

**SUSTAINABILITY OF COMMUNITY-BASED GOVERNMENT FUNDED  
AGRICULTURAL INFRASTRUCTURE PROJECTS IN TANZANIA: A CASE OF  
DADP COMMUNITY INVESTMENT SUB-PROJECTS IN KOROGWE  
DISTRICT**

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**A THESIS SUBMITTED IN FULFILLMENT OF THE REQUIREMENTS FOR  
THE DEGREE OF DOCTOR OF PHILOSOPHY OF SOKOINE UNIVERSITY OF  
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## ABSTRACT

This study intended to establish the institutional determinants of sustainability of DADP community-based investment sub-projects in Korogwe District. A cross-sectional design was adopted and a mixed methods research approach was used. Three hundred and sixty-one farmers/livestock-keepers participated in the study. The data collection methods which were used included questionnaire survey, focus group discussions, key informant interviews and direct observations. Quantitative and qualitative data analysis approaches were used for data analysis. The key findings show that except for one sub-project; the other sub-projects which were covered in this study were not sustainable. Furthermore, although most of the actors were aware of the concept of sustainability, they still could not demonstrate the knowledge about the concept of sustainability. Key challenges in achieving sustainability of agricultural sub-projects include weak institutional arrangements, poor enforcement of by-laws as well as non-adherence to sub-project constitutions. The analysis revealed further that regular monitoring, accountability of sub-project committee, and decision making process influenced sustainability of the implemented sub-projects. The study concludes that except for one sub-project the other sub-projects covered in this study were not sustainable. Although most actors involved in the implementation of community-based projects were aware of the concept of sustainability, they still could not demonstrate their knowledge about it. Weak institutional arrangements including poor enforcement of by-laws as well as norms and non-adherence of constitutions were the challenges in the management of sub-project. Furthermore, regular monitoring, sub-project committee accountability, decision making, and actors' awareness of their roles significantly influence sustainability of the sub-projects. In view of these observations, the study recommends that assessment of sustainability of the

implemented community-based interventions should be conducted at a local level to ensure that long-term objectives of the interventions are realized. Also, there is a need of building the capacity of actors in the implementation of agricultural interventions to help them gain the knowledge of the concept of sustainability so as to enhance the sustainability of interventions. Strengthening of the institutional arrangements for the implementation of community-based intervention should be given adequate attention to ensure that proper implementation mechanisms are employed to safeguard the sustainability of projects. The factors influencing sustainability such as regular monitoring of activities and accountability of sub-project committees should be given special attention to enhance sustainability of the projects.

## DECLARATION

I, Mjema, Mweta. W. J., do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work done within the period of registration and that it has neither been submitted nor been concurrently submitted in any other institution.

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**DEDICATION**

This thesis is dedicated to the late Mama Minaeli Kimweri, Brother Fadhili J. Kappara, Sister Elizabeth J. Kappara, and Mzee Joseph L. Abdallah for their kind-heartedness.

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## LIST OF ABBREVIATIONS

A-CBG	Agricultural Capacity Building Grant
ADB	Asian Development Bank
A-EBG	Agricultural Extension Block Grant
AIDS	Acquired Immunity Deficiency Syndrome
ASDP	Agricultural Sector Development Programme
ASDP II	Agricultural Sector Development Programme (Phase II)
ASDS	Agricultural Sector Development Strategy
CADS	Community-Based Agricultural Development Sub-projects
CAP	Community Action Plan
CDC	Centre for Disease Control
CDD	Community Driven Development
CIDIN	Centre for International Development Issues Nijmegen
CIS	Community Investment Sub-project
CMT	Council Management Team
D by D	Decentralization by Devolution
DADG	District Agricultural Development Grant
DADPs	District Agricultural Development Plans
DADS	District Agricultural Development Support
DALDO	District Agriculture and Livestock Development Officer
DASIP	District Agricultural Sector Investment Project
DED	District Executive Director
DFT	District Facilitation Team
DPLO	District Planning Officer
ETF	European Training Foundation

FFP	Food for Peace
FGD	Focus Group Discussion
FGIS	Farmer Groups Investment Sub-projects
HIV	Human Immunodeficiency Virus
HoD	Head of Department
IFAD	International Fund for Agricultural Development
IPM	Integrated Pest Management
KII	Key Informant Interview
LGA	Local Government Authority
LGAs	Local Government Authorities
LLGAs	Lower-level Local Government Authorities
M&E	Monitoring and Evaluation
MLDF	Ministry of Livestock Development and Fisheries
NAEP II	National Agricultural Extension Project (Phase II)
NBS	National Bureau of Statistics
NSGRP II	National Strategy for Growth and Reduction of Poverty (Phase II)
NSGRP II	National Strategy for Growth and Reduction of Poverty II
OCS	Office of Chief Government Statistician
ODI	Overseas Development Institute
PADEP	Participatory Agricultural Development and Empowerment Project
PCR	Project Completion Report
PIDP	Participatory Irrigation Development Programme
PMO-RALG	Prime Minister's Office – Regional Administration and Local Government

PO-RALG	President's Office – Regional Administration and Local Government
RAS	Regional Administrative Secretary
SDGs	Sustainable Development Goals
SI	Sustainability Index
SPFS	Special Programme for Food Security
SPSS	Statistical Package for Social Sciences
TANGO	Technical Assistance to NGOs
TBD	Tick-Borne Diseases
TShs	Tanzanian shillings
TSZ	Tanzanian Shorthorn Zebu
UNDP	United Nations Development Programme
URT	United Republic of Tanzania
VADPs	Village Agricultural Development Plans
VDP	Village Development Plan
VEO	Village Executive Officer
WADPs	Ward Agricultural Development Plans
WCED	World Commission on Environment and Development
WDC	Ward Development Committee
WEO	Ward Executive Officer

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background

The concept of sustainability came about in response to economic growth models that characterized development approaches over the last half a century (Costa and Noble, 1999; Meadows *et al.*, 1972; Pirages, 1977; Dragulanescu and Dragulanescu, 2013). On the whole sustainability is considered to be central to development theory and practice (Russell, 1994). Currently, sustainability is commonly used in major national and international declarations and institutional policies for purposes such as supporting decision making and policy making guidance for achieving positive development outcomes.

Despite the efforts which have been made into defining sustainability in absolute and relative terms (Faber *et al.*, 2005), the term has never been easy to comprehend. The World Conservation Strategy coined the term “sustainability” in 1980, but it wasn’t until after the publication of Our Common Future (WCED, 1987), that the word sustainability in conjunction with the notion of development, came to be known as sustainable development (Holden *et al.*, 2014). Nevertheless, sustainable development is the pathway to sustainability, which truly needs to reflect sustainable development (I2UD, 2017; Kuhlman and Farrington, 2010). Although some scholars believe that there is a difference between “sustainable development” and “sustainability” (Holden *et al.*, 2014) the two concepts entail the same dimensions and the same policy implications.

The Brundtland Commission looks at sustainable development as "Development that meets the needs of the present without compromising the ability of future generations to

meet their own needs” (WCED, 1987). After this definition there have been many definitions each of which looking at sustainable development in different subtle ways, each emphasizing different values, priorities and goals (Faber *et al.*, 2005; Pretty, 1995; Watkins, 2014) as well as frameworks for sustainability assessment (Watkins, 2014).

When describing sustainability, there are a number of dimensions that need to be considered and these include institutional/organizational, financial/economical, technical, environmental and social/cultural which enable people to engage in and sustain the development process (ADB, 2010; Wilk, 1991). Any intervention is highly likely to be less sustainable unless enough human and institutional capitals are mobilized to use the new facilities to the optimum (Sfeir-Younis, 1993). In development literature, there is a strong focus on institutions: building institutions, fortifying institutions, and ensuring projects’ integration with the existing institutions (Uvin and Miller, 1994; Edwards and Hulme, 1992; North, 1990). In addition, there is also a need for taking into consideration local structural and institutional factors in the community-based projects (Chibuzo, 2013; Servaes *et al.*, 2012) as well as the need for managing the interventions (Agunga, 1992), which are considered to be important determinants of sustainability (Sfeir-Younis, 1993).

While discussing sustainability in any context, it is important to clarify what is being sustained, for how long, for whose benefit, and at whose cost (including transaction costs), over what area and measured by what criteria. Nonetheless, when specific parameters or criteria such as yields, decision making, or skills and knowledge base which can be made available to farmers are selected, it is possible to conclude whether or not certain trends (trend indicators) in sustainability are steady, going up, or going down (Pretty, 1995). Giving a low priority to sustainability of projects can result in severe consequences (ADB,

2010) such as rapid infrastructural deterioration and increased costs of maintenance, reduction in the level and duration of project benefits; reduction in the quality of services, reduction in the access of particular groups to project benefits, and reduction of focus on institutional development (Bamberger and Cheema, 1990). Nevertheless, the concept of sustainability has been critical to every development intervention at local and global levels, though the dynamics are still poorly understood (Beckmann, 2013) and the factors that foster sustainability are still not sufficiently understood (Savaya *et al.*, 2009). Therefore, much needs to be found out as to what these factors are and how they interact (Stirman *et al.*, 2012).

The Government of Tanzania has been implementing various interventions in the agricultural sector since 1961. These interventions have also been made with the support of Official Development Assistance (ODA) funding amounting to US\$1.069 Billion from 2004 to 2013 specifically in the field of agriculture (IFAD, 2015a). Despite these efforts little is known as regards to the sustainability of the implemented interventions. This is notwithstanding that in 2001; the Government of Tanzania approved the Agricultural Sector Development Strategy (ASDS) which set the framework for achieving the sector's objectives and targets.

In 2006, the Agricultural Sector Development Programme (ASDP) was adopted with the aim of implementing the ASDS. The first phase of the programme covered the period from 2006/2007 to 2012/2013 fiscal years. In its key principles, ASDP envisioned to have an increase of the control of resources by beneficiaries. It stresses on the importance of increasing the voice of farmers in local planning processes and their control in the design and implementation of priority investments and the types of services they need.

Development activities at the national level were based on strategic plans of the line ministries while at the district level these activities were implemented by Local Government Authorities (LGAs). On the basis of District Agricultural Development Plans (DADPs), as part of the broader District Development Plans (DDPs) 75% of the ASDP resources were devolved to the local level (URT, 2006).

According to the District Agricultural Development Plans (DADPs) guidelines, agricultural development project activities were implemented through the Community Investment Sub-projects CIS and Farmer Groups Investment Sub-projects - FGIS (URT, 2011). Apart from the fact that DADPs have been the vehicle for the implementation of ASDS and ASDP, they have also been very crucial for the development of agricultural sector which caters for the livelihood of about 80% of the Tanzanian people (ERSF, UNDP, and URT, 2015; Sulle and Nelson, 2009; URT, 2002). The main objective of the agricultural development interventions in projects on crops and livestock production has been to raise the production of food, incomes, and assets of participating households and groups in a sustainable manner through the implementation of small agricultural development sub projects which are planned and managed by community members and farmers (URT, 2006).

The implementation of DADPs in Tanzania as envisioned in the ASDP was geared towards financing three types of interventions: (i) investments in community infrastructure or productive assets; (ii) provision of public or private agricultural services; and (iii) capacity building for farmers' service providers in the private and public sectors and local government officials (URT, 2006).

In operationalizing the ASDP, the Government of Tanzania concentrated its efforts and resources towards formulation and implementation of District Agricultural Development

Plans (URT, 2004). In 2002, the government commenced the preparatory work for the formulation of DADPs.

In 2003, the government embarked on the implementation of ASDP's local component of DADPs with its own budget (CONCERN, 2009) covering 90 districts, with the aim of covering the whole country in the financial year 2004/2005 (URT, 2004). Kilindi, Handeni, Korogwe, Lushoto, and Muheza districts in Tanga region were among the first to participate in the implementation of DADPs in the country in the year 2003/2004.

The implementation of these interventions through DADP in Korogwe District Council in 2003/2004 included rehabilitation of four livestock dips at Kwaluma, Kwashemshi, Kwasunga and Changalikwa villages at a total cost of 20 000 000.00 Tanzanian shillings. Thereafter, between the financial year 2004/05 and 2005/06, a total of 70 849 525.00 Tanzanian shillings were spent in various community-based agricultural sub-projects (KDC, 2014). Thereafter, a total of 2 086 678 358.00 Tanzanian shillings was disbursed to Korogwe District Council. These funds were spent by various actors including farmers and livestock-keepers on various agricultural development projects such as irrigation, livestock dips, agricultural services, marketing and private sector development, food security and nutrition, and cross cutting issues (KDC, 2014). The funding was implemented through the District Agricultural Development Grant (DADG), the Agricultural Capacity Building Grant (A-CBG), the Agricultural Extension Block Grant (A-EBG), farmers/livestock-keepers contributions and Council contribution. With such a huge funding of community-based projects, it is apparent that sustainability must receive serious attention (ADB, 2010; World Bank, 2007; Honadle and VanSant, 1985).



## 1.2 Problem Statement

Various studies show that community-based projects which are implemented at huge costs experience difficulties with regards to sustainability (ADB, 2010; Akerlund, 2000; Johnson *et al.*, 2004; Kamau, 2014; Oino *et al.*, 2015; World Bank, 2005, 2012). This is because such projects cease to operate after their initial funding runs out (MLDF, 2010; Sequeira and Moharana, 2012; SNV, 2012) resulting in the wastage of human and financial resources that have been invested (Peredo and Chrisman, 2004; Savaya *et al.*, 2009). Moreover, considerations of sustainability for community-based projects have been mostly made on technology, socio-economic, and financial aspects, and little attention has been paid to institutional challenges towards benefits from the projects. As Hounkonnou *et al.* (2012) argues, agricultural development in sub-Saharan Africa has underestimated the crucial role of the institutional setting, and hence, it has overestimated the value of technological investment. A study by Oino *et al.* (2015) on the dilemma in sustainability of community-based projects in Kenya focused on socio-cultural, political, economic and technical factors and how such factors affect sustainability of community-based projects.

Globally, studies on sustainability of community-based projects have been carried out mostly in Asia (ADB, 2010), Latin America and parts of Sub Saharan Africa (IFAD, 2007; World Bank, 2012). In Tanzania, studies on the assessment of sustainability of community-based projects have largely focused on the water sector (Jiménez and Pérez-Foguet, 2010; Cleaver and Toner, 2006). Even where such sustainability studies have been reported, most of them were based on Project Completion Reports (PCR) at a time when outputs and revenues have started to be generated, though the outcomes may have not yet been directly observable. In addition, in the agricultural sector, the assessment of agricultural projects such as the National Agricultural Extension Project (NAEP II), Special Programme for Food Security (SPFS) and Participatory Agricultural Development

and Empowerment Project (PADEP) have only been limited to the aspects of production, productivity, and farmers' income. As such, the inadequacy of empirical data or evidence on sustainability of community-based projects necessitated this investigation. Thus, the present study investigated the sustainability of community-based agricultural infrastructure projects, with the intent of generating empirical knowledge and identifying factors that influence sustainability of such projects.

### **1.3 Justification**

The undertaking of this study was justified because the Government of Tanzania and development partners have been funding the implementation of agricultural intervention by farmers and livestock-keepers for a long time. By investigating the institutional determinants of sustainability, this study makes a significant contribution of knowledge to the existing literature on sustainability of community-based agricultural development projects. The findings of the study are expected to provide the impetus for further empirical investigation relating to the sustainability of community-based agricultural development interventions. Moreover, the findings will be useful in the formulation of evidence based policies to; policy makers, practitioners, planners and the community in project planning and implementation.

### **1.4 Objectives of the Study**

#### **1.4.1 Overall objective**

Establish the institutional determinants of sustainability of agricultural community-based investment sub-projects in Korogwe District.

#### **1.4.2 Specific objectives**

- (i) To determine the level of sustainability of the implemented agricultural community-based investment sub-projects after donor funding in Korogwe District.

- (ii) To determine the perception among actors of the sustainability of agricultural community-based investment sub-projects in Korogwe District.
- (iii) To analyse the institutional arrangements for the management of agricultural community-based investment sub-projects in Korogwe District.
- (iv) To determine the institutional factors influencing the sustainability of agricultural community-based investment sub-projects implemented in Korogwe District.

### **1.4.3 Research questions**

The study is guided by the following research questions:

- (i) What is the level of sustainability of the implemented agricultural community-based investment sub-projects after donor funding in Korogwe District?
- (ii) What is the perception of sustainability among actors of community-based investment sub-projects in Korogwe District?
- (iii) What are the institutional arrangements for management of community-based investment sub-projects in Korogwe District?
- (iv) What are the institutional factors influencing the sustainability of community-based investment sub-projects in Korogwe District?

### **1.5 Limitations of the Study**

Some difficulties were encountered in conducting this study. At the District Council offices, some information on such things as village maps was not easily accessible. In addition, some of the respondents had moved out of the villages for various reasons. However, efforts were made to reschedule the work plan and ask for assistance from local leaders and VEOs to make arrangements that enabled us to meet a good number of respondents for interview.

## **1.6 Organization of the Thesis**

This thesis is divided into five chapters each of which is subdivided into sections and sub sections. Chapter 1 covers the introduction and presents the background to the problem, statement of the problem, justification, objectives of the study, the conceptual framework that guided the study, significance of the study, and the limitations of the study. Chapter 2 reviews the literature relating to the study. Chapter 3 presents the research methodology; in particular, it describes the location and geographical description of the study area, and data collection approaches used in the study. Lastly, the chapter describes the sampling procedures, sample size, and data processing and analysis. Chapter 4 presents and discusses the results of the study. In Chapter 5, conclusions are drawn and recommendations are made on enhancing sustainability of the implemented community-based donor funded agricultural development projects.

## **CHAPTER TWO**

### **REVIEW OF LITERATURE**

#### **2.1 Definition of Basic Concepts**

##### **2.1.1 Sustainability**

The concept of sustainability has gained prominence since the publication of the Brundtland Commission Report of 1987 (WCED, 1987) in line with the overarching concept of "sustainable development" (Velten *et al.*, 2015). The World Commission on Environment and Development (1987) defines sustainability as 'forms of progress that meet the needs of the present without compromising the ability of future generations to meet their needs'. This broad definition emphasizes the aspect of future generation as a basic element of sustainability (Silvius *et al.*, 2012).

Nevertheless, the concept of sustainable development implies that there are limits on environmental resources and the ability of the biosphere to absorb human activities. These limits are seen to have roots in technological inadequacies and inequitable social organization. Thus, sustainable development must entail: a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs. Moreover, the changing nature of institutions and laws need to reflect the interconnectedness of environmental and economic problems (WCED, 1987).

Since the Brundtland Commission's commonly accepted the definition of sustainability in the context of sustainable development, other definitions of sustainability have been given. Such definitions as related to project or programme include: "The continuation of benefit flows to rural people with or without the programmes or organizations that stimulated

those benefits in the first place” (Honadle and VanSant, 1985: 2), “The capacity of a project to continue to deliver its intended benefits over a long period of time” (Bamberger and Cheema, 1990:7). “The continuation of benefits after major assistance from a donor has been completed” (AusAID, 2000); “The ability of a project to maintain its operations, services and benefits during its projected life time” (Khan, 2000); “The likelihood that the benefits from an intervention will be maintained at an appropriate level for a reasonably long period of time after the withdrawal of donor support” (Sida 2007). “The probability that human, institutional, financial, and natural resources are sufficient to maintain the outcome achieved over the economic life of the project and that any risks need to be or can be managed” (ADB, 2010); and “An assessment of the likelihood that actual and anticipated results will be resilient to risks beyond the project’s life” (IFAD, 2015b: 69). The IFAD definition do acknowledge that the assessment of sustainability entails determining whether or not the results of the project will be sustained even in the long-term after the project has been handed over to the community concerned.

In general, according to Khan (2000), sustainability of a project concerns itself with; the level of continuation of the delivery of project goods and services, changes stimulated/caused by the project, and new initiatives caused by the project. However, sustainability can be influenced by (i) Continued operation and maintenance of project facilities, (ii) Continued flow of net benefits, (iii) Continued community participation/involvement, (iv) Equitable sharing and distribution of project benefits (v) Institutional stability, and (vi) Maintenance of environmental stability.

From the given definitions with regard to sustainability of programmes or projects, the aspect of ‘benefit(s)’ dominates. Therefore, in the context of donor-funded development

programs and projects, sustainability can be defined as: the continuation of benefits after major assistance from a donor has been completed/withdrawn (Okun, 2009). The key points to note in this definition are; the focus is on sustaining the flow of benefits into the future rather than on sustainable programs (Sabbil and Adam, 2015).

In this respect, from the goals and objectives of DADPs as well as the implemented sub-projects, it is expected that resources are available to maintain the achieved outcomes. This is because having an infrastructure in place (output) does not guarantee the flow of benefits or maintenance of the outcomes. In fact, sustainability of any project should be judged by its achievement and that any risks can be managed. Therefore, the definition given by ADB (2010) is adopted in this study.

### **2.1.2 Institutions**

Worldwide, development practitioners and scholars such as Hodgson (2006) and North (1990) argue that, the concept of institution is difficult and subject to considerable number of definitions. However, the term has a long history of usage in the social sciences, dating back to Giambattista Vico in his *Scienza Nuova* of 1725. Even today, there is no consensus on the definition of the term institution (Hodgson, 2006) though literature is replete with definitions of institutions (Lawrence and Suddaby, 2006). As Bell (2002) notes, although debate continues on how best to define institutions and institutional boundaries, it is perhaps best not to think of an institution as a ‘thing’ but as a process or a set of processes which shape behaviour. Bell (2002) observes further that, there is a broad agreement [that] in defining institutions in these terms there is need to focus not only on *formal* institutions and practices but also on *informal* routines or relationships.

North (1990) provides the most common definition of institutions, as “rules and norms that constrain human behaviour” or as “humanly devised constraints that structure political, economic and social interaction. They consist of both informal constraints (sanctions, taboos, customs, traditions, and codes of conduct) and formal rules (constitutions, laws and property rights).” Scott (2001, p. 49) defines institutions as “multifaceted, durable social structures, made up of symbolic elements, social activities, and material resources”. McFadden *et al.* (2010) defines institutions as systems of either formal or informal rules that define the boundaries of any institution. Furthermore, the author views institutions as consisting of “cultured-cognitive, normative and regulative elements that provide stability and meaning to social life and are transmitted by various types of carriers, including symbolic systems, relational systems, routines and artefacts” and they “operate at multiple levels of jurisdiction”.

North (1990) categorises institutions as informal (e.g., norms, habits, and customs), semi-formal (e.g., mental constructs and models, rules of the game, conventions), and formal (e.g., family, prescriptions, proscriptions, corporation, trade unions, the state) phenomena, the way in which individuals should interrelate and act. As noted by Vatn (2006), some authors consider institutions as a system of rights, rules, decision-making procedures, and programmes that give rise to social practices, assign roles and guide interactions among the actors. Moreover as Ahrens (2002) argues, in their most generic form, institutions are characterized by having enforceable norms, rules, and behaviours that serve collective purposes and structure and constrain social interaction.

Furthermore, institutions are considered as underlying permanent/durable and internalized patterns of rules or acts, regulations, by-laws, code of conduct norms, and can be unwritten such as norms, values, customs, and orientations that implicitly assume a regulatory function in a society (Scott, 2004; Wolfenden and Attard, 2007). However, as



emphasized by Parto (2005), what should come through the definitions of institutions is that institutions can be more or less formal phenomena that structure different levels of inter-relation, territorial scales of governance, and systems.

Generally, institutions account for the framework within which actors operate and interact in pursuit of their aims (Zilber, 2012; Jütting, 2003). This is to say that, institutions are recognized as important elements underlying all social, organizational and even individual processes of change, and remain one of the gateways to either positive or negative actions. The role played by institutions is so broad, such that taking institutions as a point of departure in developmental approaches has not yet led to a coherent approach. Instead, institutional factors are often overlooked in project or programme design, or are addressed only at the organizational level or within the framework of formal institutions – through laws and regulations. Institutions can either empower or restrain actors' behaviour making them more or less capable of adhering to the rules in place. In fact, actors' behaviour towards the implementation of development activities can influence the sustainability of the intervention.

As emphasized by Scott (2001), in order for an institution to be stable and provide meaning to social life together with associated activities and resources, it must have foundations in three recognized elements: regulative (rules) that focus on normative (norms and values), and cultural-cognitive (culture). These have traditionally been used to explain stability and similarity in a given population or a field of organizations (Palthe, 2014). It is accepted that the regulative element of institutions, do constrain and regularize behaviour; and emphasizes conformity to *legal* systems as the bases of legitimacy (Scott, 2007; Palthe, 2014). However, the normative element stresses on the *moral* (*normative rules*) that prescribe rights and privileges as well as responsibilities and duties as the bases

for assessing legitimacy. On the other hand, the cognitive element emphasizes on the *cultural* legitimacy that comes from adopting a shared mind set or conceptions that constitute the nature of social reality and the frames through which meaning is interpreted (McFadden *et al.*, 2010; Palthe, 2014). Moreover, institutions support and empower actors. Institutions do provide guidelines and resources for taking action as well as prohibitions and constraints on action, and this provides a room for sustainability of human activities (Jackson, 2010).

