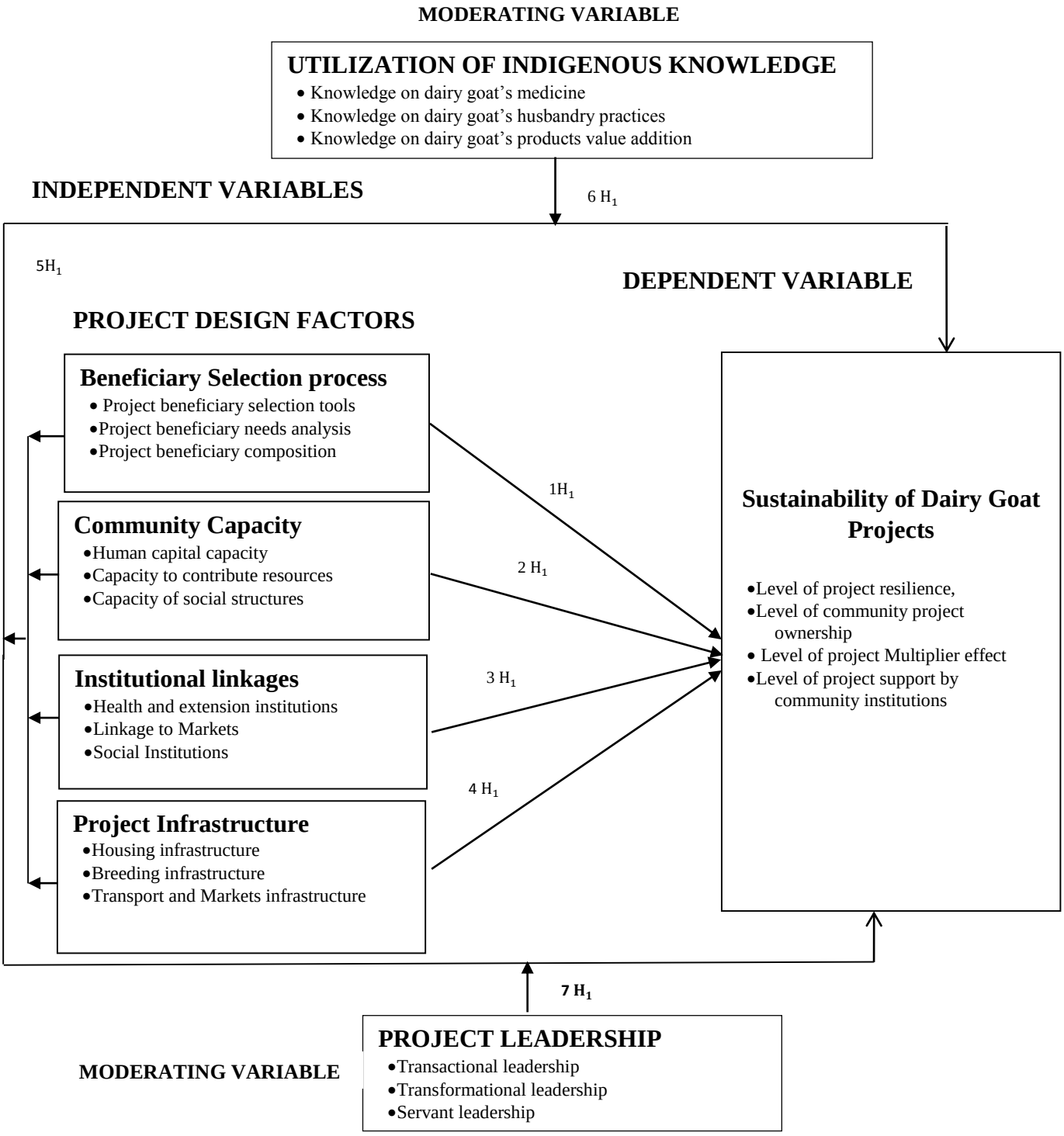

Figure 2.1: Conceptual Framework for Project Design Factors Utilization of Indigenous Knowledge and Project Leadership

2.8 Summary of Research Gaps

Based on the reviewed literature from empirical studies, Table 2.1 gives a summary of research gaps for this study

Table 2.1. Summary of Research Gaps

Variable	Author	Focus of the Study	Methodology used	Findings	Gap in Knowledge	Focus of current study
Sustainability of dairy goat projects	Ogola, Nguyo & Kosgey(2015)	Management practices and performance of the dairy goat multiplication Programme	Descriptive design	Sustainability of dairy goat project must be commensurate with the farmer's capacity to ensure success	This study focused more on management practice and not much on non-farmer centered factors like community capacity	The current study focus on the study of institutional linkages and community capacity in dairy goat projects
Sustainability of dairy goat projects	Chamboko et al. (2016)	Socio-economic factors influencing goat milk production in the smallholder areas of Zimbabwe:	Descriptive survey design.	The study found that the cost of disease control and education level of the head of household affected goat milk production.	This study focused on disease control and education but did not address project design factors	The current study investigates the influence of project design factors on the sustainability of dairy goat projects.
Sustainability of dairy goat projects	Ahuya O, Okeyo A, Njuru M, and Peacock C, (2005)	Developmental challenges and opportunities in the goat industry: The Kenyan experience	Content analysis and review	Community-bases and farmer-group approaches can be successful, and offer opportunities for quick adaptation and rapid adoption of new technologies.	This study reviewed empirical literature	The current study provided empirical information about the dairy goat sustainability drivers
Project beneficiary selection process	Anwar, H & Hayat A (2014)	Effects of participatory development on community	Descriptive survey design	Participatory approach has partially succeeded in mobilizing and strengthening the	This study focused on community participation in a general	The current study focuses on participation in project beneficiary selection as an

		developmental projects		community organizations in the project area.	approach resulting to inadequate conclusions	important design factor that enhance sustainability
Project beneficiary selection process	Kilic, Whitney and Winters 2013	Decentralized Beneficiary Targeting in Large-Scale Development Programs: Insights from the Malawi Farm Input Subsidy Program	Descriptive survey design	Lack of beneficiary targeting is notable given that the program objectives are to improve productivity through access to inputs and enhance household food security through increased production.	Beneficiary targeting was not linked to sustainability of the development project and the beneficiary targeting indicators were not explicit	The current study provided empirical evidence on the influence of project beneficiary selection process on the sustainability of dairy goat projects
Community capacity	Philemon and Maitho (2017)	Factors Influencing Uptake of Exotic Dairy Goats in Kitui West Sub-County, Kitui County, Kenya	Descriptive survey research design	Inadequate knowledge and skills in record keeping, lack of modern farming skills especially in dairy farming delimited uptake of dairy goats farming	The study methodology did not include focus group discussions as the respodents were dairy goat farmer	The current study incorporates focus group discussions, key informant interviews and questionnaires thus providing an opportunity for triangulation of result from different tools
Community capacity	Ahuya, Ojango, Mosi, Peacock, and Okeyo (2009)	Performance of Toggenburg dairy goats in smallholder production systems of the eastern highlands of Kenya	Cross-sectional survey design	High demand for the perceived good quality animal from the resource poor farmers negatively influences any possible selection for improved productivity	Methodology and variables of study is not clearly stated	The current study investigate the influence of community capacity on the performance of dairy goat projects
Institutional Linkages	Onono. J, Wieland. J,	Factors influencing choice of	Descriptive survey design	The factors that significantly influenced the choice of animal health	This study focused on the factors	The current study focused on critical linkages with

	Rushton. J, (2015)	veterinary service provider by pastoralist in Kenya		service providers included the distance, time spent seeking service providers, and cost incurred	influencing the choice of veterinary services but did not consider how they are linked to veterinary institutions	relevant institutions including veterinary, market and social institutions.
Institutional Linkages	Ayele. S, Duncan. A, Larbi. A, and Khanh. T, (2012)	Enhancing innovation in livestock value chains through networks	Descriptive survey design.	Technological innovation in livestock development is sustainably enhanced when linked with other innovations and market-oriented activities that optimize productivity	The study did not collect qualitative data for triangulation with the other data	The current study source data from questionnaires, key informant interviews and focus group discussions and the information is triangulated to strengthen the study conclusions
Institutional Linkages	Bett et al (2013)	Participatory assessment of institutional and organizational challenges confronting dairy goat management in Kenya	Descriptive survey design	Strong and supportive government policies on regulation and facilitation of animal breeding and veterinary services, coordination of research and extension, market organisation and monitoring and evaluation of projects and programmes are lacking.	The study methodology was limited to descriptive and did not show correlations and relationship of variables	The current study established correlations and relationship between institutional linkages and sustainability of dairy goat projects
Project infrastructure	Yadav, Chadel, & Sirohi (2014),	Infrastructure disparities in rural India, with special reference to livestock support services	The study used review and content analysis of the existing literature	Infrastructure is a pre-condition for development and that better Infrastructure lead to livestock sector development	The study do not provide evidence of the relationship between Infrastructure	The current study investigates the relationship between dairy goat project infrastructure and

		and veterinary infrastructure			and livestock sector development	sustainability of dairy goat projects
Project infrastructure	Mburu et al (2016)	Factors affecting Kenya alpine dairy goat milk production in Nyeri region	Descriptive survey method	The study found out that poor feeding practices, significantly affected the Alpine dairy goat milk production	This study only focused on the production inputs as a factor influencing production	The currents study investigates dairy goat infrastructures as a design factor for sustainability of dairy goat projects
	Shivairo et al (2013)	Production Challenges and Socio-Economic Impact of Dairy Goat Farming amongst Smallholder Farmers	Cross-sectional survey design. Data collected using structured questionnaire	Design of dairy goat housing was provided by the donor but significant variations were noted in the quality and design. Higher percentage of source of information was from peer to peer	The variables of study and their relationship is not clearly explained and demonstrated in a conceptual framework	The current study looks at design factors of dairy goat project and the sustainability of the project. The study also tests seven hypothesis and show relationship between variables
Utilization of indigenous knowledge	Ajani, Mgbenka and Okeke (2013)	Use of Indigenous Knowledge as a Strategy for Climate Change Adaptation among Farmers in sub-Saharan	The study used literature review and content analysis of the existing literature	Indigenous knowledge practices have been employed successfully in adapting to climate change impacts among farmers in sub-Saharan Africa.	Empirical research is needed to establish the relationship between utilization of indigenous knowledge and livestock adaptation to climate change	This study considers utilization of indigenous knowledge as a moderator on project design factors and sustainability of dairy goat projects
	Ndoro, Mudhara, Chimonyo, (2016)	Dairy goat milk consumption and the associated factors in arid and semi-arid	Descriptive survey design.	The results showed lack of interest, indigenous knowledge and religious beliefs affected milk	There is need for further study to establish the establish other factor	The current study provides empirical information on the moderating effect of utilization of

		lands of Kenya in Mwala sub county in Machakos county		consumption in the study area.	influencing success of project promoting milk consumption	indigenous knowledge
Project leadership	Harwiki, W (2015)	The impact of servant leadership on organizational culture, commitment, citizenship behavior, employee performance in women cooperatives	Descriptive survey	Servant leadership have a significant impact on the organizational culture. That servant leadership is highly effective style of leadership for empowering followers and affects the organizational commitment levels	The study failed to analyze other styles of leadership but focused on the servant leadership style only	The current study focuses on transactional, transformational and servant leadership style in project design for dairy goat projects
	Nkanata, Mulwa, and Kyalo (2016)	Reflections on organizational leadership on implementation of electronic project monitoring information system in public tertiary institutions	The study employed a mixed mode approach to conduct a combined cross sectional descriptive survey and correlational research design.	There was a statistically significant relationship between organizational leadership and implementation of electronic project monitoring information system	The study has not demonstrated the conceptual relationship of variables of study	The current study provides empirical evidence of the moderating effect of project leadership on the relationship between project design factors and sustainability o dairy got projects

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter provides a detailed methodology used to conduct the study covering the philosophical orientation, study design, target population, sample size and sampling procedure, research instruments, data collection procedures, validity of research instruments and reliability of data collection instruments data analysis techniques, ethical considerations and operationalization of variables.

3.2 Research Paradigm

This study adopted a pragmatic paradigm that integrates both positivism and interpretivism or constructivism philosophical foundation. A paradigm is defined as the generally proven and accepted way of doing things and establishes a set of practices. Scotland (2012) points out that paradigms are diverse based on their ontological and epistemological orientation such that they assume differing assumptions of reality and knowledge. This knowledge is what underpins their particular research approach ranging from thought patterns to action. As such, the belief system guides on the type of research approach leading to either embarking on qualitative, quantitative, or mixed methods approach. Our view of knowledge, our interaction with it and how we search for the knowledge is influenced by this characteristic.

The choice of this paradigm in this study was guided by the ontological, epistemological, axiological as well as methodological foundations of pragmatism. This study used mixed mode approach to data collection, analysis and presentation. Johnson and Anthony (2004) says that mixed mode approaches are highly supported by the pragmatic paradigm. Mixed methods research is a type of inquiry that is philosophically grounded where an intentional mixture of both qualitative and quantitative approaches is used in a single research study. Researchers believe that qualitative and quantitative approaches can come together to build on their ‘‘complementary strengths’’ and weaknesses (Morgan, 2007)

3.2.1 Research Design.

This study used descriptive cross-sectional survey and correlational research designs. A descriptive design was useful because the researcher was able to collect data from respondents drawn from different dairy goat farmer groups. In addition, data were collected from key informants and analyzed. The correlation study was chosen for this study as it provides quantitative responses from the questionnaires.

This study generated both qualitative and quantitative data thus a mixed mode approach of data collection. This complementarity capability of mixed mode builds the strength of this study by allowing descriptive explanation of study variables while showing the relationship among variable through inferential analysis. This allowed simultaneous integration of descriptive, inferential and qualitative data analysis. Kothari (2004) explains that qualitative and quantitative approach supplement each other in that, qualitative techniques provide in-depth explanations while quantitative technique provided the hard data needed to meet the requirements of objectives and to test the hypotheses.

3.3 Target Population

Dairy goat farmers in self-help groups in Tharaka Nithi County was targeted in this study. Data obtained from Tharaka Nithi dairy goat breeders association (TDGBA) and the Livestock department indicates that there are 53 active self-help groups practicing dairy goat farming spread across the three counties of this study namely Maara sub-county, Tharaka South sub-county and Meru South sub-county. Tharaka North has minimal number of dairy goats and self-help groups thus was not included in this study. The groups have an average membership of 23 members. A sampling frame was a list of all groups that are directly involved in the dairy goat project under the Tharaka Nithi dairy breeders association. The dairy goat farmers were targeted as respondents for the self-administered questionnaires. The unit of analysis for this study was the dairy goat farmer groups who for the purposes of this study are referred to as projects while the respondents were the dairy goat farmers. The target population is shown in Table 3.1

Table 3.1 Target Population of Dairy Goat Farmers and Key Informants

Sub-county	Total no of groups	Sampled groups (30% of the total groups.	Total population of dairy goat farmers.
Meru South	19	6	138
Maara.	22	7	161
Tharaka South	12	4	92
Total	**53**	**16**	**391**
Key informants			
Departments Heads		**Total number of department heads**	
Sub-county livestock officer			4
Sub-county veterinary officer			4
Sub-county Social services officer			4
Dairy goat breeders officials			5
Total		**16**	

In addition, this study interviewed key informants from the three targeted sub counties. There are four sub counties in Tharaka Nithi County but only three were targeted where dairy goat project was being implemented. Targeted key informants were the sub-county livestock officer, sub-county vet officer and sub-county social services officer in all the three sub-counties and the five dairy goat breeder's association project officials.

3.4 Sample Size and Sampling Procedure

Sampling is a process of choosing individuals or objects from a population which is representative of the larger population.

3.4.1: Sample Size

To establish the sample size for this study, Krecie and Morgan (1970) statistical Table have been used. Based on the Krecie and Morgan (1970) a population of 391 dairy goat farmers gives a sample size of 196 dairy goat farmers.

$$s = x^2NP(1 - P) \div d^2 (N - 1) + x^2P(1 - P)$$

S= Required sample size.

x^2 The table value of chi-square for 1 degree of freedom at the desired confidence level(3.841)

N= The population size

P= The population proportion (assumed to be 0.50 since it would provide the maximum sample size).

d= The degree of accuracy expressed as a proportion (0.05)

Therefore

S= 3.841(391)(0.5)(1-0.5)÷ 0.05^2 (391-1)+3.841(0.5)(1-0.5) =196

3.4.2: Sampling Procedure

In this study, a combination of multi-stage and stratified random sampling technique, was used to generate a sample for questionnaire respondents. Multi-stage sampling technique was selected because the research context comprised of different level of selection and this helped the researcher to select respondents through three levels (stages). The first level involved the selection of the three sub counties, the second phase involved the selection of the dairy goat farmer groups to be involved in the study and the third stage involved sampling of the respondents. Sampling frame for the groups was a list of all the 53 with an average of 23 members each group. Self-help groups considered for this group were the active groups and currently engaged in dairy goat keeping as per the project model. Huber (2004) argues that multi-stage sampling technique would be the most preferred sampling technique for large population and where it is desired every sub-population to be presented in the sample.

To enable selection of a representative sample from the 53 groups, 30% of the groups were randomly samples and proportionately from each of the three sub counties. Sekaran (2003) indicates that in sampling procedures, a minimum of 30% of subpopulations is essential for statistical analysis. Meru South which had 19 groups was reduced to 6 groups with 138 members, Maara from 22 groups to 7 groups with a membership of 161 dairy goat farmers and finally Tharaka South from 12 groups to 4 groups with total membership of 92 dairy goat farmers. The total population from where the sample was drawn was 391 dairy goat farmers. Stratified random sampling based on the sub counties was used to generate a proportionate sample size of 191 respondents for this study.

For triangulation purpose, Purposive sampling, a non-probability procedure was used to sample 13 key informants for this study. This study sought to gather information from the key relevant government departments of veterinary, livestock, social services as well as from the dairy goat project officials. There is only one head of department in these respective department thus each was sampled purposively since the nature and type on information required for this study could better be given by the head of the departments. Merriam (1997) says that purposive sampling is based on the assumption that the researcher wants to discover, understand and gain insight and therefore must select a sample from which the most can be learned. Table 3.2 show the sampling design for dairy goat farmers (respondents) and key informants

Table 3.2. Sampling Design for Dairy Goat Farmers and Key Informants

Sub-county	Total no of groups	Sampled groups (30% of the total groups.	Total population of dairy goat farmers.	Sample size
Meru South	19	6	138	69
Maara.	22	7	161	81
Tharaka South	12	4	92	46
Total	**53**	**16**	**391**	**196**

Departments Heads	Total number of department heads	Purposely selected Respondents
Sub-county livestock officer	4	3
Sub-county veterinary officer	4	3
Sub-county Social services officer	4	3
Dairy goat breeders officials	5	4
Total	**16**	**13**

Further, random sampling was used to select six groups (two from each of the study area) that were involved in the focus group discussions (FGDs). A list of dairy goat self-help groups was developed from the groups that were not considered for sampling respondents for self-administered questionnaire. This was done to avoid the possibility of selecting a respondent who was involved in the questionnaire. This pre-exposure to the objectives of the study could bring biasness and non-objective information. From each of the six groups, 8 to 12 members were selected randomly and participated in the focus group discussions.

3.5 Research Instruments

Guided by the mixed mode approach, this study generated qualitative and quantitative data. The study adopted self-administered questionnaires for study respondents, interview guide for key informant interviews and focus group discussion (FGD) guide as tools for data collection. A questionnaire is a tool for capturing information on social attributes and characteristics of respondents (Bulmer 2004). Since this study was underpinned by pragmatic philosophy and employed mixed method approach, data generated was twofold: qualitative and quantitative data. The questionnaire design had, therefore, the capability to generate this type of data.

3.5.1 Questionnaires for Dairy Goat Farmers

The questionnaire for dairy goat farmers consisted of eight sections from section A to section H which were designed to gather responses using a Likert Scale type questions.

Each section was designed to generate responses to address each of the objectives. Section A generated information specific to the respondent personal profiles including their gender, age, group membership, duration in group, experience with dairy goat keeping and leadership position. Section B generated information on the dependent variable (sustainability of dairy goat projects). Section C, D, E and F generated information on the independent variable; project design factors (project beneficiary selection process, community capacity, institutional linkages and project infrastructure) respectively. Section F and G gathered information on the two moderating variable on utilization of indigenous knowledge and project leadership respectively.

3.5.2 Interview Guide for Key Informants

An interview guide is a tool used in collecting qualitative data. McNamara (2009) observes that interview guide ensures that general idea is collected from different interviewees with some level of uniformity while allowing flexibility in gathering information. This is achieved by allowing the participants to give as much information as possible and the researcher asking probing questions. Guided by this literature, this study carefully used interview guide to generate information from key informants selected due to their knowledge of the phenomenon of study. The interview guide was designed to gather information based on the objectives of this study. The tool was designed to such that information obtained using the tool would be easily and effective triangulated with information gathered using the self-administered questionnaires and the focus group discussion guide.

3.5.3 Focus Group Discussion Guide

This study used Focus Group Discussions (FGDs) to collect qualitative data from the respondents. Focus group discussions is a method of generating diverse views from respondents (Wilkinson 2004). Based on this strength, FGDs was conducted to dairy goat farmers of between eight (8) and Twelve (12) participants drawn from groups that were not subjected to the dairy goat farmer questionnaires. FGD guide was administered by the researcher assisted by two research assistants being the moderator, note taker, and the

observer. The discussions were kept short between 60 to 90 minutes deliberately to ensure high level of participation and promote credibility of information given by the participants. To maximize the capture of responses, recorders were used to back up information documented by the note taker that was reviewed later after the focus group discussions. The FGDs data capture tools contained three levels of questions to introduce the subject, gather information based on the topic and then the exit questions.

3.5.4 Pilot Test of Research Instruments

A pilot study is a crucial step in scientific research as it helps to identify gaps in research instruments (Lancaster et al 2004). For this reason, the instrument for this study was pilot tested. Validity of research instrument was checked through engagement of experts who are the university supervisors. The research instrument was then modified based on the inputs of the university supervisors. 30 randomly selected respondents were subjected to the questionnaires and the data analyzed to check reliability of the instruments. Connelly (2008) suggests that a pilot sample size should be 10% of the projected study sample size. Participants involved in the pilot test were excluded from the study.

3.5.5 Validity of the Instruments

Validity is an important component of any scientific study. Mugenda and Mugenda (2003), Cooper and Schindler (2006) says that validity is about the accuracy of data and the level of representation of the variables of the study. Donald and Delno (2006) say that types of validity are content, construct validity and criterion validity. Content related validity is the content and format of the instruments Huber (2004). DeVon et al., (2007) define criterion-related validity as the evidence of a relationship between the attributes in a measurement tool with its performance on some other variable while Huber (2004) defines construct validity as the nature of the psychological characteristics being measured.

To ensure content validity, experts opinion was sought from the University supervisors, as well as from the experts in dairy goat management. Content validity was achieved by conducting a pilot study. Based on the result of the pilot test, content validity was achieved

according to representativeness by the researcher examining objectives and comparing them to the content of instrument and using the pilot study. Construct validity support the theory by assessment of various relationships to the major variable.

3.5.6 Reliability of the Instruments

The extent to which results are consistent over time and that the results of a study can be achieved in the same way is referred to as reliability. Donald and Delno (2006) define reliability of research instrument as the consistency of scores obtained and has two aspects: stability and equivalency. Bell (2005) observes that reliability is the extent to which a test or procedure produces similar results under constant conditions on all occasions. A measure is reliable to the extent that repeated application of it under the same condition by different researchers gives the same results. To ensure reliability, the researcher used to test and retest method done at an interval of three weeks. Larry (2003) indicates that Cronbach Coefficient is used to test internal consistencies of samples of a given population when research instrument with Likert type scales with multiple responses are used for data collection. A Cronbach α (Alpha) reliability coefficient that ranges between 0 and 1 was generated to measure the reliability. Best and Khan (2004) say that the closer the value is to +1.00, the stronger the congruency measure it is. For the purposes of this study, a Cronbach α (Alpha) reliability coefficient of above 0.7 was considered good thus tools were not revised. Bryman (2006) postulates that a Cronbach α (Alpha) reliability coefficient of 0.70 is an acceptable level of internal consistency. The results of the Cronbach α (Alpha) reliability coefficient is presented in Table 3.3.

Table 3.3. Reliability Coefficients

	Variable	N of cases	N of items	Reliability coefficient
Section B	Project Sustainability	30	10	0.9812
Section C	Project Beneficiary Selection Process and Project Sustainability	30	10	0.7393
Section D	Community Capacity And Project Sustainability	30	10	0.7182
Section E	Community Institutional Linkages and Project Sustainability	30	10	0.7743
Section F	Project Infrastructure and Project Sustain ability	30	10	0.7251
Section G	Project Design Factors and Sustainability of Projects	30	10	0.7891
Section H	Project Design Factors, Utilization of Indigenous Knowledge and Sustainability of Projects	30	10	0.7912
Section I	Project Design Factors, Project Leadership and Sustainability of Projects	30	10	0.7902
	Composite Cronbach's (Alpha) Reliability Coefficient = 0.789			

The results in Table 3.3 show that the Cronbach α (Alpha) reliability coefficient for the variables under study ranged from 0.7902 to 0.9812 with a composite Cronbach's (Alpha) Reliability Coefficient of 0.789. This implies that all the instruments were reliable in carrying out the study.