While taking into account Scott's (2001) conception of institutions and institutional arrangements, institutional arrangements are likely to combine regulative, normative, and cognitive processes in varying degrees as the combination of formal constraints, informal rules, and their enforcement characteristics. Therefore, the focus of this study is on the role of institutional arrangements and how it influences the management and sustainability of community-based agricultural development projects.

### **2.1.3 Institutional Arrangements**

According to UNDP (2014), institutional arrangements are the policies, systems, and processes that organizations use to legislate, plan and manage their activities efficiently and to effectively coordinate with others in order to fulfil their mandate. Institutional arrangements refer to the structure that humans impose on their dealings with each other (hence the reference to the state of play); while institutional environment refers to the "rules of the game" that could be formal and explicit (constitutions, laws etc.) as well as informal and implicit (norms, customs). ETF (2014) defines institutional arrangements as the organization of policies, rules, norms and values that countries have in place to legislate, plan and manage the execution of development, the rule of law, the measurement of change, and other such functions of the state. Lamb (2007) considers institutional

arrangements as the collection of laws, regulations, policies, and organizations that pertain to a particular policy question. Lin (1987) defines institutional arrangements as a set of behavioural rules that governs a specific pattern of action and relationships.

An institutional arrangement can be formal or informal. For example, formal institutional arrangements are firms, governments, money and so on, and in contrast, values, ideologies, and customs are just a few examples of informal institutional arrangements (Lin, 1987). In addition, according to the World Bank (2015), institutional arrangements may range from formal to informal, with varying degrees of authority, accountability, and responsibility for coordination, handover, and delivery.

Moreover, according to North (2005), institutional arrangements are the combination of formal constraints, informal rules, and their enforcement characteristics, which include official sanctions, such as criminal punishment, fines, incarceration, self-enforcement mechanisms of obligation, expectations of reciprocity, internalized norm adherence (standard operating procedures), boycotting, shaming, and threats (North, *op. cit.*). In fact, institutional arrangements can reflect the strength of an institution (Williamson, 2009). The enforcement characteristics that will produce the desired results are quite important, as the structure and procedures to implement an intervention are very much determined by the characteristics of the institution involved and the functions to be performed.

These institutional arrangements are simultaneously shaped at local, regional and (inter)national levels and mutually influence each other within a framework of complex inter-linkages and strategic feedbacks. Institutional arrangements are shaped by economic exchange, socio-cultural norms and political regimes, and may provide welfare, identity, solidarity and a sense of belonging (CIDIN, 2015). Moreover, as emphasized by the

World Bank (2015), determining the optimum institutional structures is a key to the success of a project. Hence, strong institutional arrangements are essential to develop resources further such as making more finances available through increasing the willingness of participants and communities to contribute or pay for the services offered or to educate and train the actors. On the other hand, weak institutional arrangements may result in serious inefficiencies in the implementation of an intervention. Very often, development intervention performs poorly because of inappropriate or rigid institutional arrangements (Mahonge, 2013).

In the context of this study, institutional arrangements include institutional capacity (rules – by-laws and norms, procedures, roles and responsibilities of actors, law enforcement mechanisms, and management capacity of sub-projects) as well as institutional strengths (transparency, accountability, monitoring, and decision making). By its nature, institutional arrangements appear in every aspect of development and public sector management (ETF, 2014). It is worthwhile to note that an institutional arrangement may at the same time perform several functions such as alleviation of problems of cheating, free-riders, moral hazards or shirking as well as monitoring, enforcement, and so forth with significant benefits (Greiner *et al.*, 2016; Lin, 1987).

The performance of various institutional arrangements during project implementation is a good guide to their ability to sustain project interventions after the closure of the project as it promotes sustainability (IFAD, 1993; 1995). In general, institutional arrangements can reflect the strength of an institution (Williamson, 2009). However, institutional arrangements if not carefully monitored and regulated may become a significant impediment to the sustainability of development interventions (Parto, 2005).

## **2.2 Theoretical Review**

The current study was anchored on institutional theory. The theory considers the processes by which structures including rules, norms, and routines, become established as authoritative guidelines for social behaviour (Scott, 2004). According to this theory, local actors (i.e. organizations or national states) are seen as being affected by the institutions, which are built up in much wider environments (Meyer, 2007).

Institutional theory in general, represents a powerful theoretical lens that explains sustainability of specific interventions such as community-based development projects and clarifies the relationships between community-based development projects and institutional arrangements which are in place. It is one of these institutional approaches that recognize the importance of the context in which development interventions are embedded and help to understand the influence of various factors on their implementation.

According to Lawrence and Shadnam (2008), institutional theory is a theoretical framework for analysing social (particularly organizational) phenomena, which views the social world as significantly comprised of institutions – enduring rules, practices, and structures that set conditions for action. Lawrence and Shadnam (2008) observed further that institutions are fundamental in explaining the social world because they are built into the social order, and direct the flow of social life. Hence, institutions are constants that determine the rules of variation, and they are not everywhere and for everyone; rather, they are situated within specific social contexts and condition action within those contexts.

Institutional theory is associated with the works of Meyer and Rowan (1977) who argue that, in modern societies, organizations are in a highly institutionalized context of various professions, policies, and programs, which serve as powerful myths. They establish that

the formal organizational structure has a symbolic aspect in addition to its functional aspect, and this symbolic aspect is influential in both the decision to adopt a structure and in gaining legitimacy and better survival chances (Lawrence and Shadnam, 2008). Based on the seminal works including that of Meyer and Rowan (1977) in the area of organization theory and DiMaggio and Powell (1983) in the analysis of institutional processes, extensive work has been published under the banner of institutional theory, particularly in the area of organization studies (Lawrence and Shadnam, 2008).

Thereafter, institutional theory has been employed in many areas with a variety of methodological and epistemological approaches. Similarly, researchers using both quantitative and qualitative methods have employed institutional theory. As a result, institutional theory is understood as compatible with many different perspectives and research questions, and has no a common set of constructs or methods (Lawrence and Shadnam, 2008). Nevertheless, according to Lawrence and Shadnam (2008), despite or perhaps because of its wide acceptance, institutional theory is associated with intense, unresolved debates around key constructs and issues. The meaning of the concept institution, for instance, is considered to be overly ambiguous as a result of lack of both theoretical and methodological elaboration on the process of institutionalization. Other researchers express their doubts as to whether or not phenomenology and ethnomethodology can provide a useful micro-sociological foundation for institutional theory. Finally, there is a debate with respect to the intellectual boundaries of institutional theory, with some researchers arguing that institutional theory has expanded beyond its proper domain. Nonetheless, theorists have identified regulative, normative, and cognitive social systems as central elements of institutions (Scott, 2001). These elements act together in mutually reinforcing ways to contribute to the institutional context.

Moreover, the theory is concerned with how various groups and organizations can better secure their positions and legitimacy by conforming to the rules and norms of the institutional environment (Scott, 2007) as well as with the behaviour and effects of institutions and with the process through which institutions are established (Jackson, 2010). Hence, institutional theory is considered as a useful lens in analysing the behaviour of actors because of its ability to respond to empirical disparity, and as it shares the premise that action is largely organized by institutions (Barley and Tolbert, 1997). Institutional theory has been considered as critical in search for sustainable development (Edwards and Hulme, 1992) and sustainability whilst acknowledging that resources are also important (Bruton *et al.*, 2010; Glover *et al.*, 2014). Therefore, the framework of this study is based on institutional theory as it integrates a range of strategies designed to enhance the sustainability of community-based agricultural infrastructure interventions, drawing on regulative institutional supports (e.g. policies, rules- laws or by-laws, regulations, and their enforcement), normative institutional supports (e.g. norms, habits, roles), and cognitive (e.g. values, beliefs, assumptions).

### **2.3 Empirical Review of the Literature**

This subsection focuses on sustainability of community-based agricultural projects, perceptions of sustainability, and institutional arrangements.

#### **2.3.1 Sustainability of community-based agricultural projects**

As indicated by IFAD (2015b), ensuring sustainability of benefits (after project closure) of its operations remains a challenge, with only 62 per cent of the projects rated as moderately satisfactory or better in 2011-2013, out of which 47 per cent were only moderately satisfactory. The report indicates further that 57 per cent of the historically

available independent evaluation ratings for sustainability are in the satisfactory zone, whereas 43 per cent lies in the unsatisfactory zone. However, a large number of projects which were rated satisfactory are in effect only moderately satisfactory and none were highly satisfactory for sustainability. The IFAD report indicates further that, less than sixty per cent of the operations evaluated in 2005-2015 on the sustainability of IFAD-financed projects within the agriculture sector operations of ADB and the World Bank were rated as moderately satisfactory or better for sustainability.

In its special evaluation study on post-completion sustainability of the Bank-assisted projects, the Asian Development Bank, on the sustainability ratings showed that 65% of 491 project completion reports (PCRs) were rated *most likely* or *likely* to be sustainable, which implied a substantial task, after completion, of enhancing the sustainability of the remaining 35%. Several projects which were rated *effective* or *efficient* had a sustainability rating of *less likely* which also implies that there is still a substantial task of ensuring greater sustainability for projects rated *effective* and those rated *efficient*. The agricultural and natural resources sector had several examples of projects rated as *unlikely* to be sustained (ADB, 2010).

Also, a report on the Asian Development Bank-assisted projects in the Asian and Pacific region from 2001-2009 indicated that agricultural and natural resources sector projects, had 46% of sustainability ratings at four points scale of most unlikely and unlikely (ADB, 2010). Also, studies by Suresh Kumar (2011) on 12 micro-watersheds in South India showed that in several watersheds, there was a problem of sustainability. Similarly, in India's implemented watershed projects, Joshi *et al.* (2004) provides evidence that suggested that a long-term sustainability of majority of watersheds was still unsatisfactory. The failure of watershed programme in India to attain sustainability was also revealed by



the Ministry of Agriculture, Government of India. However, Eder *et al.* (2012) assessment on the impact and sustainability of interventions in Bolivia six years post-project found that infrastructure for community water systems (e.g. irrigation) were 30% more likely to have sustained the quality of these systems and facilities over time.

In the African region, the World Bank (2012) studies reported that unsatisfactory and sustainability of donor supported projects have been a major challenge and are considered as a critical issue in the sub-Saharan agriculture. The World Bank (2002) evaluation report indicates that only one in five community-based projects (CBP) including agricultural projects in Africa was likely to be sustainable; this is less than the Africa-wide average of 28%. Furthermore, a study by Mutambara *et al.* (2014) on the stakeholder engagement and sustainability of smallholder irrigation schemes in Zimbabwe revealed that lack of ownership was a major threat to the future functionality and sustainability of the scheme. Similarly, a study by Ali (2011) on sustainability of Nedhi Gelan Sedi small-scale irrigation scheme in Eastern Oromia Region, Deder District found that after 9 years of its construction the sustainability index of the scheme was 1.31, which suggests unsustainability of the intervention.

Coates *et al.* (2016) conducted a study on community-based Food For Peace (FFP) development projects in four countries (Kenya, Honduras, Bolivia, and India) in the technical sectors including agriculture and livestock and found that in Kenya some of the achievements were sustained 2–3 years after the project, while many others were not sustained between the withdrawal of project support and the follow-up study. In Malawi, Hofisi and Chizimba (2013) in their evaluation of community-based projects found that the Ngolowindo Irrigation Project located in Salima District in central Malawi was not sustainable as it failed to sustain the benefits of the intervention.

In Tanzania according to IFAD (2007), Participatory Irrigation Development Programme (PIDP), which were implemented in 12 districts (Kwimba, Misungwi, Maswa, Shinyanga Rural, Igunga, Nzega, Manyoni, Iramba, Dodoma Rural, Mpwapwa, Mbulu and Babati) in Central, Lake Zone and part of Northern Region of Tanzania, were assessed for sustainability, among others. The Completion Evaluation Report showed that the interventions had 4 points of sustainability ratings, that is, potentially/partly sustainable at six-point scale. However, this evaluation was conducted in less than two years after programme completion, the duration that could not reflect the reality after the donor exit as it was against 50 months or more after completion as proposed by ADB (2010).

In Kenya within the livestock sector projects, Wesonga *et al.* (2010) noted that most of the community-based livestock dips which were implemented were not sustainable due to various reasons such as weak project management committees. Similarly, Ole-Neselle *et al.* (2014) reported that in three Districts of Hanang, Kiteto and Simanjiro, no single dip tank was found to operate at 100% of its capacity at the time of their study; and 73% of the dips were technically functional (with all requirements) but not operating. Similarly, Karimuribo *et al.* (2012) from the field experience in Kilosa District reported that a number of livestock (cattle) dips in the study area were not used (operating) due to management problems such as weak committees. Mahonge (2010) reported a disruption of livestock services such as dipping in Lake Jipe, Mwanga District, as a result of failure to sustain the established arrangements. Moreover, a mapping conducted by Kayombo (2013) in the Districts of Musoma, Serengeti, Rorya, Tarime and Bunda in 2009/2010 revealed that many livestock keepers had doubts on dipping due to uncertainty of the sustainability of cattle dip as a result of fluctuations in the dipping operations caused by the outbreaks of tick born disease.

### **2.3.2 Perception of sustainability**

A case study carried out by TANGO International (2009) showed that respondents among the stakeholders had varied perceptions of what sustainability meant and how the project has worked to achieve it. For community members, it was particularly important that the new enterprises would remain viable and grow, and that the opportunities provided to them by the project would continue to be available. Project staff and partners shared these views and also noted the importance of empowerment of beneficiaries, particularly women for future sustainability. Government counterparts felt that sustainability meant a continuing flow of financial assistance as well as a government takeover of services provided by the project. However, the IFAD senior stakeholders placed the greatest emphasis on the durability of the institutions created by the project. Moreover, a survey by Mutambara *et al.* (2014) on stakeholders' engagement and sustainability of smallholder irrigation schemes in Zimbabwe revealed that, farmers' perception of sustainability was linked to their feelings on inability to pay electricity bills without external assistance making it a major threat to the future functionality and sustainability of the scheme.

### **2.3.3 Institutional arrangements for the management of community-based agricultural projects**

The implementation of community-based development projects involves a number of actors which necessitates the need for institutional arrangements to achieve efficiency and sustainability. Various studies have reported on the importance of institutional arrangements for the management of community-based projects in various sectors. For example, Sreedevi *et al.* (2008) looked into watershed development projects in Andhra Pradesh, Karnataka, Maharashtra, and Rajasthan and found that efficiency and sustainability of watershed development programs were determined by the quality of institutional structures such as village watershed committees which are created during the

project period. In their assessment of the impact and sustainability of community-based interventions in Bolivia, Eder *et al.* (2012) found that in an intervention, communities' water committees ensured that community irrigation systems were built, operated, and maintained properly, and the water committees still functioned sustainably under the existing institutional arrangements for the management of the irrigation systems.

In Fogera Ethiopia, Dessalegn and Merrey (2015) reported that lack of institutional arrangements such as mechanisms for water allocation and irrigation scheduling and resource management to guide motor pump irrigation did affect their sustainability; similar results were reported for traditional irrigation. In addition, they reported little institutional response at the *kebele* (ward) level in terms of institutional arrangements to guide motor pump irrigation and ensure its sustainability. Moreover, Dessalegn and Merrey (2015) found that in Fogera, a small watershed located in the Blue Nile Basin of Ethiopia traditional irrigation schemes invariably involve social cooperation whereby water usage is regulated and coordinated by 'water judges' and 'water committees'.

#### **2.4 Institutional Factors Affecting Sustainability of Development Projects**

The literature shows that sustainability of community-based or managed projects after donor funding are influenced by many including institutional factors (Shediac-Rizkallah and Bone, 1998). However, the success and sustainability of agricultural infrastructure and allied technologies depend on institutional arrangements (institutional capacity, and strengths) and the organizations that manage the intervention (Makin, 2016).

The institutional factors that influence sustainability of the projects include institutional capacity and strengths. Institutional capacity represents a broader “enabling environment”,

which forms the basis upon which individuals and organizations interact (Willems and Baumert, 2003). The ADB's special evaluation study on post-completion sustainability of ADB-assisted projects including agriculture and natural resources showed that legal framework and regulatory environment and, adequate funds and financing did enhance the sustainability of the implemented projects (ADB, 2010). Dessalegn and Merrey (2015) reported that, most of the agricultural investments in irrigation systems in Ethiopia gave more attention to construction work than to the institutional capacity (such as management structures, regulations, rules, and resources) which in turn affected their sustainability. In Burkina Faso, the IFAD (2008) interim evaluation report revealed that poor management capacity was found to be among the factors that impede the sustainability of community-based projects. Similar findings have been reported in Uganda (FAO, 2005). Similarly, Ndou (2012) in a study conducted in South Africa reported that poor project management capacity did limit sustainability of community-based projects.

On the other hand, institutional strengths which are reflected by the capacity to manage as well as coordinate programmes or projects should be the priority in the implementation of development projects to ensure their sustainability. Bamberger and Cheema (1990) in their report of "case studies of project sustainability: implications for policy and operations from Asian experience" pointed out that inadequacy or lack of adequately qualified and/or experienced extension staff/personnel remains to be a major stumbling block towards implementation, longevity, and ultimately sustainability of community-based projects. Moreover, the ADB's special evaluation study on post-completion sustainability of ADB assisted projects revealed that skilled, experienced, and competent staff did determine the sustainability of the implemented projects (ADB, 2010).

Abiona and Bello (2013) in a study that examined grassroots participation in decision-making process and sustainability of community development programmes in Nigeria revealed that there is significant relationship between decision-making process and sustainability of development programmes. Furthermore, inadequate funding and poor accountability impeded sustainability. Moreover, Kinyua (2015) concluded that accountability and monitoring did influence sustainability of Itabua-Muthatari community based water project.

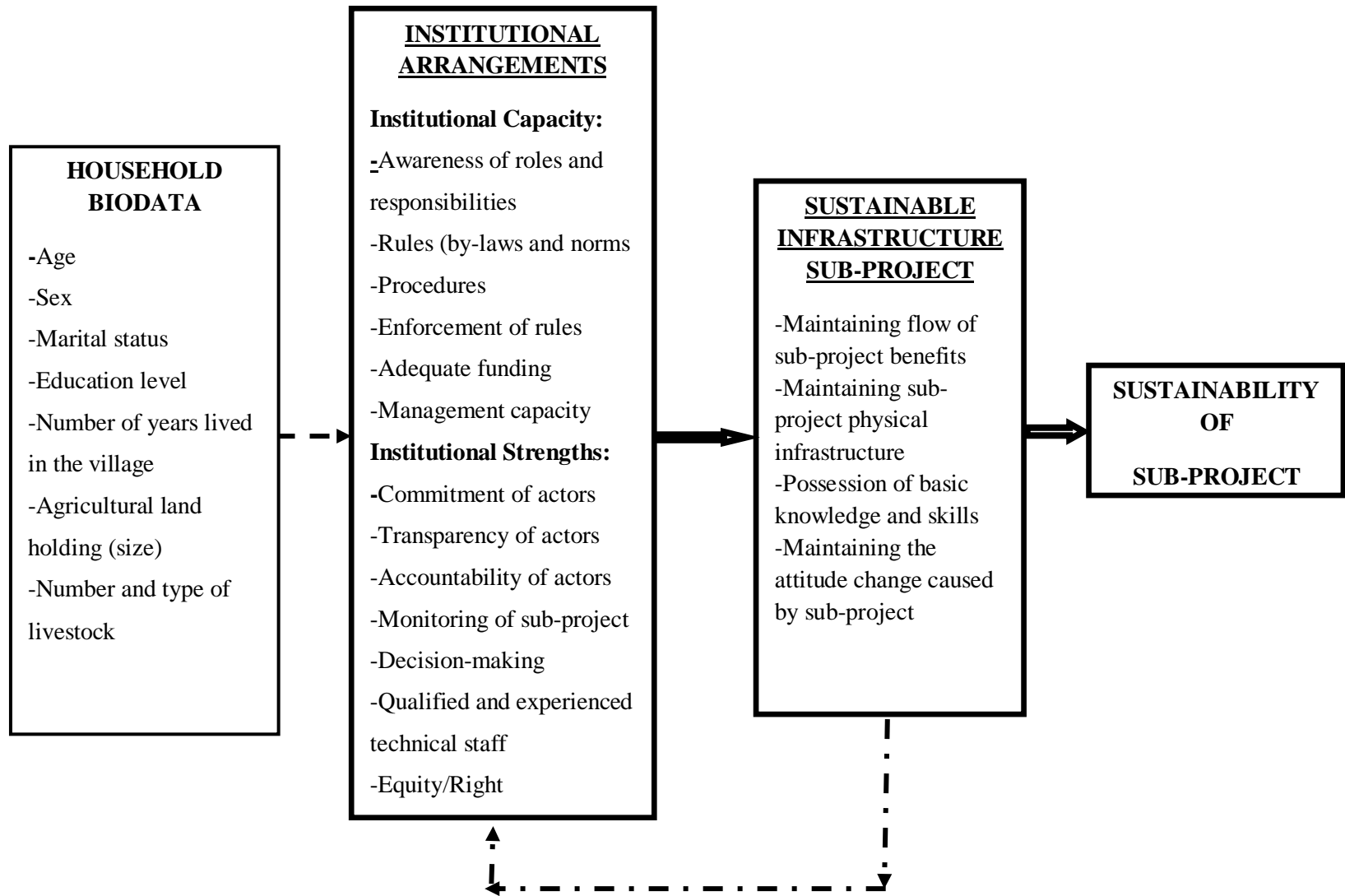
Also, a study by Ndou (2012) in South Africa revealed that lack of project members' commitment, and dropping-out, lack of monitoring by community leaders and departmental staff (government officials) were identified as limiting sustainability of community-based projects. In addition, the World Bank (2002) insisted that lack of monitoring of community-based projects was found to jeopardize sustainability of the implemented interventions. Furthermore, study findings by Featherstone (2013) in Kenya and Myanmar provide a significant evidence of the link between accountability mechanisms and relevance, effectiveness, efficiency, and sustainability of projects, whereby accountability mechanisms, which are important means for voicing and feedback on practices which require improvements or solutions, were considered to have contributed to the sustainability of projects in 10 out of the 11 villages studied.

## **2.5 Conceptual Framework**

The conceptual framework provided a lens to guide both questions and analysis. The conceptual framework for the study is presented in Figure 1. The framework consists of project sustainability as a dependent variable. The dependent variable is influenced or depends on the institutional arrangements (ADB, 2010; Dell'Angello, 2016; UNDP, 2014)

which are an independent variable. The independent variable includes institutional capacity (roles and responsibilities, rules, procedures, enforcement of rules, adequate funds, and management capacity) and institutional strengths (commitment of actors, transparency, accountability, decision-making, adequate staff, and monitoring). The conceptual framework also consists of household biodata variable. This framework is based on the assumption that, the institutional arrangements where the sub-project was implemented contributes to sustainability. In the context of this study, the institutional arrangements were operationalized to refer to the maintenance of the flow of benefits of the implemented project, maintenance of project physical infrastructure, farmers/livestock-keepers access to knowledge and skills, and sustenance of the attitudinal changes caused by the project.

This study is set to address the sustainability of implemented community-based agricultural infrastructure sub-projects. While the government of Tanzania has formally embraced the involvement of farmers and livestock-keepers in implementation of agricultural development interventions, their sustainability is still in question. The disconnection between local actors' management efforts and institutional arrangements still persist. Through the analysis using Institutional Theory the results of this study could benefit from a deeper understanding of the local level institutional processes.



**Figure 1: Conceptual Framework**



## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Description of the Study Area**

The study was conducted in Korogwe District, Tanga Region (Fig. 2) where both agriculture and livestock enterprises play a significant role to the economy of the people and of the district as a whole. Korogwe District Council was selected for this study because it is one of the districts, which participated in the implementation of the pilot phase of DADPs since the financial year 2003/04 as well as PADEP between 2005/06 and 2007/08 (KDC, 2010) and later followed by the implementation of ASDP/DADPs. During the implementation of ASDP/DADPs, the District implemented more than ten irrigation projects and more than ten livestock dips projects managed by the community. The implemented projects are distributed evenly in the eastern and western parts of the District.

Korogwe is one of the eight districts in Tanga Region. The District has an area of 3 756 square kilometres out of which 3 544 square kilometres are occupied by Korogwe District Council (KDC, 2014). The District shares borders with Lushoto District to the North, Mkinga and Muheza districts to the East, Handeni District to the West, and Simanjiro and Same Districts in Kilimanjaro and Manyara Regions respectively to the North.

Administratively, Korogwe District Council is divided into four divisions namely Mombo, Bungu, Magoma and Korogwe, with 20 wards, 122 villages and 610 hamlets. Among these wards, Mombo ward constitutes Mombo Township Authority with 20 hamlets (KDC, 2011). Currently, the population in the Council is estimated at 252 805 people, among these 123,817 are males and 128 988 are females (KDC, 2017). The average

household size in the District is 4.6 against 4.7 and 4.8 average household sizes for Tanga Region and Tanzania, respectively. The average population and household size for the study wards and villages is presented in Table 1.

**Table 1: The population and average household size in study wards and villages**

Ward	Village	Number of HHs in the village	Total Population	Males	Females	Average HH Size
Magoma	-		11,395	5,575	5,820	4.4
	Makorora	370	1664	820	844	
	Mkwajuni	418	1925	965	960	
	Sekioga					
Kwagunda	-		8,924	4,426	4,498	4.3
	Kwagunda	586	2405	1193	1212	
	Mkokola	604	2621	1309	1312	
Mswaha	-		13,594	6,718	6,876	4.5
	Maurui Rutuba	262	1102	531	571	
	Mafuleta	389	1698	831	867	
Mazinde	-		22,832	10,981	11,851	4.6
	Mazinde Muheza	321	1452	691	761	
	Magila	997	4737	2353	2384	
	Mkumbara					
<b>Total</b>		<b>3947</b>	<b>62954</b>	<b>30818</b>	<b>32136</b>	

Source: National Bureau of Statistics – National Bureau of Statistics (2013) - Population and Housing Census 2012

Generally, Korogwe District has a tropical type of climate, with an average annual rainfall ranging from 600 mm to 2000 mm (KDC, 2013). However, the average annual rainfall varies from year to year and between ecological zones (National Bureau of Statistics and RS-Tanga, 2008).

Four wards namely, Magoma, Kwagunda, Mswaha and Mazinde were purposively selected for the study (Fig. 3). These are among the wards in Korogwe District where both irrigation and livestock dips were implemented. In each of the wards, two villages (Fig. 4) with agricultural infrastructure project (one village with irrigation scheme and the other

village with livestock dip) were selected as follows: Mazinde (Mazinde Muheza and Magila Mkumbara), Mswaha (Mafuleta and Maurui Rutuba), Kwagunda (Mkokola and Kwagunda), and Magoma (Makorora and Mkwajuni Sekioga).

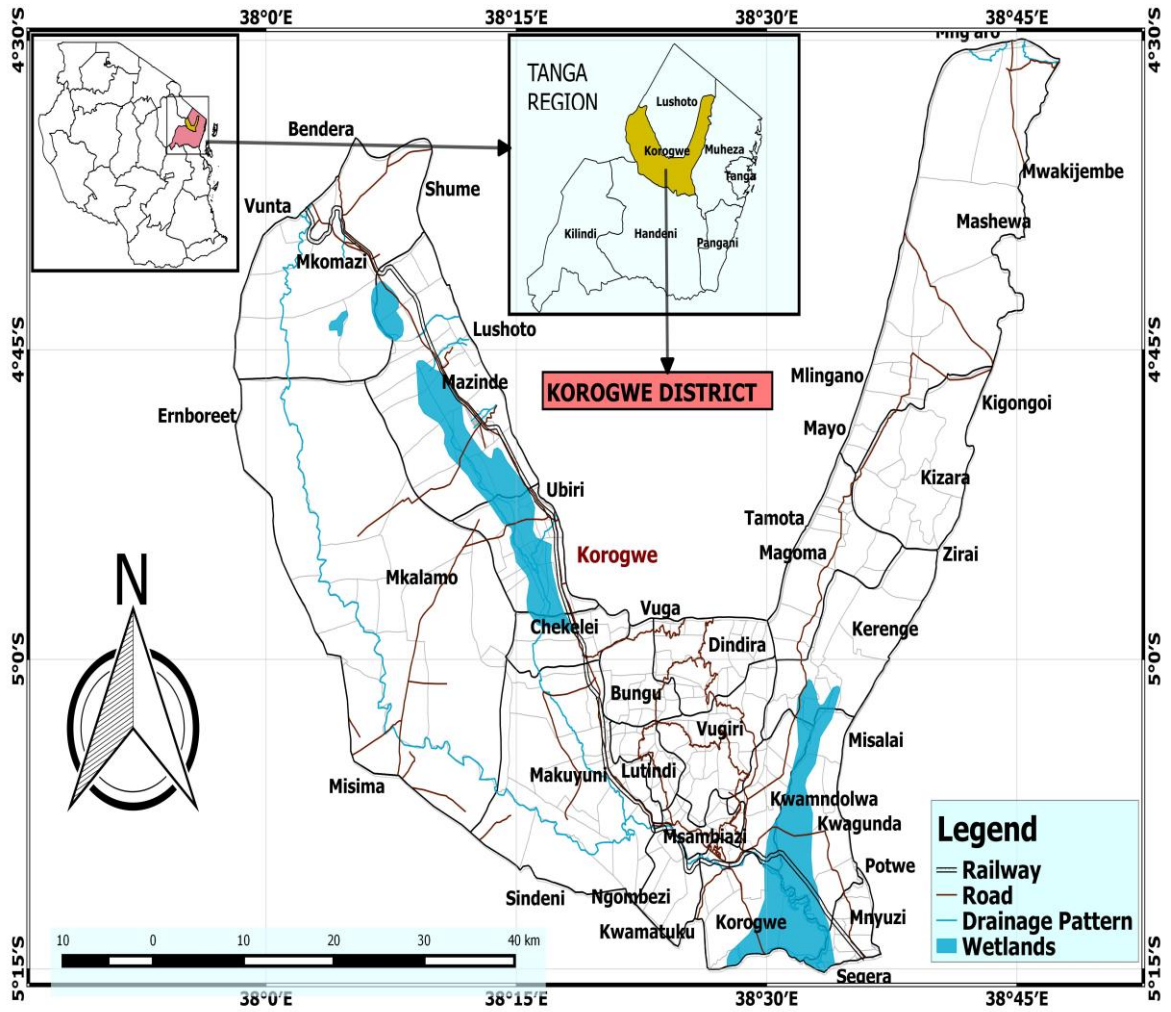


Figure 2: Map of Tanzania showing Tanga Region and Korogwe District

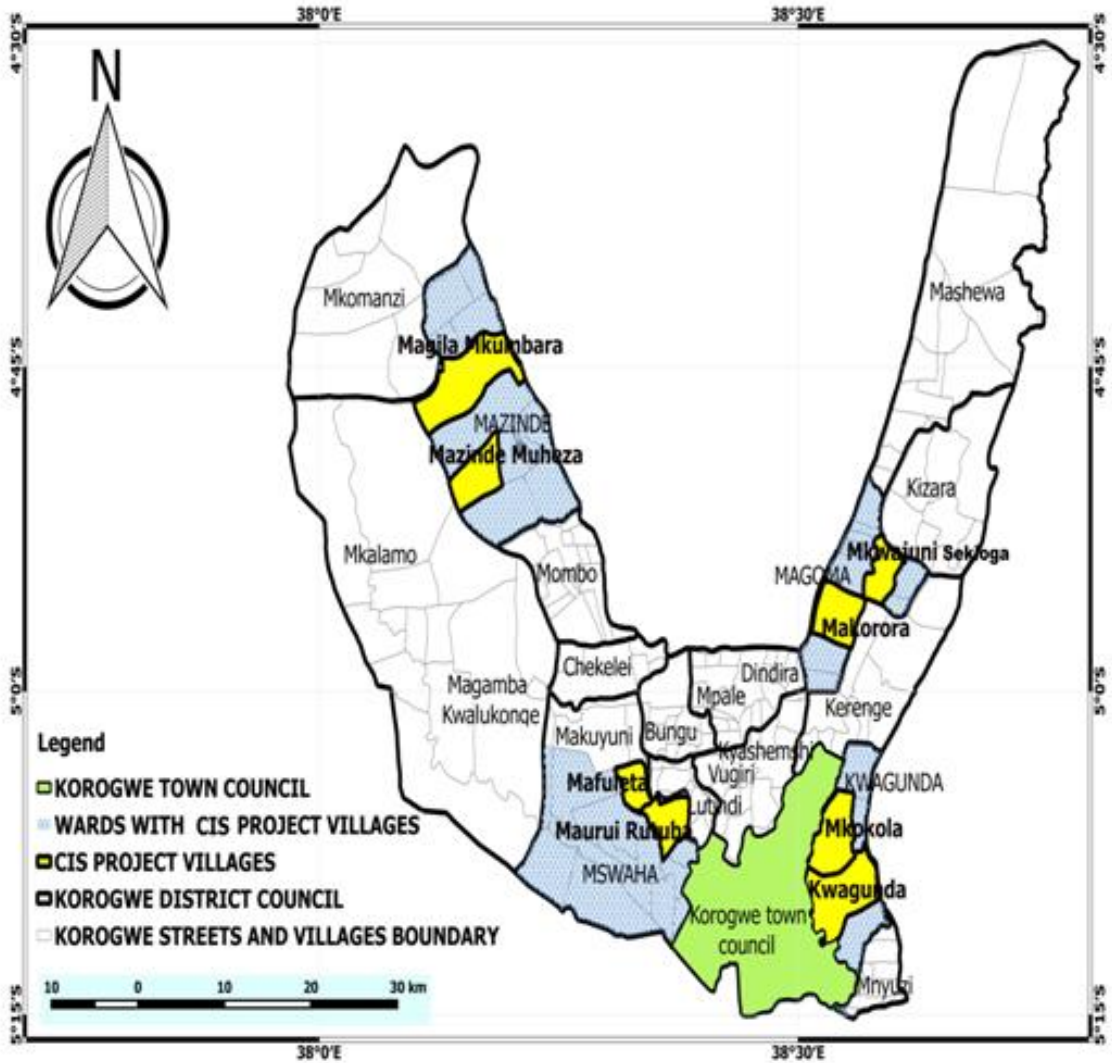


Figure 3: Korogwe District – District Council Wards with studied project villages

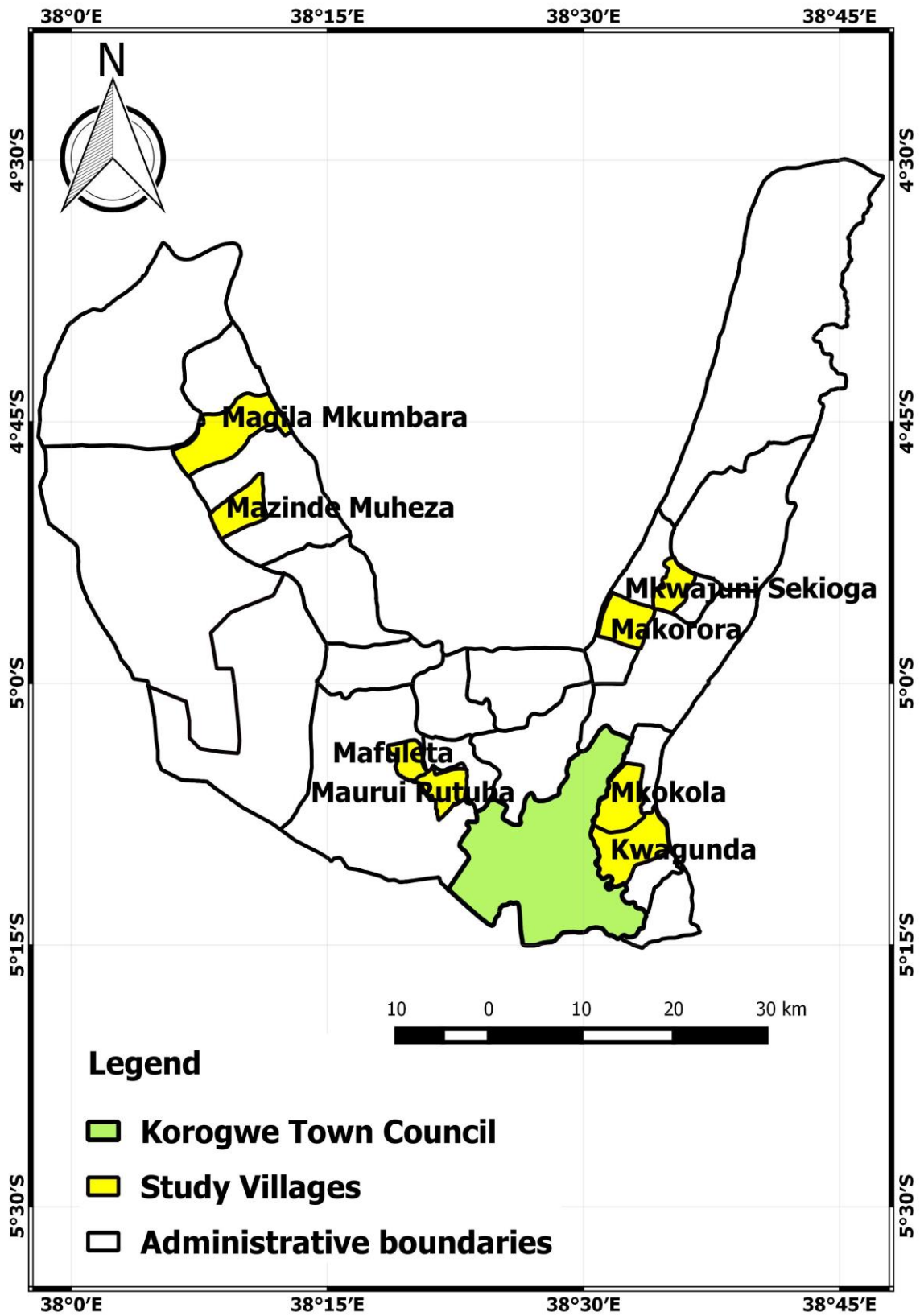


Figure 4: Korogwe District – District Council study villages

### **3.2 Research Design**

The study adopted a cross-sectional mixed method research design. The design was adopted and considered appropriate as it allows the use of various methods to gather quantitative and qualitative data (Kothari, 2004; Mann, 2003). The design also has high degree of accuracy and precision (Creasey, 2006). Quantitative data were collected through household interviews while qualitative data were collected using focus group discussions (FGDs), key informant interviews (KIIs), and observations.

### **3.3 Population of the Study**

The target population in this study were rural people distributed in 3947 households; among these only 1772 household in eight villages in four wards participated in the implementation of irrigation schemes and livestock dips. The household was the sampling unit because it is the basic unit for resource management, production, and consumption at the micro level (Bryman, 2012). Each of the selected wards has at least two villages; one implemented irrigation system infrastructure sub-project and another implemented livestock dip sub-project. The wards are Magoma (Makorora and Mkwajuni Sekioga villages), Kwagunda (Kwagunda and Mkokola villages), Mswaha (Mafuleta and Maurui Rutuba villages), and Mazinde (Magila Mkumbara and Mazinde Muheza villages).

### **3.4 Sampling Procedures and Sample Size**

From each of the selected wards, two villages one with irrigation scheme sub-project and another one with livestock dip sub-project were selected to make a total of eight villages. In each village, the available list of farming/livestock keeping households, after being verified as complete and up to date, was used as a sampling frame to get the respondents. To ensure an adequate sample, a sample size formula suggested by Israel (1992) and Smith (2013) was used as follows:

$$n = \frac{z^2 p (1 - p)}{e^2}$$

$$n = \frac{z^2 (pq)}{e^2}$$

Where;

$n$  = Sample size (without considering the finite population correction factor)

$z^2$  = Confidence interval

$p$  = Probability

$q$  =  $1 - p$

$e$  = level of precision or allowable error of  $\pm 5$

$$= 1.96^2 (0.50 \times 0.50) / 5^2 = 384$$

Adequacy of the sample size for a research varies depending on various factors including the purpose of the study, population size, the risk of selecting a "bad" sample, and the allowable sampling error (Israel, 1992; Czaja, 1998; Mason, 2010). On the other hand, a good sample size, say for example, 200-500, is needed for multiple regressions, analysis of covariance, or log-linear analysis, which might be performed for more rigorous state impact evaluations (Israel, 1992). Although the study targeted a sample of 384 respondents, only 361 respondents participated. The rest of the households did not respond.

### **3.5 Process of Data Collection**

#### **3.5.1 Research clearance and training of enumerators**

In order to carry out data collection for the study, permission was sought and granted from the Regional Administrative Secretary (RAS) – Tanga and the District Executive Director

for Korogwe. Four research assistants were trained and given the detail of what the questions meant in relation to the research objectives.

### **3.5.2 Pre-testing**

The interview schedule for data collection was pre-tested in Kitivo Irrigation Scheme which is located in Lushoto District, and implemented through DADP. The scheme shares borders with Mombo and Magoma Divisions in Korogwe District where the wards and villages that implemented agricultural projects are located. Also, the location of the Scheme has similar climate, soils, as well as crop and livestock production systems to those in Korogwe District Council. A total of 20 farmers from the scheme participated in the pre-testing exercise. The pre-test led to minor changes in wording of a few questions. After making corrections as per the pre-test results, the interview schedule was administered to the respondents in eight study villages.

### **3.5.3 Data collection**

#### **3.5.3.1 Household Interviews**

Household interview schedule were administered to 361 respondents from eight villages that implemented community-based investment projects between July and September 2014. The interviews aimed at eliciting relevant responses with respect to the household biodata, sustainability of the implemented projects, their perception of sustainability, institutional arrangements for the management of the implemented sub-projects, and institutional factors influencing sustainability of the projects. Open and closed-ended questions were used in the questionnaire. Before the interview, interviewees were briefed on the nature of the study, and informed about the confidentiality of the information which they were to provide. They were also given some background information on the study and the researcher's contact details. Interviewees were asked to give their consent before the interviews. This is an important ethical practice in research.



### **3.5.3.2 Focus Group Discussions (FGDs)**

A total of eight FGDs with an average of twelve participants drawn from among farmers and livestock keepers in each village were conducted in the study area. The number of participants in FGDs per session was within the recommended range of between eight and fifteen participants as suggested by scholars (e.g. CDC, 2008; Marczak and Sewell, 2007; Masadeh, 2012; and ODI, 2009). Focus group participants included farmers/livestock-keepers who participated in the implementation of the projects, project committee members and leaders, village government council members, influential people, and religious leaders. These were selected based on sex, age, length of residence in the village and participation in the development activities. Participants were free to talk openly and give honest opinions but without dominating discussions. The participants were encouraged to express their own opinions, and provide any relevant information they might have on issues under discussion. The discussions were conducted in comfortable places which were preferred by the participants; and these included classrooms, under tree shades or in the village council offices. The FGDs were tape-recorded upon getting participants' consent. The recorded information was later transcribed for data analysis.

### **3.5.3.3 Key Informant Interviews (KIIs)**

Key informant interviews were among the methods used to collect data for the study. The interviews were conducted with knowledgeable individuals who could provide relevant information, ideas, and insights (IFAD, 2011; Kumar, 1989; USAID, 1996) on aspects related to the implemented agricultural projects in the District. Key informants were selected through expert advice and individuals who were knowledgeable about important actors and knowledge holders in the agricultural development projects. Key Informant Interviews were held at village and district levels. At the district level, KIIs involved

Heads of Department and Sections, as well as Subject Matter Specialists from Planning; Agriculture, Irrigation and Co-operatives; Livestock Development and Fisheries; and Community Development Departments. At the village level, key informants included the village government council members, Village Executive Officers, Village Extension Officers, project committee members, religious leaders, and opinion leaders.

#### **3.5.3.4 Direct observation**

The data collection exercise also involved direct observation of the state of physical infrastructures in the irrigation schemes and livestock dips, water availability and distribution, dipping of livestock, and supervision of the exercise. Through observation, it was possible to document activities, behaviours, and physical evidence and aspects related to the implemented projects. Such data were recorded in the researchers' diary.

### **3.6 Data Analysis**

#### **3.6.1 Qualitative data analysis**

Qualitative data which were generated were subjected to content analysis. The collected information was categorised into themes based on questions. The categories were then examined in detail for their relevance and those with similarities were merged. The process helped to reduce the volume of tape-recorded information, and written text.

#### **3.6.2 Quantitative data analysis**

Quantitative data from the interview schedule were summarized, coded, and analysed using the Statistical Package for Social Sciences (SPSS) version 20. The analytical tools which were employed include descriptive statistics and inferential statistics (chi-square test and binary regression).

### 3.6.2.1 Descriptive statistics

Descriptive statistics were computed to determine frequencies and percentages of individual variables for multiple comparisons of various data. Frequencies and percentages were summarized and tabulated. Also, cross-tabulation was performed to establish the association between respondents' awareness of their roles and responsibilities, and the maintenance of physical infrastructures (i.e. irrigation system and livestock dips).

### 3.6.2.2 Binary logistic regression

The binary logistic model is actually used to estimate the probability of a binary response based on predictors (independent variables). In the current study, a binary logistic regression analysis was performed to predict the sustainability (response variable) of the implemented agricultural infrastructure projects from a set of selected predictors (independent variables).

Sustainability (the dependent variable) is represented in the model by binary variable taking the value of 1 if the variable/factor was sustainable and 0 if otherwise.

$$Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + \dots + b_{14} X_{14} + \varepsilon$$

Where:

*Y = Sustainability - Response variable (1=Sustainable; 0=Not sustainable)*

*X<sub>1</sub> = Project committee management capacity (1=Good; 0=Otherwise)*

*X<sub>2</sub> = Village government management capacity (1=Good; 0=Otherwise)*

*X<sub>3</sub> = Adequate extension staffs (1=Adequate; 0=Not adequate)*

*X<sub>4</sub> = Satisfaction with management decision making (1=Satisfied; 0=Otherwise)*

*X<sub>5</sub> = Monitoring of project activities (1=Conducted; 0=Not conducted)*

$X_6 = \text{Village government accountability (1=Accountable; 0=Otherwise)}$

$X_7 = \text{Project committee accountability (1=Accountable; 0=Otherwise)}$

$X_8 = \text{Adequate funds (1=Adequate; 0=Not adequate)}$

$X_9 = \text{Law enforcement (1=Enforced, 0=Otherwise)}$

$X_{10} = \text{Roles awareness of respondents (1=Aware; 0=Otherwise)}$

$X_{11} = \text{Responsibilities awareness of respondents (1=Aware; 0=Otherwise)}$

$X_{12} = \text{Project committee transparency (1=Transparent; 0= Otherwise)}$

$X_{13} = \text{Village government transparency (1=Transparent; 0= Otherwise)}$

$b_0 = \text{Constant}$

$b_1 \text{---} b_{14} = \text{Regression coefficient of } X_1 \text{---} X_{14} \text{ to be estimated}$

$\varepsilon = \text{Error term.}$

### **3.7 Measurement of Sustainability**

Measurement of sustainability was conducted to determine whether or not the implemented agricultural projects were sustainable. The sustainability criteria were effectively meant to separate sustainable outcomes from unsustainable ones as asserted by Pope *et al.* (2004; 2005).

It is important to note that sustainability of the projects was assessed using Sustainability Index (SI). The SI was constructed using four sets of indicators as follows: (1) the continued delivery of services and benefits, (2) the maintenance of physical infrastructure, (3) the long-term institutional capacity of the actor(s) responsible for the project implementation, and (4) the level of actors support for the project. A checklist was developed to ensure that no major aspects of sustainability are overlooked. The assessment took into consideration a minimum of three years after sub-project infrastructure became operational.

The indicators were weighted according to their relevance and importance to the sustainability of the sub-project. The calculation of the project sustainability score was made assigning each indicator a score based on a five points scale – (1 = "Very Poor," 2 = "Poor," 3 = "Average," 4 = "Good," and 5 = "Very Good"). The score provided was later multiplied by the weight of the sub-indicator. The scores which were recorded for all indicators were then summed up for each sub-project to result in a single final score representing the final sustainability score of the specified project in the village. The projects were then ranked and classified according to their sustainability scores into unsustainable (score < 2.5 or percent < 50%) and sustainable (i.e. score > 2.5 or percent > 50%).

Being a subjective concept, sustainability was assessed in terms of a set of indicators that combined different quantitative and qualitative aspects of the project performance. Indicators which were used include, continued delivery of services and benefits, maintenance of physical infrastructure, long-term institutional capacity, and the level of actors' support for the project. These were considered to be useful for assessing agricultural and livestock infrastructure projects. According to Bamberger and Cheema (1990), the purpose of assessing sustainability was to determine whether the current path will be the same in the future. Nevertheless, the assessment of the sustainability was not only about taking stock of progress – it was also about identifying shortcomings and challenges and to inform relevant actors on the actions required to ensure continued delivery of benefits and maintenance of infrastructures into the future (Khan, 2000; IFAD, 2016).

## **CHAPTER FOUR**

### **RESULTS AND DISCUSSION**

#### **4.1 Demographic and Socio-economic Characteristics of the Respondents**

##### **4.1.1 Sex of respondents**

Of the 361 respondents interviewed, 68.1% were males and 31.9% were females. However, majority of the participants in both types of the project were males. This was the case because most households were male-headed hence men took the leading role in the interviews.

##### **4.1.2 Age distribution of respondents**

From the demographic data, the mean age of the respondents was 46 years, with a range of 18 – 99 years. In livestock dip project, the mean age of the respondents was 49 years, with a range of 18 – 89 years; whereas in the irrigation scheme project, the mean age was 44 years with a range of 18 – 99 years. Overall, 57.1% of the respondents were in the age bracket/range of between 36 and 60 years. From the results, 18% of the respondents were 61 years and above.

##### **4.1.3 Marital status of respondents**

Of the 361 respondents who participated in project implementation, 81.7% were married. However, the findings differ from those in the National Bureau of Statistics (NBS, 2014a; 2015), which reported that, the proportion of people aged 15 years and above of both males and females who were either married or cohabiting in Tanzania decreased from 54 percent in 2002 to 51 percent at the time of the Census in August, 2012. The report reveals further that people living in rural areas were more likely to be married than those in urban

areas. However, 6.9% of the respondents were widowed; this figure is close to 6.6% which was reported by the Household Budget Survey of 2011/12 carried out by the National Bureau of Statistics (NBS, 2014a); whereas 6.4% and 5.0% were divorced and living single respectively. The percentage of the divorced in this study was higher than the national average of 5.8%, as reported by the National Bureau of Statistics (NBS, 2014b). However, the incidences of widowhood were higher in this study compared to the national average of 3% in 2012 as reported by the National Bureau of Statistics (NBS, 2014a).