3.6 Data Collection Procedure

Data collection for this study was a procedural process to ensure the success of the process. Before undertaking data collection, the researcher obtained a research clearance letter from The University of Nairobi (UON) and later obtained a research permit from the National Commission for science, Technology, and Innovation (NACOSTI). In addition, the researcher obtained authorization to collect data from Tharaka Nithi County from the County ministry of education as well as from the Ministry of Agriculture, Livestock and Fisheries. The researcher also made courtesy and introductory visits to the office of the

County commissioner. Research assistants were identified, interviewed for qualification and competency. They were then trained on data collection procedures, research ethics and were taken through each item on the questionnaire so that they would clarify questions in the right manner and be able to handle any concerns from the respondents. The research assistants were also trained on the process of conducting focus group discussions and key informant's interviews. Trained assistants were first involved in the pilot study, revision of the questions and then in data collection for the main study. A follow-up time schedule for questionnaires was agreed on with the research assistants to increase the questionnaire return rate.

Community guides who were not part of the study respondents and who understood the distribution and location of dairy goat groups were used to assist the research team while collecting primary data by use of the self-administered questionnaires. The researcher ensured that all the self-administered questionnaires for dairy goat farmer (respondents) were completed, collected and securely filed as serialized. Using interview guide, interviews were conducted with the County officials (Sub county livestock officers, Sub-county veterinary officers, Sub-county social service officers and the dairy goat project officials). Interviews were conducted at their convenient places outside their offices as suggested by them. Focus group discussions were scheduled within the villages at a venue and time agreeable by the participants as each group had its time preferences.

3.7 Data Analysis Techniques

In this study, both quantitative data and qualitative data were collected and analyzed. Therefore, a mixed method data analysis techniques were employed incorporating both descriptive and inferential data analysis in conformity with the pragmatism paradigm. Oso and Onen (2009) explain that descriptive analysis refers to the use of measures of central tendencies such as mean, the measure of dispersion such as standard deviation and variance to describe a group of subjects. Descriptive analysis refers to statistically describing, aggregating, and presenting the constructs of interest or associations between these

constructs. Inferential analysis refers to the statistical testing of hypotheses (Bhattacherjee 2012).

Once the data was received from the field, the data was edited for inconsistencies, coded and entered into the computer using Statistical Package for Social Sciences (SPSS) software.

A mixed methods data analysis techniques used a mixture of descriptive and inferential data analysis techniques in both data collection and analysis. Descriptive statistics such as measures of central tendency, dispersion, percentages and frequency distributions were used to analyze the scores distribution, while inferential statistics tested the hypotheses.

Simple linear and multiple regression analysis was adopted which helped in establishing the nature of the relationship between variable under study. A coefficient r and a magnitude indicated the strength and direction of the relationships. r values of between $+0.10<r<0.29$ was a weak correlation, $0.30<r<0$-49 was moderate correlation and $+0.5 < r <1$ was a strong relationship. The values of coefficient of determination R2 showed the degree or amount of variation in the dependent variable (s) attributed to the predictor variables (s).

The Beta values showed the amount of change in the dependent variable attributable to the amount of change in the predictor variable, and the F ratio measured the model fit, or simply it is a measure of how well the equation line will develop fit with the observed data. The statistical significance of each hypothesized relationship was interpreted based on the F and t values. Regression analysis was applied in all the cases where the correlation was found to exist.

3.7.1 Analysis for Qualitative Data

Qualitative data analysis is the range of processes and procedures of transforming qualitative data into meaningful explanation, understanding or interpretation of the people and situations under investigation. Ultimately, the focus is to scrutinize the significant and symbolic content of qualitative data. Bogdan and Biklen (2003) define qualitative data analysis as interacting with data, organizing it, breaking it into manageable units, coding.

processing, synthesizing and searching for patterns. This process is beneficial in searching for patterns to explain influencing patterns and relationship from the data collected.

Qualitative data were collected through key informant interviews and Focus group discussions (FGDs). The purpose of the focus group discussions was to provide an in-depth understanding of dairy goat project, guided by the study objectives. Focus group discussions were facilitated by the researcher assisted by three research assistants; one making observations, the second taking notes, the third recording the discussions while the researcher engaged the participants in discussions. The researcher sought consistent simple descriptive narratives that formed the basis for conclusions.

The first step of the analysis of data from the FGDs was the confirmation of information from the note taker, observer, and review of the recorded information (listening through). The second step of FGD data analysis was the transcription of the recordings using strict verbatim style. The transcribed information was a useful back up to the handwritten notes and enhanced clarification and completion of statements. The third step was coding both transcribed data and recorded data into themes that were relevant to the objectives of the study and finally interpretation and generalization was done in the light of the study objectives.

Analysis of key informant interviews involved a similar process of recording, transcription, categorizing the data into themes and making interpretations and deductions. Triangulation was done so as to strengthen the validity and reliability of the data collected. In this study, therefore, data was triangulated through comparison of qualitative data received from both key informant interviews, focus group discussions and data from the structured questionnaires.

3.7.2 Regression Models

The following section show the correlation and regression model for the seven objectives of this study. Correlation and regression model is shown in Table 3.4

Table 3.4. Regression Models

Variable		Indicator
Dependent Variable	Sustainability of dairy goat projects	• Project level of resilience. • Multiplier effect capability • Networked with support structures • Community ownership, • Social, economic and environmental outcomes • Dairy goat breeding
Independent variable	Project Design X_1, X_2, X_3, X_4	Beneficiary selection (X_1) Community Capacity (X_2) Institutional linkage (X_3) Project Infrastructure (X_4)
Moderating variable	Utilization of Indigenous knowledge (X_5)	Utilization of knowledge on dairy goat medicine, Utilization of knowledge on dairy goat husbandry, Animal product value addition
	Project Leadership (X6)	Transactional leadership, Servant leadership, Transactional leadership

The following correlation and regression models guided the data analysis with the variables and the indicators denoted as follows:

Dependent variables:

Y – Sustainability of dairy goat projects

Independent variables:

Project Design Factors

X_1: Beneficiary Selection Process

X_2: Community Capacity

X_3: Institutional Linkage

X_4: Project Infrastructure

Moderating variables:

$X_{5:}$ Utilization of indigenous knowledge

$X_{6:}$ Project Leadership

$\beta_{0:}$ Constant term

$\beta_1, \beta_2, \beta_3, \ldots \beta_n$ -: Beta coefficients

$X_1, X_2, X_3, \ldots X_{n:}$ Predictor variables

ε Error term

Analytical model for research Objective one

This study sought to establish the extent to which Project Design factors influence the sustainability of dairy goat projects in Tharaka Nithi County. For this relationship to be established four hypotheses are generated and the corresponding correlation models as shown below:

Model for hypothesis one

Hypothesis $H_{1:}$ There is a significant relationship between project beneficiary selection process and sustainability of dairy goat projects in Tharaka Nithi County.

Sustainability of dairy goat projects = f (project beneficiary selection process)

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Model for Hypothesis Two

Hypothesis $H_{1:}$ There is a significant relationship between community capacity and the sustainability of dairy goat projects in Tharaka Nithi County.

Sustainability of dairy goat projects = f (Community capacity)

$$Y = \beta_0 + \beta_2 X_2 + \varepsilon$$

Model for Hypothesis Three

Hypothesis $H_{1:}$ There is a significant relationship between Institutional linkages and Sustainability of dairy goat projects in Tharaka Nithi County.

Sustainability of dairy goat projects = f (Institutional Linkage)

$$Y = \beta_0 + \beta_3 X_3 + \varepsilon$$

Model for Hypothesis Four

Hypothesis $H_{1:}$ d: There is a significant relationship between Project Infrastructure and Sustainability of dairy goat projects in Tharaka Nithi County.

Sustainability of dairy goat projects = f (Project Infrastructure)

$$Y = \beta_0 + \beta_4 X_4 + \varepsilon$$

Model for Hypothesis Five

Hypothesis $H_{1:}$ There is a significant relationship between project design factors and the Sustainability of dairy goat projects in Tharaka Nithi County.

Sustainability of dairy goat projects = f (Beneficiary Selection Process, Community Capacity, Institutional linkage, Project Infrastructure)

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Analytical Model for Research Objective two

This study also sought to examine the extent to which the utilization of indigenous knowledge influences the relationship between the combined project design factors and the sustainability of dairy goat projects. For this relationship to be established the corresponding correlation models as shown below:

Model for Hypothesis Six

Hypothesis H_1: Utilization of indigenous knowledge has a significant influence on relationship between the combined project design factors and the sustainability of dairy goat projects in Tharaka Nithi County.

Sustainability of dairy goat projects = f (Project design factors, Indigenous knowledge)

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_{15} X_1 X_5 + \beta_{25} X_2 X_5 + \beta_{35} X_3 X_5 + \beta_{45} X_4 X_{5+} \varepsilon$$

Analytical Model for Research Objective Three

This study also sought to examine the extent to which the Project Leadership influence the relationship between the combined project design factors and the sustainability of dairy

goat projects. For this relationship to be established the corresponding correlation models as shown below:

Model for Hypothesis Seven

Hypothesis H_1: Project leadership has a significant influence on relationship between the combined project design factors and the sustainability of dairy goat projects in Tharaka Nithi County

Sustainability of dairy goat projects = f (Project design factors, Project Leadership)

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_{16} X_1 X_6 + \beta_{26} X_2 X_6 + \beta_{36} X_3 X_6 + \beta_{46} X_4 X_6 + \varepsilon$$

3.7.3 Tests of Hypotheses

For the hypotheses to test the relationship between the dependent and independent variables was analyzed and tested as shown in the Table 3.5.

Table 3.5. Summary of Statistical Tests of Hypotheses

Objective	Hypotheses	Type of analyses	Interpretation of results
1: To establish the extent to which project design factors influence the sustainability of dairy goat projects in Tharaka Nithi County.	1: **H_1** The combined project design factors has a significant influence on the sustainability of dairy goat projects in Tharaka Nithi County	• Pearson's correlation • Regression	P values less than 0.05, Ho will be rejected and H_1 will fail to be rejected. Strength relationships of r values +0.10<r<0.29 will be a weak correlation 0.30<r<0-49 will be moderate correlation +0.5 < r < 1 will be a strong relationship. If variable under consideration will be excluded from the final regression model, Ho will fail to be rejected and R2 values will be considered for determination of the strength of the relationship. In stepwise regression modeling, if the variable under consideration was excluded from the final regression model, Ho will be accepted. Where Ho will be rejected R2 values will be considered in determination of the strength of the relationship.
1a: To establish how project beneficiary selection, influence the sustainability of dairy goat projects in Tharaka Nithi County	1a: **H_1** Project beneficiary selection has a significant influence on the sustainability of dairy goat projects in Tharaka Nithi County	• Pearson's correlation • Regression	
1b: To assess the extent to which community capacity influence the sustainability of dairy goat projects in Tharaka Nithi County	1b: **H_1** The level of community capacity has a significant influence on the sustainability of dairy goat projects in Tharaka Nithi County	• Pearson's correlation • Regression	
1c: To establish how institutional linkage, influence the sustainability of dairy goat projects in Tharaka Nithi County	1c: H_1 Community institutional linkage has a significant influence on the sustainability of dairy goat projects in Tharaka Nithi County	• Pearson's correlation • Regression	
1d: To establish the extent to which dairy goat project infrastructure influence the sustainability of dairy goat projects in Tharaka Nithi County	**1d: H_1** Project infrastructure has a significant influence on the sustainability of dairy goat projects in Tharaka Nithi County	• Pearson's correlation • Regression	
2: To establish how the influence of combined project design on sustainability of dairy goat projects is moderated by the utilization of indigenous knowledge in Tharaka Nithi County..	1. **H_1** Utilization of indigenous knowledge has a significant influence on relationship between the combined project design factors and the sustainability of dairy goat projects in Tharaka Nithi County	• Pearson's correlation • Stepwise regression	
3: To examine the extent to which the influence of combined project design on sustainability of dairy goat projects is moderated by the project leadership in Tharaka Nithi County.	**2.H_1:** Project leadership has a significant influence on relationship between the combined project design factors and the sustainability of dairy goat projects in Tharaka Nithi County	• Pearson's correlation • Stepwise regression	

3.8 Operational Definition of Variables:

To enable measurement of variable, Table 3.6 provides an operational definition of variables.

Table 3.6. Operational Definition of Variables

Objective	Variables	Indicators	Measurement	Measuring Scale	Analysis
To establish the extent to which project design factors influence the sustainability of dairy goat projects in Tharaka Nithi County.	**Dependent variable;** sustainability of dairy goat projects	• Project level of resilience • Multiplier effect capability • Networked with support structures • Community ownership • Social, economic and environmental outcomes • Dairy goat breeding	Strength of relationship	Nominal	• Pearson's correlation (r) • Regression
To examine the extent to which beneficiary Selection influence the Sustainability of dairy goat projects in Tharaka Nithi County.	**Independent variable** Beneficiary Selection	• Selection tools and process • Beneficiary needs • Beneficiary composition	Strength of relationship	Ordinal	• Pearson's correlation (r) • Regression
To establish the extent to which community Capacity influence the sustainability of dairy goat projects in Tharaka Nithi County	Community Capacity	• Community human capital • Capacity to contribute resources • Capacity of social structures	Strength of relationship	Ordinal	• Pearson's correlation (r) • Regression
To establish the extent to which institutional linkage influence	Institutional linkage	• Health services institutions	Strength of relationship	Ordinal	• Pearson's correlation (r)

the sustainability of dairy goat projects in Tharaka Nithi County.		• Markets institutions • Social Institutions			• Regression
To establish the extent to which infrastructure influence the sustainability of dairy goat projects in Tharaka Nithi County.	Project Infrastructure	• Sheltering infrastructure • Tools and equipment's infrastructure • Transport and market infrastructure	Strength of relationship	Ordinal	• Pearson's correlation (r) • Regression
To establish how the influence of combined project design on sustainability of dairy goat projects is moderated by the community indigenous knowledge in Tharaka Nithi County	**Moderating variable;** Utilization of indigenous knowledge	• Utilization of knowledge on dairy goat medicine • Utilization of knowledge on dairy goat husbandry • Utilization of knowledge on product value addition	Strength of relationship	Ordinal	Stepwise regression
To examine the extent to which the influence of combined project design on sustainability of dairy goat projects is moderated by the community leadership in Tharaka Nithi County.	Project Leadership	• Transactional leadership • Servant leadership • Transformational leadership	Strength of relationship	Ordinal	Stepwise regression

3.9 Ethical Issues

The researcher was sensitive and conscious about ethical issues before, during and after this research. The researcher treated all the respondents and any parties involved in this research with respect and courtesy that uphold their dignity. Special recognition was done to the disadvantaged people who may be affected or will affect this study. The researcher also ensured that data collection procedure was reasonable, non-exploitative, carefully considered and fairly administered so that no unnecessary risk, harm or wrong is done to the respondents or other parties. This was enhanced by ensuring that the researcher did not in any way bribe or raise wrong expectations by the respondents or the community. This was done by carefully explaining to them the purpose of the research and the extent to which they can participate or benefit from it. Confidentially of information given was assured and that the respondents participated voluntarily with informed consent- that is, without threat or undue inducement.

CHAPTER FOUR
DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter presents the data analysis, findings of the study, and providing interpretation and discussion of the findings. The chapter presents the questionnaire return rate, project beneficiary selection process and sustainability of dairy goat projects, community capacity and sustainability of dairy goat projects, institutional linkages and sustainability of dairy goat projects, project infrastructure and sustainability of dairy goat projects, project design factors, utilization of indigenous knowledge and sustainability of dairy goat projects and Project design factors, project leadership and sustainability of dairy goat projects.

4.2 Questionnaire Return Rate

In the simplest sense, questionnaire return rate is the number of participants who completed a questionnaire divided by the total number of participants who were asked to participate. A study must have a good response rate in order to produce accurate, useful results. Failure to achieve an adequate response rate can limit the usefulness of the result. In this study, out of 196 targeted respondents, 188 returned the questionnaires. Fowler (2002) stated that there is no agreed-upon standard for a minimum acceptable response rate, but they all agree that return rate of over 80% is generally good. The response rate for this study was 95.9% of the target population hence the population was deemed adequate to make conclusions in this study.

4.3. Demographic Information and Respondents Profiles

Demographic information of the respondents was based on, gender, the position of the respondents in their respective groups, respondents age, the age of their respective groups and the duration the respondents had been keeping dairy goats. Data on the gender of the respondents is as shown in Table 4.1.

4.3.1. Distribution of Respondents by Gender

This section discusses the distribution of respondents by gender. The purpose of this was to establish the distribution of gender that took place in the study. Respondents were asked to indicate their gender and the responses recorded in Table 4.1.

Table 4.1. Distribution of Respondents by Gender

Gender	Frequency	Percentage
Male	107	56.9
Female	81	43.1
Total	**188**	**100**

Table 4.1 shows that 107(56.9%) of the respondents were male while 81(43.1%) were female. This implies that men are the one who is mostly involved in the issues of dairy goat keeping as opposed to the women. The findings of this study agrees with Koskey (2008) who stated that gender imbalance may be due to the fact that women normally shy away from issues to do with livestock rearing. However, this representation of both male and female was important for this study as it ensured that information was gathered from both genders.

4.3.2. Distribution of Respondents by Position in the Group

The respondents were also asked to indicate the position that they held in the group. The purpose of this was to establish the distribution of different categories of group leadership that took part in this study. The data is presented in Table 4.2.

Table 4.2. Distribution of Respondents by Position in the Group

Position in the group	Frequency	Percentage
Chairperson	23	12.2
Secretary	18	9.6
Treasurer	13	6.9
Vice chairperson	7	3.7
Vice secretary	5	2.7
Member	119	63.3
Coordinator	1	.5
Buck keeper	1	.5
Adviser	1	.5
Total	**188**	**100.0**

Table 4.2 shows that majority 119(63.3%) of the respondents were ordinary group members while the rest cumulatively 69(37.7%) being taken up by group officials. The data implies that there was an equal proportion of the officials and the members hence the members taking up a large share of the participation in the study. This finding supports the study findings by Munyua (1997), where he observes that farmers should be involved right from the beginning of a project as key players in identifying the problems, prescribing solutions and setting up the sequences and priority of activities aimed at solving their problems.

4.3.3. Distribution of Respondents by Age

The researcher further sought to establish the age of the respondents. This was done to establish the distribution of respondents who took part in the study by age and also to establish the age category that is most involved in dairy goat project. Respondents were therefore asked to indicate their age. Data on the age of the respondents is as shown in Table 4.3.

Table 4.3. Distribution of Respondents by Age

Age bracket	Frequency	Percentage
Below 30 years	2	1.1
30-39 years	27	14.4
40-49 years	79	42.0
50 years and above	80	42.6
Total	**188**	**100.0**

Table 4.3 shows that majority of the respondents 80(42.6%) were 50 years and above, 79(42%) were between 40-49 years, 27(14.4%) were between 30-39 years while only a small number of 2(1.1%) were below 30 years. This finding implies that the youth aged below 30 years did not actively participate in the dairy goat keeping and thus were not part of the project. An almost similar proportion of age brackets between 40 to 49 years and 50 years and above were engaged in active dairy goat keeping and were part of the project. Adoption of the dairy goat project is more pronounced with the mature and elderly farmers than the youth and young ones. This finding concurs with another study by Chenyambuga and Lekule (2014) who found that dairy goat projects are implemented by men and women who are mature and with a property like land against which the dairy goats can be kept and fed. However, both studies differ with Philemon and Maitho (2017) who found that age factor has been found to play a key role in terms of acceptability and application of sound management practices when handling dairy goat enterprise with the old being slow.

4.3.4. Distribution of Respondents by Duration in the Group

The study also sought to establish the duration of time that the respondents were in the group. Establishing the duration of the respondents was important to this study because experienced dairy goat farmers are likely to have more knowledge and experience in the project thus able to give credible information. The findings are presented in Table 4.4.

Table 4.4. Distribution of Respondents by Duration in the Group

Duration in the group	Frequency	Percentage
1 and below years	14	7.4
1-2 years	2	1.1
2-3 years	11	5.9
3-4 years	17	9.0
4-5 years	12	6.4
5 years and above	132	70.2
	188	**100**

From Table 4.4 majority 132(70.2%) of the respondents were in the self-help group for a duration 5 years and above, 17(9%) were between 3-4 years, 14(7.4%) indicated 1 year and below, 12(6.4%) indicated between 4-5 years, 11(5.9%) indicated between 2-3 years, while only 2(1.1%) indicated between 1- year and below. This finding implies that majority of the respondents had stayed in the groups for a long duration. This achievement provides dairy goat farmers who are beneficiaries of the dairy goat project an opportunity to gain the necessary knowledge and skills in relation to dairy goat husbandry and management. They were thus knowledgeable about the dairy goat project. This finding agrees with finding from a study by Mulwa (2008), who found that when farmers are involved in the activities for a long duration they tend to gain skills and thus develop a sense of ownership which is fundamental to the sustainability of community-based projects. Further, a study by Hussain and Sanders, (2012) found that projects beneficiaries need to have participated in the project for a long duration, need to remain sensitive to the history and culture of the community where the project is implemented for the project sustainability to be realized.

4.4.Test for Statistical Assumption and Analysis of Likert –Type Data

This section presents the test for statistical assumption and analysis of Likert type data. The analysis is provided in subsequent sections.

4.4.1.Test for Normality

The use of inferential parametric statistical processes necessitates that the rules of such tests of normality are put to test. This helps in graphical tests to be performed about the normality of the data to check for skewness and kurtosis coefficients. These tests help to confirm whether the data follows a normal distribution or not. If the normality is not achieved, the results may not depict the true picture relationship amongst the variable. In this study, normality was tested using Kolmogorov-Smirnov Test and the Shapiro-Wilk Test. The Shapiro-Wilk Test is more appropriate for small sample sizes (< 50 samples), but can also handle sample sizes as large as 2000. For this reason, this study used the Shapiro-Wilk test as our numerical means of assessing normality. If the Sig. value of the Shapiro-Wilk Test is greater than 0.05, (P-value test statistic) the data is normal. If it is below 0.05, the data significantly deviates from a normal distribution.

Table 4.5 Shapiro-Wilk Test of Normality

Variables	**Kolmogorov-Smirnov[a]**			**Shapiro-Wilk**		
	Statistic	**Df**	**Sig.**	**Statistic**	**df**	**Sig.**
Project beneficiary selection process	.364	188	.331	.656	188	.401
Community capacity	.309	188	.331	.742	188	.401
Institutional linkages	.329	188	.331	.703	188	.401
Project infrastructure	.289	188	.331	.730	188	.401
Utilization of indigenous knowledge	.285	188	.331	.678	188	.401
Project leadership	.316	188	.331	.632	188	.401
Sustainability of dairy goat project	.349	188	.331	.616	188	.401

a. Lilliefors Significance Correction

The findings in Table 4.5 depict that the significance values for the Shapiro-Wilk tests were 0.401 for the project beneficiary selection process, community capacity, institutional linkages, project infrastructure, utilization of indigenous knowledge, project leadership and sustainability of dairy goat project. For the Kolmogorov-Smirnov tests, the significance values were 0.331 for project beneficiary selection, community capacity, institutional linkages, project infrastructure, utilization of indigenous knowledge, project leadership and sustainability of dairy goat project. This implies that since the p-value is greater than the chosen alpha level of 0.05 then we fail to reject the hypothesis based on the fact that the data came from a normally distributed population. The results of the tests are therefore of a normally distributed population.

4.4.2.Test for Multi-collinearity and Singularity

When there is a perfect linear relationship among the predictors, the estimates for a regression model cannot be uniquely computed. The term collinearity implies that two variables are near perfect linear combinations of one another. When more than two variables are involved it is often called Multicollinearity, although the two terms are often used interchangeably. Multicollinearity is a test that evaluates whether the independent variables are highly correlated. The primary concern is that as the degree of Multicollinearity increases, the regression model estimates of the coefficients become unstable and the standard errors for the coefficients can get wildly inflated.

The variance inflation factor (VIF) was used to evaluate the level of correlation between variables and to estimate how much the variance of a coefficient was inflated because of linear dependence with other predictors. As a rule of thumb if any of the VIF are greater than 10 (greater than 5 when conservative) then there is a probability of a problem with Multicollinearity and is harmful to the study (Newbert, 2008). Tolerance, defined as 1/VIF, is used by many researchers to check on the degree of collinearity. A tolerance value lower than 0.1 is comparable to a VIF of 10. It means that the variable could be considered as a linear combination of other independent variables (Newbert, 2008). The results for tests of Multicollinearity were as presented in Table 4.6.

Table 4.6. Test for Multicollinearity

Coefficients[a]							
Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**	**Collinearity Statistics**	
	B	**Std. Error**	**Beta**			**Tolerance**	**VIF**
(Constant)	1.272	.350		3.636	.000		
Project Beneficiary selection	.198	.063	.188	3.126	.002	.780	1.281
Community capacity	.096	.066	.107	1.451	.148	.512	1.954
Institutional linkages	.325	.073	.349	4.481	.000	.463	2.162
Project infrastructure	.174	.070	.145	2.463	.014	.815	1.228
Utilization of indigineous knowledge	.123	.054	.161	2.272	.024	.558	1.793
Project leadership	.108	.051	.137	2.115	.035	.672	1.489

a. Dependent Variable: Sustainability of Dairy Goat Project

The results in Table 4.7 revealed that there was no problem of Multicollinearity. Tolerance levels for all the variables were greater than the recommended minimum of 0.1 (Cooper and Schindler, 2014). Similarly, variance inflation factors for the variables were all below 5 meaning that the variables were not highly correlated.

4.4.3.Test for Homoscedasticity and Heteroscedasticity

Heteroscedasticity occurs when the variance of the error terms differs across observations. Heteroscedasticity is useful to examine whether there is a difference in residual variance of the observation period to another period of observation (Godfrey, 1996). The study utilized Glejser test (1969) conducted by regression residual value of the independent variable. In the case, there is an assumption that if the Sig. value >0.05, then there is no problem of heteroscedasticity. The results for tests of Heteroscedasticity were as presented in Table 4.7

Table 4.72 Test for Heteroscedasticity

Coefficients[a]				
Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t Sig.**
	B	**Std. Error**	**Beta**	
(Constant)	1.125	.012		3.856.000
Project beneficiary selection	.198	.045	.186	0.156.269
Community capacity	.096	.056	.112	0.258.148
Institutional linkages	.256	.089	.349	0.481.86
Project infrastructure	.174	.070	.145	0.463.089
Utilization of indigineous knowledge	.125	.064	.151	0.256.059
Project leadership	.118	.068	.148	0.165.063

a. Dependent Variable: Sustainability of Dairy Goat Project

Based on the output coefficients, the obtained Sig. values are >0.05, thus there is no problem of Heteroscedasticity. Hence, there is no difference in residual variance of independent to dependent variables tested.

4.4.4 Analysis of Likert –Type Data

Self-administered questionnaires for this study had eight sections each with 10 items. Frauke et al. (2008) propose that ten objectively constructed items for each research variable in a Likert type scale are sufficient to measure the desired construct. Each section of the research questionnaire had five scales Likert-type of items. Researchers have assumed that Likert-type data have equidistant so that parametric methods of data analysis are used (Lantz, 2013). According to Carifio and Racco (2007), when using a five-point Likert scale, the following is the scoring; Strongly Agree (SA) 4.2<SA<5.0; Agree (A) 3.4<SA<4.2; Neutral (N) 2.6<N<3.4; Disagree (D) 1.8<D<2.6 and Strongly Disagree (SD) 1.0<SD<1.8. The scale gives equidistant of 0.8. This weighting criterion was followed in

data analysis of Likert-type of data in this study. The same scale was used successfully by (Nganga 2014), (Seboru et al 2016) and (Obare et al 2016).

4.5. Sustainability of Dairy Goat Projects

Sustainability of dairy goats was considered as the dependent variable in this study. As informed by the existing empirical literature and the related theories, the following indicators were considered to measure sustainability of dairy goat projects; the extent of project resilience, extent of project ownership by the beneficiary community, the extent of project multiplier effect, the extent of support by relevant institutions and level of project support to social, economic and environmental progression. Key informant interviews and focus group discussions data were analyzed and results triangulated with the results from self-administered questionnaires. To measure the sustainability of dairy goat projects, a self-administered questionnaire with ten (10) items based on the above indicators was subjected to the respondents who were dairy goat farmers. Respondents were then asked to indicate the extent to which dairy goat projects were sustainable based on each of the item. They were given ten items rated on a five-point Likert scale ranging from Strongly agree (SA), Agree (A), Neutral (N), Disagree (D) and Strongly disagree (SD) which they were to choose. The following scoring was also used: (SD: $1<SD<1.8$), (D: $1.8<D<2.6$), (N: $2.6<N<3.4$), (A: $3.4<A<4.2$) and (SA: $4.2<SA<5.0$). The mentioned scales give an equidistance of 0.8. Results are presented in Table 4.8

Table 4.8. Sustainability of Dairy Goat Projects

	Statement	SD	D	N	A	SA	Mean	SD
		F %	F %	F %	F %	F %		
9a	Dairy goat project has been effective and resilient since inception	0 (0.0)	12 (6.4)	11 (5.9)	110 (58.5)	55 (29.3)	4.11	.773
9b	Dairy goat project can continue without external financial support	2 (1.1)	5 (2.7)	12 (6.4)	147 (78.2)	22 (11.7)	3.97	.620
9c	The dairy goat project initial inputs has trickled down "pass on" to other beneficiaries	18 (9.6)	95 (50.5)	40 (21.3)	28 (14.9)	7 (3.7)	2.53	.983
9d	Dairy goat breeding technology has been adopted and practiced	11 (5.9)	84 (44.7)	50 (26.6)	34 (18.1)	9 (4.8)	2.71	.988
9e	Dairy goat project is widely accepted and owned by the community	0 (0.0)	11 (5.9)	24 (12.8)	110 (58.5)	43 (22.9)	3.98	.770
9f	Beneficiaries actively participate in project decision making	16 (8.5)	91 (48.4)	45 (23.9)	35 (18.6)	1 (0.5)	2.54	.909
9g	Relevant community institutions support the dairy goat project	27 (14.4)	93 (49.5)	40 (21.3)	23 (12.2)	5 (2.7)	2.39	.967
9h	Community leadership supports dairy goat project	1 (0.5)	15 (8.0)	13 (6.9)	68 (36.2)	91 (48.4)	4.24	.931
9i	Project beneficiaries social - economic status has improved due to the project	3 (1.6)	29 (15.4)	74 (39.4)	74 (39.4)	8 (4.3)	3.29	.837
9j	Dairy goat project has no negative environmental implication	2 (1.1)	74 (39.4)	84 (44.7)	24 (12.8)	4 (2.1)	2.76	.770
Composite mean and standard deviation							**3.25**	**0.85**

n = 188
Composite Mean = 3.25
Composite Standard deviation = 0.85
Alpha Coefficient = 0.645

As shown in Table 4.9, the overall composite means (M) for sustainability of dairy goats projects is 3.25 and the standard deviation SD = 0.85. The Cronbach Alpha Coefficient for the ten items that were used to measure the influence of community capacity on the sustainability of dairy goat project was 0.645. This level of reliability coefficient is an indicator that the item had a moderately internal consistency. The implication of this result is that at M = 3.25, STD = 0.85, respondents were neutral that the project was sustainable as explained by the level of project resilience, level of project multiplier effect, level of

project ownership by the community, level of project support by community structures and institutions and the level of project support to social, economic and environmental progression.

Results of the Focus Group Discussions (FGD) support this finding in that participants expressed a mixed reaction when asked if the dairy goat project has been sustainable and has impacted positively on their lives. Main gaps noted by FGD participants were: that the cost of maintaining the dairy goat project was too high, there were inadequate or inaccessible dairy goat markets, beneficiaries and the community did not have sufficient skills and knowledge on dairy goat husbandry and management. In addition, FGD participants pointed that the government has not been supportive in terms of financing, training and infrastructure development to improve the sustainability of dairy goat project. Asked where they get information about dairy goat management most, a participant said;

"Since the support from the government and project officials is minimal, we rely mainly on peer to peer learning and exchanges. The old dairy goat farmers coach and mentor the upcoming farmers"

Key informants indicated that the project is sustainable in some pockets of the county especially the high potential, greener and wet areas unlike in the drier part of the county. Key informants also agreed with the FGD results that support by the government and project officials is not adequate due to financial constraints and lack of prioritization of dairy goat sector by the government. A key informant noted that dairy goat sector is supported mainly by the non – governmental organizations (NGOs) with limited input from the County government in terms of financing but the government support in capacity building, disease surveillance and monitoring. This view supports the findings of a study conducted by Ngeiywa and Masake (2009). The study established that delivery of animal health services has been hampered by several challenges including lack of resources by government, low incentives for setting up private practices and that dairy goat farming was not a prime priority target by the government. Likewise, this study agrees with Ahuya and

Okeyo (2004) in their study that inadequate veterinary services led to premature deaths and fewer dairy goats reared by farmers.

Majority 110 (58.5%) of the respondents with a Mean score (M) = 4.11 and a standard deviation (SD) = 0.773 agreed with the item 9a that dairy goat project has been effective and resilient since its inception. This finding is supported by other findings in the study. For instance, 132(70.2%) of the respondents indicated that they have kept dairy goats for more than five years. However, on the contrary, FGD results indicated that majority of those keeping dairy goats currently was not the initial target group. This means that the project did not address the needs of the poor of the poorest as targeted as said by FGD participant;

"The dairy goat project was meant to improve the livelihoods of the poor of the poorest but currently the most successful dairy goat farmers are the rich who have hijacked the project"

Item 9b sought to establish the extent to which dairy goat project can continue without external financial support. Majority 147(78.2%) agreed with the statement. Further analysis shows a mean score (M) = 3.97 and a standard deviation (STD) = 0.620 indicating that dairy goat project can continue without external financial and technical support. This result differs from the FGD result as the participants indicated that they would require financial and technical support from donors and the government for the project to continue successfully. Government officials interviewed indicated that without donor funding, the project may not be sustainable since the government financial allocation to dairy goat production sector is insufficient and cannot adequately support the projects.

Item 9c sought to establish the extent to which the dairy goat project initial inputs have trickled down "pass on" to other beneficiaries. Results indicate that majority 95(50.5%) disagreed while 40(21.3%) were neutral with this statement. The mean score for this item was 2.53 and the standard deviation was 0.983. This result implies that majority of the respondents disagreed that dairy goat project initial inputs had trickled down to beneficiaries. Key informants interviewed indicated that the initial objective of the project to "pass on "dairy goat offspring to new donkey owners was affected by poor leadership

of the facilitating groups. Focus group discussions (FGDs) indicated that the "pass on model" had a challenge because farmers preferred Does (female) than Bucks (male). Those who received the bucks just sold them off cheaply or slaughtered them for household consumption thus curtailing the objective of spreading the ownership of dairy goats. This finding concurs with a study by Koskey (2008) that dairy goat keeper's capacity to attain the projected "pass on" was low resulting to fewer multiplication levels limiting the impact of the multiplication programmes. A respondent from the focus group discussion (FGD) said that;

"The unfortunate thing with the pass on model is that the next offspring is given to the already predetermined member. If the offspring is a buck, the member gets disappointed; some opt to leave the group"

This finding confirms earlier finding by Kosgey (2012) that dairy goat beneficiaries were provided with a female dairy goat (Doe) and in return gave out the first two offspring to the next listed beneficiaries regardless of being a Doe or a Buck. Item 9d sought to establish the extent to which dairy goat breeding technology has been adopted and practiced. Results indicate that majority 84(44.7%) disagreed while 50(26.6%) were neutral to this statement. Further analysis indicates that the mean score (M) = 2.71 while standard deviation (SD) = 0.988 indicating that respondents were neutral that dairy goat breeding technology has been adopted and practiced. Other findings from focus group discussions (FGDs) indicates that other than peer to peer learning and exchanges among dairy goat farmers, there was limited information on dairy goat technology from the government and other stakeholders.

Item 9e sought to establish the extent to which dairy goat project is widely accepted and owned by the community. Results indicate that 110 (58.5%) agree while 43 (22.9%) strongly agree with this statement. The mean score (M) = 3.98 with a standard deviation of 0.770 indicating that respondents agreed that dairy goat project is widely accepted and owned by the community. Further, Item 9f sought to establish the extent of beneficiaries actively participate in project decision making. The result indicates that 91(48.4%) of the respondents disagreed while 45 (23.9%) were neutral to this statement. Further results

indicate that the mean score (M) = 2.54 and the standard deviation (SD) = 0.909 indicating that respondents were neutral.

Item 9g sought to establish the extent to which the relevant community institutions support the dairy goat project. Results indicate that 93(49.5%) of the respondents disagreed with the statement while 40(21.3%) were neutral. The item had a mean score (M) = 2.39 and the standard deviation (SD) = 0.967 indicating that the respondents disagreed that there exist supporting community institutions to support dairy goat projects. Focus group discussion (FGD) participants confirmed that dairy goat health services were inadequate and inaccessible. Further, livestock markets were unfavorable to dairy goats and their products. Item 9h sought to establish the extent to which community leadership supports dairy goat project. Results indicate that the mean score (M) = 4.24 with a standard deviation (SD) 0.931. This result shows that respondents strongly agreed that community leaders supported the dairy goat project. Focus group discussions support this finding, however, noted that location chiefs and sub-chiefs only gave goodwill to the project did not have an active role in the dairy goat project.

Item 9i sought to establish the extent to which project beneficiaries social - economic status has improved due to the project. Results indicate that 74(39.4%) were neutral to the statement while equal number 74(39.4%) agreed with the same statement. Further analysis indicates that the mean score for this statement M = 3.29 and a standard deviation SD = 0.837 indicating that respondents were neutral that project beneficiaries social - economic status has improved due to the project. Item 9j sought to establish the extent to which dairy goat project has impacted on the environment. The result indicated that majority 74(39.4%) of the respondents disagreed with this statement while 84(44.7%) were neutral to the statement. The mean score for this item was (M) = 2.76 and a standard deviation (SD) = 0.770 meaning that respondents disagreed that dairy goat project impacted negatively to the environment.

4.6. Project Design Factors and Sustainability of Dairy Goat Projects

This study sought to establish the influence of project design factors (independent variable) on the sustainability of dairy goat projects (dependent variable). The constructs under the project design factors for this study were the project beneficiary selection process, community capacity, institutional linkages, and project infrastructure. In this section, the influence of each of these four variables on the sustainability of dairy goat projects was measured. In addition to this, the combined influence of the project beneficiary selection process, community capacity, institutional linkages, and project infrastructure on the sustainability of dairy goat projects was also examined.

4.6.1. Project Beneficiary Selection Process and the Sustainability of Dairy Goat's Projects

In this section, descriptive and inferential statistics on the influence of project beneficiary selection process and sustainability of dairy goat's project were analyzed and presented. Key informant interviews and focus group discussions data was analyzed and results triangulated with the results from self - administered questionnaires. To measure the influence of project beneficiary selection process and sustainability of dairy goat's project, the following indicators were examined; project beneficiary selection tools, project beneficiary needs analysis and project beneficiary composition. Ten (10) items were developed in the self-administered questionnaire and respondents were then requested to indicate the extent to which they agree with the statements. They were given ten items rated on a five-point Likert scale ranging from Strongly agree (SA), Agree (A), Neutral (N), Disagree (D) and Strongly disagree (SD) which they were to choose. The following scoring was also used: (SD: 1<SD<1.8), (D: 1.8<D<2.6), (N: 2.6<N<3.4), (A: 3.4<A<4.2) and (SA: 4.2<SA<5.0). The mentioned scales give an equidistance of 0.8. Results are presented in Table 4.9

Table 4.9: Project Beneficiary Selection Process and the Sustainability of Dairy Goat's Projects

Statement		SD	D	N	A	SA	Mean	SD
		F %	F %	F %	F %	F %		
10a	Project beneficiaries selection was fair and transparent	3 (1.6)	7 (3.7)	23 (12.2)	116 (61.7)	20.7 (39.0)	3.96	.790
10b	Project beneficiaries are involved in selection process	2 (1.1)	10 (5.3)	28 (14.9)	126 (67.0)	22 (11.7)	3.83	.741
10c	Beneficiary selection tools are clear and well understood	4 (2.1)	9 (4.8)	86 (45.7)	79 (42.0)	10 (5.3)	3.44	.761
10d	Project beneficiaries are involved in need analysis	3 (1.6)	13 (6.9)	26 (13.8)	129 (68.6)	17 (9.0)	3.77	.773
10e	Project addressed priority needs	4 (2.1)	24 (12.8)	68 (36.2)	78 (41.5)	14 (7.4)	3.39	.880
10f	Beneficiary needs are reviewed periodically	4 (2.1)	37 (19.7)	38 (20.2)	91 (48.4)	18 (9.6)	3.44	.982
10g	Project beneficiaries composition is gender inclusive	3 (1.6)	42 (22.3)	62 (33.0)	70 (37.2)	11 (5.9)	3.23	.918
10h	Project beneficiaries integrates people with special needs	8 (4.3)	71 (37.8)	38 (20.2)	63 (33.5)	8 (4.3)	2.96	1.028
10i	Project beneficiary selection is sensitive to social economic class	9 (4.8)	77 (41.0)	32 (17.0)	57 (30.3)	13 (6.9)	2.94	1.088
10j	Project beneficiary composition is age sensitive	19 (10.1)	37 (19.7)	74 (39.4)	55 (29.3)	3 (1.6)	2.93	.978
Composite mean and standard deviation							**3.36**	**0.89**

n = 188

Composite mean = 3.36

Composite standard deviation = 0.89

Cronbach Alpha Reliability Coefficient = 0.865

As shown in Table 4.10, the overall composite means and the standard deviation was (M = 3.36, SD = 0.89). The Cronbach Alpha Coefficient for the ten items that were used to measure the influence of community capacity on the sustainability of dairy goat project was 0.865. This level of reliability coefficient is an indicator that the item had a very strong internal consistency.

In item 10a, respondents were required to indicate the extent to which project beneficiary selection was fair and transparent. Majority 116 (61.7%) agreed, 20.7(39.0) strongly agreed, while 23(12.2) were neutral with this item. The item had (M = 3.96, SD = 0.79). The mean score was above the composite mean M = 3.36 indicating that the item has an influence on the sustainability of dairy goat projects.

FGD participants were in agreement that the selection criteria were transparent, free and fair. For instance, one group indicated that the project gave them enough goats for the fifteen group members. Another group said that the first lot to received goats was supposed to pass on the off-springs to those who did not get and this was done successfully. However, there were challenges when the offspring to be passed on was male as the female offspring were most preferred. A respondent from FGD discussions said;

"Everyone prefers to get a female goat because they can get young ones and also get milk for household consumption and also for the market; but with the male goat, not much to get other than selling at the market or slaughtering for meat"

Respondents were required to indicate if the project beneficiaries were involved in the project beneficiary selection process. Majority 126 (67.0) agreed, 22(11.7) strongly agreed, 28 (14.9) were neutral to this item. Item 10 b had (M = 3.83, SD = 0.741). This implies that the majority agreed with this statement. The mean for this item was above the composite mean (M = 3.36) implying that the involvement of project beneficiary in selection process influenced sustainability. Key informants and focus group discussions (FGDs) confirmed that the project targeted the poor of the poorest beneficiaries regardless of their age, gender and religion but agreed that the extent of involvement in the selection process was not adequate. This was because most of the decisions on selection criteria and methodology

was already predetermined before they were involved. Asked if they were involved in the decision to select the poor of the poorest, FGD respondent said that;

"We don't know why the project officials decided to select the poor of the poorest and the criteria and methodology was not decided by the community, however, the community was trained on the selection process"

Asked if they were happy with the beneficiary selection criteria, FGD participants said that targeting the poor of the poorest was demeaning to the target beneficiaries; a fact that made some of the farmers shy away from the project despite the fact that they qualified due to their low social economic status. This finding agrees with Booher and Innes (2002) that seeking the opinion and views of the project beneficiaries can greatly make easy the planning and design processes and bring understanding among beneficiaries. Further, Sanders and Binder (2010), Muriithi and Crawford (2003) also observed that the use of appropriate beneficiary engagement tools and technics is key to project success.

In the item, 10c respondents were required to indicate the extent to which the project beneficiary selection tools were clear and well understood by the beneficiaries. Majority 89(45.3) agreed, 86 (45.7) were neutral while 13(6.9) disagreed with this item. The item had (M = 3.44, SD = 0.761). The implication of this is that majority agreed that beneficiary selection tools were clear and understood. The mean for the item is more than the composite mean of 3.36 indicating that clarity of tools and methods has an influence on the sustainability of projects. This study finding concurs with Crawford (2003) that tools and technics employed in project design are key to the success of any project.

Item 10d shows that majority of the respondents 146 (77.6) agreed, 26(13.8) were neutral while 16(8.5) disagreed that project beneficiaries were involved in beneficiary need analysis. The mean and standard deviation was (M = 3.77, SD = 0.773). The mean is higher than the composite mean implying that involvement of project beneficiaries in the need analysis influences the sustainability of dairy goat projects. This finding agrees with earlier findings by Swanepoel and de Beer (2006) that needs identification exercise should be a

participatory process because it is the beneficiaries who must identify their needs before they organize themselves to do something about their situation.

In item 10e, respondents were required to indicate if the project addressed the beneficiary's priority needs. Results indicate that a majority 92(48.9 agreed, 28(14.9) disagreed while 24(12.8) were neutral to this statement. The mean score and standard deviation was (M = 3.39, SD = 0.880). Compared to the composite mean, it shows that the item had some influence on the sustainability of dairy projects since the items mean is slightly higher than the composite mean. Focus group discussion was not conclusive on whether the project addressed their priority needs as some were happy while others expressed their reservations. Key informants interviewed noted that the project addressed the needs of individual farmers especially those who were active in the project and applied the right dairy goat husbandry practices. The importance of beneficiary needs in sustainability supports Matiwane and Terblanché (2012) that projects are motivated by a specific need that must be clearly outlined as a prerequisite to proper project designing.

Item 10f established the extent to which the project beneficiary needs were reviewed periodically. Majority 109(58%) agreed, 41 (21.8% disagreed while 38(20.2) were neutral to this statement. This result differs with that from FGDs who said that that beneficiary needs were discussed and agreed at the initial stages of the project and was not reviewed at all. The mean score and standard deviation was (M = 3.44, SD = 0.982). The mean score for this item was higher than the composite mean indicating that reviewing beneficiary needs periodically has an influence on the sustainability of dairy goat projects.

On gender composition, item 10g sought to establish whether the project beneficiary selection was gender sensitive. Majority of respondents 81(43.1%) agreed, 62(33% were neutral while 45(23.9%) disagreed with this item. The mean score and standard deviation for this item was (M = 3.23, SD = 0.918). This implies that the composite mean is higher than the mean for this item indicating a less influence of gender on the project sustainability. This finding differs with a study by Nicola, Chanamuto, and Stephen (2015)

that, livestock projects that have not integrated a gender perspective, have their efficiency affected.

Item 10h established the extent to which dairy goat project beneficiaries integrated people with special needs in its composition. Results indicated that majority of the respondents 79 (42.1%) disagreed, 71(37.8%) agreed while 38(20.2%) were neutral that the project took into consideration people with special needs in their design. The mean and standard deviation for item 10h was (M = 2.96, SD = 1.028. This mean is lower than the composite mean indicating a lesser influence of the item. Key informant interviews indicated that the project did not have special group focus since the main criteria were on the economic capability of the beneficiaries. Focus group discussions said that both male and female were selected on the basis of their participation but not on gender equity criteria. Swanepoel and de Beer (2006) points out that different groups of people may be concerned about different needs or that may have different perceptions about the same needs and in this case grouping becomes necessary.

Item 10i sought to establish the extent to which the dairy goat project beneficiary selection is sensitive to beneficiaries' social economic class. Results indicate that the majority 79(42.1) disagree, 71(37.8) agree while 38(20.8) were neutral to this statement. The mean score and standard deviation were (M = 2.96, SD =1.028). With a composite mean of 3.36, the result for this item implies that social economic class did not influence. Focus group discussions results show that even though the project targeted the poor of the poorest, well to do farmers hijacked the project; and as a result, the well-off people in the community were successful in keeping dairy goat but not the poor as targeted. Brokers and middlemen also interfered with the process in the sense that the poor farmers could not access dairy goats due to high prices and the high cost of maintenance.

Item 10j sought to establish whether the project beneficiary selection process was sensitive to the age of beneficiaries. Results indicate that a majority 74(39.4%) were neutral to this item. The mean score for this item was 2.93 and a standard deviation of 0.978. This result

implies that majority of the respondents were neutral that project beneficiary selection process was sensitive to the age of beneficiaries. Key informant interviews indicate that no specific age bracket was targeted in the selection of the beneficiaries. This finding was supported by the result from FGD where all the participants agreed that the question of who to be involved in terms of their age and gender did not arise.

4.6.2. Relationship Between Project Beneficiary Selection Process and Sustainability of Dairy Goat Projects

Correlational analysis using Pearson's product moment technique was done to determine the relationship between project beneficiary selection process and sustainability of the dairy goat's projects. Results of the correlation are presented in Table 4.10.