**Table 2: Respondents demographic and socio-economic characteristics (n = 361)**

Demographic and socio-economic characteristics	All projects		Irrigation scheme Projects		Livestock dips projects	
	Frequency	%	Frequency	%	Frequency	%
<b>Sex of respondents</b>						
Males	246	68.1	126	60.6	120	78.4
Females	115	31.9	82	39.4	33	21.6
<b>Age Group (Years) of both males and females</b>						
18 – 35	90	24.9	59	28.4	31	20.3
36 – 60	206	57.1	124	59.6	82	53.6
61 and Older	65	18.0	25	12.0	40	26.1
<b>Marital Status of both males and females</b>						
Married	295	81.7	166	79.8	129	84.3
Divorced	23	6.4	18	8.7	5	3.3
Single	18	5.0	10	4.8	8	5.2
Widowed	25	6.9	14	6.7	11	7.2
<b>Education level</b>						
No Formal Education	40	11.08	17	8.2	23	15.0
Primary Level	304	84.21	186	89.4	118	77.1
Ordinary Level	16	4.43	4	1.9	12	7.8
University College	1	0.28	1	0.5	0	0.0

#### 4.1.4 Level of education of respondents

The levels of education of the respondents as presented in Table 2 indicate that about 84% of the respondents had attained primary education. This level was higher than 72% of the

heads of agricultural households who had formal education of in 2012 (NBS, 2013; 2014b). Moreover, 11% of the respondents had no formal education. This percentage was lower than the one reported at the national level which stood at 24% for those who had never attended school in 2007/08 and 18.8% for those who had never attended school in 2012 (NBS, 2013).

#### **4.1.5 Land ownership, holding size for agricultural production and number of livestock owned by respondents**

Agriculture and livestock enterprises are the major sources of income not only to the farmers and livestock-keepers but also to local authorities in Korogwe District Council. The study found variations in holding sizes as well as the type and number of livestock owned.

#### **4.1.6 Land ownership and holding size for agricultural production**

Land ownership, holding size, and distribution for paddy (main crop) production in the study area are presented in Table 3. The results show that out of 361 respondents, about 51% owned land for paddy production, whereas about 49% either borrowed or rented the land they cultivated. Through interviews with key informants, it was learnt that most of the livestock-keepers migrated to the study area from other areas. This was not the case with farmers in irrigation schemes who were indigenous to those areas and used to inherit plots for paddy cultivation. In addition, most of the immigrant livestock-keepers, by virtue of their ownership to livestock, had the ability to buy land for crop production, sell livestock and buy food (paddy and/or maize), and or borrow/rent land for food crop production.



**Table 3: Land ownership and holding size for agricultural production (n = 361)**

Land ownership and holding for paddy crop (Ha)	All projects		Irrigation scheme Projects		Livestock dips projects	
	Frequency	%	Frequency	%	Frequency	%
<b>Ownership of land for paddy crop</b>						
Own land	183	50.7	144	69.2	39	25.5
Other (Borrowed/Rented)	178	49.3	64	30.8	114	74.5
<b>Land holding for paddy crop (Ha)</b>						
<1.0	297	82.3	172	82.7	125	81.7
≥1.0 and <2.0	35	9.7	22	10.6	13	8.5
≥2.0 and <4.0	23	6.45	13	6.2	10	6.5
≥4.0	6	1.75	1	0.5	5	3.3

The majority of the respondents in the study area were found to have land holding size for paddy crop production of less than the national average of 1.6 hectares of planted area for annual crops per growing season (NBS, 2013).

#### 4.1.7 Livestock holding (herd size)

Livestock kept by the respondents in the study area were cattle and shoats (sheep and goats) (Table 4). The cattle were mostly the Tanzania Shorthorn Zebu. Livestock keeping was preferred because the livestock served as an informal type of cash in hand and provided an informal type of food security.

**Table 4: Livestock holding (herd size) by type (n = 361)**

Livestock holdings (Herd size)	All projects		Irrigation scheme Projects		Livestock dips projects	
	Frequency	%	Frequency	%	Frequency	%
<b>Cattle</b>						
1 – 10	306	84.8	205	98.6	101	66.0
11 – 20	48	13.3	3	1.4	45	29.4
21 and above	7	1.9	0	0.0	7	4.6
<b>Shoats (Goats and sheep)</b>						
1 – 10	312	86.43	199	95.7	113	73.9
11 – 20	42	11.63	9	4.3	33	21.6
21 and above	7	1.94	0	0.0	7	4.6

Overall, of 361 respondents about 2% owned only 21 and above animals of each type of livestock. Owning a small number of livestock was attributed to inadequate grazing land and tick-borne diseases such as East Coast Fever (*Ndigana kali*) and trypanosomiasis (*Ndorobo*).

#### **4.2 Sustainability of Community-based Agricultural Infrastructure Projects**

Sustainability of the implemented community-based agricultural infrastructure projects was determined using the “Sustainability Index – SI.” The index, which is estimated from developed indicators and sub-indicators, consisted of the following aspects: continued delivery of service and benefits, condition/maintenance of physical infrastructure, long-term institutional capacity, and support from actors as shown in Appendices 4 and 5.

##### **4.2.1 Sustainability Index (SI) of implemented irrigation projects**

Findings on the sustainability of irrigation projects are presented in Table 5. Findings from sustainability index (SI) on irrigation of sub-projects show that none of the irrigation sub-projects was sustainable.

**Table 5: Assessment of sustainability of irrigation sub--projects**

<b>Rating:</b> <b>1=Very Poor, 2=Poor,</b> <b>3=Moderate, 4=Good, 5=Very</b> <b>Good</b>		<b>Mkokola</b>		<b>Mafuleta</b>		<b>Makorora</b>		<b>Mazinde Muheza</b>	
		<b>%</b>	<b>Score</b>	<b>%</b>	<b>Score</b>	<b>%</b>	<b>Score</b>	<b>%</b>	<b>Score</b>
<b>A</b>	Continued service delivery & benefits								
	Number of households benefiting from the project	4	0.2	4	0.2	4	0.2	4	0.2
	Effectiveness and efficiency of service delivery	1.5	0.075	3	0.15	2.5	0.125	2	0.1
	Quality of services and benefits	1.5	0.075	3	0.15	2	0.1	2	0.1
	Satisfaction with services and benefits	1.5	0.075	3	0.15	2	0.25	2	0.1
	Distribution of benefits among groups	1.5	0.075	3.5	0.175	3	0.3	2.5	0.125
	<b>Sub-total</b>	<b>10</b>	<b>0.5</b>	<b>16.5</b>	<b>0.825</b>	<b>13.5</b>	<b>0.975</b>	<b>12.5</b>	<b>0.625</b>
<b>B</b>	Maintenance of physical infrastructure								
	Condition of physical infrastructure	2	0.1	2	0.1	2.5	0.125	2.5	0.125
	Condition of logistics - machinery/equipment	2	0.1	1.5	0.075	3	0.15	2	0.1
	Adequacy of physical infrastructure maintenance procedures	1.5	0.075	3	0.15	1.5	0.075	2.5	0.125
	Adequacy of physical infrastructure maintenance and repair budget	1.5	0.075	1	0.05	2	0.1	2	0.1
	Farmers/livestock-keepers involvement in maintenance and repair	1.5	0.075	1.5	0.075	2	0.1	2	0.1
	<b>Sub-total</b>	<b>8.5</b>	<b>0.425</b>	<b>7.0</b>	<b>0.45</b>	<b>11.0</b>	<b>0.55</b>	<b>11.0</b>	<b>0.55</b>

**Table 5 Continued.....**

Rating: 1=Very Poor, 2=Poor, 3=Moderate, 4=Good, 5=Very Good	Mkokola		Mafuleta		Makorora		Mazinde Muheza	
	%	Score	%	Score	%	Score	%	Score
C Long-term institutional capacity								
Adequacy of capacity and mandate of committee	1.5	0.075	2	0.1	2	0.1	2	0.1
Adequacy of project committee budget	1.5	0.075	1	0.05	2	0.1	2	0.1
Adequacy of inter-committee coordination	1.5	0.075	1.5	0.075	1.5	0.075	2.5	0.125
Adequacy of coordination and linkages between actors	1.5	0.075	2	0.1	2.5	0.125	2	0.1
Adequacy of flexibility and capacity to adapt changes	1.5	0.075	3	0.15	3	0.15	2.5	0.125
<b>Sub-total</b>	<b>7.5</b>	<b>0.375</b>	<b>9.5</b>	<b>0.475</b>	<b>11.0</b>	<b>0.55</b>	<b>11</b>	<b>0.55</b>
D Support from key actors								
Strength and stability of support from national government - Ministry	3.5	0.175	3.5	0.175	3.5	0.175	3.5	0.175
Strength and stability of support from Regional Secretariat (RS)	2.5	0.125	2.5	0.125	2.5	0.125	2.5	0.125
Strength and stability of support from LGA - district council	1.5	0.075	2.5	0.125	2.5	0.125	2.5	0.125
Strength and stability of support from LGAs - village government council	1.5	0.075	2	0.1	2	0.1	2.5	0.125
Strength and stability of support from the farmers & l/keepers	1	0.05	3.5	0.175	3	0.15	2.5	0.125
<b>Sub-total</b>	<b>10</b>	<b>0.5</b>	<b>14</b>	<b>0.7</b>	<b>13.5</b>	<b>0.675</b>	<b>13.5</b>	<b>0.675</b>
<b>Sustainability index (SI)</b>	<b>36.0</b>	<b>1.8</b>	<b>47.0</b>	<b>2.45</b>	<b>49.0</b>	<b>2.75</b>	<b>48.0</b>	<b>2.4</b>

**(i) Respondents satisfaction with condition of irrigation infrastructures**

With regards to respondents' satisfaction with the condition of the infrastructures of the projects, majority of the respondents in the irrigation schemes were not satisfied with the condition of sub-project infrastructures. It was observed further that irrigation canals (main and secondary canals) in Mafuleta were dilapidated, and in other schemes

distribution boxes and secondary canals were not completed. Reasons given by the respondents to justify their dissatisfaction with the condition of the infrastructures are as follows.

- a) Sub-project infrastructures are in very poor condition (dilapidated)
- b) Secondary canals and distribution boxes are not completed
- c) Water flow control gates are vandalized and/or in bad shape, that is, they are consumed by rust or broken down.
- d) Canals are not cleaned/maintained, they are heavily silted and full of vegetation/grasses inside and/or along the canals
- e) Drainage (waste) canals are not in place, which results into water logging and salinity in some areas (plots)
- f) The head-works are constructed where there is not enough water for irrigation.

These reasons not only affected the farmers' morale and production potential of the schemes but also the sustainability of the intervention. In addition, majority of farmers in the irrigation schemes were found not to be satisfied with the condition of physical infrastructures due to lack of maintenance leading to poor state of affairs in the irrigation system.

Findings from key informant interviews and physical observation of the sub-project physical infrastructures showed that poor condition of the irrigation infrastructures was a result of lack of maintenance. In addition, there was no emphasis on ensuring efficiency, effectiveness, and sustainability of the implemented infrastructural development projects as the overall aim of maintenance procedures. It was also learnt from key informant interviews and focus group discussions that the existing sub-project committees did not

have formal and workable technical know-how on maintaining the irrigation physical infrastructure. In addition, farmers revealed that the sub-project committees were not given the responsibility of maintaining infrastructures, a situation which significantly led to the bad state of the infrastructures in question. For example, in Mkokola Irrigation Scheme, participants in FGD reported that the water control gates at the abstraction point were vandalized and were yet to be repaired or replaced; whereas the main and secondary canals in Mafuleta Irrigation Scheme were not attended to and were in poor condition. In Makorora Irrigation Scheme, the main canal was full of silt and vegetation which resulted in over-flooding and wastage of water (resource). It is worth saying that, lack of maintenance was a major cause of continued deterioration of the infrastructures and dissatisfaction among farmers. The findings confirm those reported earlier by Hailelassie *et al.* (2016) in Ethiopia, which indicated that most of the irrigation schemes had shortfalls, resulting from poor maintenance of infrastructures.

**(ii) Flow of benefits in irrigation scheme sub-projects**

It is apparent that in the implementation of development interventions benefits may or may not be realized. However, the realized flow of benefits needs to be sustained to ensure that whatever the implemented sub-projects produce continue to generate or create value. Generally, when benefits are managed well, farmers can realize the greatest possible returns on their implemented interventions. As the realization of benefits validate the achievement of sub-project objectives, then the realized benefits become important for sustainability. Although realization of benefits in the irrigation schemes depends on various factors such as completion of irrigation system (e.g. canals, distribution boxes) and even water availability, only 39.9% of the respondents admitted to have realized benefits from the implemented projects. However, these findings were in contrast with

those reported earlier by Endale *et al.* (2014) in Farta District; Northwest Ethiopia where access to irrigation was found to be significantly associated with the realization of such benefits as household food security.

During the FGDs, majority of the participants admitted that only a handful of farmers benefited from irrigation schemes and that the flow of benefits was also short-lived in some irrigation schemes. These findings concur with those reported previously in literature (ADB, 2015; Mwendera *et al.*, 2013; Ali, 2011; Vermillion and Sagardy, 1999; Snellen, 1996) on failures of irrigation schemes in realizing or sustaining the benefits from the intervention made in irrigation schemes.

Apart from realization of direct benefits, farmers felt that there was a reduction in HIV/AIDS infection (because of the reduced husbands/males mobility to/from urban areas in search of part-time employment). Also in irrigation schemes specifically in Mafuleta FGD participants reported on the improvement in marriage stability as a result of increased household income from paddy farming (cropping season increased from one to two) before the reduction in paddy yields. Similar findings are reported in a study by Doi and Pitiwut (2014) who reveal that in north and central Thailand, farmers achieved an increase of up to 57% in the yields (from 4.38 to 6.88 t ha<sup>-1</sup>) which resulted in the improvement of health status of farmers and villagers, financial security (profit and savings), freedom, and hence total quality of life both physically and mentally. Moreover, the retained male labour force in irrigation schemes might have also reversed the feminization of agriculture as well as a change in the roles and responsibilities which are traditionally performed by men to be performed by women; hence a change in workload profile among women.

Furthermore, after assessing the benefits realized (intensive use of resources, household food security, access to extension services, employment opportunity, access to training on modern farming, crop (paddy) yields, irrigation services, and diseases control), it was found that less than 40% of the respondents reported to have realized the benefits (though at varying degrees of the assessed benefits). However, the respondents said that those few who benefited from the schemes, which included village/sub-project leaders and/or their friends/relatives, had access to resources such as water.

As for the assessed benefits in irrigation sub-projects, apart from lack of use of intensive resource in most of the schemes, household food insecurity was also observed and reported. This trend was attributed to declining trends in paddy production per unit area and deteriorating conditions of irrigation systems. The decline was a warning sign of food shortages among farmers in the study area. Similar findings were also reported in Zimbabwe by Dube (2016) who revealed that irrigators and the surrounding communities had an opportunity to produce enough food for their families and extra food that can be sold and ensure food security and income to both the households and the community .

Moreover, it was found that irrigation sub-projects had more employment opportunities than was the case with the livestock dip sub-projects. In fact, farmers in irrigation schemes were of the opinion that paddy production is not only a labour intensive farm business, but it also involves time bound activities from land preparation to harvesting which necessitates increased labour requirements from within and outside the village. Furthermore, during focus group discussions in Mafuleta and Makorora Irrigation Schemes it was affirmed that in the early days there was a reverse migration from urban areas in most of the irrigation schemes which was strongly linked to the employment



opportunities created within the irrigation schemes. This demonstrated the positive impact which irrigation schemes have had on rural communities through bringing social benefits. Employment opportunities in irrigation scheme were also reported in Zimbabwe by Dube (2016) in Lower Gweru irrigation scheme, whereby irrigators employ non-irrigators to work as security guards for their crops. Guarding of the crops was mostly done in the evening. Labourers were also employed to assist in other irrigation activities such as land clearance, weeding and harvesting. Dube (2016), revealed further that, irrigation schemes play a significant role in providing seasonal employment to those not participating in the irrigation projects. In this respect, irrigation generates higher and stable employment throughout the year.

Due to failures in sustaining the benefits, one key informant in Mafuleta irrigation scheme said:

*“If the implemented projects could have been performing as intended or expected, employment opportunities would have increased year after year, but it is not the case. People benefited only for a few years, and thereafter getting employment became difficult”.*

The farmers’ comment seemed valid because employment depends on labour requirements resulting from an increase of the firm size and/or improved production. Therefore, reduction in employment opportunities did result not only in competition for jobs but also in the reduction of the amount of wages paid.

During FGDs in all villages, the participants reported of not having Extension Officers of their own. And it was common to find one Extension Officer rendering services to more than one village and at the same time acting as a Village or Ward Executive Officer. This

kind of arrangement actually denies participants of the right of using the Extension Officer for the set purposes. Similar findings were reported by Anderson (2007) who reported that Extension Officers were overloaded with frequent burden of public duties in addition to their role in knowledge transfer as Extension Officers. This might be attributed to inadequate qualified and/or experienced extension personnel. Similar findings were reported by Auta and Dafwang (2010) that 59% of the Agricultural Development Projects (ADPs) in Nigeria cited inadequate qualified extension staff as one of the problems facing extension services after the end of funding. In such situations, it is obvious that inadequacy of agricultural extension staff can significantly affect the sustainability of community-based agricultural development projects.

Documents at the District Council Offices confirmed what was said during the FGDs and by individual farmers. These findings are in line with what were observed by the Ministry of Agriculture, Food Security and Cooperatives in the Annual Report of 2014/15 that the failure of attaining the targets set by the Government of Tanzania of increasing and having one Extension Officer per village is among the challenges facing the sector. The extension staffs requirement at the village level was 15 802, but only 9 558 were available (URT, 2015). Despite the inadequacies experienced in the study area, agricultural extension service delivery remains to be the essential mechanism for delivering information and advice as an "input" (knowledge and skills) in the modern farming that can improve welfare of farmers and other rural people. These findings are in agreement with the findings reported by Kihupi *et al.* (2007) on factors affecting water productivity in farmer managed irrigation schemes in Ruanda Majenje, Mbeya Tanzania. The authors revealed that limited accessibility to extension services has a negative influence on crop production and water productivity, which may ultimately affect sustainability of the irrigation scheme.

It was also revealed that majority of the farmers never received training on modern farming. Further interviews with various key informants revealed that trainings were offered in the early days of project implementation. Such training sessions were reported to involve a fraction or a small group of farmers/livestock-keepers. It was further revealed that, sub-project committee members, village council members, leaders and their relatives, and very active farmers were given priority whenever the training opportunity occurred. Key informants at district offices added that, training support and backstopping from the district office was rarely available, and this was a result of meagre budgets from the central government and lack of any budget in the District Council, as the sector was not among the priority areas as opposed to education, health, and water sectors. Lack of financial support to the agricultural sector was attributed to lack of/weak revenue sources.

Regarding the increase in crop yield, in Mafuleta irrigation scheme, the average paddy production increased from less than 2 000 kg per hectare before the implementation of the sub-project to more than 4 000 kg per hectare per season after the implementation of the sub-project. Similar increase in paddy yields per unit area was reported by IFAD (2012) in Cambodian rice belt (irrigation schemes) where yields ranged from 2 400 to 2 700 kg/ha in the wet season and from 4 200 to 5 000 kg/ha in the dry season. However thereafter, paddy yields in Mafuleta irrigation scheme decreased to less than 2500 kg per hectare as a result of infrastructure deterioration.

The average paddy production before and after the intervention in the irrigation scheme as presented in Table 6 varied from one scheme to another due to physical condition of the infrastructure in place.

**Table 6: Average paddy production (kg/ha) in irrigation scheme projects (n = 361)**

Irrigation Scheme	Before sub-project	Average production after sub-project implementation				
		2009/10	2010/11	2011/12	2012/13	2013/14
<b>Mafuleta</b>	<1000	4200-6300	4200-4500	2400-3000	2250-3000	1875-2813
<b>Makorora</b>	<2400	NA	NA	3500	3700	4300
<b>Mkokola</b>	<1500	NA	2000	2000	2000	2000

Note: There was no paddy crop grown in Mazinde Muheza Irrigation Scheme

The findings in this study agree with those reported by Longoi (2011) in the assessment of the sustainability of Mbori Irrigation Scheme in Mpwapwa District. In the cited study, findings revealed that crop yields increased during the early years of the presence of donors and declined later after the exit of these donors. Longoi concluded that the scheme was not sustainable, as it could not meet the expectation of producing enough crop yields. Although paddy crop production levels in Makorora Irrigation Scheme increased from less than 2 000 kg per hectare to an average of 4 000 kg per hectare, the observed deteriorating condition of irrigation infrastructure, lack of maintenance and repair together with lack of budget for maintenance jeopardised the sustenance of the attained production levels.

Regular irrigation (the application of the controlled amounts of water to plants at required intervals) as a benefit was said to have accessed by a handful of farmers. However, the majority of farmers reported to have never experienced regular irrigation. Regular availability (certainty and stability) of water resources provides farmers with a more secure basis on which to plan their production pattern and season, which in turn, can lead to increased efficiency and output. According to key informants and researcher's observation in Mazinde Muheza, the cultivation of high value horticultural crops such as ginger and vegetables in the upstream villages resulted in poor availability of water for paddy cultivation downstream. As a result of inadequate water for regular irrigation,

farmers downstream decided to embark on growing less water demanding crops such as maize and horticultural crops such as green pepper. It was noted further that there was no resource use plan to ensure equity in resource (water) utilization among users; and this affected the sustainability of the sub-project.

Moreover in Mkokola Irrigation Scheme, as a result of failure to irrigate, FGD participants vehemently blamed the projects committee, village government council and farmers for the failure of the projects to deliver enough water for regular irrigation as opposed to what was expected; this was happening despite having the infrastructure in place. During focus group discussion and key informant interviews, it was realized that, unlike the current situation there was regular availability of water for paddy cultivation in Mafuleta Irrigation Scheme earlier on. Due to lack of adherence to the constitution regarding water availability and distribution, FGD participants' were of the view the projects committee failed them as they could not facilitate the agreements on resource use. In Makorora Irrigation Scheme too, the FGD participants complained against irresponsible Village Council and sub-project committee which failed to take action to ensure that water was available for regular irrigation especially to farmers at the tail-end. This was unlike the case with farmers at the middle and close to the head-works who had plenty of water which sometimes flooded the plots close to the head-works. In addition, lack of management mechanisms in some irrigation schemes and ineffective management mechanisms, where they existed, severely affected regular irrigation and sustainability of the intervention. Similar, findings were reported by Nhundu *et al.* (2015) and Nhamo *et al.* (2016) in Zimbabwe and Malawi respectively.

Although disease control was assessed as a benefit in the irrigation sub-projects, paddy diseases were not found to be a significant problem. This was apart from the reality that, the use of integrated pest management (IPM) techniques was advocated during the

previously implemented programmes/projects such as Special Programme for Food Security (SPFS) in Korogwe District using the Farmer Field School (FFS) approach. FFS is considered as a successful farmer training and extension methodology because of its focus on consultation and participation when introducing new practices or technologies to farming communities (Smith *et al.*, 2014).

FGDs participants and key informants indicated that vandalism of infrastructures (stolen steel/iron water control gates at Mkokola), water losses due to seepages, salinity, waterlogging, and poor enforcement of norms by sub-project committee and the Village Government Council in Mafuleta irrigation scheme did affect the flow of benefits. Similar cases of waterlogging and salinity in the productive capacity of irrigation systems in Mafuleta are reported by Abbott and Leeds-Harrison (1994); Ayers and Westcot (1985); Bos and Boers (1994); Freisem and Scheumann (2001); and Valipour (2014). The cited reasons significantly affected not only the flow of benefits but also sustainability of the implemented projects in the study area.

#### **4.2.2 Sustainability Index (SI) of livestock dips**

Findings presented in Table 7 indicate that for livestock dips; only one sub-project did attain the SI score of above 2.5 (fifty percent). Overall, according to the sustainability index, most of the implemented projects (three out of four) scored below 2.5 (fifty percent) and these were considered as “not sustainable.”

One of the livestock dips subprojects was found to be sustainable because of the efforts of few individual livestock-keepers and one livestock extension staff (who is a livestock-keeper) that encouraged other livestock-keepers to dip their animals at the agreed fee and

dipping schedule. This shows that individuals who are knowledgeable on certain innovation can play a significant role not only in enhancing sustainability of an intervention but also in influencing others to participate.