Table 4.10: Correlation Between Project Beneficiary Selection Process and the Sustainability of Dairy Goat Projects

		Project beneficiary selection process	Sustainability of dairy goat projects
Project beneficiary selection process	Pearson Correlation		.683
	Sig. (2-tailed)		.005
	n	188	188
Sustainability of dairy goat projects	Pearson Correlation	.683	1
	Sig. (2-tailed)	.005	
	n	188	

Results from the Table 4.10 reveal that there is a significant positive relationship between project beneficiary selection process and sustainability of dairy goat projects ($r = 0.683$, $P = 0.005$). This implies that there is a very strong association between project beneficiary selection process and sustainability of dairy goat projects which is significant.

4.6.3 Simple Linear Regression Analysis

After establishing the correlation between project beneficiary selection process and the sustainability of dairy goat projects, the researcher sought to analyze the contribution of

project beneficiary selection process in the sustainability of dairy goat projects. Regression analysis was further carried out to establish the extent to which project beneficiary selection process significantly influences the sustainability of dairy goat projects in line with objective one.

The following hypothesis was formulated and tested:

Hypothesis One.

Hypothesis H_0 There is no significant relationship between project beneficiary selection process and the sustainability of dairy goat projects in Tharaka Nithi County.

The regression model used to test the null hypothesis was as follows:

Sustainability of dairy goat projects = f (Project beneficiary selection process)

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Data was analyzed and the regression results for the influence of the project beneficiary selection process on the sustainability of dairy goat projects is presented in Table 4.11.

Table 4.11: Simple Linear Regression Results for Influence of the Project Beneficiary Selection Process and the Sustainability of Dairy Goat Projects.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change	df1	df2	Sig. F Change
1	.224[a]	.050	.045	.41153	.050	9.850	1	186	.002

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.668	1	1.668	9.850	.002[b]
	Residual	31.501	186	.169		
	Total	33.169	187			

Coefficients'

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.719	.172		15.779	.000	2.379	3.059
	Project beneficiary selection process	.157	.050	.224	3.138	.002	.058	.256

Dependent Variable: Sustainability of dairy goat projects
Predictors: (Constant), Project beneficiary selection process

F (1,186) = 9.850, t=3.138, at level of significance p=0.002<0.05, r= 0.224 and R square=0.050

Results in Table 4.11 shows that r = 0.224, implying a positive slope between the independent variable (Project beneficiary selection process) and the dependent variable (Sustainability of dairy goat projects). The R- Squared was 0.50, meaning that 50% of the variation in the sustainability of dairy goat projects was explained by variation in the project beneficiary selection process. The other factors explained 50%. The ANOVA results indicated that the model was statistically significant. The results indicate that the p-value = 0.002≤0.05, t=3.138, p=0.002<0.05, r= 0.224 and R squared = 0.050. Overall F statistics was F (1,186) = 9.850. Hence based on these findings we reject the null hypothesis that there is no significant relationship between project beneficiary selection process and the sustainability of dairy goat projects. Since p-value of 0.002 is less than 0.05 we,

therefore, accept the alternative hypothesis at the $\alpha=0.05$ level of significance that there is a significant relationship between project beneficiary selection process and Sustainability of dairy goat projects. Further, by substituting the mathematical model, the implication is presented below:

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

can then be substituted as follows; $Y= 2.719+ 0.224\ X_1$

The beta value implies that for a one-unit increase in the project beneficiary selection process, sustainability of dairy goat project increases by 0.224. This, therefore, confirms that project beneficiary selection process had a significant influence on the sustainability of dairy goat project.

The objective of this study was to investigate the extent to which project beneficiary selection process influence the sustainability of dairy goat projects in Kenya. Based on this objective, the null hypothesis that there is no significant relationship between project beneficiary selection process and the sustainability of dairy goat projects in Tharaka Nithi County was rejected and concluded that that there is a significant relationship between project beneficiary selection process and Sustainability of dairy goat projects in Tharaka Nithi. This finding confirms that the predictor indicators; project beneficiary selection tools, project beneficiary needs analysis and project beneficiary composition are important in designing dairy goat projects and enhances the sustainability of such projects.

The finding that project beneficiary selection tools are important in project sustainability is agrees with findings by Sanders and Binder (2010), Muriithi and Crawford (2003) who observed that the use of appropriate beneficiary engagement tools and technics is key to project success. Further this study finding concur with Matiwane and Terblanché (2012) that projects are motivated by a specific need that must be clearly outlined as a prerequisite to proper project designing. Similarly, this study supports Barasa and Jelagat (2013) who points out that community participation in need analysis is important as the needs are collectively conceived and prioritized paving the way for the process of addressing them.

Findings that project beneficiary composition is significant in the sustainability of dairy goat's projects supports the findings by Swanepoel and de Beer (2006) that different groups of people may be concerned about different needs or that may have different perceptions about the same needs and in this case grouping becomes necessary. This means that dairy goat projects should take into consideration the composition of the project beneficiaries. Further, this finding agrees with the findings by Nicola, Chanamuto and Stephen (2015) that livestock projects did not integrate a gender perspective, which has, in turn, affected their efficiency.

4.7. Community Capacity and Sustainability of Dairy Goat Projects

In this section, descriptive and inferential statistics on the influence of community capacity and sustainability of dairy goat's project were analyzed and presented. Key informant interviews and focus group discussions data were analyzed and results triangulated with the results from self-administered questionnaires. To measure the influence of the community capacity, the following indicators were measured; human capital capacity, capacity to contribute resources and the capacity of community social structures. Ten (10) items were developed in the self-administered questionnaires and respondents were then requested to indicate the extent to which they agree with the statements. They were given ten items rated on a five-point Likert scale ranging from Strongly agree (SA), Agree (A), Neutral (N), Disagree (D) and Strongly disagree (SD) which they were to choose. The following scoring was also used: (SD: 1<SD<1.8), (D: 1.8<D<2.6), (N: 2.6<N<3.4), (A: 3.4<A<4.2) and (SA: 4.2<SA<5.0). The mentioned scales give an equidistance of 0.8. Results are presented in Table 4.12.

Table 4.12: Community Capacity and Sustainability of Dairy Goat Projects

	Statements	SD	D	N	A	SA	Mean	SD
		F	F	F	F	F		
11a	Dairy goat farmers are commitment to participate in dairy goat project	1 (0.5)	10 (5.3)	42 (22.3)	117 (62.2)	18 (9.6)	3.75	.721
11b	Dairy goat farmers have the right skill for dairy goat management	2 (1.1)	39 (20.7)	76 (40.4)	64 (34.0)	7 (3.7)	3.19	.842
11c	Dairy goat farmers have attained good level of academic education	4 (2.1)	35 (18.6)	79 (42.0)	60 (31.9)	10 (5.3)	3.20	.877
11d	Dairy goat farmers have the capacity to train others farmers	2 (1.1)	23 (12.2)	34 (18.1)	106 (56.4)	23 (12.2)	3.66	.883
11e	Dairy goat farmers are committed to make financial contribution	0 (0.0)	15 (8.0)	44 (23.4)	110 (58.5)	19 (10.1)	3.71	.756
11f	Dairy goat farmers have the capacity to make contribution in kind	0 (0.0)	28 (14.9)	98 (52.1)	56 (29.8)	6 (3.2)	3.21	.729
11g	Dairy goat project have the capacity to sustained project without external resource support	28 (14.9)	92 (48.9)	51 (27.1)	14 (7.4)	3 (1.6)	2.32	.874
11h	There are strong dairy goat farmer groups to support dairy goat project	13 (6.9)	34 (18.1)	57 (30.3)	76 (40.4)	8 (4.3)	3.17	1.004
11i	Dairy goat farmer groups have good knowledge on group dynamics	50 (26.6)	84 (44.7)	34 (18.1)	15 (8.0)	5 (2.7)	2.15	.993
11j	Dairy goat farmer groups are well networked with each other for peer support	6 (3.2)	30 (16.0)	94 (50.0)	52 (27.7)	6 (3.2)	3.12	.825
Composite mean and standard deviation							**3.15**	**0.85**
n = 188 Composite mean = 3.15 Composite standard deviation = 0.85 Cronbach Alpha Reliability Coefficient = 0.626								

As shown in Table 4.12, the overall composite means (M) for community capacity was 3.15 and the overall composite standard deviation (SD) was 0.85. The Cronbach Alpha Coefficient for the ten items that were used to measure the influence of community capacity

on the sustainability of dairy goat project was 0.626. This level of reliability coefficient is an indicator that the item had a moderate-strong internal consistency.

In item 11a, respondents were required to indicate if dairy goat farmers are commitment to participate in dairy goat project. Results indicate that the majority 135(71.8%) agreed, 42(22.3%) were neutral and 11(5.8%) disagreed that dairy goat farmers were committed to participating in the dairy goat project. The mean score and standard deviation for this item was (M = 3.75, SD = 0.721). This result implies that the level of dairy goat farmer's commitment to the project influenced the sustainability of dairy goat project since the mean score is higher than the composite mean.

11b sought to find out if dairy goat farmers had the right skills for dairy goat keeping. Results show that the majority of the respondents were neutral to this statement at 76(40.4) respondents. 71(37.7%) agreed while 41(21%) disagreed with this item. The mean score and standard deviation for this item was (M = 3.19, SD = 0.842). This implies that this item did not influence sustainability since the composite mean is over the mean for this item. Key informants were for the opinion that most of the farmers did not follow the training that was given to them; for instance, some of the farmers fail to trim the hooves of the dairy goats, some did not practice zero-grazing method as advised but resorted to free-ranging or tethering instead.

Results from key informants indicate that dairy goat project is capital intensive compared to keeping the local goats. It also requires special skills, knowledge, and technics ranging from breeding, husbandry, management, healthcare, and infrastructure maintenance. Focus group discussions revealed that dairy goat project design incorporated a capacity building component for dairy goat beneficiaries. However, key informant interviews noted that this technology was new to the community, many targeted dairy goat farmers took too long to adopt it and others dropped in the process. Asked if the community has the required capacity to sustain dairy goat project, a respondent from the focus group discussion noted that:

"Peer to peer learning and exchange was employed as a faster and sustainable method of information transfer but unfortunately only a few remaining initial farmers who were trained by the project officials have the necessary capacity; new farmers do not have"

This finding is in agreement with that of Akintoye and Adidu (2008) that capacity building for project beneficiaries help to develop the capabilities that are useful in propelling project success and sustainability. Respondents were required to indicate in line with 11c whether dairy goat farmers have attained a good level of academic education to understand extension information. Results show that majority 79(42%) were neutral, 70(37.2%) agreed while 39(20.7%) disagreed with this statement. The mean score and standard deviation was M = 3.20, SD = 0.877). The mean for this item is lower than the composite mean thus did not influence sustainability. Key informants interview shows that dairy goat farmers capacity to manage dairy goat is a pre-requisite to success and sustainability of the project. This finding confirms previous findings by Lubungu, Chapoto, and Tembo (2012) that level of education is very critical in enabling farmers to use market information and take advantage of the market opportunities in livestock development.

In item 11d, respondent's respondent to the statement that dairy goat farmers have the capacity to train others farmers on dairy goat management. The result shows that majority 140(74.5%) agreed with this statement while 25(13.3%) disagreed and 23(12.2%) were neutral to this item. Other results show that the mean and standard deviation for this item at (M = 3.66, SD = 0.883). The composite mean for community capacity was 3.15. This implies that item 11d was important as it is above the composite mean and thus has influence sustainability. Project officials interviewed indicated that the County government provides limited extension and training services to dairy goat farmers which is need driven. This means that dairy goat farmers have to rely on peer to peer learning and exchanges and taking advantage of the few farmers who had been trained earlier. A similar finding from focus group discussion indicated that majority of new dairy goat farmers have not received formal training but rely on peer to peer training and exchanges. This finding conforms with

Michèle and Colverson (2014) finding that livestock producers require appropriate information and technology so that they are able to sustain an improved production.

Item 11e sought to find out if dairy goat farmers are committed to making a financial contribution to dairy goat project. Results show that majority 129(68.6%) agreed with this item while 44(23.4%) were neutral. A small percentage 15(8%) disagreed that farmers are making a financial contribution to the project. The mean score and standard deviation for item 11e indicates that (M = 3.71, SD = 0.756). Comparing this mean with the composite mean of M = 3.15, it can be concluded that financial contribution by project beneficiaries had an influence on the sustainability of dairy goat projects.

Item 11f sought to establish the extent to which dairy goat farmers have the capacity to make a contribution in kind to dairy goat project. Results indicate that a majority 98(52.1%) were neutral, 62(33%) agreed and 28(14.9%) disagreed with this item. The mean score for this item was; (M = 3.21, SD = 0.729) implying that dairy goat farmer's capacity to make a contribution in kind to dairy goat project is important in dairy goat project sustainability. The current study affirms previous findings by Thwala (2010) that even when an element of 'participation' is built into projects, it is often largely in terms of local investment of labor in kind. Item 11g sought to establish whether the dairy goat project has the capacity to sustained project without external resource support. Majority 120(63.8%) disagreed with this statement while 51(27.1%) were neutral and 17(9%) agreed with item 11g. The mean score and standard deviation was; (M = 2.32, SD = 0.874). This result implies that the capacity to sustain dairy goat project without external support did not influence sustainability as the means were below the composite mean.

Item 11h sought to find out whether there are strong dairy goat farmers groups to support the implementation of the dairy goat project. On this, 84(47.7%) agreed that there are strong groups, 57(30.3%) were neutral while 47(25%) disagreed that there are strong groups. The mean score and standard deviation of this item were; (M = 3.17, SD = 1.004) meaning that this item slightly influences the sustainability of dairy goat projects. Asked if

the self-help groups running this project had the required capacity necessary for the sustainability of the dairy goat project, FGD participant respondents that:

"Some of the groups are doing very well while others are not due to poor leadership and lack of training on group leadership".

Item 11i sought to establish if dairy goat farmer groups have good knowledge of group dynamics and group development. Majority 84(44.7%) disagreed while 84(44.7) strongly disagreed with this item. The mean score for this item was 2.15 with a standard deviation of 0.993. This result implies that majority of the respondents disagreed that dairy goat farmer groups have good knowledge of group dynamics. Results from key informants show that many of the groups that were started during project initiation have collapsed or are doing badly. This was attributed to poor leadership and unfounded member's expectation at the onset of the project. Focus group discussion confirmed this finding indicating that initially, group members expected a lot from the donor, and they were very active at the phase of initiation but after funding went down, over half of the groups collapsed.

This finding agrees with Mulwa (2004) that the majority of self-help groups found in rural areas do not have the required capacity to manage their affairs making them vulnerable to manipulation by the rural elites. Results from focus group discussion indicated that due to challenges of communication and transport infrastructure, the interaction between groups has not been successful. Further, groups lack coordination for this interaction to take place. Key informants indicated that groups were required to form a support cluster of five self-help groups within the same locality, but due to poor leadership and lack of appropriate coordination, this arrangement was not successful.

4.7.1. Relationship Between Community Capacity and Sustainability of Dairy Goat Projects

Correlational analysis using Pearson's product moment technique was done to determine the relationship between community capacity and sustainability of the dairy goat's projects. Correlation results are presented in Table 4.13.

Table 4.13: Correlation Between Community Capacity and the Sustainability of Dairy Goat Projects

		Community capacity	sustainability of dairy goat projects
Community capacity	Pearson Correlation	1	.585
	Sig. (2-tailed)		.004
	n	188	188
sustainability of dairy goat projects	Pearson Correlation	.585	1
	Sig. (2-tailed)	.004	
	n	188	188

Results from Table 4.13 reveal that there is a significant positive relationship between community capacity and sustainability of dairy goat projects (r =0.585, P = 0.005). This implies that there is a very strong association between community capacity and sustainability of dairy goat projects which is significant.

Simple Linear Regression Analysis

After establishing the correlation between community capacity and sustainability of dairy goat projects, the researcher sought to analyze the contribution of community capacity in the sustainability of dairy goat projects. Community capacity is explained by human capital capacity, the capacity to contribute resources and the capacity of community social structures. Regression analysis was further carried out to establish the extent to which community capacity significantly influences the sustainability of dairy goat projects in line with objective two.

The following hypothesis was formulated and tested:

Hypothesis Two.

Hypothesis $H_{0:}$ There is no significant relationship between community capacity and sustainability of dairy goat projects in Tharaka Nithi County.

The regression model used to test the null hypothesis was as follows:

Sustainability of dairy goat projects = f (Community capacity)

$$Y = \beta_0 + \beta_2 X_2 + \varepsilon$$

Data was analyzed and regression results for influence of community capacity on the sustainability of dairy goat projects is presented in Table 4.14.

Table 4.14: Simple Linear Regression Results for the Influence of Community Capacity on Sustainability of Dairy Goat Projects.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.096[a]	.009	.004	.42035	.009	1.718	1	186	.192

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.304	1	.304	1.718	.192[b]
	Residual	32.866	186	.177		
	Total	33.169	187			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.913	.260		11.193	.000	2.400	3.427
	Community capacity	.108	.082	.096	1.311	.192	-.054	.270

a. Dependent Variable: Sustainability of dairy goat projects
b. Predictors: (Constant), Community capacity

The results in Table 4.14 shows that r = 0.096, implying a weak positive correlation between the independent variable (Community capacity) and the dependent variable (Sustainability of dairy goat projects). The R- Squared was 0.09, meaning that 9% of the variation in the sustainability of dairy goat projects was explained by variation in the

community capacity. The other factors explained 91%. The ANOVA results indicated that the model was statistically significant at (F (1,186) = 1.718).

The results indicate that the p-value = 0.192≤0.05, t=1.311, p=0.192>0.05, r= 0.096 and R square = 0.09. Overall F statistics was F (1,186) = 1.718. Hence based on these findings we accept the null hypothesis that there is no significant relationship between community capacity and sustainability of dairy goat projects and reject the alternative hypothesis at the α=0.05 level of significance that there is a significant relationship between community capacity and the Sustainability of dairy goat projects.

$Y = \beta_0 + \beta_2 X_2 + \varepsilon$

can then be substituted as follows; $Y= 2.913+ 0.096X_2$

The beta value implies that for a one-unit increase in community capacity, sustainability of dairy goat project increases by 0.096. This, therefore, confirms that community capacity has a significant influence on the sustainability of dairy goat project. The objective of this study was to investigate the extent to which community capacity influence sustainability of dairy goat projects in Tharaka Nithi County. The null hypothesis was accepted that there is no significant relationship between community capacity and sustainability of dairy goat projects in Tharaka Nithi County. This finding confirms that the predictor indicators; human capital capacity, capacity to contribute resources and the capacity of community social structures are not significant in the sustainability of dairy goat projects.

Finding from studies conducted earlier have differed with the findings of this current study. A study by Adidu (2008) found that capacity building help to develop the capabilities that are useful in propelling project success and sustainability. Ndoro, Mudhara and Chimonyo, (2016) found that participation in livestock extension programs depends on the capacity of the livestock farmers. Another study by Khwaja (2004) found that projects where beneficiaries made either cash or in-kind contribution registered high level of success than those without. Likewise, Dongier et al. (2003) points out that community cash contributions help reduce dependency on external support, promote community confidence

and ownership, ensure community priority needs are addressed and that genuine beneficiary are targeted.

4.8. Institutional Linkages and Sustainability of Dairy Goat Projects

In this section, descriptive and inferential statistics on the influence of institutional linkages and sustainability of dairy goat projects were analyzed and presented. Key informant interviews and focus group discussions data were analyzed and result triangulated with the results from self-administered questionnaires. To measure the influence of the institutional linkages on the sustainability of dairy goat projects, the following indicators were examined; linkage to health services, linkage to markets and social institutions linkages Ten (10) items were developed in the self-administered questionnaires and respondents were then requested to indicate the extent to which they agree with the statements. They were given ten items rated on a five-point Likert scale ranging from Strongly agree (SA), Agree (A), Neutral (N), Disagree (D) and Strongly disagree (SD) which they were to choose. The following scoring was also used: (SD: 1<SD<1.8), (D: 1.8<D<2.6), (N: 2.6<N<3.4), (A: 3.4<A<4.2) and (SA: 4.2<SA<5.0). The mentioned scales give an equidistance of 0.8. Results are presented in Table 4.15

Table 4.15: Institutional Linkages and Sustainability of Dairy Goat Projects

	Statements	SD	D	N	A	SA	Mean	SD
		F	F	F	F	F		
12a	Dairy goat health services are readily available	20 (10.6)	108 (57.4)	30 (16.0)	26 (13.8)	4 (2.1)	2.39	.928
12b	Dairy goat health services are of acceptable quality	17 (9.0)	83 (44.1)	51 (27.1)	31 (16.5)	6 (3.2)	2.61	.973
12c	Dairy goat veterinary services are affordable	16 (8.5)	110 (58.5)	42 (22.3)	16 (8.5)	4 (2.1)	2.37	.840
12d	Dairy goat farmers have ready access to dairy goat markets.	18 (9.6)	114 (60.6)	38 (20.2)	16 (8.5)	2 (1.1)	2.31	.801
12e	Dairy goat farmers have access to the right market information	9 (4.8)	80 (42.6)	57 (30.3)	39 (20.7)	3 (1.6)	2.72	.902
12f	Dairy goat market facilities are favorable to dairy goats needs	24 (12.8)	94 (50.0)	60 (31.9)	9 (4.8)	1 (.5)	2.30	.773
12g	Dairy goat farmers are well linked to the government departments for market support	12 (6.4)	107 (56.9)	59 (31.4)	10 (5.3)	0 (0.0)	2.36	.683
12h	Dairy goat farmer groups are linked to community leaders for support	26 (13.8)	118 (62.8)	34 (18.1)	9 (4.8)	1 (0.5)	2.15	.733
12i	Dairy goat self-help groups are well linked and support each other	11 (5.9)	107 (56.9)	65 (34.6)	5 (2.7)	0 (0.0)	2.34	.630
11j	Dairy goat farmers are well linked to social enterprises to promote dairy goats	35 (18.6)	93 (49.5)	47 (25.0)	13 (6.9)	0 (0.0)	2.20	.822
Composite mean and standard deviation							2.34	0.80

n = 188
Composite mean =2.34
Composite standard deviation = 0.80
Cronbach Alpha Reliability Coefficient = 0.82

As shown in Table 4.15, the overall composite means (M) for Institutional Linkages was 2.34 and the overall composite standard deviation (SD) was 0.80. The Cronbach Alpha Coefficient for the ten items that were used to measure the influence of the institutional

linkages on the sustainability of dairy goat project was 0.82. This level of reliability coefficient is an indicator that the item had a strong internal consistency.

Item 12a sought to establish the extent to which dairy goat health services are readily available. Majority 128(68%) disagreed that health services are readily available, 30(16%) were neutral while 30(16%) agreed with this statement. The mean score and standard deviation was: (M = 2.39, SD = 0.928). The composite mean of M = 2.34, SD 0.80, the implication of this result is that the availability of health services has an influence on the sustainability of dairy goat projects. FGDs majority participants were in agreement that health services are available but the cost is high with low emergency response rate. This finding agrees with a study conducted in Narok in Kenya by Onono, Wieland, and Rushton (2015) that the average distance covered while seeking services from the drug stockiest and government veterinarians was 10.93 and 12.56 km, respectively.

Findings from the focus group discussions (FGDs) indicated an inadequate and high cost of veterinary services, slower emergency response rate and the existence of quacks in service provision as the major obstacles to sustainability. Key informants agree with this finding that there were few qualified health practitioners mainly para-vet professionals (animal health assistants) who mainly have agro-vet stores and rarely do they do the actual treatment. FGDs confirmed that there are many quack service providers who neither have the right skills and knowledge nor do they have the right drugs. Key informant's interviews indicated that veterinary services have been privatized where the practice is done by the private vets and para-vets while the government's role is that of supervision, disease surveillance, control, and management. The current study is of similar findings with a study by Ahuya and Okeyo (2004) that inadequate veterinary services led to premature deaths and fewer dairy goats reared by farmers.

Item 12b sought to assess the level at which the dairy goat health services was of the acceptable quality. Majority of the respondents 100(53.1%) disagreed, 51(27.2%) were neutral while 37(19.7%) agreed with this item. The mean score for this item was; (M = 2.61, SD = 0.973). This result infers that item 12b is important is dairy goat sustainability. The composite mean is lower than the mean for this item. Focus group discussions sighted

the presence of unqualified health service providers who charge them cheaper but sometimes their treatment was not successful. Key informant's interviews supported this finding indicating that the number of qualified service providers is limited compared to the demand and expansive area meaning that local animal health service providers (LAHPs) had to travel long distances on rough terrains to offer the services.

Focus group discussions revealed that due to this challenge, they resorted to purchasing drugs from Agro-Vet stores to administer themselves; a situation that compromised on the health of their dairy goats. This finding agrees with that of Onono, Wieland, and Rushton (2015) that most livestock farmers obtained veterinary services from drug stockiest (87.76 %), while only 12.24 % were seeking services from qualified service providers and from the government.

In item 12c, respondents were required to indicate the if dairy goat health services were affordable by the farmers. Majority 126(67%) disagreed, 42(22.4%) were neutral while 20(10.6%) agreed with this item. The mean score for this item was; (M = 2.37, SD = 0.840). With a mean score above the composite mean, the implication is that affordability of dairy goat health services is important in the sustainability of dairy goat projects. Key informant interviews indicated that due to the privatization of veterinary service provision, the cost of veterinary services is determined by the market forces. Further, livestock farmers need to create proper linkages and working relationship with the private service providers. The current study agrees with Ngeywa and Masake (2009) that delivery of animal health services has been hampered by several challenges including lack of resources by government and the low incentives for setting up private practices.

Respondents were required to indicate the level at which dairy goat farmers are able to access to market institutions. Results indicate that a majority 132((70.2) disagreed, 38(20.2%) were neutral while 18(9.6%) agreed with this item. The mean score for item 12d was; (M = 2.31, SD = 0.801). This result implies that the item has no influence since the mean is less than the composite mean. Results from the focus group discussion indicate that there is no specific market for dairy goats and their products. For example, all the milk

is sold locally for domestic use. Asked if there is a proper market for dairy live goats, respondent indicated that;

"It is not easy to properly sell dairy goats at the usual livestock market. Goat merchants prefer Galla goats and local goats. Dairy goat marketing is arranged by the dairy goat association but the problem is that you have to be a member of the association to benefit. The other challenge is that for one to be a member, he or she must be a member of a self-help group and the group must also be a member of a cluster that comprises of five self-help groups. As a result, farmers resort to selling their goats locally fetching noncompetitive prices and taking longer to get a buyer"

In the item, 12e respondents were required to indicate if dairy goat farmers have access to the right market information. Results show that majority 89(47.4%) disagreed, 57(30.3%) were neutral and 42(22.3% agreed with the statement that dairy goat farmers have the access to the right market information. The mean score and standard deviation for this item were; M = 2.72, SD = 0.902 meaning that dairy goat farmers access to right market information influenced the sustainability of dairy goat's project.

Key informants revealed that dairy goat marketing arrangement is controlled by the Tharaka Nithi dairy goat breeders association (TDGBA) with limited autonomy for sale by the individual dairy goat farmers. Focus group discussions support this finding that sale of dairy goat must be done through the association who in addition charge them Kshs 2000 per every dairy goat sold. A study by Lubungu, Chapoto, and Tembo (2012) found that the level of education is very critical in enabling families to use market information and take advantage of the market opportunities. This finding is supported by the current study. Item 12f sought to establish the extent to which dairy goat market facilities are favorable to dairy goat's needs. Majority 118(62.8%) disagreed, 60(31.9%) were neutral while 10(5.3%) agreed with this item. The mean score and standard deviation for this item was; (M = 2.30, SD = 0.773). Key informant interviews were for the opinion that just like dairy cows, marketing for dairy goats should be done in a more organized manner.

Item 12g sought to establish if dairy goat farmers are well linked to the government departments for market support. Majority 119(63.3%) disagreed, 59(31.4%) were neutral while 10(5.3%) agreed with this statement. The mean score and standard deviation for this item was; (M = 2.36, SD = 0.683). This result means that since the composite mean is less than the items mean, the extent of linkage of dairy goat farmers to the government and market support is important. On market arrangement, focus group discussion (FGD) participants agreed that marketing of dairy goats and their products has been the major problem facing dairy goat farmers. This was found to be emanating from both the project design gaps and practice of the farmers. A respondent noted that:

"Dairy goat breeder's association have centralized marketing of dairy goats such that all the marketing must be done through the organization. More so, they are the ones who look for markets, negotiate for prices and organize for transportation of the dairy goats to the destination markets. This arrangement has not helped farmers as the officials lack the capacity to generate an adequate market for the goats"

Item 12h sought to find out the extent to which dairy goat farmer groups are linked to community leaders for support. Majority 118(62.8%) disagreed with this item. The mean score for this item was 2.15 with a standard deviation of 0.733. This result implies that majority of the respondents disagreed that dairy goat farmer groups are linked to community leaders for support. Item 12i sought to establish the extent to which dairy goat self-help groups are well linked and support each other. Majority of the respondents118(62.8%) disagreed, 65(34.6%) were neutral while 5(2.7) agreed. The mean and standard deviation was; (M = 2.34, SD = 0.630). The mean and composite mean was at the same level meaning that the influence was neutral

Correlational analysis using Pearson's Product Moment technique was done to determine the relationship between Institutional Linkages to dairy goat projects and sustainability of the dairy goat's projects. Correlation results are presented in Table 4.16.

Table 4.16: Correlation Between Institutional Linkages and the Sustainability of Dairy Goat Projects

		Institutional Linkages	sustainability of dairy goat projects
Institutional Linkages	Pearson Correlation	1	.625
	Sig. (2-tailed)		.000
	n	188	188
Sustainability of dairy goat projects	Pearson Correlation	.625	1
	Sig. (2-tailed)	.000	
	n	188	188

Results from Table 4.16 shows that there is a significant positive relationship between institutional linkages and sustainability of dairy goat projects (r = 0.000). This implies that there is a very strong association between institutional linkages and sustainability of dairy goat projects which is significant.

Simple Linear Regression Analysis

After establishing the correlation between institutional linkages and the sustainability of dairy goat projects, the researcher sought to analyze the contribution of institutional linkages in the sustainability of dairy goat projects. Regression analysis was further carried out to establish the extent to which institutional linkages significantly influences the sustainability of dairy goat projects in line with objective Three.

The following hypothesis was formulated and tested:

Hypothesis Three.

Hypothesis $H_{0:}$ There is no significant relationship between institutional linkages and sustainability of dairy goat projects in Tharaka Nithi County.

The regression model used to test the null hypothesis was as follows:

Sustainability of dairy goat projects = f (Institutional linkages)

$$Y = \beta_0 + \beta_3 X_3 + \varepsilon$$

Where:

Y: Sustainability of dairy goat projects

X_3: Institutional linkages

β_0: Constant term

β_3: Beta coefficients

ε: Error term

Data was analyzed and the regression results for the influence of institutional linkages on sustainability of dairy goat projects is presented in Table 4.17.

Table 4.17: Simple Linear Regression Results for the Influence of Institutional Linkages on the Sustainability of Dairy Goat Projects.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.179[a]	.032	.027	.41548	.032	6.146	1	186	.014

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.061	1	1.061	6.146	.014[b]
	Residual	32.108	186	.173		
	Total	33.169	187			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.896	.147		19.735	.000	2.607	3.186
	Institutional linkages	.150	.060	.179	2.479	.014	.031	.269

Dependent Variable: Sustainability of dairy goat's projects

Independent Variable: Institutional Linkages

F (1.186) = 6.146, t = 2.479 at level of significance p=0.014<0.05, r= 0.179, R2 = 0.0320

The results in Table 4.17 shows that r = 0.179, implying a positive slope between the independent variable (Institutional linkages) and the dependent variable (Sustainability of dairy goat projects). The R- Squared was 0.032 meaning that 32% of the variation in the sustainability of dairy goat projects was explained by variation in the institutional linkages. The other factors explained 68%. The ANOVA results indicated that the model was statistically significant at F (1.186) = 6.146

The results indicate that the p-value = $0.014 \leq 0.05$, t=2.479, r = 0.179 and R squared = 0.032. Overall F statistics was F (1,186) = 6.146, this shows that there exists a positive correlation and the slope of the population regression line is not zero. Since p-value of 0.014 is less than 0.05 the null hypothesis was rejected and concluded that there is a significant relationship between institutional linkages and the sustainability of dairy goat projects.

Using the statistical findings, the regression model

$Y = \beta_0 + \beta_3 X_3 + \varepsilon$

can then be substituted as follows; $Y = 2.896 + 0.179 X_3$

The beta value implies that for a one-unit increase in institutional linkages, sustainability of dairy goat project increases by 0.179. This, therefore, confirms that institutional linkage has a significant influence on the sustainability of dairy goat projects. The objective of this study was to investigate the extent to which institutional linkages influence the sustainability of dairy goat projects in Tharaka Nithi County. The null hypothesis was rejected and the alternative hypothesis that there is a significant relationship between institutional linkages and sustainability of dairy goat projects in Tharaka Nithi accepted. This finding confirms that the predictor indicators; linkage to health services, linkage to markets and social institutions linkages are important in dairy goat project sustainability.

The findings of the current study concur with a study done by DFID (2004) that found out that appropriate institutions and stakeholders that are committed to honoring dairy goat development activities need to be established prior to any intervention activity for continuity and flow. Likewise, the current study agrees with Ahuja (2000) that key actors

play a crucial role in linking projects and providing channels for knowledge sharing. Finding of this study agrees with earlier studies like Villanueva et al (2016), Pali et al (2013) that functional social networks provide the necessary conduits for social learning to livestock producers, a situation that fastens adoption of technology. On market linkages, Peacock and Hastings (2011) that efforts by farmers to promote livestock production are affected by inaccessibility to crucial markets and Alemayu (2011) that dairy goat markets are dispersed with remote markets lacking price information.

4.9. Project Infrastructure and the Sustainability of Dairy Goat Projects

In this section, descriptive and inferential statistics on the influence of project infrastructure and sustainability of dairy goat projects were analyzed and presented. To measure the influence of the project infrastructure on the sustainability of dairy goat projects, the following indicators were examined; housing infrastructure, breeding infrastructure, transport and markets infrastructure. Key informant interviews and focus group discussions data were analyzed and result triangulated with the results from self-administered questionnaires. Ten (10) items were developed in the self-administered questionnaires and respondents were then requested to indicate the extent to which they agree with the statements. They were given ten items rated on a five-point Likert scale ranging from Strongly agree (SA), Agree (A), Neutral (N), Disagree (D) and Strongly disagree (SD) which they were to choose. The following scoring was also used: (SD: $1<SD<1.8$), (D: $1.8<D<2.6$), (N: $2.6<N<3.4$), (A: $3.4<A<4.2$) and (SA: $4.2<SA<5.0$). The mentioned scales give an equidistance of 0.8. Results are presented in Table 4.18

Table 4.18: Project Infrastructure and the Sustainability of Dairy Goat Project

	Statements	SD	D	N	A	SA	Mean	SD
		F	F	F	F	F		
13a	Dairy goat farmers have the skills to construct dairy goat houses/shelters	4 (2.1)	40 (21.3)	16 (8.5)	113 (60.1)	15 (8.0)	3.51	.984
13b	Material for dairy goat housing is readily available	3 (1.6)	42 (22.3)	47 (25.0)	88 (46.8)	8 (4.3)	3.30	.917
13c	Dairy goat house/shelter maintenance is affordable	17 (9.0)	93 (49.5)	60 (31.9)	14 (7.4)	3 (1.6)	2.48	1.077
13d	Dairy goat breeding facilities are appropriate	24 (12.8)	118 (62.8)	31 (16.5)	13 (6.9)	2 (1.1)	2.21	.791
13e	Dairy goat breeding facilities are within reach of the community	6 (3.2)	72 (38.3)	74 (39.4)	32 (17.0)	4 (2.1)	2.77	.846
13f	Dairy goat breeding tools and equipment's are readily available	15 (8.0)	112 (59.6)	48 (25.5)	12 (6.4)	1 (.5)	2.32	.734
13g	Transport infrastructure is favorable for dairy goat transportation	13 (6.9)	100 (53.2)	68 (36.2)	7 (3.7)	0 (0.0)	2.37	.669
13h	Means for transportation of dairy goats is sufficiently available	11 (5.9)	99 (52.7)	61 (32.4)	17 (9.0)	0 (0.0)	2.45	.740
13i	Dairy goats farmers are happy with market arrangement	8 (4.3)	92 (48.9)	35 (18.6)	51 (27.1)	2 (1.1)	2.72	.948
13j	Dairy goat markets have suitable infrastructures	15 (8.0)	116 (61.7)	50 (26.6)	5 (2.7)	2 (1.1)	2.27	.691
Composite mean and standard deviation							**2.64**	**0.84**

n = 188
Composite mean =2.64
Composite standard deviation =0.84
Cronbach Alpha Reliability Coefficient =0.79

Table 4.18 shows that the overall composite means (M) for project infrastructure was 2.64 and the overall composite standard deviation (STD) was 0.84. The Cronbach Alpha Coefficient for the ten items that were used to measure the influence of the project infrastructure on the sustainability of dairy goat project was 0.79. This level of reliability coefficient is an indicator that the item had a strong internal consistency.

In item 13a, respondents were required to indicate the extent to which dairy goat farmers are able to construct appropriate dairy goat houses. Majority of the respondents 128(68.1%) agreed, 44(23.4%) were disagreed while 16(8.5%) were neutral. The mean score for the item was; (M = 3.51, SD = 0.984). This result implies that dairy goat farmer's knowledge and skills to construct shelters and proper housing is important in sustainability of dairy goat projects. Key informants noted a gap in the design of the project in that the initial dairy goat shelter design was too standardized without considering the capacity of the farmers to maintain the same. All participants in the focus group discussions agreed that the use of locally available material, that are simple and less expensive design would have been a better approach.

Item 13b sought to establish the extent to which material for dairy goat housing is readily available. Results show that majority 96(51.1%) agreed with this item while 47(25%) were neutral with a closer percentage of 45(23.9%) disagreeing with this statement. The mean score and standard deviation was; (M = 3.30, SD = 0.917). With an overall composite mean of 2.64, item 13b had a mean over and above the composite mean indicating that availability of dairy goat housing material is important in promoting sustainability. Key informant indicated that houses material especially timber and wood related material is becoming scarce thus a challenge in dairy goat housing. A participant in the focus group discussion said that:

"I used to have a very good, strong house for my goats, but now I am not able to maintain the house to the required standards due to the cost involved, lack of material. Again I have to pay someone to build it for me since I don't have the skills"

FGDs agreed with this result that initially, material for construction of the shelters was not a problem but currently the availability of timber is not adequate. As a result, some farmers are forced to use the substandard shelter and or do without any shelter just like the local goat's do

In item 13c, respondents were required to state the extent to which dairy goat house and shelter maintenance are affordable. Majority 110(58.5%) disagreed, 60(31.9%) were neutral while 17(9%) agreed with this statement. The mean score for this item was; (M = 2.48, SD = 1.077). This result implies that affordability of goat shelters was lesser important in sustainability of dairy goat project. Focus group discussions, participants were in agreement that there are adequate skills within the community to construct dairy goat houses but they also confirmed that the shelter is very expensive to construct and maintain.

In item 13e, respondents were required to indicate the extent to which dairy goat breeding facilities are within reach of the community. Results indicate that majority 78(41.5%) disagreed, 74(39.4%) were neutral while 36(19.1%) agreed that dairy goat breeding facilities are accessible by the community. The mean score for this item was (M = 2.77, SD = 0.846). This implies that breeding facilities in dairy goat project is important and need to be addressed for sustainability of dairy goat projects. Key informants said that there are shared breeding stations where the pure breed male (buck) is kept and farmers are expected to access the station for breeding purposes and support in the maintenance of the buck and the breeding facility. However, they noted that the stations are not adequate to serve the many farmers. Focus group discussions said that the stations are located far away from their residence thus a challenge in transporting the female (doe) to the station. In addition, the bucks are getting old since replacing the pure breed is expensive and not easily done. Others in FGDs said that there is laxity in participatory maintenance of the breeding facility as some farmers bring their female foe breeding but fail to bring feed and water for the goats as expected.

Item 13f sought to establish the extent to which the dairy goat breeding tools and equipment are readily available. Results indicate that 127(67.6%) disagreed, 48(25.5%) were neutral while only 13(6.9%) agreed with this statement. The mean score for this item was; (M =

2.32, SD = 0.7343. This result implies that dairy goat may not require specialized tools and equipment's from what is used in the other livestock thus not an important aspect in sustainability of dairy goat's project. FGDs revealed that milking equipment was not different from what they use in cows and other local goats. They were all in agreement that no special skills are required in this aspect. This current study finding differs with the finding of another study by Zewdie and Welday (2015) who found that dairy goat project requires specialized equipment's that requires skills to operate. FGDs also indicated that milk production level of the dairy goats in Tharaka Nithi is noncommercial or small-scale commercial mainly within the villages and thus would not require sophisticated tools and equipment's as used in commercial production

Item 13g sought to establish whether the transport infrastructure is favorable for dairy goat transportation. Results indicate that majority 113(60.1%) disagreed, 68(36.2%) were neutral and only 7(3.7%) agreed with this statement. The mean score for this items was; (M = 2.37, SD = 0.669). Result implies that transport infrastructure was not important in dairy goats. The current study differs with Zewdie and Welday (2015) that lack of infrastructure leads to goats generally being walked for long distances to markets without adequate feed and water.

Item 13h sought to establish if the means for transportation for dairy goats is sufficiently available. Results indicated that 100 (52.7%) disagreed while 68(36.2%) were neutral to this item. The mean score was; (M = 2.45, SD = 0.7402). The implication of this result is that availability of transport infrastructure was not key in this project. Focus group discussion indicate that there is a challenge with the transportation of dairy goats. However, key informants disagree with this finding indicating that there is some level of established marketing strategy where the Tharaka Nithi dairy goat breeders association leaders outsource markets from other counties and the goats are transported to the destination in a more organized manner.

Item 13i sought to establish if dairy goat's farmers are happy with the market arrangement. Results indicated that majority 100(53.2%) disagreed, 53(28.2%) agreed and 35(18.6%) were neutral to that dairy goat famers were happy with the dairy goat marketing

arrangement. The mean score and standard deviation for this item was; (M = 2.72, SD = 0.948). This implies that markets and the market arrangements for dairy goat is important in the sustainability of dairy goats. Key informant interview indicated that markets in Tharaka are widespread covering long distances that dairy goats find it difficult to travel. FGD respondents noted that selling dairy goats within the same markets is not easy because traders are not interested in buying these goats and others will mock the sellers. Infrastructure for dairy goat is also not available at the market as the market is for general livestock without addressing specific needs for the dairy goats.

4.9.1. Relationship Between Project Infrastructure and the Sustainability of Dairy Goat Projects

Correlational analysis using Pearson's Product Moment technique was done to determine the relationship between project infrastructure and sustainability of the dairy goat's projects. Correlation results are presented in Table 419.

Table 4.19: Correlational Analysis on Project Infrastructure and the Sustainability of Dairy Goat Projects

		Project infrastructure	sustainability of dairy goat projects
Project infrastructure	Pearson Correlation	1	.708
	Sig. (2-tailed)		.001
	n	188	188
sustainability of dairy goat projects	Pearson Correlation	.708	1
	Sig. (2-tailed)	.001	
	n	188	188

The findings indicated a significant positive relationship between project infrastructure and sustainability of dairy goat projects (r =.708, P-value < 0.001) thus, depicting that project infrastructure has a significant positive relationship to the sustainability of dairy goat projects.

Simple Linear Regression Analysis

After establishing the correlation between project infrastructure and sustainability of dairy goat projects, the researcher sought to analyze the contribution of project infrastructure to the sustainability of dairy goat projects. Regression analysis was carried out to establish the extent to which project infrastructure significantly influences the sustainability of dairy goat projects in line with objective four.

The following hypothesis was formulated and tested:

Hypothesis four.

Hypothesis $H_{0:}$: There is no significant relationship between project infrastructure and sustainability of dairy goat projects in Tharaka Nithi County.

The regression model used to test the null hypothesis was as follows:

Sustainability of dairy goat projects = f (Project infrastructure)

$$Y = \beta_0 + \beta_4 X_4 + \varepsilon$$

Data was analyzed and the regression results for the influence of project infrastructure on sustainability of dairy goat projects is presented in Table 4.20

Table 4.20: Inferential Analysis on Project Infrastructure and the Sustainability of Dairy Goat Projects

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change	df1	df2	Sig. F Change
1	.322[a]	.104	.099	.39983	.104	21.482	1	186	.000

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	3.434	1	3.434	21.482	.000[b]
	Residual	29.735	186	.160		
	Total	33.169	187			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.356	.196		12.051	.000	1.970	2.742
	Project infrastructure	.340	.073	.322	4.635	.000	.195	.484

a. Dependent Variable: Sustainability of dairy goat projects
b. Predictors: (Constant), Project infrastructure

The results in Table 4.20 shows that r = 0.322 implying a positive slope between the independent variable (Project infrastructure) and the dependent variable (Sustainability of dairy goat projects). R- Squared was 0.104 meaning that 10.4% of the variation in the sustainability of dairy goat projects was explained by variation in the project infrastructure. The other factors explained 89.6%. ANOVA results indicated that the model was statistically significant at (F (1.186) = 21.482).

The results indicate that the p-value = 0.000≤0.05, t=4.635, r = .322 and r square=0.104. Overall F statistics was (F (1,186) = 21.482) this shows that there exists a positive correlation and the slope of the population regression line is not zero. Hence based on these findings we reject the null hypothesis that there is no significant relationship between project infrastructure and the sustainability of dairy goat projects. Since p-value of 0.000 is less than 0.05 we accept the alternative hypothesis at the α=0.05 level of significance

that there is a significant relationship between project infrastructure and the sustainability of dairy goat projects.

Using the statistical findings, the regression model

$Y = \beta_0 + \beta_4 X_4 + \varepsilon$

can then be substituted as follows; $Y = 2.356 + 0.322\ X4$

The beta value implies that for a one-unit increase in project infrastructure, the sustainability of dairy goat project increases by 0.322. This, therefore, confirms that project infrastructure has a significant influence on the sustainability of dairy goat project.

Other studies are supported by the findings of this study. Tewari (1983), Majumder (2004) studied the relationship between development and infrastructure and found a significant relationship. The findings of the study also agree with the findings of Zewdie and Welday (2015) who stated that dairy goat project requires specialized equipment's that requires skill too to operate. A good understanding of the requirements for the adapted goat genetic is a prerequisite for designing a successful breeding program. This consideration is important and assembling all the necessary equipment's, tools, structures like proper housing, and other support infrastructures like roads is key to the sustainability of dairy goat projects.

4.10. Multiple Analysis of the Project Design Factors and the Sustainability of Dairy Goat Projects

Correlational analysis using Pearson's Product Moment technique was done to determine the relationship between combined project design factors and sustainability of the dairy goat's projects. Correlation results are presented in Table 4.21.

Table 4.21: Correlational Analysis of Combined Project Design Factors and Sustainability of Dairy Goat Projects

		Project beneficiary	Community Capacity	Institutional Linkages	Project Infrastructure	Sustainability of dairy goat projects
Project beneficiary	Pearson Correlation	1				
	Sig. (2-tailed)					
	n	188				
Community Capacity	Pearson Correlation	.526	1			
	Sig. (2-tailed)	.000				
	n	188	188			
Institutional Linkage	Pearson Correlation	.578	.586	1		
	Sig. (2-tailed)	.000	.005			
	n	188	188	188		
Project Infrastructure	Pearson Correlation	.567	.536	.580	1	
	Sig. (2-tailed)	.000	.000	.000		
	n	188	188	188	188	
Sustainability of dairy goat projects	Pearson Correlation	.564	563	.591	.526	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	n	188	188	188	188	188

The results in Table 4.21 shows that there is a significant positive relationship between project beneficiary selection process and sustainability of dairy goat projects (r = 0.000). This implies that there is a very strong association between project beneficiary selection process and the sustainability of dairy goat projects which is significant. The findings also reveal that there is a significant positive relationship between community capacity and sustainability of dairy goat projects (r = .563, p-value < 0.05), thus implying that community capacity has a positive and significant relationship with the sustainability of dairy goat projects.

On institutional linkages, the findings indicated a significant positive relationship between institutional linkage and sustainability of dairy goat projects ($r = .591$, p-value < 0.01) thus, depicting that institutional linkages have a significant positive relationship to the sustainability of dairy goat projects. The findings also show a significant positive relationship between project infrastructure and sustainability of dairy goat projects ($r = .526$, p-value < 0.01) thus, depicting that project infrastructure has a significant positive relationship to the sustainability of dairy goat projects.

The following hypothesis was formulated and tested:

Hypothesis Five.

Hypothesis H_0 The combined project design factors has no significant influence on the sustainability of dairy goat projects in Tharaka Nithi County.

The hypothesis was tested using the following linear regression model

Sustainability of dairy goat projects = f(Project beneficiary selection process, Community capacity, Institutional linkages, Project infrastructure)

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where

- Y: Sustainability of dairy goat projects
- X_1: Project beneficiary selection process
- $X_{2:}$ Community Capacity
- $X_{3:}$ Institutional Linkage
- $X_{4:}$ Project Infrastructure
- $\beta_{0:}$ Constant term
- $\beta_1, \beta_2, \beta_3, \beta_4$ Beta coefficients
- ε Error term

Data was analyzed and the regression results for the influence of project design factors on the sustainability of dairy goat projects is presented in Table 4.22.