**Table 7: Assessment of sustainability of livestock dip projects**

Rating:1=Very Poor, 2=Poor, 3=Moderate, 4=Good, 5=Very Good	Magila		Maurui		Kwagunda		Mkwajuni	
	Mkumbara		Rutuba				Sekioga	
	%	Score	%	Score	%	Score	%	Score
A Continued service delivery & benefits								
Number of households benefiting from the project	4	0.2	4	0.2	4	0.2	4	0.2
Effectiveness and efficiency of service delivery	2.5	0.125	1.5	0.075	3	0.15	1.5	0.075
Quality of services and benefits	2.5	0.125	1	0.05	3.5	0.175	1.5	0.075
Satisfaction with services and benefits	3	0.15	1	0.05	3	0.15	2	0.1
Distribution of benefits among groups	2.5	0.125	1	0.05	3	0.15	2	0.1
<b>Sub-total</b>	<b>14.5</b>	<b>0.725</b>	<b>8.5</b>	<b>0.425</b>	<b>16.5</b>	<b>0.825</b>	<b>11</b>	<b>0.55</b>
B Maintenance of physical infrastructure								
Condition of physical infrastructure	4	0.2	4	0.2	4	0.2	4	0.2
Condition of logistics - machinery/equipment	1.5	0.075	3	0.15	3.5	0.175	3	0.15
Adequacy of physical infrastructure maintenance procedures	2.5	0.125	2	0.1	3.5	0.175	2	0.1
Adequacy of physical infrastructure maintenance and repair budget	2.5	0.125	1.5	0.075	2.5	0.125	2	0.1
Farmers/livestock-keepers involvement in maintenance and repair	2.5	0.125	1	0.05	3	0.15	2	0.1
<b>Sub-total</b>	<b>13.0</b>	<b>0.65</b>	<b>11.0</b>	<b>0.55</b>	<b>16.5</b>	<b>0.825</b>	<b>13.0</b>	<b>0.65</b>

**Table 7 Continued.....**

Rating: 1=Very Poor, 2=Poor, 3=Moderate, 4=Good, 5=Very Good	Magila Mkumbara		Maurui Rutuba		Kwagunda		Mkwajuni Sekioga	
	%	Score	%	Score	%	Score	%	Score
C Long-term institutional capacity								
Adequacy of capacity and mandate of committee	2.5	1.5	1.5	0.075	2	0.1	2.5	0.125
Adequacy of project committee budget	2	1.5	1.5	0.075	2	0.1	2	0.1
Adequacy of inter-committee coordination	2	1.5	1.5	0.075	2	0.1	2.5	0.125
Adequacy of coordination and linkages between actors	2	1.5	1.5	0.075	2	0.1	3	0.15
Adequacy of flexibility and capacity to adapt changes	2.5	2	2	0.1	2.5	0.125	2	0.1
<b>Sub-total</b>	<b>11.0</b>	<b>8.0</b>	<b>8.0</b>	<b>0.4</b>	<b>10.5</b>	<b>0.525</b>	<b>12.0</b>	<b>0.6</b>
D Support from key actors								
Strength and stability of support from national government – Ministry	3.5	0.175	3.5	0.175	3.5	0.175	3.5	0.175
Strength and stability of support from Regional Secretariat (RS)	2.5	0.125	2.5	0.125	2.5	0.125	2.5	0.125
Strength and stability of support from LGA - district council	1.5	0.075	1.5	0.075	1.5	0.075	1.5	0.075
Strength and stability of support from LGAs - village government council	2	0.1	1	0.05	1.5	0.075	1.5	0.075
Strength and stability of support from the farmers & l/keepers	1.5	0.075	1	0.05	4	0.2	2	0.1
<b>Sub-total</b>	<b>11</b>	<b>0.55</b>	<b>37.0</b>	<b>0.475</b>	<b>56.0</b>	<b>0.65</b>	<b>47.0</b>	<b>0.55</b>
<b>Sustainability Index (SI)</b>	<b>48.0</b>	<b>2.4</b>	<b>37.0</b>	<b>1.85</b>	<b>56.0</b>	<b>2.8</b>	<b>47.0</b>	<b>2.35</b>

**(i) Respondents' satisfaction with the condition of livestock dips**

Findings regarding respondents' satisfaction with the condition of the projects infrastructures show that about 52% of the respondents in the livestock dips were satisfied with the condition of the infrastructures.

During FGDs, the following reasons for dissatisfaction in livestock dips sub-projects implemented were given;



- a) Leaking water troughs in two of the four livestock dips
- b) Non-working water pumps
- c) The width between GS pipes/guardrails of the livestock dips allows shoats (goats and sheep) and weaned calves to escape while dipping.

Some of the problems on livestock-keepers' dissatisfaction towards the condition of livestock dips could have been resolved by the livestock-keepers themselves. This is unlike the case in irrigation schemes which need specific technical expertise and more money. Lack of ownership by livestock-keepers resulted in the failure of carrying out even minor repairs of the water troughs.

#### **(ii) Flow of benefits in livestock dip sub-projects**

Unlike in the irrigation projects, majority of the respondents said that they had realized the benefits because of the implementation of livestock dip projects in their villages. The benefits accrued to livestock-keepers whom were assessed included, intensive use of resources, household food security, access to extension services, employment opportunities, access to training, milk yields, dipping services, and diseases control. The basic question was whether or not there was a continued flow of benefits for sustainability results.

The findings on intensive use of resources from the implemented projects show that, to some of the livestock-keepers the benefits were short lived. A gradual failure in sustaining intensive use of resource was an indication that the projects might not achieve their objectives in resource utilization. This is because of the fact that the population is growing while the resources remain the same in the production areas. Nevertheless, such low level of intensive use of resource also seems to be attributed to weak institutions in various

levels of local authorities. This trend increases the likelihood of affecting sustainability of the implemented sub-projects. Moreover, about a third of the respondents reported to have experienced some improvement on household food security as a benefit from the implemented sub-projects. However, the respondents said that those who benefited included village/sub-project leaders and/or their friends/relatives who had access to resources such as dipping of livestock in operating dips and at times dipping of their livestock either on credit or free of charge.

In addition, although livestock are said to provide financial security or insurance against financial problems, FGDs and dipping records revealed that most livestock dips were not operating regularly. This posed a threat to households' food security among livestock-keepers. This was the case as the healthy condition of a livestock determines its market price hence sick animals with wasted condition could not fetch high prices. This affected the ability of the household to food secure itself. Livestock dips were among the physical resources which could have positive influence on household food security; however, this was not the case in the study area. A study by CONCERN (2009) in four districts of Iringa rural, Kilosa, Lindi rural, and Mtwara rural found that families with no livestock were relatively more marginalized as they were more exposed to livelihood shocks than those with some livestock. In addition, livestock were the important means of generating additional family income to meet unexpected social and economic obligations (CONCERN, 2009).

Furthermore, less than one fifth of the respondents said that employment opportunities were created as a result of project implementation. FGDs revealed that the employment opportunities were on milk production and attending livestock, though the benefits did not

last long due to reduction in milk production and increased livestock diseases and deaths. Weak enforcement of By-laws and norms and weak adherence to constitutions in Magila Mkumbara were among the reasons that precipitated the benefit related problems thus causing the unsustainability of the benefits. In addition, a female key informant who is a project committee member at Magila Mkumbara said;

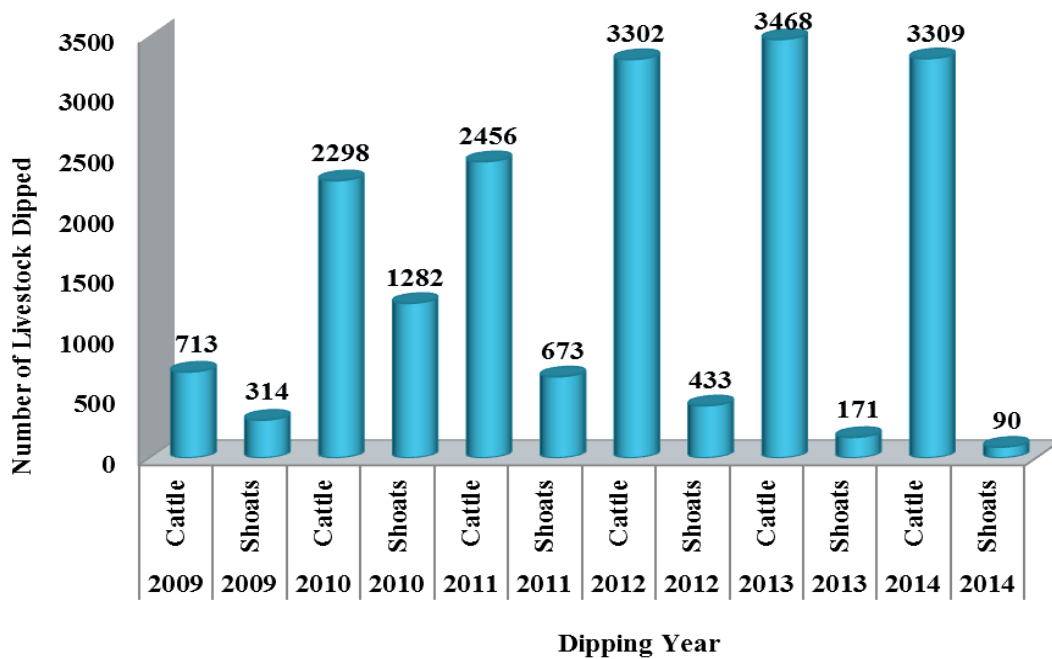
*“The observed decrease in milk production and increased livestock deaths trend did curtail the previously observed employment opportunities when most of livestock-keepers used to dip their livestock”*

This indicates that the continued flow of benefit is among the desirable indicators of sustainability for the implemented projects.

Regarding the enhanced access to livestock extension services it was found that less than 15% of the respondents reported to have benefited from advisory services in the study area. During FGDs in all villages, the participants lamented over inadequate Extension Officers. It was common to find one Extension Officer serving more than one village and at the same time acting as a Village Executive Officer or Ward Executive Officer or acting in other administrative posts. This kind of arrangement actually denies those whom would have been served by such officers of their right of using the Extension Officer for the set purposes. Similar findings were reported by Anderson (2007) who revealed that an Extension Officer who is part of livestock personnel was found serving rice growers. Similar findings were also reported by IFAD (2002) in the Republic of Namibia where, the technical staff operating at a field level were principally crops oriented, were relatively few in number, and were involved in a wide range of activities. In addition to the shortage of extension personnel, majority of livestock-keepers reported to have never accessed training on modern livestock keeping, and even those who accessed training said that such trainings were short lived.

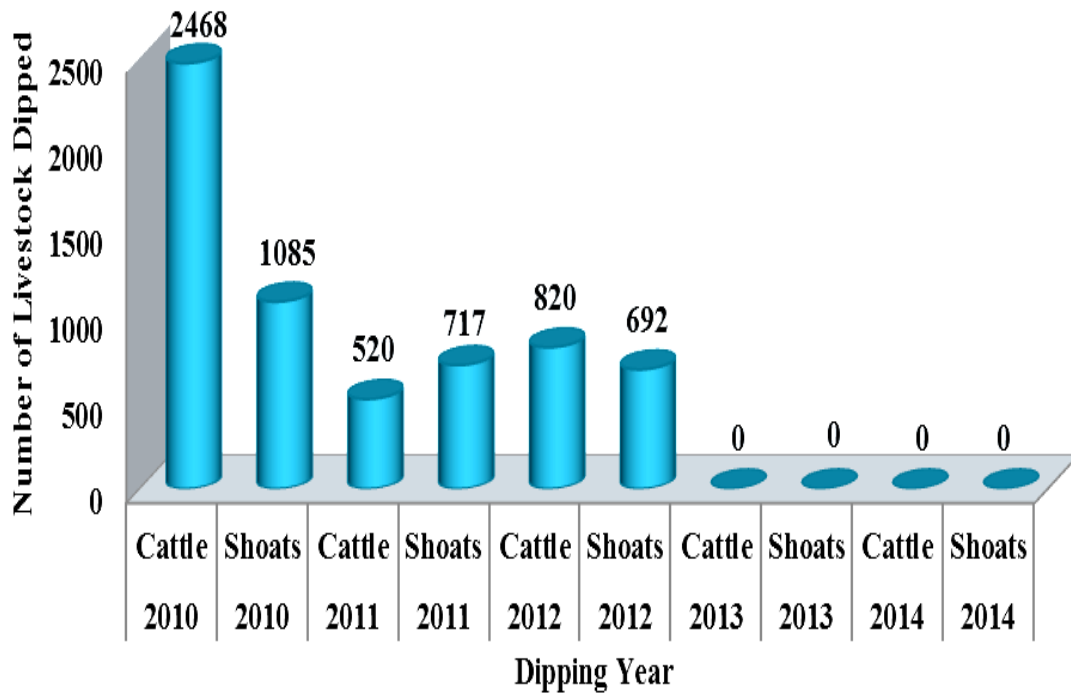
It was revealed further that the average milk production from indigenous Tanzanian Shorthorn Zebu (TSZ) cows initially increased on average from less than two litres per cow per day to three litres per cow per day, and thereafter it dropped to less than three litres per cow per day. This affected not only the household income but also the employment of milk vendors. The reduction in milk yield per cow per day was linked to an increase in livestock diseases due to irregular dipping as a result of inoperative livestock dips.

The findings revealed further that, about one third of the respondents reported to have regular dipping. This is an indication that the realization of the benefit of the service was in jeopardy. Findings of this study indicate that, regularity of dipping was observed in Kwagunda livestock dip only (Fig. 5) although all dip tanks were in very good condition and were granted funds for initial filling acaricide. According to key informant at District Livestock Offices the District Council had a By-law (Korogwe District Council Dipping Fee By-law of 1989); however, none of the studied villages were observing or enforcing the said By-laws which would have facilitated the dipping of livestock in the District. In addition, the Magila Mkumbara livestock dip project had its own constitution, but it was not honoured. The failure in enforcing Korogwe District Council By-Law and failure in abiding by the laid constitutions in livestock dips is linked to weaknesses or ineffectiveness of institutional arrangements. The observed regular dipping at Kwagunda livestock dip was attributed to, among others, the fact that the Extension Officer (who was also a livestock-keeper) was committed to serve the livestock-keepers. Besides, the fact that the project committee had only one active member and without an operating (defunct) bank account, the Extension Officer together with the only active project committee member did manage all the dipping activities.



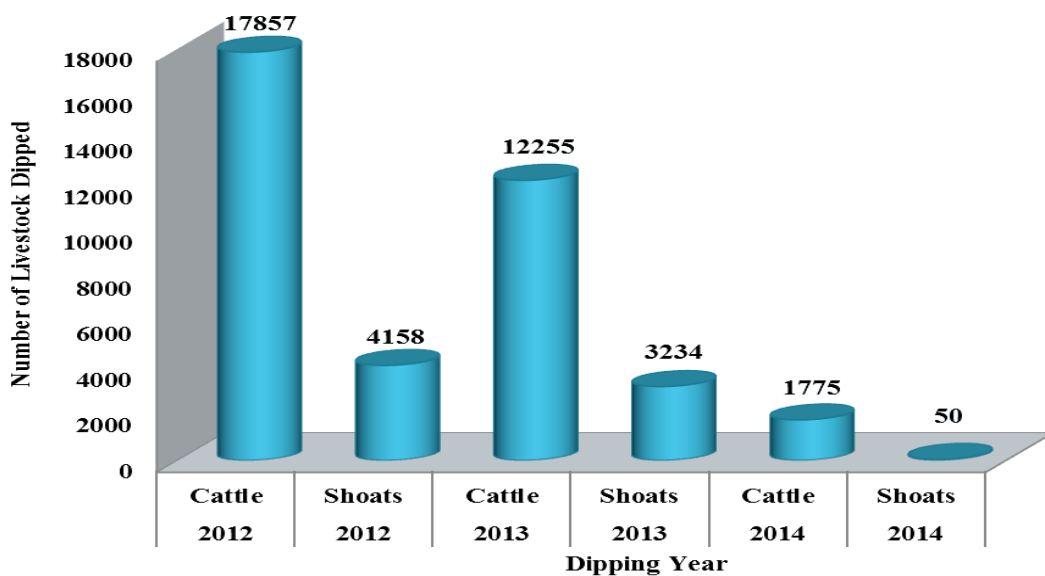
**Figure 5: Kwagunda livestock dip – livestock dipping trends from 2012 to 2014**

Moreover, irrespective of fluctuations in dipping, the practice was largely meant for cattle than shoats. In fact, the minimal dipping of goats and sheep (shoats) was said to be associated with difficulties experienced during the dipping. In general, despite their importance in diseases control, a good number of the constructed or rehabilitated livestock dips in the country are not working (MLDF, 2010) and Korogwe District Council is not an exception as exhibited by the dipping records in Maurui Rutuba (Fig. 6) whereby the livestock dip remained non-operative for more than eighteen months.



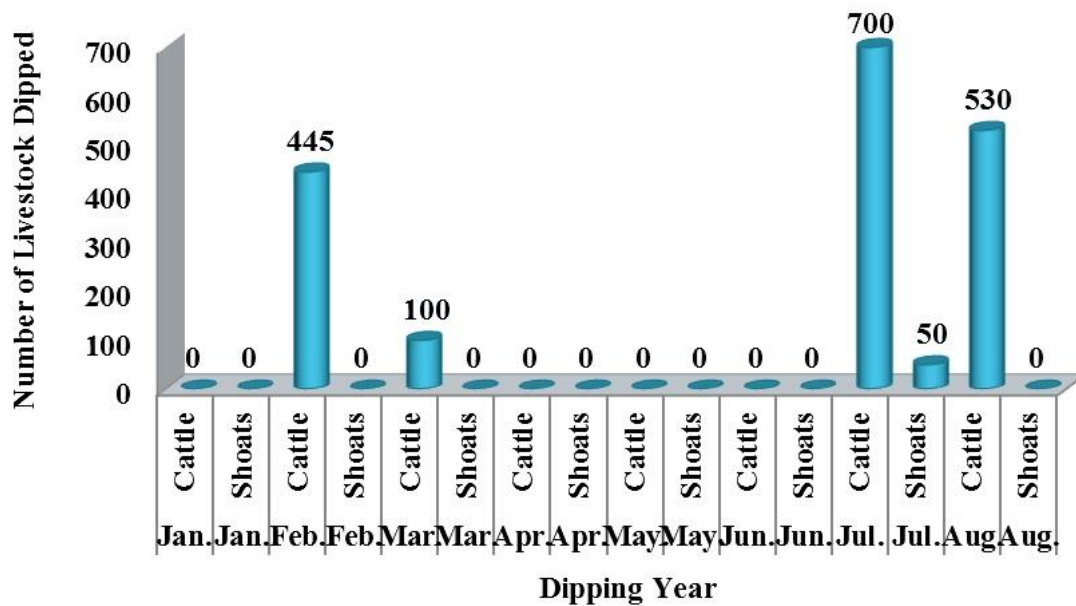
**Figure 6: Maurui Rutuba livestock dip – dipping trends from 2010 to 2014**

The trend of non-operating livestock dips was also observed at Magila Mkumbara which had the highest number of livestock in Korogwe District Council (Fig. 7 and Fig. 8).



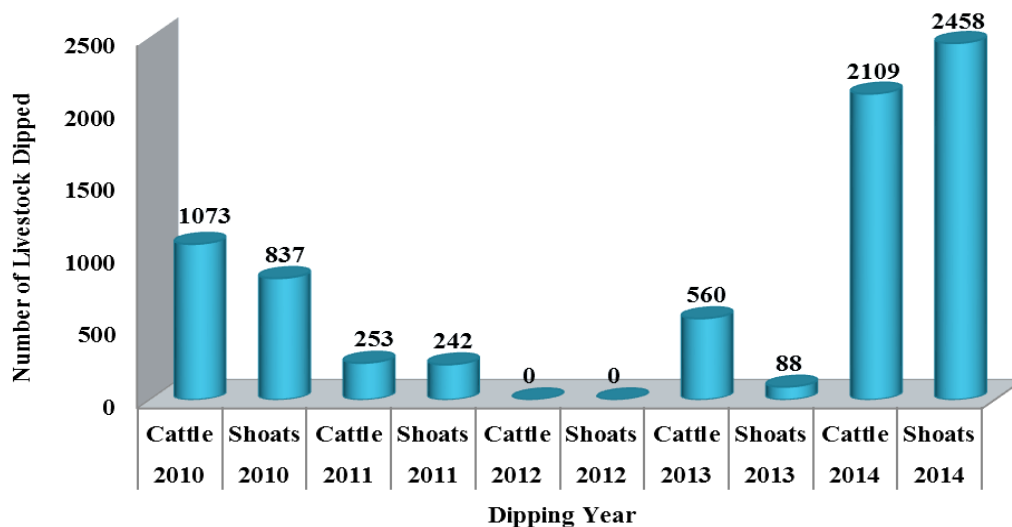
**Figure 7: Magila Mkumbara livestock dip – livestock dipping trends from 2012 to 2014**

The dipping trend in Magila Mkumbara livestock dip between January and August 2014 was alarming, as less than 2 000 cattle, goats, and sheep were dipped (Fig. 8).



**Figure 8: Magila Mkumbara livestock dip – livestock dipping trends for 2014**

The failure of livestock dips to operate forced some livestock keepers to embark on knapsack sprayers, though this was said to be very expensive and cumbersome. Also, according to key informants, there was a sharp rise in the costs incurred on prophylaxis and/or treatment of trypanosomiasis and tick-borne diseases. The situation was less similar at Mkwajuni Sekioga livestock dip. However, unlike Magila Mkumbara and Maurui Rutuba livestock dips, Mkwajuni Sekioga Extension Officer made some efforts and managed to grant the projects committee a loan for buying some acaricide. This is when the livestock dip became operational again (Fig. 9), though the question that remains unanswered is as to whether or not the loan was going to be repaid and whether or not the dip would remain operational sustainably.



**Figure 9: Mkwajuni Sekioga livestock dip – dipping records from 2010 to 2014**

The findings of this study reflect what has been reported earlier by various authors such as DASIP (2013) in Lake Zone; Karimuribo *et al.* (2012) in Kilosa district; Mahonge (2010) in Mwanga district; MLDF (2010) in Tanzania – nationwide, Nonga *et al.* (2012); Ole-Neselle *et al.* (2014) in Hanang, Kiteto and Simanjiro; SNV (2012) in Tanzania – nationwide, and Wesonga *et al.* (2010) in Kenya that most of the livestock dips which were meant for controlling ticks and tick-borne diseases were not operating regularly due to various reasons including poor management.

For the unsustainable dipping services, during FGDs and KIIs it was revealed that no funds were made available for the replenishment of acaricide due to poor financial management and weaknesses in dipping fee collection, as well as weakness in enforcing the Korogwe District Council Dipping By-laws of 1999. All this reflects ineffectiveness of institutions/institutional arrangements which affected the sustainability of livestock dips projects.

Generally, improved disease control in livestock production enterprises is a prerequisite for increased production and productivity as well as improving economic wellbeing of farmers and livestock keepers. In addition, success in the efforts geared towards livestock



disease control needs effective institutional arrangements. However, disease control as a benefit did experience some problems. FGD participants and key informants revealed that, after the initial offer of acaricide from the project, funds for dipping services started to decline. This was attributed to poor management and weaknesses in dipping fee collection, poor enforcement of the Korogwe District Council dipping fee By-law, and free riders.

Furthermore, according to key informants and FGDs participants, the failure to run or operate livestock dips led to the eruption of tick-borne diseases (TBD) and trypanosomiasis. These led to an increase in the mortality of calves, reduction in milk production, poor condition of livestock and reduction in income from livestock which threatened sustainability of the projects. A similar study by Nonga *et al.* (2012) found that, non-dipping of animals led to an alarmingly increase of the prevalence of tick-borne diseases and their associated losses. Such irregularity in the functioning of livestock dips, not only economically affected individual livestock-keepers or farmers, but it also affected the nation in general. This is because of an increase in livestock diseases and mortalities as well as a decrease in the production of better quality livestock products and sustainability of interventions. Through observation and key informants, it was revealed further that the width between rail guards or GS pipes of the livestock dips allowed goats and sheep to escape the dipping because of their small size. These then became a source of tick-borne diseases. These findings concur with those reported by Asmaa *et al.* (2014) in Egypt; Moghaddam *et al.* (2014) and Shemshad *et al.* (2012) in Iran; and Nyangiwe and Horak (2007) in South Africa, who found that the failure in the dipping of goats and sheep results in the spread of tick-borne diseases which compromised sustainability of the disease control programmes.

Focus group discussions in various villages in the study area and key informant interviews revealed that institutional weaknesses were the main reason for short-lived and/or poor realization of benefits of the implemented projects. For example, inadequacy of extension staffs was among the reasons that prevented farmers/livestock-keepers from accessing relevant information on the protection and/or control of crop or livestock diseases. One key informant remarked, “The inadequacy of extension staff denied farmers/livestock-keepers of their right of accessing relevant information. This was a result of limited scope of awareness regarding the impact of crop and livestock diseases, a gap that needs to be filled”.

#### **4.2.3 Acquisition of knowledge and skills on resource use and management**

When new or additional information is made available and accessed accordingly, results not only in increased knowledge and improved skills, but also in behavioural change, and later attitudinal change. Generally, effective institutional arrangements not only facilitate the uptake of knowledge and skills by farmers/livestock-keepers, but they also facilitate their use in the implementation of development interventions. The findings indicate that less than 15% of the respondents in livestock dips and irrigation projects reported to have acquired knowledge on resource use and management. Such minimal percentages of those who acquired knowledge in projects implementation left the majority of farmers and livestock-keepers without the necessary knowledge in the use and management of the resources.

Lack of knowledge in the use and management of resources led to poor valuation of the investment made. However, this could also be linked to inadequacy of extension staffs that have the obligation of equipping farmers/livestock-keepers with the knowledge (and

skills) relevant for the implementation of infrastructure projects. This finding was backed by observations from participants in focus group discussions and key informants who reported that majority of the farmers and livestock-keepers did not have adequate knowledge on the management of the resources. This reality therefore risked the sustainability of the development endeavour. Similarly, less than 20% of the respondents reported to have acquired skills on resource use and management. However, the observed low levels of skill acquisition limit the transmission to the local communities of technological innovation which was introduced through sub-projects.

The low level of acquisition of knowledge and skills on resource use and management might have been caused by inadequate or lack of knowledgeable and skilled extension staffs in the villages where infrastructure agricultural projects were implemented. For example, in some villages where irrigation scheme sub-projects were implemented, the staff available were those trained in livestock instead of extension staff trained in irrigation. Similarly, in some of the livestock dips sub-project, the extension staffs available were those trained in crop production. This greatly affected farmers/livestock-keepers acquisition of knowledge and skills which were necessary for the sustainability of the implemented projects.

#### **4.2.4 Attitudinal change**

The findings on attitude change of farmers and livestock-keepers as a result of projects implementation indicate that, 62.7% and 38.0% of the respondents in livestock dips projects and irrigation projects respectively admitted that their attitude changed because of the projects implementation. The major changes reported were willingness to contribute for agricultural interventions and a change in mind set towards resource use.

Although this subject area has been less studied in sub-Saharan Africa, Meijer *et al.* (2014) argue that intrinsic factors such as knowledge, perceptions, and attitudes of the potential users in relation to the benefits and challenges of the technology or innovation play a key role. The knowledge and perceptions about an innovation together determine a change of attitude towards it. And in this case, positive attitude towards an agricultural innovation or intervention was expected to increase the likelihood of the adoption for the better (Meijer *et al.*, 2014). In view of the findings, there is a link between perceptions and the actual economic benefits manifestations. It is apparent that once the actors exhibit a positive change in their perception, the actual economic benefits are likely to emerge. At this point therefore, nurturing of the change is an important pre-requisite for sustainability.

#### **i) Willingness to pay or contribute to projects implementation**

The findings indicate that less than 25% of the farmers and livestock-keepers were willing to contribute or pay for the services. FGDs revealed that in order for farmers/livestock-keepers to contribute, there should be commitment, accountability, and transparency in the implementation of the interventions. Furthermore, during key informants and focus group discussions, it was revealed that there were some weaknesses which were associated with prior knowledge of roles and responsibilities among farmers/livestock-keepers, and these were to do with financial responsibilities in the implementation of the interventions. Resource or service pricing is a way of ensuring sustainability of the intervention and related services, and these can also serve as a mechanism for enhancing efficiency of the resource use. In addition, there is a need for having strong and effective institutional arrangements. Moreover, according to key informant and focus group discussions those who were willing to pay or contribute had benefited from the implemented projects. Willingness to contribute for development activities was found to be a big problem in the study area.

For example, during interviews with key informants in irrigation schemes, it was found that none of all the four irrigation schemes (Makorora, Mkokola, Mafuleta and Mazinde Muheza) had funds paid or contributed from farmers for the implementation of various sub-projects activities. In addition, even the bank accounts were said to be dormant. These findings concur with those reported by Schram *et al.* (2007) who revealed that, in many cases, farmers in the irrigation schemes funded through ASDP do not see the importance of contributing to the water fees which is very important. Resistance against or lack of willingness to pay result in the paucity of funds for the operation and maintenance of physical infrastructures, which in the long-run, affect the production potential and sustainability of the implemented sub-projects.

Weaknesses in farmers' willingness to pay or contribute for various activities in agricultural infrastructure investments were also reported by Hailelassie *et al.* (2016) and Assefa (2016) in Ethiopian irrigation systems whereby even at the schemes with irrigation organizations, irrigation fees were yet to be introduced. Lack of willingness to pay/contribute for various scheme activities was also reported by Akayombokwa *et al.* (2015) in Nabuyani Scheme - Zambia where each farmer had to contribute USD 2 per year for maintenance. Even though the fee was low, none of the farmers paid it because the scheme had not faced any major crisis which needed funding. Nevertheless, farmers in Mafuleta irrigation scheme agreed to contribute all dues for various irrigation scheme purposes. However, the treasurer said that farmers never made such contributions. This might be due to the fact that the ownership of the irrigation scheme was unclear and therefore it was assumed to be the responsibility of the government.

Generally, the issue is not only on ownership of the infrastructure, but also on the moral hazard of dependency syndrome which is reinforced by grant-financed projects as pointed

earlier by Korten (1985), “As villagers learn to wait for outsiders to bring them charity, their own resources go un-mobilized and consequently the total amount of resources mobilized for local development may actually decline”. Hence, both lack of ownership and dependency on external funding created an environment where the communities failed to manage the implemented projects and lowered the likelihood of sub-project sustainability.

Also, livestock-keepers’ willingness to pay for the services or to contribute for various projects implementation activities in the efforts of controlling livestock diseases in Cote d’Ivoire had a very different picture. In a study in northern Côte d’Ivoire, Pokou *et al.* (2010) evaluated the willingness of beneficiaries to pay for tsetse control using traps and targets. The findings indicated that 94% of the respondents were willing to contribute money, 86% were willing to contribute labour, and 81% were willing to contribute both money and labour.

Besides the fact that the programme through DADP covered the initial costs for acaricides and water pumps, the cost for subsequent dipping were to be obtained from dipping fees (TShs 100 per cattle and TShs 50 per the goat or sheep dipped). However, dipping records indicated that in the first or second year all livestock dips were operating. Thereafter, the trend changed and later some dips stopped operating altogether. FGDs provided two major reasons for the dips failure to operate regularly; these include lack of funds (due to embezzlement of the collected fees) to procure acaricide and protest against livestock dips (doubting the strengths of acaricide in the dip tank). Other reasons included weakness in the enforcement of the dipping by-laws and lack of awareness among livestock keepers on the importance of livestock dipping. Thus in this respect, some livestock-keepers refused

to contribute dipping fees or the agreed contributions. It is apparent that the District Council and Village Government Council, which were responsible for development issues, were too weak to have had any positive influence on livestock-keepers' willingness to contribute or pay for the dipping services accordingly. In addition, although the 'Korogwe District Council (dipping fees By-law) by-laws of 1999', do exist (on papers), their enforcement remained a problem. During FGDs and key informant interviews, it was revealed that the dipping by-laws were not made available or known to livestock-keepers the majority of Livestock Extension Officers, Village Executive Officers (VEOs), and Ward Executive Officers (WEOs). This made the enforcement of the By-law difficult.

Unlike in other livestock dips, Magila Mkumbara livestock dip project had a constitution in place. However, the constitution was rarely honoured due to various reasons including lack of clarity on roles between the sub-projects committee and village government council. For example, section 5(4) of the constitution clearly states that every member is liable to pay for all contributions as required, and section 11(1) states that all conflicts arising shall be resolved through the livestock dip committee. However, livestock-keepers protested and refused to dip their livestock demanding that the dip tank should be emptied whenever they (livestock-keepers) deem it necessary. This was however against the dipping procedures according to one key informant in the area. This could have been resolved by the projects committee using their constitution. But the matter was reported to the village government council chairperson who failed to act accordingly, and he later came into loggerhead with the projects committee chairperson. During the FGD at Magila Mkumbara, the matter was raised and generated a heated debate between Village Government Council Chairperson and sub-projects Chairperson. The observed institutional weaknesses severely affected the implementation as well as sustainability of the sub-projects.

## **ii) Changes in mind set towards resource use**

The findings on the respondents' change of mind set towards projects resource use indicate that only less than 30% of the respondents in livestock dips and irrigation sub-projects said that there was a change in mind set towards resource use. In such a situation, it was almost impossible for the majority to see the importance of the available resources, and be ready to own and take care of them for their benefits. The absence of a change in mind set among the majority of the respondents in livestock dips and irrigation schemes is an indication that the implemented projects were just taken for granted. This was regardless of the resources used in the construction of such infrastructures; and this seems to have affected the sustainability of the implemented interventions.

Regarding the role of institutional arrangements on sustainability, the observed weaknesses are in line with those reported earlier by Dixon and Carrie (2012). The author revealed that five years after the formal cessation of "Striking a Balance (SAB) Project", while many SAB activities continued to be implemented, the institutional arrangements failed to prevent a decline in farmer engagement in the SAB project activities. This had negative implications for the sustainability of (the systems in the catchment and wetlands) the project. Needless to say, the effectiveness of institutional arrangements in the sustainability of an intervention is in fact partly attributed to the actor's capabilities, knowledge, preferences, and perceptions.

### **4.2.3 Sustainability of implemented sub-projects**

The assessment of sustainability of the implemented sub-projects revealed that seven out of eight or 87.5% of the assessed sub-projects were not sustainable and only one out of eight or 12.5% of the assessed sub-projects were sustainable. Such high level of unsustainability of agricultural infrastructure sub-projects can be viewed and discussed



based on the observed weak areas of the assessment. Upon rating, the sustainability index (SI) of the projects indicated that some projects performed better (Table 8) while others failed to perform better (Table 9) in some indicators.

The strong areas observed include the number of households benefiting from the sub-project, condition of logistics, the strength and stability of the support from national government, and regional secretariat.

**Table 8: Indicators with ratings of “very strong to strong” for both irrigation and livestock dip projects**

<b>Indicator</b>	<b>Indicators with “very strong to strong ratings”</b>
<b>A – Continued delivery of services and benefits</b>	
A-1	Number of households benefiting from the project
<b>B – Maintenance of project Physical Infrastructure</b>	
B-2	Condition of logistics -machinery/equipment
<b>D – Support from Key Actors</b>	
D-1	Strength and stability of support from national government – Ministry
D-2	Strength and stability of support from Regional Secretariat (RS)

However, weak areas included poor quality of the services and benefits, lack of maintenance and repair budget for infrastructures, inadequate capacity and mandate of sub-project committees, and inadequate or lack of support from various actors. These factors were found to affect the sustainability of sub-projects negatively.

**Table 9: Indicators with ratings of “very poor to poor” for both irrigation and livestock dip projects**

<b>Indicator</b>	<b>Indicators with “very poor to poor ratings”</b>
<b>A – Continued delivery of services and benefits</b>	
A-2	Effectiveness and efficiency of service delivery from the implemented project
A-3	Quality of services and benefits from the project
A-4	Satisfaction of farmers/livestock-keepers with project services/benefits
<b>B – Maintenance of project Physical Infrastructure</b>	
B-4	Adequacy of project infrastructure maintenance and repair budget
B-5	Farmers/livestock-keepers involvement in maintenance and repair procedures
<b>C – Long-term Institutional Capacity and Strengths</b>	
C-1	Adequacy of capacity and mandate of the project committee
C-2	Adequacy of project committee budget
C-3	Adequacy of inter-committee coordination
C-4	Adequacy of coordination and linkages between project committee and local actors
<b>D – Support from Key Actors</b>	
D-3	Strength and stability of support from local government (district council)
D-4	Strength and stability of support from local government (village government council)

The observed weaknesses resulted in inefficiencies and ineffectiveness in service delivery as against the target of improving outcomes for individuals, families, communities and societies using the sub-projects. The importance and relevancy of effectiveness and efficiency of the delivery of services were reported by Khan *et al.* (2013) in a study on prompt community based veterinary services delivery system and its impact on disease

burden and production in the dairy animals. In the cited study, Khan *et al.* (2013) concluded that community based veterinary services delivery system is helpful in reducing the burden of disease and can consequently boost agricultural economy by increasing livestock production. Efficiency was said to be improved through allocation of appropriate resources for the services and employment of the required staff to deliver the said services.

The inadequacy of physical infrastructure maintenance and repair was also reported in Ethiopia by Hailelassie *et al.* (2016) who revealed that limited capacity particularly for timely maintenance and equitable water distribution significantly affected service delivery in the irrigation systems. Moreover, from their analysis, it was evident that the major ingredients of effective service delivery (e.g. infrastructure, institutional settings and capacity) were not in place. This was said to result from the absence or weakness of irrigation institutions.

The finding on observed inadequate support in LGAs was in agreement with to the finding reported in the ANSAF's - Consolidated Report for agriculture sector social accountability monitoring programs in the selected districts of Tanzania as reported by Henjewe (2013). The author revealed that agriculture is currently contributing between 20% and 65% of own source of revenue in LGAs. Despite its significant contribution to the economy, the sector has not received the attention it deserves. From the studied councils, the majority of LGAs were found to allocate relatively small amounts of funds to support agriculture interventions at the district and sub - district levels. For example, while Iringa DC allocated 14% (FY 2010/11) and Singida DC 10.8% (FY 2008/09) the rest of the districts did as follows; Tandahimba 7% (FY2008/09), Korogwe 4.2% (FY 2010/11), Ulanga 8.1% (FY 2010/11) and Karagwe 4.0% (FY 2008/09). It can be concluded

therefore that the level of LGAs commitment in improving agriculture productivity is very low.

Institutional arrangements do play a significant role in the sustainability of interventions. However, the fact that only 12.5% of the projects were sustainable reflected weak institutional arrangements as against what has been reported earlier by Mahonge (2013). According to Mahonge (2013), the observed continuity (sustainability) of the project activities in the post-project time has been significantly contributed by the well-established institutional arrangement which is responsive, accountable, and adaptive to dynamic social, economic and ecological transformations. Village government councils and project committees failed to ensure that norms or constitution, which were in place, are enforced, or enacted for the effective and efficient institutional arrangement which is necessary for the sustainability of the implemented sub-projects.

In addition, where rules or constitution were crafted it was nobody's duty to make sure that they were enacted or enforced; neither leaders nor those whom were led felt that such rules were ever needed for the continuation and sustainability of project benefits. The sustainability assessment results corroborate the feelings of the respondents on sustainability of sub-projects in their villages. The majority (82%) of the respondents doubted the sustainability of the interventions. the main reason for their scepticism was poor functioning of the institutions which are responsible for development issues in their villages.

Furthermore, the findings show that between the two types of infrastructure sub-projects, none of the irrigation ones were sustainable unlike in livestock dips where a quarter of

infrastructure sub-projects were sustainable. Though the reasons for poor sustainability (below 50% or a score of less than 2.5) for both irrigation and livestock projects did not differ much, one would have expected livestock-based dip sub-projects to score higher on SI due to the nature of the infrastructure and requirements for operations.

The reason for unsustainability of irrigation projects include poor quality of services and benefits from the project which were associated with incomplete and/or poor condition of irrigation infrastructures especially secondary and tertiary canals. Other reasons include; lack of budget for maintenance and repair of infrastructures and project committees; lack of coordination and linkages between project committees and local institutions such as Village Government Councils, lack of support from Local Government (micro and meso – levels) and farmers, and poor involvement of farmers in the maintenance and repair works which were associated with inadequate or lack of skills. These findings are in contrast with those reported by Istijono and Ophiyandri (2015) in Indonesia where seven community-based small-scale irrigation projects which were implemented showed a sense of belonging that ensured sustainability. Istijono and Ophiyandri (*ibid*) revealed further that, the key policy that contributed to the success was the trust bestowed upon the community in controlling the project.

As for livestock dip projects, similar reasons were cited for poor sustainability results. These reasons include: lack of effective and efficient service delivery mechanism, poor quality of services and the benefits delivered, satisfaction of farmers/livestock-keepers, adequacy of sub-project infrastructure maintenance and repair budget. Other reasons include farmers/livestock-keepers' involvement in the maintenance and repair, adequacy of coordination and linkages between project committee and local actors, strength and

stability of the support from the Local Government (District Council), strength and stability of support from the Local Government (Village Government Council). These reasons were attributed to weak and ineffective institutional arrangements, whereby, project committees as well as Village Government Councils failed to enforce the 'Korogwe District Council Dipping Fee By-law', and even the constitution in some villages.

### **4.3 Perception of Sustainability**

#### **4.3.1 Actors' awareness and knowledge of the concept of sustainability**

Actors at different levels in Korogwe District had varied perception of the sustainability concept. The findings indicate that most of the actors including farmers and livestock-keepers, village government council members, sub-project committee members, as well as Council staff from the District offices and the villages were not aware of the concept of sustainability. However, even those who reported to have been aware of the concept of sustainability could not express their knowledge of the concept. Lack of knowledge about the concept of sustainability among actors could have affected their ability to monitor sustainability of the implemented projects. Moreover, lack of knowledge on the concept of sustainability could be an indication that sustainability was considered as a nonentity to the implementation of agricultural interventions! It was further noted that sustainability was not a part of the community-based projects implementation requirements even in the DADPs implementation guidelines, and as a result, actors failed to take keen interest in it.

Findings indicate that 65.5% and 69.9% of the respondents in both irrigation schemes and livestock dip projects respectively were aware of the term sustainability as a concept. This can be linked to the fact that the word 'sustainable' and 'sustainability' in Kiswahili, made it easier for whoever speaks the Kiswahili to understand them, though in practice this was

not the case with the Council staff. In fact, the word ‘sustainable/sustainability’ is mostly used when it comes to planning or implementation of development interventions, and the communities have been implementing a variety of projects for the past decade.

Although literature on the perception towards sustainability is scanty, some related findings were reported by college students in developed countries. For example, Khmel (2011) in a study on students’ perception on sustainable development in Ukraine found that, 67 out of 74 students who participated in the questionnaire were not aware of this concept; and that the general understanding of the concept of sustainable development was extremely low as only 4% of students showed familiarity with the ‘sustainable development’ concept as defined by the Brundtland Commission. Khmel (2011) further revealed further that the general awareness on sustainability was also quite low as sustainability as a topic was poorly treated not only by universities, but also by other national and local sources.

In another study on student perceptions and definitions of sustainability at the University of Illinois, it was revealed that awareness, interest, and knowledge levels regarding sustainability within the sample population were quite low (Behm 2011). Moreover, a study by Jeong *et al.* (2015) on College students’ perceptions towards sustainability revealed that 86.4% of the students reported to have heard of the concept sustainability; and about 35% of the students considered themselves familiar with the topic. However, the average score showed mediocre familiarity level as the students seemed to be less confident regarding their knowledge of sustainability. In this respect, Jeong *et al.* (2015) concluded that although many college students think they know about and are familiar with the concept sustainability, they are not fully confident in their level of knowledge in this area.

Respondents in the irrigation scheme projects managed to define the term sustainability. However, most of them, as expected, defined sustainability in the context of the implemented projects as follows: “The benefits from the project are maintained”; “something useful or beneficial for present and future generation”; “long lasting and self-operating activity”. Others definitions include “maintaining project for the benefit of present and future generations”; “a project which is performing continuously for a long time”; “something that can bring long-term benefits”; and “something that is maintained so that it can last for a long time”.

In the livestock dips projects, a number of definitions of sustainability were given by the respondents and FGDs participants as follows: “Something that provides benefits to the community”; “to maintain something and attain benefits”; “a sustainable project is that which contributes to a community’s development for present and future generations”; “to operate and provide services reliably to the community for a long time”; “sustaining or operating itself”; “something that can be used for a long time even by grandchildren”. Although the definitions of sustainability were found to vary across categories of respondents and the types of the implemented projects, generally sustainability was defined based on the belief that the projects should result in benefits that have lasting effect beyond the project life after funding.

#### **4.3.2 Respondents’ perception towards the ownership of the infrastructure projects**

Table 9 presents the findings on the perception of respondents towards ownership of the infrastructure projects.



**Table 10: Respondents' perceptions on ownership of sub-project infrastructures**

Perceptions of respondents on ownership of sub-project infrastructure	Irrigation schemes		Livestock dips	
	Projects		projects	
	Frequency	%	Frequency	%
District council	0	0.0	4	2.6
Village government	99	47.6	75	49.0
Project committee	21	10.1	8	5.2
Farmers/livestock-keepers	62	29.8	32	20.9
Don't know	26	12.5	34	22.2

The respondents' mixed perceptions towards ownership of the implemented sub-projects are due to lack of clarity on who owns the sub-project infrastructure. It was noted that Korogwe District Council failed to facilitate the process of handing over and issuing legal ownership documents (such as a certificate) to the farmers/livestock-keepers. Similar findings on failures of handing over project infrastructures to communities (farmers) were observed in Ethiopia by Assefa (2016). One would have expected that the Village Government Council in collaboration with the District Council could have issued a certificate of 'customary right of occupancy' based on The Land Act No. 4 and 5 of 1999, to the farmers or livestock-keepers. This would have created a strong sense of ownership of the infrastructure among farmers and livestock keepers.

Lack of clarity on ownership was cited as one of the reasons for the lack of willingness among farmers in Mafuleta, Makorora and Mkokola irrigation schemes to contribute to the implemented interventions which indeed affected not only the implementation of activities, but also the sustainability of the interventions. Although the involvement of farmers/livestock-keepers was expected to engender a sense of ownership and sustainability of the implemented interventions, the case was quite different in the implemented projects.

The ownership of the irrigation scheme sub-projects infrastructure was quite unclear among the respondents. During focus group discussions and key informants interviews it was revealed that the infrastructures belonged to the farmers as they contributed labour amounting to 20% of the total cost for the construction of the infrastructures. However as indicated earlier, only 28.8% of the respondents said that the project infrastructures were owned by the farmers. The majority of participants in the focus group discussion raised concerns that they indeed considered the irrigation scheme infrastructures as belonging to the farmers. However, lack of legal documents indicating the ownership of the infrastructure remained an issue to be sorted out. This seemed to have affected farmers' commitment towards project implementation.

A follow up on the issue of ownership with the District Council officials revealed that the Council was in the process of making itself the legal owner of all livestock dips in the District as a source of revenue. Some key informants considered this decision as illegal, and against the procedure by which the projects were implemented. At the same time in Mkwajuni Sekioga, Kwagunda, and Maurui Rutuba villages, the Village Government Councils were reported to be struggling to legalize the ownership of livestock dips and make them a source of revenue. Such an act by the Council, has led to reduced commitment of livestock-keepers in managing the resources.

Moreover, the Council's intention was against the Local Government Act No. 7 of 1982, which clearly states that among "the District Council functions is to construct and operate livestock dips" (using its own funds), and not to hijack those constructed by livestock-keepers. It seems that the Council (management) was not aware of such Councils' functions. Such weaknesses may not only jeopardize the sustainability of the implemented projects, but also affect the willingness of local communities to contribute and/or implement agricultural interventions.

#### **4.4 Analysis of Institutional Arrangements for Management of Agricultural Projects**

The institutional analysis was undertaken to determine the institutional arrangements which were in place for the implementation of agricultural sub-projects. The analysis focused on institutions/actors at district and village levels to identify institutional arrangements in sustainability of agricultural sub-projects and to determine how the actors interacted.

##### **4.4.1 Actors involved in the implementation of sub-projects**

During household interviews and focus group discussions, the following actors were identified as involved in the implementation of agricultural projects: farmers/livestock-keepers, sub-project committees, Village Government Councils, and the District Council. The actors identified were at district and village levels. Actors' involvement is an essential component of project implementation and management, as it allows them to have a say in the decision making (Makin, 2016) and on the sustainability of the intervention. Hence, in exploring the roles across actors from a holistic view point in terms of sustainability, Institutional Theory can be used to explain how changes in social values, technological advancements, and regulations affect decisions regarding sustainability of interventions.

##### **(i) Actors at district (meso) level**

At the district level, the council (with the powers to make by-laws and approve village by-laws, pass development plans and budgets as granted by the LGA Act No. 7 of 1982) was the only actor identified by the respondents and participants in the focus group discussions. The roles and responsibilities of the District Council in the implementation of agricultural projects are as presented in Appendix 6.

##### **(ii) At village (micro) level**

At village level where the implementation of sub-projects takes place, the following actors were identified during household interviews and focus group discussions as involved in

the implementation of agricultural projects namely, village assembly, Village Governments' Councils, project committees, and farmers/livestock-keepers. The roles and responsibilities of actors in the implementation of agricultural projects at village level are as presented in Appendix 7. Moreover, Village Government Council was reported to have the powers of making By-laws to be used in the implementation of development intervention, and ensure that the laws are enforced to nourish and supplement the efforts made by various actors in sustaining development interventions.

#### **4.4.2 Analysis of institutional arrangements for the management of sub-projects**

The institutional arrangements for the implementation of sub-projects are based on the DADP guideline issued by the government. However, there are other agreed institutional arrangements at LGA level which are used in the implementation of development projects. Institutional arrangements as stipulated in the guidelines and agreed upon were also mentioned by some of the respondents, participants in the focus group discussions, and key informants.

According to the key informants, the District Council and Village Government Council are the institutions which are responsible for overseeing smooth implementation of agricultural development projects (oversight bodies), formulation of By-laws, and their enforcement within the areas of their jurisdictions. It was further revealed that the implemented community-based agricultural development projects were managed using stipulated and agreed institutional arrangements. Moreover, the sub-project committees were responsible for the day to day management of the implemented sub-projects.