Table 4.22: Multiple Regression Results of Project Design Factors and Sustainability of Dairy Goat Project

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.389[a]	.152	.133	.39214	.152	8.176	4	183	.000

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	5.029	4	1.257	8.176	.000[b]
	Residual	28.140	183	.154		
	Total	33.169	187			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.870	.307		6.082	.000	1.263	2.476
	Project beneficiary selection process	.133	.050	.190	2.665	.008	.035	.231
	Community capacity	-.031	.083	-.027	-.374	.709	-.194	.132
	Institutional Linkages	.119	.060	.142	1.960	.051	-.001	.238
	Project infrastructure	.283	.074	.268	3.811	.000	.137	.430

a. Dependent Variable: Sustainability of dairy goat projects

b. Predictors: (Constant), Project Infrastructure, Community capacity, Project beneficiary selection process, Institutional Linkages

The results in Table 4.23 shows that r = 0.389 implying a positive slope between the independent variables (Project infrastructure, Community capacity, Project beneficiary selection process, Institutional Linkages) and the dependent variable (Sustainability of dairy goat projects). The R- Squared was 0.152 meaning that 15.2% of the variation in the sustainability of dairy goat projects was explained by variation in the project infrastructure, community capacity, project beneficiary selection process, and institutional linkages. The

other factors explained 84.8%. The ANOVA results indicated that the model was statistically significant at (F (1,183) = 8.176).

The results indicate that the p-value = 0.000≤0.05, r =.389 and r square=0.133. Overall F statistics was (F (1,183) = 8.176) this shows that there exists a positive correlation and the slope of the population regression line is not zero. Hence based on these findings we reject the null hypothesis that the combined project design factors have no significant influence on the sustainability of dairy goat projects in Tharaka Nithi County and accept the alternative hypothesis that the combined project design factors have a significant influence on the sustainability of dairy goat projects in Tharaka Nithi County

Using the statistical findings, the regression model

$Y = \beta 0 + \beta 1\ X1 + \beta 2\ X2 + \beta 3\ X3 + \beta 4\ X4 + \varepsilon$

can then be substituted as follows;

$Y = 1.870 + 0.133\ X1 + 0.031\ X2 + 0.119\ X3 + 0.283\ X3 + \varepsilon$

The beta value implies that for a one-unit increase in the project beneficiary selection process, the sustainability of dairy goat project increases by 0.133. A one-unit increase in community capacity, the sustainability of dairy goat project increases by 0.031. A one-unit increase in institution linkage, the sustainability of dairy goat project increases by 0.119 and one-unit increase in project infrastructure, the sustainability of dairy goat project increases by 0.283. This, therefore, confirms that combined project design factors have a significant influence on the sustainability of dairy goat project.

4.11. Utilization of Indigenous Knowledge and the Sustainability of Dairy Goat Projects

In this section, descriptive and inferential statistics on the influence of utilization of indigenous knowledge and the sustainability of dairy goat projects were analyzed and presented. Key informant interviews and focus group discussions data were analyzed and results triangulated with the results from self-administered questionnaires. To measure the

influence of the Utilization of Indigenous Knowledge on the sustainability of dairy goat projects, the following indicators were examined; knowledge on dairy goat's health care, knowledge on dairy goat's husbandry practices and knowledge on dairy goat's products value addition. Ten (10) items were developed in the self-administered questionnaires and respondents were then requested to indicate the extent to which they agree with the statements. They were given ten items rated on a five-point Likert scale ranging from Strongly agree (SA), Agree (A), Neutral (N), Disagree (D) and Strongly disagree (SD) which they were to choose. The following scoring was also used: (SD: 1<SD<1.8), (D: 1.8<D<2.6), (N: 2.6<N<3.4), (A: 3.4<A<4.2) and (SA: 4.2<SA<5.0). The mentioned scales give an equidistance of 0.8. Results are presented in Table 4.23

Table 4.23: Utilization of Indigenous Knowledge and the Sustainability of Dairy Goat Projects

Statement		SD	D	N	A	SA	Mean	S.D
		F %	F %	F %	F %	F %		
14a	Dairy goat farmers prefer indigenous methods of treating their animals when sick	29 15.4	133 70.7	19 10.1	6 3.2	1 0.5	2.03	0.66
14b	Use of indigenous knowledge was integrated in the dairy goat project design	13 (6.9)	98 (52.1)	47 (25.0)	29 (15.4)	1 (0.5)	2.51	0.86
14c	Indigenous animal health services are readily available and affordable to many dairy goat farmers	27 (14.4)	111 (59.0)	44 (23.4)	6 (3.2)	0 (0.0)	2.15	0.70
14d	Dairy goat farmers use the traditional method of feeding dairy goats	21 (11.2)	127 (67.6)	32 (17.0)	7 (3.7)	1 (0.5)	2.15	0.68
14e	Dairy goat farmers practice free ranging methods of goat keeping	37 (19.7)	110 (58.5)	23 (12.2)	18 (9.6)	0 (0.0)	2.12	0.83
14f	Dairy goat farmer practice both modern and indigenous husbandry methods	49 (26.1)	95 (50.5)	34 (18.1)	10 (5.3)	0 (0.0)	2.03	0.81
14g	Indigenous goat breeding practices are preferred than the modern practices	13 (6.9)	111 (59.0)	50 (26.6)	12 (6.4)	2 (1.1)	2.36	0.75
14h	Indigenous practices has interfered with the adoption of the new dairy goat technology	12 (6.4)	49 (26.1)	84 (44.7)	43 (22.9)	0 (0.0)	2.84	0.85
14i	Indigenous method of dairy goat product preservation is practiced by dairy goat farmers	19 (10.1)	101 (53.7)	40 (21.3)	14 (7.4)	14 (7.4)	2.48	1.03
14j	Indigenous knowledge promotes value addition on dairy goat products	11 (5.9)	53 (28.2)	79 (42.0)	34 (18.1)	11 (5.9)	2.90	0.96
Composite mean and standard deviation							**2.36**	**0.81**

n = 188
Composite mean =2.36
Composite standard deviation = 0.81
Cronbach Alpha Reliability Coefficient =0.69

As shown in Table 4.23, the overall composite means (M) for utilization of indigenous knowledge was M = 2.36 and the overall composite standard deviation SD = 0.81. The Cronbach Alpha Coefficient for the ten items that were used to measure the influence of the utilization of indigenous knowledge on the sustainability of dairy goat project was 0.69. This level of reliability coefficient is an indicator that the item had acceptable internal consistency.

Item 14a sought to establish the extent to which dairy goat farmers prefer indigenous methods of treating their animals when sick. Results show that 162(86.1%) disagreed, 19(10.1%) were neutral and only 7(3.7%) with this statement. The mean score for this item was; (M = 2.03, SD = 0.66). The implication of this finding is that since the composite mean is above the item mean, the item did not important in sustainability of dairy goat projects.

Item 14 b sought to assess the level at which indigenous knowledge was integrated into the dairy goat project design. 98(52.1%) of the respondents disagreed, 47(25%) were neutral while 29(15.4) agreed with this statements. The mean score for this item was; (M = 2.51, SD = 0.86) This result indicates that majority of the respondents disagreed that indigenous animal medicine is considered a good alternative to the conventional animal medicine. Results from the focus group discussions supported this finding. Participants noted that farmers were discouraged from using indigenous methods of either treatment of dairy goats or feeding.

Key informant interviews revealed that even though indigenous utilization of indigenous knowledge was common in the management of local goats, farmers avoided the indigenous or traditional methods of dairy goat management such as medicine and feeding. This finding was supported by the Focus group discussions. Asked if they use any form of indigenous practice on dairy goat's participants noted that;

"We use indigenous medicine like herbs on the Galla goats and the local goats but not on the dairy goats because they are very sensitive and delicate. They require proper health care than the local goats. If one does not treat his dairy goat with the right medicine, there is a risk of the goat dying"

Focus group discussion indicated that the issue of indigenous knowledge was not factored in the project design and that only the conventional and modern methods were allowed on dairy goats. This is contrary to earlier study by Lindsay et al (2006) who found that project planning decisions that overlook or underestimate the local knowledge and skills may luck the necessary impetus for project success and sustainability. Further, Reed and Dougill (2004) argues that utilizing local knowledge, makes knowledge complete and thus providing a clear local solution.

In item 14c, respondents were required to state the extent to which indigenous animal health services are readily available and affordable to many dairy goat farmers. Results show that majority 138(73.4%) disagreed, 44(23.4%) were neutral, while 6(3.2%) agreed. The means score and standard deviation for this item was; (M = 2.15, SD = 0.70). This result means that availability of indigenous animal health services was not important for the sustainability if the dairy goat project. Asked what type of feed they give to dairy goats, a FGD respondent said that:

"There is a special plan that was introduced by the dairy goat project. Many of the farmers have planted it but due to lack of adequate rainfall, the most of the plants have dried. However, we have some alternative plants that we give the dairy goats"

Item 14e sought to establish the extent to which dairy goat farmers practice free ranging methods of goat keeping common with local goats. Results indicates that majority 147(78.2%) disagreed, 23(12.2%) were neutral while 18(9.6%) agreed with this statement. The mean score for this item was: (M = 2.12, SD = 0.83). The result implies that free ranging method was not practiced and was not important in sustainability of the project. Key informants disagreed with this finding indicating that a good number of dairy goat keepers have abandoned the required housing requirement and some are actually doing free ranging on dairy goat which is not allowed. FGDs results seems to agree with this result;

"We are forced by circumstances to let dairy goat graze out with the other goats, it is not easy to do zero grazing where we are required to provide water, and feed every day. During dry season, it becomes a challenge"

Item 14f sought to establish the extent to which dairy goat farmers practice both modern and indigenous husbandry methods. Majority 144(76.6.5%) disagreed, 34(18.1%) were neutral while 10(5.3%) agreed with this statement. The mean score for this item was (M = 2.03, SD = 0.81. This result implies that majority of the respondents disagreed that dairy goat farmers practice both modern and indigenous husbandry methods. Item 14h sought to find out the extent to which Indigenous practices has interfered with the adoption of the new dairy goat technology. Majority 84(44.7%) were neutral, 61(32.5%) disagreed while 43(22.9%) agreed. This item had a mean score and standard deviation (M = 2.84, SD = 0.85). The implication of this finding is that indigenous knowledge is important in sustainability and can interfere with the adoption of the modern technology for dairy goat sustainability.

4.11.1. Project Design Factors, Utilization of Indigenous Knowledge and Sustainability of Dairy Goat Projects

Correlational analysis using Pearson's Product Moment technique was done to determine the influence of utilization of indigenous knowledge and combined project design factors have on sustainability of dairy goat projects in Tharaka Nithi County. The following hypothesis were tested:

> **H_0:** The strength of relationship between project design factors and sustainability of dairy goat projects do not depend on the utilization of indigenous knowledge in Tharaka Nithi County.

The hypothesis was tested using the following regression model

Sustainability of dairy goat projects = f (Project design factors, utilization of indigenous knowledge)

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_{15} X_1 X_5 + \beta_{25} X_2 X_5 + \beta_{35} X_3 X_5 + \beta_{45} X_4 X_{5+} \varepsilon$$

This hypothesis was tested using regression analysis. The findings are presented in Table 4.24

Table 4.24: Project Design Factors, Utilization of Indigenous Knowledge and Sustainability of Dairy Goat Projects

(a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.322	.104	.048	.73989	.104	1.856	4	184	.150	
2	.700	.489	.394	.59014	.385	6.490	1	187	.000	2.107

(b) ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.064	4	1.016	1.856	.030
	Residual	100.648	184	.547		
	Total	104.712	188			
2	Regression	1.794	1	1.794	6.490	.000
	Residual	65.076	187	.348		
	Total	66.87	188			

a) Coefficients

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	T	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	.803	.314		2.559	.013		
	combined project design factors	.360	. 086	.426	4.192*	. 000	.966	1.035
	Utilization of Indigenous Knowledge	.290	.106	.278	2.740*	.008	.966	1.035
2	(constant)	.740	.319		2.321*	.023		
	combined project design factors	.357	.086	.421	4.148*	.000	.964	1.037
	Utilization of Indigenous Knowledge	.314	.108	.301	2.905*	.005	.925	1.081
	combined project design factors and Utilization of Indigenous Knowledge	-.675	.068	-.354	-3.957*	.046	.958	1.044

a. Predictors: (Constant), Utilization of Indigenous Knowledge, combined project design factors
b. Predictors: (Constant), Utilization of indigenous knowledge, combined project design factors, Interaction term between combined project design factors and utilization of indigenous knowledge
c. Dependent Variable: Sustainability of dairy goat projects p<0.05

The findings of step one and step two are in Table 4.25 (a, b and c). The findings in model one indicate that combined project design factors (B=.360, t=4.192, P<.05) and utilization

of indigenous knowledge (B=.290, t=2.740, P<.05) have a statistically significant independent influence on sustainability of dairy goat projects, together accounting for 10.4 Percent (R2=.104, F=1.856, P-value =.15>.05) of explained variance in sustainability of dairy goat projects. In the second model, the effect of the interaction between combined project design factors and utilization of indigenous knowledge was tested and results provided was also statistically significant (B=-.675, t=-3.957, P value =<.05). The significance of the interaction between combined project design factors and utilization of indigenous knowledge implies that utilization of indigenous knowledge enhances the effect of combined project design factors on the sustainability of dairy goat projects.

The model explaining the relationship was statistically significant and accounted for 48.9 percent of the variation in the sustainability of dairy goat projects (R2=.489, F=6.490, P-value=0.00<.05). The influence of the interaction between combined project design factors and utilization of indigenous knowledge was negative, implying a decline in the sustainability of dairy goat projects due to a unit change in combined project design factors and utilization of indigenous knowledge. This suggests that the greater the utilization of indigenous knowledge the lower the level of sustainability of dairy goat projects. The VIF shows that there was no problem of multicollinearity within the variables.

The findings suggest that for the dairy goat projects to realize good sustainability, utilization of indigenous knowledge cannot be ignored when the predictor variable of project design are taken into consideration. Thus, the hypothesis that the strength of the relationship between project design factors and sustainability of dairy goat projects do not depend on the utilization of indigenous knowledge was rejected and concluded that the strength of the relationship between project design factors and sustainability of dairy goat projects depend on the utilization of indigenous knowledge. The current study thus concludes that utilization of indigenous knowledge has a moderating influence on the relationship between project design factor and sustainability of dairy goat

The findings of the study concur with Mark (2008) who stated that integration of informal local and indigenous knowledge with contemporary science is an important process which enables practitioners and scientists to implement activities in a project to increase resilience

in communities. The intricate and vibrant nature of development environment needs a decision-making process that recognizes the diversity of knowledge and values. This recognition facilitates a clear understanding of the complexities of the process and triggers positive attitudes towards adoption of new technology and acquisition of knowledge such as dairy goat project management.

Project planning decisions that overlook or underestimate the local knowledge and skills may luck the necessary impetus for project success and sustainability. This integration also makes it possible for decision-makers to put into practice policies that support such activities. Such actions promote the use of local and indigenous knowledge and empower communities to use their knowledge supplemented with outside knowledge, to continue to make informed decisions about managing their adaptation. One of the key arguments in favor a decentralized targeting approach, such as community-based targeting (CBT), has been based on its potential to identify potential program beneficiaries accurately by drawing on local knowledge and preferences that might otherwise be unknown to the program administrators at the central level (Mansuri and Rao 2012).

4.12. Project Leadership and the Sustainability of Dairy Goat Projects

In this section, descriptive and inferential statistics on the influence of project leadership and sustainability of dairy goat projects were analyzed and presented. Key informant interviews and focus group discussions data were analyzed and result triangulated with the results from self-administered questionnaires. To measure the influence of the project leadership on the sustainability of dairy goat projects, the following indicators were examined; transactional leadership, transformational leadership and servant leadership. Ten (10) items were developed in the self-administered questionnaires and respondents were then requested to indicate the extent to which they agree with the statements. They were given ten items rated on a five-point Likert scale ranging from Strongly agree (SA), Agree (A), Neutral (N), Disagree (D) and Strongly disagree (SD) which they were to choose. The following scoring was also used: (SD: $1<SD<1.8$), (D: $1.8<D<2.6$), (N: $2.6<N<3.4$), (A: $3.4<A<4.2$) and (SA: $4.2<SA<5.0$). The mentioned scales give an equidistance of 0.8. Results are presented in Table 4.25

Table 4.25 Project Leadership and the Sustainability of Dairy Goat Projects

Statement		SD	D	N	A	SA	Mean	S.D
		F %	F %	F %	F %	F %		
14a	Project leaders promote creativity and innovation in the dairy goat project	1 (0.5)	12 (6.4)	20 (10.6)	108 (54.7)	47 (25.0)	4.00	0.81
14b	Important project decisions about dairy goat project are made in consultation with beneficiaries	1 (0.5)	5 (2.7)	19 (10.1)	136 (72.3)	27 (14.4)	3.97	0.63
14c	Project leaders are strategic thinkers and have good vision for the community	1 (0.5)	7 (3.7)	39 (20.7)	128 (68.1)	13 (6.9)	3.77	0.65
14d	Project leaders understands the needs of the project beneficiaries	17 (9.0)	76 (40.4)	80 (42.6)	15 (8.0)	0 (0.0)	3.49	0.77
14e	Project leaders are open and transparent on project finance matters	2 (1.1)	5 (2.7)	17 (9.0)	104 (55.3)	60 (31.9)	4.14	0.77
14f	Project leaders sacrifice their time and resources for the benefit of the dairy goat project	7 (3.7)	33 (17.6)	128 (68.1)	20 (10.6)	0 (0.0)	3.86	0.64
14g	Project leaders are more focused on the results than the beneficiaries welfare	2 (1.1)	22 (11.7)	85 (45.2)	66 (35.1)	13 (6.9)	3.36	0.85
14h	Project leaders motivate people by reward good performance	16 (8.5)	66 (35.1)	29 (15.4)	62 (33.0)	15 (8.0)	2.97	1.16
14i	Project leaders consider service to beneficiaries as their priority	2 (1.1)	8 (4.3)	68 (36.2)	90 (47.9)	20 (10.6)	3.63	0.77
14j	Project leaders have great respect to the project beneficiaries	3 (1.6)	8 (4.3)	29 (15.4)	111 (59.0)	37 (19.7)	3.91	0.81
Composite mean and standard deviation							3.71	0.79

n = 188
Composite mean = 3.36
Composite standard deviation = 0.89
Cronbach Alpha Reliability Coefficient = 0.865

As shown in Table 4.25, the overall composite means (M) for project leadership was 3.71 and the overall composite standard deviation (SD) was 0.79. The Cronbach Alpha Coefficient for the ten items that were used to measure the influence of the project leadership on the sustainability of dairy goat project was 0.76. This level of reliability coefficient is an indicator that the item had a strong internal consistency.

In item 14a, respondents were required to indicate the extent to which project leaders promote creativity and innovation in the dairy goat project. Results shows that majority 155(79.7%) agreed with this item, 20(13.4%) were neutral while 13(6.9%) disagreed with item 14a. The mean score for this item was; (M = 4.00, SD = 0.81). This implies that creativity and innovation is a very important aspect in dairy goat projects and should be promoted for sustainability of dairy goat projects. This finding is similar to that of the focus group discussions that operation of all groups were guided by a predetermined constitution that leaders uphold and implement for the interest of the group. Further, FGDs indicated that groups were strongly supported by the government (department of social services) with trainings on group dynamics and project leadership. Further FGD participants said that leaders supported the growth and development of groups that were key pillars to sustainability of the dairy goat project. This current study agrees with Ezatollah and Karami (2006) that key trait that a leader must possess are interest in leadership, sympathy with people, self-confidence, motivation, sense of responsibility, literacy and education level.

Item 14 b required responses from respondents on the level at which the important project decisions about dairy goat project are made in consultation with beneficiaries. Majority 163(86.7%) agreed, 19(10.1%) were neutral and 6(3.2%) with this item. The mean score for this item was; (M = 3.97, SD = 0.63). This implies that the way decisions concerning the project are made is very important in projects. Consultation with beneficiaries and building consensus leads to making the right decisions and supports sustainability. Asked about decisions making in groups, a participant in the Focus group discussion respondent said that;

"Every meeting, we write minutes that are used to track our discussions and guide in decision making. No leader is allowed to make decision outside what is agreed and contained in the minutes"

Item 14c sought to establish the extent to which project leaders are strategic thinkers and have good vision for the community. Results shows that majority 128(68.1%) agreed while 39 (20.7%) were neutral. The mean score for this item was; (M = 3.77, SD = 0.65). The results imply that leaders should have a clear vision and a good sense of direction the group is taking. Asked about their opinion on project leadership, a key informant noted that;

"Some leaders gained interest in the project with a lot of expectations from the donors but when this did not materialize, they slowed down, others pulled out while others just run the groups down, however, there are a number of groups with very good leadership skills and are able to steer their groups to higher level"

Item 14d required respondents to indicate the level at which project leaders understands the needs of the project beneficiaries. Results indicates that majority 93(49.4%) disagreed, 80(42.6%) were neutral while 15(8%) agreed with this statement. The mean score for this item was; (M = 3.49, SD = 0.77). This imply that knowledge and understanding of the beneficiaries needs by the project leaders is very critical in promoting project sustainability.

Item 14e required respondents to indicate the extent to which project leaders are open and transparent on project finance matters. Results indicates that majority of the respondents agreed 164(87.2%) and 17(9%) were neutral. The mean score for this item was; (M = 4.14, SD = 0.77) meaning that project leaders were transparent and open, a prerequisite to project sustainability. Focus group discussions did not support this finding. The general agreement among the participants indicated that leaders misuse funds and were not accountable. Key informant interview also indicated that finance management and leader's accountability was the most challenging issues causing group breakdown. As note by the social services officer who deals with the group operations and accountability.

Item 14f sought to establish if project leaders sacrifice their time and resources for the benefit of the dairy goat project. Majority of the respondents were neutral to this statement 128(68.1%) while 40(21.3%) disagreed and 20(10.6%) agreed with this item. The mean score for 14f was (M = 3.86, SD = 0.64). This means that project leaders require to sacrifice

their time and resources if sustainability of dairy goat projects is to be achieved. Item 14g sought to establish if project leaders are more focused on the results than the beneficiary's welfare. Majority 85(45.2%) were neutral, 66(35.1% agreed while 22(11.7%) disagrees with this statement. The mean score for this item was; (M = 3.36, SD = 0.85. This result implies that leaders tried to balance between the welfare of the project beneficiaries and the expected results in their engagement

4.12.1. Project Design Factors. Project Leadership and the Sustainability of Dairy Goat Projects

Correlational analysis using Pearson's Product Moment technique was done to determine the moderating influence of project leadership on the relationship between project design factors and the sustainability of dairy goat projects in Tharaka Nithi County. The following hypothesis were tested:

Hypothesis seven

H_0 The strength of the relationship between Project design factors and the sustainability of dairy goat projects does not depend on the project leadership in Tharaka Nithi County

Model for Hypothesis Seven

The hypothesis was tested using the following regression model

Sustainability of dairy goat projects = f (Project design factors, Project Leadership)

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_{16} X_1 X_6 + \beta_{26} X_2 X_6 + \beta_{36} X_3 X_6 + \beta_{46} X_4 X_{6+} \varepsilon$$

This hypothesis was tested using Baron and Kenny (1986) four-step method where linear regression was used in each step. In step one, project leadership was regressed on combined project design factors. If R^2 and beta coefficients are statistically significant, the process would move to step two. If they are not significant, the process terminates and would be concluded that project leadership does not moderate the relationship between combined project design factors and sustainability of dairy goat projects.

Step 2 involved regressing of combined project design factors on utilization of indigenous knowledge. If the results are significant, the process moves to step 3 because the necessary condition for moderation exist. In step three the influence of project leadership on sustainability of dairy goat projects is tested using a simple linear regression model. A statistically significant effect of project leadership on sustainability of dairy goat projects is a necessary condition in testing for the moderation. The analysis then moves to step 4. Finally, Step four tested the influence of combined project design factors on sustainability of dairy goat projects while controlling for the effect of project leadership. These tests were done using simple linear regression analysis. The influence of combined project design factors on sustainability of dairy goat projects should not be statistically significant when project leadership is controlled. This is a necessary condition in testing for moderation.

Step one: Combined Project Design Factors and Sustainability of Dairy Goat Projects.

The regression results from the test of the influence of influence of combined project design factors on sustainability of dairy goat projects are presented in Table 4.26

Table 4.26: Combined project design factors and sustainability of dairy goat projects.

(a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.494	.244	.198	.52833

a. Predictors: (Constant), combined project design factors

(b) ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.884	4	1.471	5.271	.003
	Residual	51.057	183	.279		
	Total	56.941	187			

a. Dependent Variable: sustainability of dairy goat projects

b. Predictors: (Constant), combined project design factors

(c) Coefficients

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
	(Constant)	.951	.763		1.247	.218
	combined project design factors	.787	.243	.416	3.236	.002

a. Dependent Variable: Sustainability of Dairy Goat Projects

The results in Table 4.26 show that combined project design factors had a moderate positive relationship with sustainability of dairy goat projects (R=.494). The model explained 24.4 percent of the variation in sustainability of dairy goat projects which was significant (R2=0.244, F=5.271, P<0.05) leaving 75.6 percent unexplained. The results thus confirmed the first step of testing for the moderation effect of project leadership on the relationship between combined project design factors and sustainability of dairy goat projects.

Step Two: Project Design Factors and Project Leadership

This step involved testing the moderating effect of project leadership on the relationship between combined project design factors and the sustainability of dairy goat projects. The results of the tests are presented in Table 4.27

Table 4.27. Project Design Factors and Project Leadership

(a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.671	.451	.446	8.17058

Predictors: (Constant), combined project design factors

(b) ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.434	1	3.434	108.288	.000
	Residual	29.92	187	.160		
	Total	33.354	188			

Dependent Variable: project leadership

Predictors: (Constant), combined project design factors

(c) Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	23.451	5.507		4.258	.000
	combined project design factors	.778	.075	.671	10.406	.000

Dependent Variable: Project leadership

Predictors: (Constant), combined project design factors

The results presented in Table 4.27 above indicate that combined project design factors had a positive strong and significant effect on project leadership (R=.671 P< 0.05). The model explained 45.1 percent (R^2=0.451 F=108, p < 0.05) of the variation in project leadership, leaving 54.9 percent unexplained. The results, therefore suggest that the second step of testing confirms intervention of project leadership in the relationship between combined project design factors and sustainability of dairy goat projects and thus permits analysis to move to step

Step three: Moderating Effect of Project Leadership in the Relationship between Project Design Factors and Sustainability of Dairy Goat Projects

This step involved testing the moderating influence of project leadership on the relationship between project design factors and the sustainability of dairy goat projects. The results for the step 3 are presented in Table 4.28.

Table 4.28. Moderating Effect of Project Leadership in the Relationship between Project Design Factors and Sustainability of Dairy Goat Projects

(a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.111	.012	.001	.2989420

(b) ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.094	1	.094	1.057	.307
	Residual	166.43	187	.089		
	Total	166.524	188			

(c) Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
Project leadership	.015	.061	.030	.252	.802
Combined project design factors	.087	.055	.186	1.566	.121

Predictors: (Constant), Project leadership, Combined project design factors
Dependent Variable: sustainability of dairy goat projects

The results in Table 4.28 indicate that project leadership had a weak positive relationship with sustainability of dairy goat projects (R=.111). The model explained 1.2 (0.012) percent of the variation in sustainability of dairy goat projects. 98.8 percent of sustainability of dairy goat projects is explained by other factors not considered in the model. The results were not statistically significant at P=>0.05. The results therefore did not satisfy condition in the third step in testing for moderation effect of project leadership in the relationship between combined project design factors and sustainability of dairy goat projects. The influences of project leadership (B=.015, t= .252, p>05) and combined project design factors (B=.087, t= 1.566, p>05) were not statistically significant. The model was also not statistically significant (R2=.040, F=1.763, p>05).

The statistical results at step three are not significant and thus did not provide the necessary conditions to progress to **step 4** in testing for the moderating effect and did not support the moderating effect of project leadership on the relationship between combined project design factors and sustainability of dairy goat projects. Thus, the process terminated at step 3.

The results were indicative of the fact that combined project design factors interacts with project leadership and the interaction has an effect on their influence on sustainability of dairy goat project though the indirect effect was not clear from the results in this study. The study accepts the hypothesis that the strength of the relationship between project design factors and the sustainability of dairy goat projects does not depend on the project leadership in Tharaka Nithi County

CHAPTER FIVE
SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter presents a summary of findings, conclusions, and recommendations. The summary of findings presents the results of hypothesis testing in regard to whether the hypothesis is rejected or accepted. The chapter also presents the conclusions based on the seven objectives for this study as informed by the research findings, analysis, interpretation and discussions. In addition, and based on the conclusions deduced, specific areas of the contribution of the study to knowledge was expounded. Finally, this chapter presents the recommendations based on the results of policy, practice, and methodology. Further, the chapter presents suggestions for further research.

5.2. Summary of Findings

The study achieved 95.9% questionnaire return rate as out of the total 196 targeted respondents, 188 returned completely filled questionnaires. The significance values for the Shapiro-Wilk tests were found to be 0.401 for each of project beneficiary selection, community capacity, institutional linkages, project infrastructure, utilization of indigenous knowledge, project leadership and sustainability of dairy goat projects. On the other hand, the results for the Kolmogorov-Smirnov tests established significance values of 0.331 for each of project beneficiary selection, community capacity, institutional linkages, project infrastructure, utilization of indigenous knowledge, project leadership and sustainability of dairy goat project.

The normality of the variables was also done and the study determined that all the variables had a fairly good fit in the normal distribution. The study also revealed that there was no problem of multicollinearity. The variance inflation factors for the variables were all below 5 meaning that the variables were not highly correlated. Heteroscedasticity was tested and based on the output coefficients, the obtained Sig. values were >0.05, thus there was no

problem of Heteroscedasticity. Hence, there was no difference in residual variance of independent variables tested.

The purpose of this study was to empirically evaluate the project design factors utilization of Indigenous knowledge, project leadership, and Sustainability of dairy goat project in Tharaka Nithi County. To achieve this, seven objectives were set and corresponding hypotheses formulated. In testing of the hypothesis in the study, Pearson's Product Moment correlation, linear, stepwise and multiple regression was used. A total of seven hypotheses were formulated and tested.

5.2.1 Project Beneficiary Selection Process and Sustainability of Dairy Goat Projects

The first objective of this study was to establish how project beneficiary selection influences the sustainability of dairy goat projects in Tharaka Nithi County. The study established that the Cronbach Alpha Coefficient for the ten items used 0.865 indicating a good internal consistency. The composite mean and standard deviation were as follows: (M = 3.36, SD = 0.89). This showed that respondents were neutral that project beneficiary selection process was positive with regard to the project beneficiary selection tools, project beneficiary needs analysis and the project beneficiary composition.

The null hypothesis tested stated that; there is no significant relationship between project beneficiary selection process and the sustainability of dairy goat projects in Tharaka Nithi County. Results were F (1,186) = 9.850, t=3.138, at level of significance p=0.002<0.05, r= 0.224 and r square=0.050. Hence the null hypothesis was rejected and concluded that there is a significant relationship between project beneficiary selection process and the Sustainability of dairy goat projects.

5.2.2 Community Capacity and Sustainability of Dairy Goat Projects

The second objective was to assess the extent to which community capacity influence the sustainability of dairy goat projects in Tharaka Nithi County. The study established that the Cronbach Alpha Coefficient for the ten items used was 0.626 indicating a moderately acceptable internal consistency. The composite mean and standard deviation were as

follows: (M = 3.15, SD = 0.85). This implies that majority of respondents were neutral that community capacity influences the sustainability of dairy goat projects with regard to human capital capacity, capacity to contribute resources and the capacity of community social structures.

The null hypothesis tested stated that there is no significant relationship between community capacity and sustainability of dairy goat projects in Tharaka Nithi County. Results were F (1,186) = 1.718, t = 1.311 at level of significance p=0.192>0.05, r= 0.09 and R square=0.09. Therefore, the null hypothesis was accepted and confirmed that there is no significant relationship between community capacity and sustainability of dairy goat projects.

5.2.3 Institutional Linkages and Sustainability of Dairy Goat Projects

The third objective was to establish how institutional linkages influence the sustainability of dairy goat projects in Tharaka Nithi County. The study established that the Cronbach Alpha Coefficient for the ten items used was 0.82 indicating a good internal consistency. The composite mean and standard deviation were as follows: (M = 2.34, SD = 0.80). This implies that majority of the respondents were neutral that institutional linkages influence the sustainability of dairy goat projects with regard to linkage to health services, linkage to markets and social Institutions linkages

The null hypothesis tested stated that there is no significant relationship between institutional linkages and the sustainability of dairy goat projects in Tharaka Nithi County. Results indicate that F (1,186) = 6.146, t = 2.479 at level of significance p=0.014<0.05, r= 0.179, R square = 0.0320. Hence the null hypothesis was rejected and concluded that there is a significant relationship between institutional linkages and the sustainability of dairy goat projects

5.2.4 Project Infrastructure and Sustainability of Dairy Goat Projects

The forth objective was to establish the extent to which dairy goat project infrastructure influence the sustainability of dairy goat projects in Tharaka Nithi County. The study established that the Cronbach Alpha Coefficient for these ten items that was used to measure the influence of the project infrastructure on the sustainability of dairy goat project was 0.79 indicating an acceptable internal consistency. The composite mean and standard deviation were as follows: (M = 2.64, SD = 0.84) This shows that majority of the respondents were neutral that project infrastructure influences the sustainability of dairy goat projects with regard to housing infrastructure, breeding infrastructure and transport and markets infrastructure.

The null hypothesis tested stated that there is no significant relationship between project infrastructure and sustainability of dairy goat projects in Tharaka Nithi County. Results indicate that $F(1,186) = 21.482$ at level of significance p-value = $0.000 \leq 0.05$, $t = 4.635$, $r = .322$ and R square=0.104. Based on this, the null hypothesis was rejected and concluded that there is a significant relationship between project infrastructure and sustainability of dairy goat projects

5.2.5 Combined Project Design Factors and Sustainability of Dairy Goat Projects

The null hypothesis tested stated that the combined project design factors have no significant influence on the sustainability of dairy goat projects in Tharaka Nithi County. The results indicate that the $F(1,183) = 8.176$, at level of significance p-value = $0.000 \leq 0.05$, $r = .389$ and R squared = 0.133. Hence based on these findings the null hypothesis was rejected and concluded that there is a significant influence of project design factors on the sustainability of dairy goat projects with regard to the project beneficiary selection process, community capacity, institutional linkages, and project infrastructure.

The study also established that for a one-unit increase in project design factors, the sustainability of dairy goat project increases by 0.133. A one-unit increase in community capacity, the sustainability of dairy goat project increases by 0.031. A one-unit increase in institution linkage, the sustainability of dairy goat project increases by 0.119 and one-unit

increase in project infrastructure, the sustainability of dairy goat project increases by 0.283. This indicates that the combined project design factors have a significant influence on the sustainability of dairy goat project.

5.2.6 Project design Factors, Utilization of Indigenous Knowledge, and Sustainability of Dairy Goat Projects

From the findings it was established that combined project design factors (B=.360, t=4.192, P<.05) and utilization of indigenous knowledge (B=.290, t=2.740, P<.05) have a statistically significant independent influence on sustainability of dairy goat projects, together accounting for 10.4 Percent (R2=.104, F=1.856, P-value =.15>.05) of explained variance in sustainability of dairy goat projects. In the second model, the effect of the interaction between combined project design factors and utilization of indigenous knowledge was tested and results provided was also statistically significant (B=-.675, t=-3.957, P value =<.05). The significance of the interaction between combined project design factors and utilization of indigenous knowledge implies that utilization of indigenous knowledge enhances the effect of combined project design factors on the sustainability of dairy goat projects.

The study further established that respondents were neutral that utilization of indigenous knowledge was positive with regard to the utilization of indigenous knowledge tools, knowledge on dairy goat's medicine, knowledge on dairy goat's husbandry practices, and knowledge on dairy goat's products value addition. The interviewees revealed that people are very open to new ideas and change, as long as they make economic sense and are culturally acceptable. However, application of indigenous knowledge on dairy goat management was not common with the project beneficiaries.

5.2.7 Project Design Factors, Project Leadership and Sustainability of Dairy Goat Projects

From the findings, it was established that combined project design factors had a moderate positive relationship with Sustainability of Dairy Goat Projects (R=.494). Further, the study

established that project leadership had a weak positive relationship with the sustainability of dairy goat projects (R=.111). The results were not statistically significant at P=>0.05. The moderating influence of the project leadership (B=.015, t= .252, p>05) on the relationship between the combined project design factors (B=.087, t= 1.566, p>05) were not statistically significant. However, the key informants revealed that leaders supported the growth and development of groups that were key pillars to the sustainability of the dairy goat project.

Table 5.1: Summary of Tests of Hypotheses and Results

Table 5.1 Shows a summary of findings for this study.

Objective	Hypothesis	Regression model	Results	Remarks
To establish how project beneficiary selection process, influence the sustainability of dairy goat projects in Tharaka Nithi County	H_{01}: There is no significant relationship between project beneficiary selection process and the sustainability of dairy goat projects in Tharaka Nithi County.	$Y = \beta_0 + \beta_1 X_1 + \varepsilon$	r = 0.224 P=0.002<0.05 F(1,186) =9.850	Reject null hypothesis Accept alternative hypothesis
To assess the extent to which community capacity influence the sustainability of dairy goat projects in Tharaka Nithi County .	$H_{02:}$ There is no significant relationship between community capacity and the sustainability of dairy goat projects in Tharaka Nithi County	$Y = \beta_0 + \beta_2 X_2 + \varepsilon$	r = 0.096 P=0192<0.05 (F (1,186) = 1.718).	Accept null hypothesis Reject alternative hypothesis
To establish how institutional linkages, influence the sustainability of dairy goat projects in Tharaka Nithi County	H_{03}: There is no significant relationship between institutional linkages and sustainability of dairy goat projects in Tharaka Nithi County.	$Y = \beta_0 + \beta_3 X_3 + \varepsilon$	r = 0.179 P=0.014<0.05 F(1,186) =6.146	Reject null hypothesis Accept alternative hypothesis
To establish the extent to which dairy goat project infrastructure influence the sustainability of dairy goat projects in Tharaka Nithi County	H_{04} There is no significant relationship between project infrastructure and sustainability of dairy goat projects in Tharaka Nithi County	$Y = \beta_0 + \beta_4 X_4 + \varepsilon$	r = 0.322 P=0.000<0.05 F(1,186) =21.482	Reject null hypothesis Accept alternative hypothesis

To Examine the extent to which the combined project design factors influence the sustainability of dairy goat projects in Tharaka Nithi County	H_{05}: The combined project design factors have no significant influence on the sustainability of dairy goat projects in Tharaka Nithi County.	$Y=\beta_0+\beta_1X_1+ \beta_2X_2+\beta_3X_3 + \beta_4X_4+\varepsilon$	r = 0.389 P=0.000<0.05 F(1,183) =8.176	Reject null hypothesis Accept alternative hypothesis
To establish how utilization of indigenous knowledge moderates the relationship between the combined project design factors and sustainability of dairy goat projects in Tharaka Nithi County	H_{06} : The strength of the relationship between Project design factors and sustainability of dairy goat projects do not depend on the utilization of indigenous knowledge in Tharaka Nithi County	$Y = \beta_0 +\beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_{15}X_1X_5 + \beta_{25}X_2X_5 + \beta_{35}X_3X_{5+}\beta_{45}X_4X_{5+}\varepsilon$	r = 0.104, 0.489 P=0.000<0.05 F(4,184) =1.856 F(1,187) =6.490	Accept alternative hypothesis
To establish how project leadership moderates the relationship between the combined project design factors and sustainability of dairy goat projects in Tharaka Nithi County	H_{07}: The strength of the relationship between Project design factors and sustainability of dairy goat projects depend on the project leadership in Tharaka Nithi County	$Y = \beta_0 +\beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_{16}X_1X_6 + \beta_{26}X_2X_6 + \beta_{36}X_3X_{6+}\beta_{46}X_4X_{6+}\varepsilon$	r = 0.494, 0.671, and 0.111 P=0.000<0.05 F=5.271 F=108 F=1.763	Accept null hypothesis Reject alternative hypothesis

5.3. Conclusions

Project sustainability is ultimately the goal of every development project. Therefore, the critical focus of project designers is to incorporate sustainability drivers in the project design. However, research has not provided adequate information on the empirical and pragmatically tested variables that have a significant influence on sustainability. This study focused on investigating the influence of project design factors, utilization of indigenous knowledge, project leadership and sustainability of dairy goat projects in Tharaka Nithi County. This study was guided by seven objectives where seven hypotheses were tested. This section presents the conclusions made as a result of the study findings based on the objectives and hypothesis.

Objective one in this study was to establish how project beneficiary selection process influence the sustainability of dairy goat's projects in Tharaka Nithi County. From a review of the previous studies, three indicators were adopted for this objective; project beneficiary needs analysis, project beneficiary composition, and project beneficiary tools. Descriptive statistics showed that respondents were neutral that project beneficiary selection process influenced sustainability while inferential statistics indicated a positive relationship between project beneficiary selection process and sustainability of dairy goat projects. This study, therefore, concludes that it is critical to consider project selection process when designing dairy goat projects. Development projects are designed and implemented to address a specific and pertinent community need. From focus group discussions and key informants, it is evident that beneficiary selection for the dairy goat project was based on social – economic situation of beneficiaries such that the poor of the poorest were selected. Therefore, this study concludes that using just one criterion may not be used as there are other criteria for selection such as gender-based, age segment based, common interest based and need-based selection.

Objective two in this study was to establish how community capacity influences the sustainability of dairy goat's projects in Tharaka Nithi County. Based on the empirical literature, three indicators were considered; human capital capacity, capacity to contribute

resources and the capacity of community social structures. Descriptive statistics showed that respondents were neutral that community capacity influenced the sustainability of dairy goat project while inferential statistics indicated that there was no significant influence of community capacity on the sustainability of dairy goat's project. Other findings indicate that management of dairy goat projects requires specific skills and knowledge without which the project may not be sustainable. Further, community participation in terms of cash and in-kind contribution is critical to enhancing project sustainability. Likewise, community groups and other social structures are the vehicles for sustainability of such projects. Therefore, this study concludes that even though the hypothesis that there is no significant relationship between community capacity and sustainability of dairy goat projects was accepted, correlation results showed a positive relationship between community capacity and sustainability of dairy goat projects. This study, therefore, concludes that it is critical to consider community capacity in dairy goat project designs.

Objective three in this study was to establish how institutional linkages influence the sustainability of dairy goat projects in Tharaka Nithi County. Institutional linkages were explained by linkages to veterinary services, extension services and access to the right market information was measured. Descriptive statistics showed that respondents were neutral that institutional linkages influence the sustainability of dairy goat projects. Inferential statistics showed a significant positive influence of institutional linkages on the sustainability of dairy goat projects. Therefore, this study concludes that different institutions within the community where dairy goat projects are implemented play a key role in promoting sustainability of the projects. The study concludes that dairy goat projects are heavily dependent on credible health services that offer quality, affordable and accessible health services. The study concluded that there was inadequate and a high cost of veterinary services, slower emergency response rate and the existence of quacks in service provision as the major obstacles to sustainability. In addition, dairy goat projects are commercially based, therefore market information and sound marketing network are important. These fundamental aspects of project design were inadequate in the dairy goat project under study.

Objective four was to establish the influence of project infrastructure on the sustainability of dairy goat projects in Tharaka Nithi County. Based on the literature, three indicators were considered for project infrastructure; housing infrastructure, breeding infrastructure, transport, and markets infrastructure. Descriptive statistics showed that respondents were neutral that project infrastructure influenced the sustainability of dairy goat projects while inferential statistics indicated a positive relationship between project infrastructure and sustainability of dairy goat projects. Project infrastructure is the foundation of any project. A positive correlation between project infrastructure and sustainability of dairy goat projects shows that dairy goats require proper housing and breeding infrastructure that promotes dairy goat production and multiplication. Harnessing the use of locally available and cheap housing materials is important to promote dairy goat housing. Training beneficiaries on dairy goat housing and standardization of house designs are critical for improved infrastructure. In addition, even though breeding infrastructure was considered in the project design, respondents indicated that they were not adequate within reach to everyone thus affecting multiplication of dairy goats. The study also concludes that dairy goats have not been given special consideration in marketing arrangement, therefore, no market infrastructure has been developed.

Objective five was to examine the extent to which the combined project design factors influence the sustainability of dairy goat projects in Tharaka Nithi County. Indicators for project design were the project beneficiary selection process, community capacity, institutional linkages and project infrastructure. Inferential statistics show that there is a significant influence of project design factors on the sustainability of dairy goat projects. Each of these indicators of project design had a significant contribution to sustainability. Therefore, this study concludes that proper combination of sustainability drivers is important to promote sustainability of dairy goat projects.

Objective six of the study was to establish how utilization of indigenous knowledge moderates the relationship between the combined project design factors and sustainability of dairy goat projects in Tharaka Nithi County. Indicators for indigenous knowledge were the knowledge on dairy goat's health care, knowledge on dairy goat's husbandry practices

and knowledge on dairy goat's products value addition. The study showed that there is a significant influence of project design factors on the sustainability of dairy goat projects meaning that project design factors are important in dairy goat project designs for sustainability. This linear relationship, however, cannot be concluded without considering the moderating effect of the utilization of indigenous knowledge. The study found that introduction of utilization of indigenous knowledge brought about a change in the relationship. Therefore, this study concludes that utilization of indigenous knowledge cannot be overlooked when designing dairy goat projects as this can interfere with the sustainability of the projects. The idea that indigenous knowledge is static and unchanging is difficult to sustain. Rather, it is fluid and constantly changing, reflecting renegotiations between people and their environments. Therefore, measures need to be put in place to check what knowledge is acquired and how it is being utilized. Regarding dairy goat projects, it has been shown that knowledge acquisition is dynamic and ever-changing, with people being open to new ideas, as long as they remain in control.

Objective seven of the study was to establish how project leadership moderates the relationship between the combined project design factors and sustainability of dairy goat projects in Tharaka Nithi County. The indicators of project leadership were transactional leadership, transformational leadership, and servant leadership. The study found that where leadership was weak, the project did not perform well, groups collapsed and sustainability of dairy goat project was compromised. This study concludes that the positive relationship between project design factors and sustainability of dairy goat projects cannot be sustained if project leadership is overlooked. Leadership is seen as the pillar of any development project without which the projects collapse and fail to achieve the desired goals. Community development is achieved when community ties are made stronger in the neighborhood that leads to a coherent community organization that brings about a long-term capacity to address local problems. Therefore, project leadership here is important to facilitate the necessary environment for this to happen.

5.4. Recommendations

This section presents the recommendations made based on the findings of this study. Recommendations are made for practice, policy and for methodology.

5.4.1 Recommendation for Practice

From literature and findings of this study, it is clear that a need is very specific to individuals or categories of people in the community. Therefore, those who are largely and directly affected must be carefully selected and involved through an authentic process taking into consideration their needs. The study recommends that there is need to adequately conduct authentic beneficiary selection process before any project is started. How the project selection process is undertaken in terms of what tools and methods are used and whether the beneficiaries themselves are conversant with them is a critical concern in the design of dairy goat projects. Tools and procedures need to be simple, clear and easy to understand by the target beneficiaries so that the need assessment is successful. This should be done by first conducting a thorough assessment of the beneficiaries to know their needs and their ability in order to get groups who are homogenous and interested in that particular enterprise. This should be done during stakeholder analysis stage at project planning.

Community capacity is very crucial for managing dairy goat projects and should be integrated into the project design from the initiation stage. This will ensure that all the community ability is incorporated into project activities and budgeted for to ensure adequacy throughout the implementation period. The project managers should carry the responsibility of ascertaining sustainability by forming farmer organizations which could continue to run the project after the donor pulls out. The government, on the other hand, should support such farmer organization by providing grants, training and extension services.

This study recommends that proper analysis of stakeholders and supporters as a crucial project design component should be done. This will ensure that the project takes stock of the probable institutions that will work with the project and clearly show how the linkages

with these institutions will be enhanced. Further, project designers should consider project infrastructure that supports project implementation as an important component of design projects. Without proper project infrastructure, the project objectives cannot be achieved as this is the support mechanism for the project.

The study recommends that even though the design factors have to be taken into consideration, the project design will need to be sensitive to the indigenous knowledge that may prevent or delay sustainability. Further, the study recommends that dairy goat project leaders should be well motivated to help steer such projects to success and keep the momentum over the long-term thus sustainability of the projects.

5.4.2 Recommendation for Policy

From literature, it is evident that livestock production is of paramount importance to both national economies as well as household livelihood support. In the recent years, dairy goat production has gained popularity as an important contributor to this important sector. Unfortunately, the national policy and legislative framework have not prioritized dairy goat production. This study makes specific recommendations for policy as follows.

First, both National and County decision and policymakers in livestock sector need to recognize the potential contribution of dairy goats to the national economy. As such, mainstreaming dairy goat with the other important livestock will be a major step. This action will propel dairy goats to the same level of significance as dairy cows and enjoy the benefits accrued from the dairy production system.

Secondly, livestock policy needs to create a conducive environment for programs and projects designed and implemented by Non-Governmental organizations (NGOs), Community based organizations (CBOs), government departments and parastatals and collaborations programs to operate. This may include direct technical support, resource support, reducing statutory and legal requirements and providing the goodwill for dairy goat projects to thrive and be sustainable.

Thirdly, this study established that one of the major barriers to dairy goat projects sustainability is disorganized markets for dairy goats and their products. Policy provision will need to focus on building vibrant market systems for dairy goats, enabling households to generate more income within the sector and diversify their income sources.