The institutional arrangements in the use for the management of agricultural projects as cited by key informants and participants in the focus group discussions include By-laws,

norms, procedures, and constitutions. However, the informants emphasized that, the By-laws referred to (i.e. Cultivation of crops By-law and Livestock Dipping Fee By-law) belong to the District Council, and none of the villages had by-laws of their own which were meant for the management of agricultural interventions. Moreover, during focus group discussions, it was revealed that only two projects (Magila Mkumbara and Mafuleta) had a constitution of their own for the management of the implemented interventions; and regarding norms, only Mkokola village had one for the control of livestock and protection of agricultural land for crop cultivation.

The importance of institutional arrangements in the sustainability of interventions has also been reported by Mahonge (2013) who revealed the factors for the continuity of project activities (sustainability) including multiplier effects in the post project era in the Matengo highlands. An effectively laid down institutional arrangement which is responsive, accountable and adaptive to the dynamic social, economic and ecological transformations was one of the key factors that provided the local people in the Matengo highlands with the structural governing framework for organizing and directing the community towards sustainable development (Mahonge, 2013). Similar findings are reported by Sreedevi *et al.* (2008) in a study that looked into watershed development projects. The author revealed that efficiency and sustainability of watershed development programs were determined by the quality of institutional structures such as village watershed committees, which were created during the project period.

#### **4.4.3 Effectiveness of institutional arrangements and perceived failures**

The institutional arrangements which existed were found to be useful though they were reported to have problems with the implementation of irrigation and/or livestock dip sub-projects.

#### **4.4.3.1 Effectiveness of the institutional arrangements at district level**

The respondents and FGD participants had the opportunity to give their opinions on the effectiveness of the institutional arrangements in the implementation of sub-projects. Their views and/opinions were used in assessing the effectiveness of the institutional arrangements.

According to key informants at the district offices, Korogwe District Council is the implementing agency of ASDP at the district level. In addition, the Council is responsible for the formulation of Council By-laws including those pertaining to agricultural development. The council formulated an approved village By-laws Council By-laws two decades ago. Having By-laws which are enforced created a likelihood of having sub-project activities implemented as planned; and this can lead to the sustainability of the intervention.

Key informants at District offices revealed however that, the by-laws had not been updated for a long time, rendering them ineffective and difficult to implement or enforce. For example, the Korogwe District Council by-laws for cultivation of land of 1998 and dipping fees by-law of 1999, apart from being out of date they were also not available where farmers and livestock keepers reside and/or pursue their farming or livestock keeping activities. The VEOs in the villages which implemented the sub-projects said that, although they were responsible for ensuring that by-laws were enforced they did not have any copies of the Council By-laws, and this affected the implementation of activities and the sustainability of the implemented sub-projects.

Further discussions with key informants at the District Council level revealed that the previously implemented agricultural development projects were not in the current agenda of the Councils' business; this was unlike the case with the ongoing projects. It was also

noted that even the Council Management Team (CMT) had no idea of what exactly was happening or going on in the management of the previously implemented projects. In addition, FGD participants at the District office insisted that;

*“The Council’s attention and efforts were focused on social service sectors such as education, water, and health where policy makers feel that they have immediate political impacts in their career unlike the agricultural sector which employs majority of people in the district, and specifically the Korogwe District Council”.*

Similar observation was reported in Meatu District that *“Micro-projects in the much politicized education and health sectors take precedence over those in the agriculture sector. This leads to difficulty mobilization of community human, financial and material resources to meet 20 % of 50 % contribution commitments”* (Meatu District Council, 2009).

At the project level, most of the FGDs participants, remarked that;

*“There was rarely follow-up and support from the District Council beside the fact that it has a role to play in agricultural projects”.*

Similar findings on the failure of the government (LGAs) to play their role in the implementation of development projects were reported in Zambia (Nabuyani irrigation scheme) by Akayombokwa *et al.* (2015); in Ethiopia by Assefa (2016); in New Zealand by Gamble and Irvine (2002) and in Zimbabwe by Mutambara *et al.* (2014) in Zimbabwe irrigation scheme projects. Similar inadequacies of councils in Tanzania after NAEP II implementation were also reported by the World Bank (2004). It was obvious that the Council’s failure to honour its roles (and responsibilities) in the implementation of agricultural interventions created an impression that the Council was not aware of the importance of sustainability and sustainability issues with development interventions.

#### **4.4.3.2 Effectiveness of institutional arrangements at village level**

##### **a) Village Assembly**

Village assembly is the highest legal decision making body in the village. Apart from approving By-laws formulated by the Village Government Council, it elects (and even fires when necessary) members of the Village Government Council as well as members of the agricultural project committee. This implies that the implementation and sustainability of development interventions at a village level depends on the effectiveness and decisions of the village assembly.

Key informants and participants in the focus group discussions revealed that none of the villages where the agricultural projects were being implemented managed to convene an extraordinary village assembly to discuss project related issues. The failure of the villages to convene an extra ordinary village assembly was said to be a failure of these villages of fulfilling or performing their roles in the implementation of agricultural development projects.

There were a number of reasons which were reported to have contributed to the failure of most village assemblies to perform their roles in the implementation of sub-projects. In all the villages where the study was conducted the village government council rarely convened general meetings let alone extraordinary general meetings related to the implementation of agricultural projects. Key informants reported further that the leaders were scared of being asked to present the income and expenditure reports to the public. Besides, the fact that villagers have the powers to demand explanation from the Village Government Council on such development matters, this was not happening and thus rendering such councils effective in making decisions regarding the implementation of



development interventions in the village. One key informant (retired village chairperson) had this to say;

*“The village assembly being the highest decision making body in the village, it is obvious that any issue or matter related to the development of the village and well-being of its people within the village is decided there. Apart from that, the village assembly has the ability or legal powers to summon and demand explanation from the Village Government Council regarding development issue(s) in the village or any relevant issue(s), and whenever necessary the Assembly may dismiss or take the Village Government Council leaders to task. The government intention of devolving powers to local government lower levels becomes a reality, and if acted community-based agricultural development interventions sustainably”.*

Based on the above observation, the weaknesses observed in all village assemblies to some extent affected the implementation of the activities and sustainability of the agricultural projects.

#### **b) Village Government Council**

During focus group discussions in all the villages it was unanimously agreed that the Village Government Councils were responsible for the formulation and enforcement of by-laws as well as being the ‘overseeing body’ in the implementation of agricultural development interventions. However, according to VEOs, none of the villages had by-laws of their own for the management of agricultural development interventions. The absence of by-laws was cited as a challenge in the implementation and sustainability of agricultural projects. This failure was attributed to lack of budget for capacity building and inadequate capacity of the Village Government Councils which severely affected their potential in fulfilling their roles (and responsibilities) in the implementation of development projects.

In the irrigation projects, in most cases the FGD participants had their fingers pointed to the Village Government Councils on the failures of the implemented projects. In Mkokola village, one participant insisted that the Village Government Council was weak in the implementation of the project by saying the following:

*“The intake was constructed in 2012, and about 100 m of the main canal is lined with concrete. The water control gates were vandalized (stolen) and the issue was reported to the concerned authorities (Police Department), but to-date nothing has happened to restore the gates. Some farmers complain that others are not ready to participate in implementation of project activities, but there is no any legal action taken by the village government”.*

In fact, one would have expected the Village Government Council in collaboration with the project committee to find/solicit funds from various sources including the farmers themselves to ensure that farmers irrigate their crops and attain the project goals and objectives effectively. However, the Village Government did not seem to know their roles and/or responsibilities in the implementation of development interventions, as the FGD participant in Makorora Irrigation Scheme indicated

*“The village government never called for a general meeting regarding implementation of the project which it was supposed to be doing as one of its roles, this affects the progress of the project”.*

Moreover, in Mafuleta Irrigation Scheme a participant in FGD expressing views similar to those of a participant in Makorora Irrigation Scheme emphasized that;

*“The village government did not know exactly their roles as a result there was confusion in implementation of the sub-project in the village”.*

This confusion was not expected to occur among the village government council and other actors in the implementation of the project. It was among the worst scenarios in the

implementation of the agricultural projects, and can be exemplified by the observed decreasing paddy production per unit area.

Among the roles of the village government is enforcement of rules, but this was not the case as a farmer in Mafuleta Irrigation Scheme remarked:

*“Although there are rules (by-law and norms) and regulations, they are not enforced. For example, if someone is found guilty of not attending canal cleaning or found to obstruct water flow illegally s/he is liable to pay a fine amounting to TShs 10 000 in reality these rules are not enforced. At one time thirty farmers failed to attend cleaning of the irrigation canals and were reported to the village government council, but no action was taken against the defaulters.”*

The failure of the Village Government Council to enforce rules was also linked to unsustainability of the irrigation project in Mafuleta, whereby the farmers said;

*“The Village Government Council failed to enforce rules, besides the fact that there are informal rules. If rules are enforced, it can enhance sustainability of development initiatives; however, it is not the case.”*

Another participant added;

*“Enforcement of rules depends on the effectiveness of the Village Government, and failure to enforce the rules (formal or informal) tends to increase the number of defaulters and affect the attitude of being involved in implementation of development interventions deteriorates”.*

Any decline in farmers' morale to get involved in implementation of development intervention may affect its sustainability. In most of livestock dip projects the concern was on the ineffectiveness of the Village Government in the implementation of agricultural projects.

In Mkwajuni Sekioga village, a remark by FGD participant illustrated this scenario:

*“The village government is not concerned with the livestock dip project. There is no support or any contribution from the village government”.*

On clarification, the kind of support sought from the Village Government Council was the enforcement of the rules to curb those livestock-keepers who defaulted from dipping their livestock. Moreover, another participant in Maurui Rutuba village had this to say:

*“The village government council is not committed in performing their roles (and responsibilities) such as enforcement of rules because the members never benefit directly from the implemented project, and the funds are for project activities such as buying acaricides”*

The observed weakness of the Village Government Council to support the implementation of sub-projects through the enforcement of rules was said to be linked with the absence of direct financial gains (allowances) to the village government members. However, this could have been solved by the village assembly; but since the very village government council is the convener of the assembly, this problem could not be solved.

The observed failures of the Village Government Councils in performing their roles were also found to be associated with the absence of by-laws for the implementation of agricultural development interventions. Upon further enquiries with key informants it was revealed that none of the villages had by-laws of their own regarding the implementation of agricultural development interventions. In fact, most of the VEOs interviewed insisted that by-laws (if in place and enacted) offer the opportunity of establishing standards and practices that have a direct effect on the sustainability of development interventions. The VEO’s remark reflects what was said by a participant in Magila Mkumbara FGD that;

*“We formulated a dipping by-law when we were writing our project proposal and this was approved by the village assembly, however I fail to understand why the By-law is not enforced by the village government to control defaulters?”*

Of course, the participant was very right, but the application (use) of any by-law requires an approval by the Full Council – the highest decision making body of the Council.

Nevertheless, the absence of formal rules should not be the reason behind failures of the implemented interventions, since informal rules have been in place in the villages for years. For example in Mkokola village, according to one key informant a norm which was for the protection of paddy fields did exist in the village whereby; “*Whoever grazed his/her livestock in paddy fields was liable to pay ‘sungusa’ a fine equivalent to one mature goat*” and it was working. The use of such unwritten regulation was reported in Ethiopia by Hailelassie *et al.* (2016) in the irrigation schemes which were covered in their study. These had their own regulations which, in many cases, were not written or well documented. Moreover, it was found that Village Government Council or project committees which were vested with the powers of the enforcement of rules were hesitant to use them due to various reasons such as avoidance of generating overt conflict within the village and among relations. In fact, the failure to take action against the offenders created a room for more people to break the law and become offenders themselves, and this reduced the number of people who were required to implement the activity, hence leading to the unsustainability of the intervention.

Besides the observed weaknesses, the Village Government Councils in all villages were reported to have failed to incorporate agricultural projects into their development plans. This made it difficult for them to consider these projects for any funding or fund allocation during LGAs budget sessions. These findings agree with those in a study by Simane and Zaitchik (2014) who reported that a number of barriers to community-based adaptation projects sustainability in Ethiopia involved inadequacies in the local government commitment and support.

### **c) Sub-project committees**

The project committee in collaboration with the Village Government Council is responsible for the management of projects and enforcement of the rules. The roles and responsibilities of the project committee are presented in Appendix 7.

In irrigation schemes, interviews with some of the project committee members revealed that the majority of the committee members were not aware of their roles (and responsibilities) which made them ineffective in managing and implementing agricultural projects. Along the same lines, Yami (2013) in Ethiopia found 'lack of strong committees' abilities constraining the abilities of these committees to sustainably manage irrigation schemes.

Although Mafuleta Irrigation scheme had a constitution which stipulated the roles and responsibilities of leaders and members, none of the committees followed or used their constitution accordingly. Some of the participants in the focus group discussion in Mafuleta village said that the irrigation sub-project constitution was not made open or available to farmers. This made it difficult for the constitution to either be respected or adhered to. Moreover, project committees in some villages were said to be disorganized and divided along various group interests and this hampered their collective performance. Worse still most of the project committee members were found to be no longer active as no more funds were available or released by donors for project activities. Ineffectiveness among project committees in the implementation of project activities did affect the sustainability of the implemented agricultural projects.

As for livestock dips projects, interviews with key informants revealed that some project committees failed to implement agricultural projects due to vested interests of some

village government council chairpersons' who decided to remove elected and trained committee members and instil their own people. In Kwagunda village a female key informant said;

*“The village government council leaders failed to convene project committee members' election meeting; instead they nominated whoever they wanted to become committee member for their own interests and this affected the performance of the project committees and the project itself”.*

Further inquiries in the same Kwagunda village revealed that out of so many project committee members whom were elected by the village leaders, only one member was found active but the rest were not readily available for the implementation of project activities. Because of the absence of legal bank account signatories, bank deposits of the collected dipping fees could not be made.

It was further reported that of late, the existence of most of the project committees was just a formality, as Maurui Rutuba, a key informant reported;

*“The first project committee besides the fact that it had the capacity to implement the project activities because it was trained, in 2012 the committee members decided to resign. However, the current project committee has failed to perform or deliver according to livestock-keepers expectations. The dip is not operating, and even the environment surrounding the livestock dip is no longer maintained”.*

According to the responses from farmers/livestock-keepers in the study area as well as key informants and FGDs participants, the observed ineffectiveness in most of the implemented projects were mostly due to the weaknesses of both village governments and project committees in honouring their roles (and responsibilities) such as enacting and enforcing rules (by-laws and norms) in the implementation of the said projects. The

findings concur with those reported in Zambia by Akayombokwa *et al.* (2015) that in Nabuyani Scheme, there were no by-laws which made it difficult for the leadership to manage, organize and co-ordinate the scheme activities, especially taking punitive measures against the offenders.

**d) Farmers and livestock-keepers groups/associations**

During the FGDs farmers and livestock-keepers alike were reported to have failed to play their role as well as fulfilling their responsibilities through farmers' groups or livestock-keepers associations. As such, farmers and livestock-keepers failed to impose sanctions against those who failed to respect the constitution (for example in Mafuleta irrigation scheme and Magila Mkumbara livestock dip) or norms (like in Mkokola irrigation scheme). However, the case was different only in Kwagunda livestock dip where some livestock-keepers decided to work up a modality that ensured involvement of livestock-keepers in various sub-project activities. Similar situation was reported in Meatu District in 2009 whereby, according to Meatu District Council (2009), the incidences of failure particularly in DASIP dip tank sub-projects were observed. In addition, farmers and livestock keepers were not motivated in using the services that were associated with payment (service fees) such as livestock dipping facilities at Isengwa na Mwajolo villages, which affected the sustainability of the projects.

In this respect, the existing institutional arrangements (such as by-laws, norms, constitutions) for the management of the implemented projects were rendered ineffective by the existing institutions (District Council, Village Government Councils, and Sub-Project Committees). With such ineffectiveness, it was not possible for the implemented projects to become sustainable beside the fact that farmers and livestock-keepers have legal powers to remove or demand for the resignation of Village Government Council or



project committees – members. Therefore, members being the owner of the implemented projects, they are expected to respond immediately to anything that is jeopardizing their efforts and compromise development initiatives. Similar weaknesses and failure of project committees in the implementation of DASIP sub-projects were reported in Meatu District (Meatu District Council, 2009).

#### **4.4.3.3 Perceived failures**

Although there is confusion as to who is the legal owner of the sub-project infrastructures, their management is under the project committees. However, the confusion in ownership and management to some extent did result into more confusion as to who specifically is responsible for failure/success and sustainability of the interventions made. From key informant interviews, focus group discussions, respondents' interviews and observations, it was possible to gain insights of actors' involvement in the implementation, failure or success, and sustainability of the implemented projects. The failure in the implementations of projects, which to a larger extent did seem to affect the sustainability of the implemented interventions, could not be directed to any individual institution/organization, individual member of the responsible institution, or other persons (farmers/livestock-keepers). However, there were contributions from various actors, which led to the failures in the implementation and sustainability of the projects. In fact, it is quite clear that some actors had a very positive role to play and there were also actors with relatively lesser involvement and sometimes had adverse impact in the implementation of development interventions (Baroi and Rabbani, 2011).

Based on the Local Government (District Council) Act No. 7 of 1982 - RE of 2002, the District Council, the Village Assembly, and the Village Government Council have legal

powers to exercise in the implementation of development interventions as indicated earlier. The basic question is, are the actors aware of the powers granted to them? For example, are the farmers aware that through the “General Assembly” they can vote out members of the Village Government Council? Are the Village Government Councils aware that they can summon or demand explanation and implementation reports from project Committee? A very straight answer was from the farmers and livestock-keepers during focus group discussions who considered “lack of accountability, lack of commitment and lack of transparency” of Village Government Council and project committees as the main reasons for the observed failure.

Various key informants did emphasize that actors must play their stipulated roles, meet responsibilities effectively, and adhere to the agreed rules such as norms. In favour of the informants’ concern, Hagedorn *et al.* (2002) on the implementation of development interventions reported that values and beliefs of the local actors and their particular attitudes and perceptions of the concerned development issues are relevant to their readiness to collaborate with other actors and to comply with rules of co-operation, and policy measures. Moreover, any action to sustain the available resource is dependent on the existence of rules or institutions. As defined by North (1990), “institutions are the humanly devised constraints that structure political, economic and social interactions. These consist of both informal constraints and formal rules.” Upon these restraints, institutions can reduce uncertainty in human interaction allowing for actions and behaviour to be consistent with the norms of the community. Irrigation and livestock dips sub-projects can be either maintained or protected from destruction through the enforcement of rules.

If, for example, farmers are convinced that success in the implementation and sustainability of community-based projects is the objective worth working for, they would be prepared to play their role, and be systematically involved in such activities related to the project. However, it appears that the observed ineffectiveness in the implementation by Village Government Councils and project committees pushed the farmers/livestock-keepers to a position where the involvement in the implemented projects was not a priority. In fact, institutional structures must generate action (Tolbert and Zucker, 1996; Jackson, 2010; Scott, 2004) as actions are largely organized by institutions (Barley and Tolbert, 1997) which did not feature in the implementation of the agricultural projects. However, some basic questions remain unanswered such as: were the roles (and responsibilities) of actors in place and clearly understood? If the actors were not aware of their roles, what was the reason? Did the actors have the capacity? On the other hand, was there something more? All the above questions call for a platform of actors to go through their roles and responsibilities, and rate themselves based on the institutional arrangements for the implementation of agricultural development projects.

Furthermore, the findings revealed that the institutional arrangements which were in place for the management of the implemented projects were characterized by weaknesses that affected the implementation and sustainability of the said projects. At village level, farmers/livestock-keepers as well as Village Government Councils and project committees failed to pursue their roles in ensuring that the implemented interventions are sustained. Similarly at the district level, the District Council failed to play its role of supervising and supporting Village Government Councils and project committees in ensuring that the implemented agricultural development projects are sustained for the wellbeing of the people and the Council itself. This shows that there was poor coordination between actors

which would have facilitated the exchange of information on sub-project implementation, challenges, and progress made.

#### 4.5 Institutional Factors Influencing Sustainability of Implemented Sub-projects

The factors influencing sustainability of the implemented projects are presented in Tables 10, 11, and 12. The binary logistic regression analysis results in Table 10 indicate a statistically significant association between sustainability of the implemented agricultural infrastructure projects and roles' awareness of the actors, sub-project committee' accountability, regular monitoring, and sub-project management decision making.

**Table 11: Binary logistic regression predicting sustainability of implemented projects**

Predictor	$\beta$	Wald $\chi^2$	p value	Odds Ratio (Exp ( $\beta$ ))
Responsibilities awareness of actors	-2.322	2.757	.097	.098
Roles awareness of actors	3.000	4.628	.031**	20.083
Law enforcement	.032	.010	.920	1.032
Project committee management capacity	.199	.162	.687	1.220
Project committee commitment	-.011	.000	.986	.989
Village government commitment	1.039	2.659	.103	2.827
Project committee accountability	1.762	5.027	.025**	5.826
Village government accountability	-1.353	3.202	.074	.258
Project committee transparency	-.435	.455	.500	.647
Village government transparency	1.115	2.160	.142	3.050
Regular monitoring	2.639	59.627	.000***	14.004
Project management decision making	-1.784	6.060	.014**	.168
Adequate staff	.528	1.974	.160	1.696

\*\*p $\leq$ 0.05, \*\*\*p=0.000

(The positive coefficients indicate that sustainability of agricultural infrastructure sub-projects becomes more likely as the predictor (roles awareness of actors, sub-project committee accountability, and regular monitoring) increases. However, the negative coefficient shows that sustainability becomes less likely as the predictor (sub-project management decision making) increases).

The results show the importance of awareness of actors towards their roles in the implementation of sub-projects (as the model predicts that the odd of sub-project sustainability is 19.083 times higher for the roles awareness of actors on the implementation of sub-projects). In fact actors need to be aware first of why it is important to get involved and to have the desire of fulfilling that role. Hence, it is vital to stimulate actors' awareness as it is a good predictor of sub-project sustainability. Actors' awareness is also expected to improve the relevance of the implemented sub-project. Generally, lack of awareness leaves roles or issues in the dark and makes them remain unknown and un-addressable. Similarly, the results show that the project committee accountability becomes more likely as a predictor of sub-project sustainability (as the model predicts that the odds of sub-project sustainability is 4.826 times higher for the project committee accountability on the implementation of sub-projects). As the project committee accountability increases, the likelihood of sub-project sustainability also increases. In fact, the project committee should see it as an integral part of their duties to inform the community and leaders about sub-project status. In Malawi for example, de Silva (2000) pointed out that while project management committees were aware of all the sub-project costs, procurement plans, and the like, the larger community including the village chiefs were unaware even of the total grant that had been awarded to the community. Such a situation is likely to demoralize community members and leaders, while jeopardizing the sustainability of the intervention. In addition, actors' failure of being accountable tends to create a room for shirking and allied weaknesses in the implementation and later sustainability of the sub-projects.

Also, the results show that regular monitoring is likely to increase the likelihood of sub-project sustainability, as it determines whether or not adequate implementation progress has been made to achieve outcomes and provides actors with the information of enhancing

implementation (as the model predicts that the odds of sub-project sustainability is 13.004 times higher for the regular monitoring on the implementation of sub-projects). In addition, actors such as Village Government Council are responsible for monitoring sub-project activities as stipulated in the LGA Act No. 7 of 1982, as well as project committees. Furthermore, the importance of monitoring was also reported by TANGO International (2009) that a consistent and objective approach to project monitoring is essential in achieving sustainability for the IFAD funded projects in Asia and the Pacific. In addition, Ndou (2012) found lack of monitoring and evaluation of community-based projects by government officials and community leaders as among the reasons for the failure (unsustainability) of community-based projects in Follohodwe, Limpopo. In that respect, monitoring of sub-project activities remain to be important for the sustainability of intervention. Similarly, Mahonge (2013) pointed out that during the implementation of sustainable rural development project in the Matengo highlands, monitoring and evaluation were key features for enhancing ownership and sustainability of the project.

However, the results show that project management decision making (which is less likely as the predictor) reduces the likelihood of sub-project sustainability (as the model predicts that the odds of sub-project sustainability is -0.832 times lower for the project committee accountability in the implementation of sub-projects),. In fact decision making in community-based projects in most cases need to involve the actors, although at times this is considered to be expensive. Nevertheless, as pointed out by Adato *et al.* (2005) although community participation also introduces politics, conflicts and lengthier decision-making processes, and increases the time required up front foregoing participation/ involvement can result in even more conflict and an increase in the time required further down the line when time becomes more expensive. However, the qualitative work demonstrated that

participation/involvement has a statistically significant positive effect on the project. In other words, involving decision making in the projects can result in a positive effect on sustainability of the intervention.

#### a) Binary logistic regression in irrigation projects

In irrigation schemes the binary logistic regression analysis for predicting the sustainability of projects is as presented in Table 11. The binary logistic regression results show that regular monitoring of the project has an effect on the likelihood of the project to be sustainable.