Lastly, livestock infrastructural development is a policy issue. This study established that poor dairy goat project infrastructure is a challenge to the sustainability of dairy goat projects. As a matter of policy, the government needs to prioritize the establishment of the necessary infrastructure that supports dairy goat production. These include breeding infrastructure, transport infrastructure, communication infrastructure and market infrastructure.

5.4.3 Recommendation for Methodology

This study used descriptive cross-sectional survey and correlational research designs. The study adopted a pragmatic paradigm that integrates both positivism and interpretivism or constructivism philosophical foundation. Both research design and the supportive paradigm enhanced the strength of findings and conclusions made from this study. The study also employed a mixed mode approach where both qualitative and quantitative data were collected and analyzed. Descriptive statistical analysis and hypothesis testing were carried out using simple linear regression and multiple regression analysis. A correlation was also done to establish the relationship between variables of the study. Qualitative data analysis for key informant's interviews and focus group discussion was done by following a procedural process of sorting, and categorizing responses into themes and making the deduction from the themes. This complementarity capability of mixed mode builds the strength of this study by allowing descriptive explanation of study variables while showing the relationship among variable through inferential analysis as well as doing a triangulation of information from the different sources. Based on these strengths, this methodology is highly recommended.

5.5 Contribution to Body of Knowledge

Contribution of this study to knowledge is as tabulated in Table 5.2

Table 5.2: Contribution to Body of Knowledge

Objective	Findings	Conclusion	Contribution to Knowledge
1. To establish how project beneficiary selection process, influence the sustainability of dairy goat projects in Tharaka Nithi County	Project beneficiary selection process has a significant influence on the sustainability of dairy goat projects. The null hypothesis was rejected	It is important to consider project selection process when designing dairy goat projects with respect to the selection tools and processes, the needs of the beneficiaries and the project beneficiary composition	The study objective empirically demonstrated that Project beneficiary selection process should be considered in project designs to enhance sustainability of dairy goat projects. The study objective was published in the international Journal of innovative research Vol 6 issue 12.
2. To assess the extent to which community capacity influence the sustainability of dairy goat projects in Tharaka Nithi County	Community capacity do not have a significant influence of the sustainability of dairy goat projects. The null hypothesis was accepted.	Even though the null hypothesis was accepted, correlation results showed a positive relationship and FGD results showed the need for adequate community capacity. Therefore, community capacity is important in sustainability of dairy goat projects.	The study provides empirical evidence that human capital, community resource contribution and capacity of social institutions are important elements of community capacity that enhances sustainability of dairy goat projects.
3. To establish how institutional linkages, influence the sustainability of dairy goat projects in Tharaka Nithi County	Institutional linkages have a significant influence on the sustainability of dairy goat projects. The null hypothesis was rejected	Health service, markets and social institutions influences the sustainability of dairy goat projects and therefore are key design components of dairy goat projects	The study provides empirical evidence on the direct influence of institutional linkages on the sustainability of dairy goat projects. This finding will be presented at the upcoming DeKUT International Conference on Science, Technology, Innovation & Entrepreneurship
4. To establish the extent to which dairy goat project infrastructure influence the sustainability of dairy goat projects in Tharaka Nithi County	Project infrastructure has a significant influence on the sustainability of dairy goat projects. The null hypothesis was rejected	Housing infrastructure, breeding infrastructure, transport, and markets infrastructure play key role in enhancing sustainability of dairy goat projects and should be incorporated in dairy goat project designs	This study provides empirical evidence on the influence of sheltering, transport and market infrastructure on the sustainability of dairy goat projects. Finding from this study have been published in the International Journal of Creative Research and Studies Volume - 2 Issue - 8, August - 2018

To Examine the extent to which the combined project design factors influence the sustainability of dairy goat projects in Tharaka Nithi County	Combined project design factors have a significant influence on the sustainability of dairy goat projects. The null hypothesis was rejected	Project beneficiary selection process, community capacity, institutional linkages and project infrastructure together enhances sustainability of dairy goat projects	From the literature review, studies on the influence of project design factors on the sustainability of dairy goat projects are missing. This study provides empirical literature on project designs so that sustainability of such projects is achieved.
To establish how utilization of indigenous knowledge moderates the relationship between the combined project design factors and sustainability of dairy goat projects in Tharaka Nithi County	Combined project design factors and utilization of indigenous knowledge have a statistically significant independent influence on sustainability of dairy goat projects. The null hypothesis was rejected	This significance of the interaction implies that utilization of indigenous knowledge enhances the effect of combined project design factors on the sustainability of dairy goat projects	This study finding provided empirical evidence that utilization of indigenous knowledge cannot be overlooked while designing dairy goat projects. The study recommends a separate study on the direct influence of utilization of indigenous knowledge and sustainability of dairy goat projects
To establish how project leadership moderates the relationship between the combined project design factors and sustainability of dairy goat projects in Tharaka Nithi County	Project leadership have no significant moderating influence on the relationship between project design factors and sustainability of dairy goat projects. The null hypothesis was accepted	Even though a significant influence was not established, other findings indicates the importance of project leadership thus cannot be ignored in dairy goat project designs for sustainability	The study empirically provided evidence that project leadership has a moderately significant moderating influence. This therefore probes the need for further study to establish the direct relationship between project leadership and sustainability of dairy goat projects.

5.6 Suggestion for Further Research

The current study focused on examining the relationship between project design variables and the sustainability of dairy goat projects. The study also examined the moderating effect of the utilization of indigenous knowledge and Project leadership on the relationship between the project design factors and sustainability of dairy goat projects. Empirical information has been advanced by this study and at the same time, new areas of further research identified. Further areas of study have been proposed as follows:

1. Review of literature for this study established that there exist many related dairy goat projects in different Counties in Kenya. This study, therefore, recommends a similar study to be conducted in other counties. This will provide an opportunity for comparative understanding from different perspectives and study locations.
2. The study established that a very small percentage of youth were involved in dairy goat project. The objectives of this study were not aligned with establishing the factors that influence this behavior. This study suggests that a full research is conducted in the same area to establish factors influencing youth participation in dairy goat projects.
3. The study established that utilization of indigenous knowledge and project leadership has a moderating influence on the relationship between project design factors and sustainability of dairy goat projects. This new knowledge is paramount and can form a basis for a new study on the direct influence of project leadership or direct influence of utilization of indigenous knowledge on the sustainability of dairy goat projects.
4. This study focused on the influence of project design factors on the sustainability of dairy goat projects. Data collected from focus group discussions indicated community factors that may influence the sustainability of dairy goat projects. Since this study was limited to project design factors, a study on the influence of community factors on the sustainability of dairy goat projects will add value.

5. Another area of research could be to establish the economic viability of smallholder dairy goat farming as an enterprise. This will be useful in advocating for recognition of dairy goat production in policy and National and County development plans.

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APPENDICES

Appendix I: Letter of Introduction

Kikwatha Reuben Wambua
P.O Box 2859 -00200
Nairobi
24th October 2016

To
The respondent
P. O Box ……
Tharaka Nithi
Dear sir/madam

Re: Letter of Introduction,

I am a doctorate student at the University of Nairobi pursuing a degree in Doctor of Philosophy in Project Planning and Management specializing in project planning, design and implementation. Having completed my course, and as part of the university requirement for a successful completion of my doctorate studies, I am working on my thesis. The topic of my thesis is: ***Project Design Factors, Utilization of Indigenous Knowledge, Project Leadership and Sustainability of Dairy Goat Projects in Tharaka Nithi County, Kenya.***

Your group has been selected to provide key information required and consequently you have been selected for participation in this study. I have attached a questionnaire which I humbly request you to fill and return to me for further processing. Information obtained from you will be treated with uttermost confidentially and shall be used for academic purposes only. I take this opportunity to thank you for your time and cooperation and look forward to working closely with you towards the success of this study

Yours Faithfully

Kikwatha Reuben Wambua

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0721443860
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Appendix II: Questionnaire for Dairy Goat Farmers

This questionnaire is designed to gather information on Project Design factors, Utilization of Indigenous Knowledge, Project Leadership and Sustainability of Dairy Goat Projects in Tharaka Nithi County, Kenya. The questionnaire contains eight sections A, B, C, D, E, F, G, and H.

SECTION A: Personal Information

This section contains items on personal profile of dairy goat farmers. Kindly tick appropriately on the provided space.

1. Please indicate your sub-county……...Location……
2. Name ……**(Optional)** Contact ……. **(Optional)**
3. Please indicate your gender
   (a) Female ( )
   (b) Male ( )
4. Are you a member of a Group?
   Yes ( ) Name of group
   ……
   No ( ) Reasons
   ……..……
5. Please indicate your position in the group
   (a) Chairperson ( ) (d) Vice chairperson ( )
   (b) Secretary ( ) (e) Vice secretary ( )
   (c) Treasurer ( ) (e) Member ( )
6. What is your age bracket?
   (a) Below 30 years ( ) (c) 40 – 49 years ( )

(b) 30 – 39 years ( ) (d) 50 years and above ( )

7. How old is this group that you belong to?

(a) 1 and below years ( ) (d) 3 – 4 years ( )

(b) 1 – 2 years ( ) (e) 4 – 5 years ( )

(c) 2 -3 years ( ) (e) 5 and above years ( )

8. How long have you been keeping dairy goats?

(a) 1 and below years ( ) (d) 3 – 4 years ( )

(b) 1 – 2 years ( ) (e) 4 – 5 years ( )

(c) 2 -3 years ( ) (e) 5 and above years ( )

SECTION B: Sustainability of dairy goat projects

This section contains items on the sustainability of dairy goats in Tharaka Nithi County

9. Using your own understanding and opinion, kindly rate the following statements using a scale of 1 to 5 where 1= strongly disagree, 2= Disagree 3 = Neutral, 4 = Agree and 5 = Strongly Agree.

	Statement	SD	D	N	A	SA
		1	2	3	4	5
9a	Dairy goat project has been effective and resilient since inception	1	2	3	4	5
9b	Dairy goat project can continue without external financial support	1	2	3	4	5
9c	The dairy goat project initial inputs has trickled down "pass on" to other beneficiaries	1	2	3	4	5
9d	Dairy goat breeding technology has been adopted and practiced	1	2	3	4	5
9e	Dairy goat project is widely accepted and owned by the community	1	2	3	4	5
9f	Beneficiaries actively participate in project decision making	1	2	3	4	5
9g	Relevant community institutions support the dairy goat project	1	2	3	4	5
9h	Community leadership supports dairy goat project	1	2	3	4	5
9i	Project beneficiaries social - economic status has improved due to the project	1	2	3	4	5
9j	Dairy goat project has no negative environmental implication	1	2	3	4	5

SECTION C: Project beneficiary selection process

This section contains items on the dairy goat project beneficiary selection process in Tharaka Nithi county

10. Using your own understanding and opinion, kindly rate the following statements using a scale of 1 to 5 where 1= strongly disagree, 2= Disagree 3 = Neutral, 4 = Agree and 5 = Strongly Agree.

Statement		SD	D	N	A	SA
		1	2	3	4	5
10a	Project beneficiaries selection was fair and transparent	1	2	3	4	5
10b	Project beneficiaries are involved in selection process	1	2	3	4	5
10c	Beneficiary selection tools are clear and well understood	1	2	3	4	5
10d	Project beneficiaries are involved in need analysis	1	2	3	4	5
10e	Project addressed priority needs	1	2	3	4	5
10f	Beneficiary needs are reviewed periodically	1	2	3	4	5
10g	Project beneficiaries composition is gender inclusive	1	2	3	4	5
10h	Project beneficiaries integrates people with special needs	1	2	3	4	5
10i	Project beneficiary selection is sensitive to social economic class	1	2	3	4	5
10j	Project beneficiary composition is age sensitive	1	2	3	4	5

Section D: Community Capacity

This section contains items on the community capacity in dairy goat project in Tharaka Nithi

11. Using your own understanding and opinion, kindly rate the following statements using a scale of 1 to 5 where 1= strongly disagree, 2= Disagree 3 = Neutral, 4 = Agree and 5 = Strongly Agree.

	Statements	**SD**	**D**	**N**	**A**	**SA**
		1	**2**	**3**	**4**	**5**
11a	Dairy goat farmers are commitment to participate in dairy goat project	1	2	3	4	5
11b	Dairy goat farmers have the right skill for dairy goat management	1	2	3	4	5
11c	Dairy goat farmers have attained good level of academic education	1	2	3	4	5
11d	Dairy goat farmers have the capacity to train others farmers	1	2	3	4	5
11e	Dairy goat farmers are committed to make financial contribution	1	2	3	4	5
11f	Dairy goat farmers have the capacity to make contribution in kind	1	2	3	4	5
11g	Dairy goat project have the capacity to sustained project without external resource support	1	2	3	4	5
11h	There are strong dairy goat farmer groups to support dairy goat project	1	2	3	4	5
11i	Dairy goat farmer groups have good knowledge on group dynamics	1	2	3	4	5
11j	Dairy goat farmer groups are well networked with each other for peer support	1	2	3	4	5

SECTION E: Institutional Linkages

This section contains items on the institutional linkages in dairy goat project in Tharaka Nithi

12. Using your own understanding and opinion, kindly rate the following statements using a scale of 1 to 5 where 1= strongly disagree, 2= Disagree 3 = Neutral, 4 = Agree and 5 = Strongly Agree.

	Statements	**SD**	**D**	**N**	**A**	**SA**
		1	**2**	**3**	**4**	**5**
12a	Dairy goat health services are readily available	1	**2**	**3**	**4**	**5**
12b	Dairy goat health services are of acceptable quality	1	**2**	**3**	**4**	**5**
12c	Dairy goat veterinary services are affordable	1	**2**	**3**	**4**	**5**
12d	Dairy goat farmers have ready access to dairy goat markets.	1	**2**	**3**	**4**	**5**
12e	Dairy goat farmers have access to the right market information	1	**2**	**3**	**4**	**5**
12f	Dairy goat market facilities are favorable to dairy goats needs	1	2	3	4	5
12g	Dairy goat farmers are well linked to the government departments for market support	1	**2**	**3**	**4**	**5**
12h	Dairy goat farmer groups are linked to community leaders for support	1	**2**	**3**	**4**	**5**
12i	Dairy goat self-help groups are well linked and support each other	1	**2**	**3**	**4**	**5**
11j	Dairy goat farmers are well linked to social enterprises to promote dairy goats	1	**2**	**3**	**4**	**5**

SECTION F: Project Infrastructure

This section contains items on the Project Infrastructure in dairy goat project in Tharaka Nithi

13. Using your own understanding and opinion, kindly rate the following statements using a scale of 1 to 5 where 1= strongly disagree, 2= Disagree 3 = Neutral, 4 = Agree and 5 = Strongly Agree.

	Statements	SD	D	N	A	SA
		1	**2**	**3**	**4**	**5**
13a	Dairy goat farmers have the skills to construct dairy goat houses/shelters	1	**2**	**3**	**4**	**5**
13b	Material for dairy goat housing is readily available	1	**2**	**3**	**4**	**5**
13c	Dairy goat house/shelter maintenance is affordable	1	**2**	**3**	**4**	**5**
13d	Dairy goat breeding facilities are appropriate	1	**2**	**3**	**4**	**5**
13e	Dairy goat breeding facilities are within reach of the community	1	**2**	**3**	**4**	**5**
13f	Dairy goat breeding tools and equipment's are readily available	1	**2**	**3**	**4**	**5**
13g	Transport infrastructure is favorable for dairy goat transportation	1	**2**	**3**	**4**	**5**
13h	Means for transportation of dairy goats is sufficiently available	1	**2**	**3**	**4**	**5**
13i	Dairy goats farmers are happy with market arrangement	1	**2**	**3**	**4**	**5**
13j	Dairy goat markets have suitable infrastructures	1	**2**	**3**	**4**	**5**

SECTION G: Utilization of Indigenous Knowledge

This section contains items on the utilization of indigenous knowledge in dairy goat projects in in Tharaka Nithi

14. Using your own understanding and opinion, kindly rate the following statements using a scale of 1 to 5 where 1= strongly disagree, 2= Disagree 3 = Neutral, 4 = Agree and 5 = Strongly Agree.

Statement		SD	D	N	A	SA
		1	2	3	4	5
14a	Dairy goat farmers prefer indigenous methods of treating their animals when sick	**1**	**2**	**3**	**4**	**5**
14b	Use of indigenous knowledge was integrated in the dairy goat project design	**1**	**2**	**3**	**4**	**5**
14c	Indigenous animal health services are readily available and affordable to many dairy goat farmers	**1**	**2**	**3**	**4**	**5**
14d	Dairy goat farmers use the traditional method of feeding dairy goats	**1**	**2**	**3**	**4**	**5**
14e	Dairy goat farmers practice free ranging methods of goat keeping	**1**	**2**	**3**	**4**	**5**
14f	Dairy goat farmer practice both modern and indigenous husbandry methods	**1**	**2**	**3**	**4**	**5**
14g	Indigenous goat breeding practices are preferred than the modern practices	**1**	**2**	**3**	**4**	**5**
14h	Indigenous practices has interfered with the adoption of the new dairy goat technology	**1**	**2**	**3**	**4**	**5**
14i	Indigenous method of dairy goat product preservation is practiced by dairy goat farmers	**1**	**2**	**3**	**4**	**5**
14j	Indigenous knowledge promotes value addition on dairy goat products	**1**	**2**	**3**	**4**	**5**

SECTION H: Project Leadership

This section contains items on the Project Leadership in dairy goat projects in Tharaka Nithi

15. Using your own understanding and opinion, kindly rate the following statements using a scale of 1 to 5 where 1= strongly disagree, 2= Disagree 3 = Neutral, 4 = Agree and 5 = Strongly Agree.

Statement		SD	D	N	A	SA
		1	2	3	4	5
14a	Project leaders promote creativity and innovation in the dairy goat project	**1**	**2**	**3**	**4**	**5**
14b	Important project decisions about dairy goat project are made in consultation with beneficiaries	**1**	**2**	**3**	**4**	**5**
14c	Project leaders are strategic thinkers and have good vision for the community	**1**	**2**	**3**	**4**	**5**
14d	Project leaders understands the needs of the project beneficiaries	**1**	**2**	**3**	**4**	**5**
14e	Project leaders are open and transparent on project finance matters	**1**	**2**	**3**	**4**	**5**
14f	Project leaders sacrifice their time and resources for the benefit of the dairy goat project	**1**	**2**	**3**	**4**	**5**
14g	Project leaders are more focused on the results than the beneficiaries welfare	**1**	**2**	**3**	**4**	**5**
14h	Project leaders motivate people by reward good performance	**1**	**2**	**3**	**4**	**5**
14i	Project leaders consider service to beneficiaries as their priority	**1**	**2**	**3**	**4**	**5**
14j	Project leaders have great respect to the project beneficiaries	**1**	**2**	**3**	**4**	**5**

Thank you very much for your co-operation and participation

APPENDIX III: Interview Schedule for Key Informants

Section A: Personal information

1. **Gender** Male ( ) Female ( )
2. **Age** 19 years and below ( ) 20-29 years ( ) 30-39 years ( ) 40-49 years ( ) 50 years and above
3. **Work station ……**
4. **Work experience with dairy goat projects**

Up to one year ( ) one year to 5years ( ) 5 years to 10 years ( ) More than 10 years

5. Position at the workplace……

Section B: Sustainability of dairy goat projects

6. What are some of the indicators of sustainability that you can point out in the dairy goat project?
7. In your opinion, what are some of the challenges do the dairy goat project face?
8. What do you think should have been done different in the design of the dairy goat project?

Section C: Project beneficiary selection and Sustainability of dairy goat projects

9. Can you comment about the level of community involvement in the design and application of beneficiary selection tools?
10. In your opinion, in which ways was the beneficiary selection process supportive to the sustainability of the dairy goat project?
11. To what extent can you say that the dairy goat project is inclusive in terms of women, youth and people with disability?
12. Comment on the extent to which the needs of the community were incorporated in the design of the dairy goat project?

Section D: Community Capacity and Sustainability of dairy goat projects

13. In your opinion, do you think dairy goat farmers have the necessary capacity to sustain the dairy goat project?
14. How do the community support the project in terms of resource contribution?

15. In which ways does community capacity contribute to sustainability of dairy goat projects in Tharaka Nithi county?

Section E: Community Institutional Linkage and Sustainability of dairy goat projects

16. In your opinion, is the market arrangement for dairy goat sufficient in this County?
17. What type of social structures that support dairy goat project?
18. How are the various community institutional structures linked to support the dairy goat project?

Section F: Dairy Goats Infrastructure and Sustainability of dairy goat projects

19. How is the level of dairy goat housing technology adoption? And what challenges do the dairy goat farmers experience?
20. Do you think dairy goat farmers have the necessary tools and equipment for dairy goat management?
21. What is your comment on the dairy goat market infrastructure?

Section G: Indigenous Knowledge and Sustainability of dairy goat projects

22. From your experience, what are some of indigenous knowledge that may affect adoption of new livestock technologies?
23. What can you comment about the integration of indigenous knowledge and modern technology for sustainability of dairy goat projects?

Section H: Leadership and Sustainability of Dairy Goat Projects

24. What can you comment about the leadership style of the dairy goat project?
25. What are the leadership challenges that exist in the dairy goat project?

APPENDIX IV: Focus Group Discussion Guide

1.1 Project Sustainability

1.2 From your own understanding, how has the dairy goat project impacted on the dairy goat farmers

1.3 How many goats did the project produce over the last few years? And how many did you pass on to others

1.4 Is the project fully owned and supported by the community without much external support?

2.0 Project Design

2.1 Based on your knowledge, what can you say about dairy goat project beneficiary selection process, the tools and methods used as well as the gender composition of the dairy goat project?

2.2 What is the level of dairy goat farmer's capacity in terms of their human capital, ability to contribute resources and strength of groups in managing the dairy goa project?

2.3 How Is the community linked to key support institutions like dairy goat health services, , dairy goat markets and social institution?

2.4 What can you comment about project infrastructure for dairy goats?

3.0 Utilization of Indigenous Knowledge

3.1 If the modern and conventional medicine was not there, do you think the dairy goat project would succeed? Explain your answer

3.2 Do you think informal knowledge has any contribution to the sustainability of the dairy goat project?

4.0 Project Leadership

4.1 What is the style of leadership practices by the majority of the dairy goat project leaders?

4.2 What leadership elements or traits would you suggest be improved or changed?

Figure 2; Krecie and Morgan Table

Table for Determining Sample Size for a Given Population

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384

Note: "N" is population size
"S" is sample size.

Source: Krejcie & Morgan, 1970

Appendix V: Authorization letter

UNIVERSITY OF NAIROBI
COLLEGE OF EDUCATION AND EXTERNAL STUDIES
SCHOOL OF CONTINUING AND DISTANCE EDUCATION
DEPARTMENT OF EXTRA-MURAL STUDIES
NAIROBI EXTRA-MURAL CENTRE

Your Ref:

Our Ref:

Telephone: 318262 Ext. 120

REF: UON/CEES//NEMC/25/200

Main Campus
Gandhi Wing, Ground Floor
P.O. Box 30197
N A I R O B I

24th February, 2017

TO WHOM IT MAY CONCERN

RE: KIKWATHA REUBEN WAMBUA -REG NO – L83/93804/2014

This is to confirm that the above named is a student at the University of Nairobi, College of Education and External Studies, School of Continuing and Distance Education, Department of Extra- Mural Studies pursuing Doctor of Philosophy in Project Planning and Management.

He is proceeding for research thesis entitled "**project design factors, utilization of indigenous knowledge, project leadership and sustainability of dairy goat projects in Tharaka Nthi County,Kenya** ."

Any assistance given to him will be highly appreciated.

UNIVERSITY OF NAIROBI P.O Box 30197. 24 FEB 2017 NAIROBI NAIROBI EXTRA MURAL CENTRE

DR. JOHN MBUGUA
RESIDENT LECTURER
NAIROBI EXTRA MURAL CENTRE

Appendix VI: Research Permit

THIS IS TO CERTIFY THAT:
MR. REUBEN WAMBUA KIKWATHA
of UNIVERSITY OF NAIROBI, 0-200
NAIROBI,has been permitted to conduct
research in *Tharaka-Nithi County*

on the topic: *PROJECT DESIGN FACTORS, UTILIZATION OF INDIGENOUS KNOWLEDGE, PROJECT LEADERSHIP AND SUSTAINABILITY OF DAIRY GOAT PROJECTS IN THARAKA NITHI COUNTY*

for the period ending:
9th March,2018

.....
Applicant's Signature

Permit No : NACOSTI/P/17/41333/16128
Date Of Issue : 10th March,2017
Fee Recieved :Ksh 2000

.....
Director General
National Commission for Science, Technology & Innovation

CONDITIONS

1. You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit.
2. Government Officer will not be interviewed without prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.
5. You are required to submit at least two(2) hard copies and one (1) soft copy of your final report.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice

REPUBLIC OF KENYA

NACOSTI

National Commission for Science, Technology and Innovation

RESEACH CLEARANCE PERMIT

Serial No.A 13178

CONDITIONS: see back page