**Table 12: Binary logistic regression predicting sustainability of irrigation scheme**

Predictor	$\beta$	Wald $\chi^2$	p-value	Odds Ratio (Exp ( $\beta$ ))
Responsibility awareness of actors	.403	.747	.387	1.497
Law enforcement	.192	.158	.691	1.212
Project committee management capacity	1.070	2.388	.122	2.915
Project committee commitment	.158	.029	.865	1.172
Village government commitment	1.412	3.444	.063	4.105
Project committee accountability	.679	.383	.536	1.972
Village government accountability	-1.101	1.345	.246	.333
Project committee transparency	-.458	.208	.648	.633
Village government transparency	2.149	3.256	.071	8.579
Monitoring	2.317	22.704	.000***	10.149
Project management decision	-1.762	3.363	.067	.172
Adequate staff	.542	.639	.424	1.720
Adequate funds	.290	.049	.824	1.336

\*\*\*p=0.000

The binary logistic regression results indicate that regular monitoring of sub-projects has an effect on the likelihood of increasing sustainability of the irrigation schemes sub-projects. The proportional increase in the odds to be caused by the presence of regular monitoring of sub-project is = 10.149-1=9.149 (the model predicts that the odds of sub-

project sustainability is 9.149 times higher for regular monitoring in irrigation schemes sub-projects). The results clearly show that regular monitoring of sub-project implementation increases the likelihood of achieving sustainability of the implemented intervention, as monitoring does inform actors of whether or not the implementation is going on as planned and whether or not corrective action is needed.

### b) Binary logistic regression in livestock dips projects

In livestock dips, the binary logistic regression analysis is as presented in Table 12. The result indicates that regular monitoring, sub-project committee accountability, and actors' awareness of roles have an effect on the likelihood for the project to be sustainable.

**Table 13: Binary logistic regression predicting sustainability of livestock dips**

Predictor	$\beta$	Wald $\chi^2$	p-value	Odds Ratio (Exp( $\beta$ ))
Responsibility awareness of actors	-2.290	2.378	.123	.101
Roles awareness of actors	3.063	4.276	.039**	21.391
Law enforcement	.093	.038	.845	1.098
Project committee management capacity	-.788	1.034	.309	.455
Project committee commitment	-.799	.627	.428	.450
Village government commitment	1.119	.693	.405	3.061
Project committee accountability	3.865	5.931	.015**	47.693
Village government accountability	-2.563	2.652	.103	.077
Project committee transparency	-.850	.749	.387	.427
Village government transparency	.767	.451	.502	2.154
Monitoring	3.037	32.924	.000***	20.834
Project management decision	-2.240	2.609	.106	.106
Adequate staff	.182	.112	.737	1.200
Adequate funds	.297	.029	.864	1.346

\*\*p $\leq$ 0.05, \*\*\*p=0.000

The binary logistic regression results indicate that the regular monitoring of sub-project has an effect on the likelihood of sustainability of the livestock dips sub-projects. The



proportion increase in the odds to be caused by the presence of regular monitoring of sub-project is  $= 20.834 - 1 = 19.834$  (the model predicts that the odds of sub-project sustainability is 19.834 times higher for regular monitoring of livestock dips sub-projects). Moreover, the sub-project committee accountability has an effect on the likelihood of sustainability of the livestock dips sub-projects. The proportion increase in the odds to be caused by the presence of sub-project committee accountability in the implementation of project is  $= 47.693 - 1 = 46.693$  (the model predicts that the odds of sub-project sustainability is 46.693 times higher for sub-project committees accountability). In terms of percentages, the odds of the project sustainability increases by 4669.3% in the presence accountability of sub-project committee in the implementation of livestock dip sub-projects. Also, actors' awareness of their roles has an effect on the likelihood of the livestock dips sub-project to be sustainable. The proportion increase in the odds to be caused by actors' awareness of their roles in the implementation of project is  $= 21.391 - 1 = 20.391$  (the model predicts that the odds of sub-project sustainability is 20.391 times higher for actors' awareness of their roles). In fact, project committee accountability, regular monitoring of project activities and project committee accountability were found to be important for the sustainability of livestock dip sub-projects.

It is quite important to give serious consideration of the factors which were found to be influential in the sustainability of the implemented agricultural infrastructure sub-projects. This can make farmers and livestock-keepers enjoy the benefits of the interventions after donor funding has stopped.

## **CHAPTER FIVE**

### **CONCLUSION AND RECOMMENDATIONS**

Chapter Five presents the summary of key findings, conclusion, and recommendations made regarding the sustainability of community-based donor funded agricultural development projects in Korogwe District Council. The conclusion and recommendations focus on the specific objectives of this study.

This study intended to examine the institutional determinants of sustainability of agricultural community-based investment sub-projects in Korogwe District. The study involved eight implemented agricultural infrastructure projects in eight villages from four wards. The results obtained using various data collection instruments are as presented in Chapter Four. The specific objectives of the study were: to determine the level of sustainability of the implemented agricultural community-based investment sub-projects after donor funding has stopped; to determine the perception of sustainability among actors in agricultural community-based investment sub-projects; to analyse the institutional arrangements for the management of agricultural community-based investment sub-projects, and to determine the institutional factors that influence the sustainability of the implemented agricultural community-based investment sub-projects. This Chapter presents conclusions of the main findings and answers to the research questions. Lastly, the Chapter presents the contribution of this thesis to the existing body of knowledge and areas for future research.

#### **5.1 Conclusion**

Except for one sub-project the other sub-projects covered in this study were not sustainable. Although most actors that are involved in the implementation of community-based projects were aware of the concept of sustainability, they still could not demonstrate

their knowledge of the concept of sustainability. Weak institutional arrangements including poor enforcement of by-laws as well as norms and non-adherence of constitutions were the challenges in the management of sub-projects. Moreover, regular monitoring of sub-project activities, accountability of sub-project committee, decision making, and actors' awareness of their roles significantly influence sustainability of the sub-projects.

## **5.2 Recommendations**

In view of the conclusion drawn, the study recommends the following:

- i) Sustainability assessment of the implemented community-based agricultural interventions should be conducted at LGA levels at least on annual basis to ensure that long-term objectives of the interventions are realized.
- ii) LGAs should build the capacity of actors in the implementation of agricultural interventions at district and village levels on the importance of the implementation of agricultural interventions. This would help them gain the knowledge of the concept of sustainability so as to enhance the sustainability of development interventions.
- iii) Institutional arrangements for the implementation of community-based agricultural intervention should be strengthened by LGA to ensure that proper implementation mechanisms do exist to safeguard the sustainability of community-based initiatives after donor funding has stopped.
- iv) Regular monitoring of activities, accountability of sub-project committees, decision making, and actors' awareness of their roles should be given special attention by LGA during the implementation of community-based agricultural sub-projects to enhance their sustainability.

### **5.3 Major Contribution of the Study**

- (a) The study contributes empirical knowledge on the sustainability of community-based projects.
- (b) The findings of this study offer some useful insights into the role of institutional arrangements in sustainability of agricultural infrastructure development interventions.

### **5.4 Suggested Areas for Further Research**

The coverage of this study was limited to Korogwe District Council only. In fact, the District was selected purposively and thus the findings obtained cannot be generalized to the rest of the country. It is thus suggested that a similar study involving randomly selected Councils be conducted so as to shed more light on the sustainability of community-based projects in the country.

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## A3. Household Information:

Relationship with the household head	Sex 1=Male 2=Female	Age in Years	Primary Occupation	Secondary Occupation

A4. Membership (for the past five years) in sub-project committee (PC), village government council (VGC), Farmers' Association (FA), Co-operative Society (AMCOS), Water Users' Association (WUA), Livestock-keepers Association (LA), Farmers' Network (FN), Livestock-keepers Network (LN), etc.

Institution/Organization/Committee/Other	Period	Position held	If currently not, specify reason

**B. ACCESS TO LAND**

<b>Location</b> 1=Within the village 2=Outside the village 3=Outside the district	<b>Main crop</b> 1=Paddy 2=Maize 3=Other	<b>Land Size</b> (Acres)	<b>Ownership</b> 1=Own 2=Rented 3=Borrowed	Any rules in owning the land (Yes/No), If yes, explain

**C. SUSTAINABILITY OF IMPLEMENTED PROJECTS**

C1. Who owns the agricultural project infrastructure in your village?

- Community - farmers/livestock-keepers  Village government council   
 Korogwe District Council  I don't know  
 Other (specify)

.....

C2. How is your infrastructure project operated? (Multiple answers are accepted)

- Using committee
- Using rules and regulations
- Using guidelines
- Using norms
- Using procedures
- Other  
(specify).....
- I don't know

C3. Does culture affect sustainability of project in your village?  Yes  No

If the answer is yes, explain,  
.....  
.....  
.....

C4. Are the project infrastructures maintained regularly?  Yes  No

If the answer is yes, go to question C5.

C5. Who conducts the maintenance work of the infrastructures?

- Project committee
- Paid local *fundi*
- Farmers/livestock-keepers participate themselves
- Other (specify)  
.....

C6. Are the project infrastructures repaired in time?  Yes  No

If the answer is yes, go to question C7

C7. Who conducts the repair work of the project infrastructures?

- Project committee
- Paid local *fundi*
- Farmers/livestock-keepers themselves
- Other (specify)  
.....

C8. Are you satisfied with the maintenance and repair of project infrastructure?

- Yes  No

C9. Are you satisfied with the general condition of the project infrastructure?

- Yes  No

Give explanation/reason(s) for your answer  
.....  
.....

C10. Are there any benefits realized as a result of the project implemented in your village?

Yes  No

If the answer is yes, what are those benefits? Are they sustained?

<b>Benefit</b>	<b>Presence of benefit 1=Yes, 2=No</b>	<b>Benefit sustained 1=Yes, 2=No</b>	<b>Comments</b>
Increased productivity			
Intensive use of resources			
Improved household food security			
Additional income from sales of surplus crop/livestock products			
Enhanced access of extension services			
Access of trainings on modern farming			
Acquired knowledge on management of resources			
Acquired skills on resources use			
Employment creation			
Increase in yields (production)			
Regular irrigation/dipping			
Improved crop/livestock diseases control			
Training opportunities			

C11. Do you have any opportunity to attend training through DADP as regarding to project implementation?  Yes  No

C12. Has the implemented project changed your attitude?  Yes  No

If the answer is yes, what are the major changes?

Adoption of new farming technologies e.g. irrigation/dipping infrastructure management

Changes in mind-set towards resource use

Willingness to contribute for agricultural development interventions

Others (specify)

.....

C13. Do you sustain the changes caused by the Project  Yes  No

If the answer is no, what are the reasons?

.....  
 .....  
 .....  
 .....

C14. To what extent do you agree with each of the following with respect to your project?

Statements	Ratings				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
There are adequate technically qualified and experienced agricultural extension staff for project implementation					
Technical advice is always available in time					
There are adequate funds budgeted for implementation of project activities					

C15. Does the project infrastructure meet the expectations of the farmers/livestock-keepers?  Yes  No

If the answer is no, what do you think are the major reasons?

- Lack of proper infrastructure management
- Population has grown big in comparison to demand in five years back
- Lack of regular maintenance of the infrastructure
- Poor condition of project infrastructures
- Poor quality of the infrastructures
- Other(s) (mention)

.....

.....

.....

.....

C16. How do you rate the following?

	Rating				
	Very high	High	Moderate	Low	Very low
Your level of attending meetings in relation to project implementation					
Commitment of the project leaders' in fulfilling their roles and responsibilities					
	Very good	Good	Moderate	Very poor	Poor
Response of the project committee towards farmers' demands					
Representation of poor and vulnerable in project related issues					
	Highly satisfied	Satisfied	Neutral	Unsatisfied	Highly unsatisfied
Satisfaction with the income and expenditure reports of project funds					

**D. PERCEPTION OF SUSTAINABILITY OF ACTORS IN PROJECTS**

D1. Are you aware of the “sustainability concept”? [  ] Yes [  ] No

If the answer is yes, go to question D2.

D2. What does “sustainability” mean to you?

.....  
.....

D3. In your opinion what are the attributes of a sustainable projects infrastructure project?

.....  
.....  
.....

D4. Whom do you think is responsible for ensuring sustainability of project after withdrawal of donor funding? (**Tick ‘√’ where appropriate, and multiple answers are accepted**)

- [  ] Village government council
- [  ] Project committee
- [  ] Community/Farmers
- [  ] All of them
- [  ] I don’t know.

D5. What is your opinion on project implementation procedures?

.....  
.....

D6. Who makes project management decision(s)?

- [  ] Village government leaders
- [  ] Project committee
- [  ] Farmers/livestock-keepers
- [  ] Government staff(s)
- [  ] Other (specify)

.....

D7 Are you satisfied with the decisions made by the project committee?

[...] Yes [  ] No



D8 How do you rate the capacity of following in implementing project? (Tick ‘√’ where appropriate)

		Very Good	Good	Moderate	Poor	Very Poor
Village government council	Adequate budget for project					
	Enforcement of rules					
	Efficiency use of resources					
	Effectiveness in mobilization of community					
Project committee	Adequate budget for project					
	Enforcement of rules					
	Efficiency use of resources					
	Effectiveness in mobilization of community					

D9. To what extent do you rate the following on sustainability of implemented projects? (Tick ‘√’ where appropriate)

	Not important	Slightly important	Neutral	Important	Very important
Leadership commitment					
Village government council support					
Local institutions support					
Legal framework (By-laws, rules, regulations, procedures, norms)					
Enforcement of rules					
Adequate financial resources					
Training of farmers					
Clarity of roles					
Clarity of responsibilities					
Accountability					
Transparency					
Social mores (support)					
Political support					
Supervision of project activities					
Monitoring of the project					
Collaboration of actors					
Decision making process within the project					
Equity/Rights of farmers					
Availability of qualified technical staff(s)					

D10 Do you face any hurdles in taking action on failures in project implementation?

[ ] Yes [ ] No

If the answer is yes, mention the hurdles you

face?.....  
 .....  
 .....

**E. INSTITUTIONAL ARRANGEMENTS FOR MANAGEMENT OF PROJECTS**

**Tick “√” where appropriate**

E1. What are the institution(s)/organization(s) existing in your village? (Multiple answers are accepted)

- Village government council
- Primary school(s)
- Secondary school(s)
- Church (es)
- Mosque(s)
- Agricultural Project Committee
- NGOs
- CBOs
- Farmers Association
- Livestock-keepers Association
- Other (specify)

.....

E2. Who do you think are the main actors in project in your village?

- Village government
- Project committee
- Farmers Organization/Association
- Livestock-keepers Association
- Community/farmers/livestock-keepers
- Others (specify)

.....

E3. Do the actors in project communicate to one another?     Yes  No

If the answer is ‘Yes’ go to question E4

E4. How do the actors communicate?

- Through meetings
- Through exchange visits
- Using reports
- Other (specify)

.....

E5. What do you think are the roles of the village government council in project implementation?

.....  
.....  
.....  
.....

E6. What do you think are the responsibilities of the village government council in project implementation?

.....  
 .....  
 .....  
 .....

E7. Do you think the various actors' involvement in the project positively enhanced the implementation of the project?

Not at all  Rarely  Neutral  Mostly  Very much

E8. Who influenced the selection of this type of project? (Multiple answers are allowed)

Community – Farmers/Livestock-keepers  Local leaders  Government officials  NGO  Other(s)  
 (specify).....

E9. How aware are you of the following? (Tick '√' where appropriate)

	Highly Not Aware	Not Aware	Moderately Aware	Aware	Highly Aware
Your roles in relation to project implementation					

E10. How aware are you of the following? (Tick '√' where appropriate)

	Highly Not Aware	Not Aware	Moderately Aware	Aware	Highly Aware
Your responsibilities in relation to project implementation					

E11. What are your roles and responsibilities in implementation of project?

.....  
 .....  
 .....  
 .....

E12. Please provide information about the following for implementation of the project in your village

	<u>Awareness</u> 1=Aware 2=Not aware	<u>Enforcement</u> 1=Enforced/Used 2=Not enforced/Not used	<u>Respecting</u> 1=Respected 2=Partially respected 3=Not respected
By-laws			
Regulation			
Procedures			
Norms			
Guidelines			

E13. Is there a schedule/time-table for implementation of project activities [  ] Yes [  ] No

If the answer is yes, explain

.....  
 .....

E14. Is the supervision of project implementation activities conducted regularly?  
 [  ] Yes [  ] No

E15. Is monitoring of project conducted regularly? [  ] Yes [  ] No

E16. Is there a project committee currently working? [  ] Yes [  ] No

E17. If the project committee does exist, who elected them?  
 [  ] Community [  ] Village government leaders [  ] Government officials

E18. How long has the present project committee members been in office?  
 [  ] <3 years [  ] 4 - 6 years [  ] >6 years [  ] I do not remember

E19. When was the last election of project committee members held?  
 [  ] 2014 [  ] 2013 [  ] 2012 [  ] 2011 [  ] 2010 [  ] I don't know/remember

E20. What do you think are roles and responsibilities of the project committee?  
 (Tick '√' against your answer)

ROLES		RESPONSIBILITIES	
<input type="checkbox"/>	Management of project funds	<input type="checkbox"/>	Ensure smooth implementation of project
<input type="checkbox"/>	Management of project resources such as infrastructures and machinery	<input type="checkbox"/>	Ensure that conflicts within the project are resolved
<input type="checkbox"/>	Procurement for project implementation	<input type="checkbox"/>	Establish and maintain cooperation with various actors of project
<input type="checkbox"/>	Accountability for the project implementation	<input type="checkbox"/>	Regularly liaise with village government on project issues
<input type="checkbox"/>	Representation of project members	<input type="checkbox"/>	Actively take part in project activities such as meetings
<input type="checkbox"/>	As a link between project members and village government	<input type="checkbox"/>	Regularly monitor and report on progress of the project
<input type="checkbox"/>	Quality control of project infrastructures	<input type="checkbox"/>	Regularly supervise project activities
<input type="checkbox"/>		<input type="checkbox"/>	Enforcement of rules

E21. How do you rate the project committee members on each of the following? (Tick (√) where applicable)

	Very Low	Low	Moderate	High	Very High
Possession of basic knowledge on project implementation					
Possession of basic skills on project implementation					
Motivation of others for valuing of the project infrastructure					
Being honest					
Commitment to serve others					
Problems solving ability					

E22. How do you rate the commitment of each of the following towards implementation of project (Tick (√) where appropriate)

	Very Low	Low	Moderate	High	Very High
Project committee					
Village government council					
Community members					

E23. How do you rate the accountability of the following towards implementation of project (Tick ‘√’ where appropriate)

Leaders	Very Low	Low	Moderate	High	Very High
Project committee					
Village government council					

E24. How do you rate the transparency of village the following towards implementation of development projects (Tick ‘√’ where appropriate)

Actors	Very Low	Low	Moderate	High	Very High
Project committee					
Village government council					

E25. Are the project financial reports displayed on village/ project notice board?

[ ] Yes [ ] No

E26. Do you have a village agricultural extension officer? [ ] Yes [ ] No

If the answer is yes, go to question C27.

E27. How do you rate his/her performance towards implementation of project?

(Tick ‘√’ where appropriate)

[ ] Very good [ ] Good [ ] Average [ ] Poor [ ] Very poor

Give reason(s) for your rating

.....  
 .....  
 .....

E27. How often does s/he visit you? (**Tick ‘√’ where appropriate**)

- Every day  Once a week  At least once per month  Not at all  
 Other (specify).....

**F. FACTORS INFLUENCING SUSTAINABILITY OF THE PROJECT**

F1. To what extent do you agree with each of the following? (Tick ‘√’ where appropriate)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Provision of training opportunities for farmers do enhance sustainability of projects					
Provision of training opportunities for leaders do enhance sustainability of projects					
Sustainability is realized with community commitment					
Sustainability requires consideration of project long-term focus					

F2. Has there been any conflict(s) related to project implementation for the past five years?

- Yes  No

If the answer is yes, what was the conflict all about?

.....  
 .....  
 .....  
 .....

F3. What do you consider to be the most important source of conflict related to project implementation in this area/village?

.....  
 .....  
 .....

F4. What do you think are the major factors influencing the sustainability of implemented project in your village?

.....  
 .....  
 .....  
 .....  
 .....  
 .....  
 .....

**G. CROSS CUTTING ISSUES**

G1 Are there special considerations for vulnerable groups (e.g. women, people with disabilities) in the process of implementing project? [ ] Yes [ ] No

G2. Is environmental conservation given consideration in your daily activities within the project area? [ ] Yes [ ] No

Give explanation to your answer

.....  
.....  
.....  
.....

G4. Do you have any other important information that might be useful in making your projects sustainable?

.....  
.....  
.....  
.....

**THANKS FOR YOUR TIME AND COOPERATION**

## **Appendix 2: Focus Group Discussion (FDG) Interview Guide**

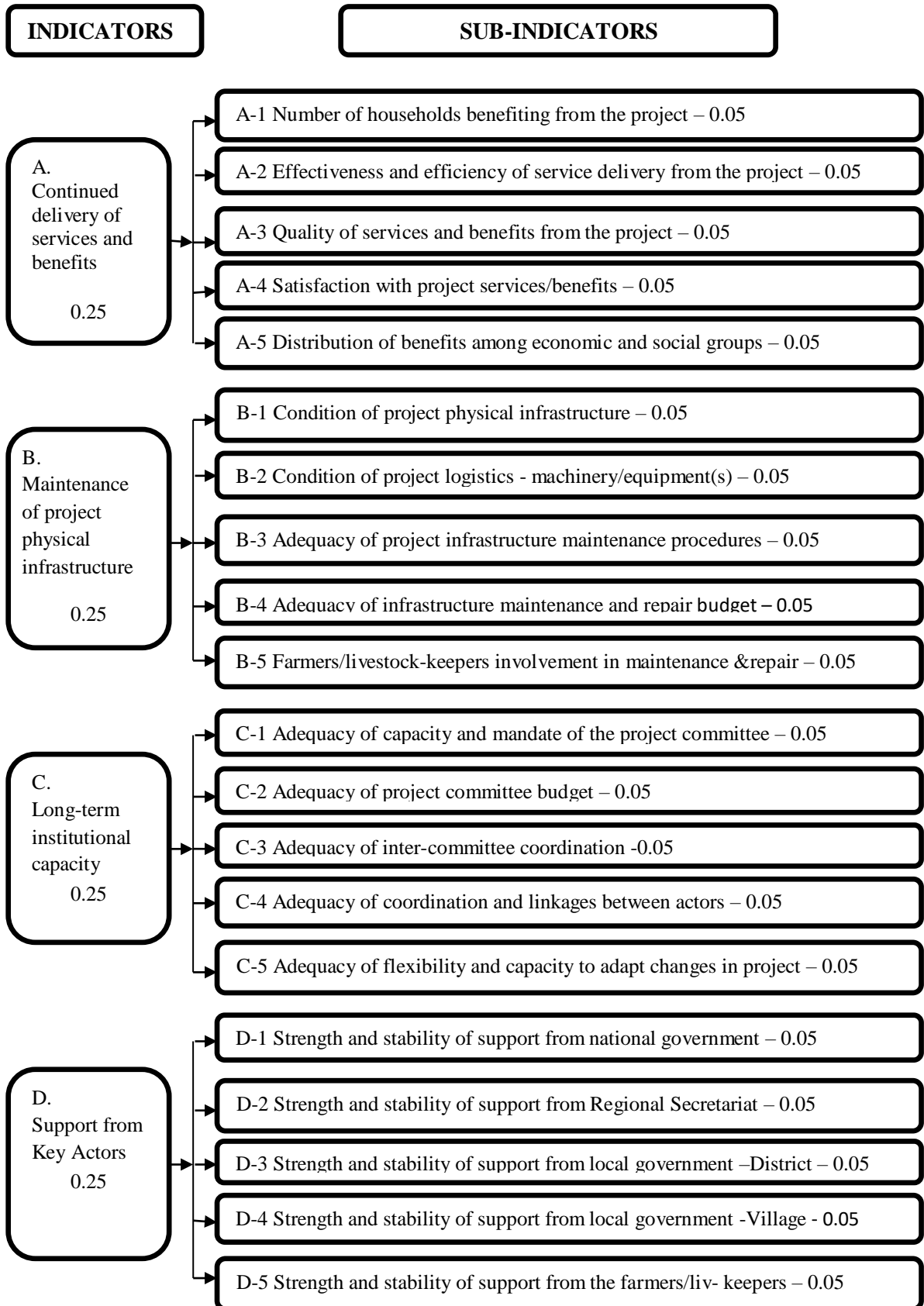
1. Who are the main actors, their roles and responsibilities in implementation of the project? What are their strengths, weakness, and relationship between them?
2. What is the capacity of the actors in project implementation in terms of project management, fund raising, management skills, knowledge, and enforcement of laws?
3. Is there an adequate budget for operation and maintenance of the project infrastructure? Is the project implementation activities accommodated in the village development plans? Was it budgeted for previously?
4. Are there by-laws, regulations, norms, procedures, or guidelines in place for smooth implementation of project activities? If yes, mention them and clarify where, when and how are they are used? Do they support project implementation and sustainability effectively? What about enforcement of such rules?
5. How do you rate the commitment and accountability of project committee members and village government leaders on project implementation? Is there transparency in implementation of the project (e.g. finances), how?
6. How effective and supportive is the local government at District and village level towards project implementation? Any contribution in any form? Is the village government committed towards sustainability (maintenance/continuation of benefits) of the project implemented?
7. Who monitors the function of project committee (oversight)? Do they have the capacity to take corrective actions against the project committee or its members? How?
8. What does sustainability mean to you? Can you recognize a sustainable infrastructure project and what do you think are the indicators of such a project? Is your project having those indicators of sustainability?
9. Are there any benefits realized as a result of the project implemented in your village? If yes, what are those benefits, and are they sustained?
10. What are your opinion on the sustainability of the project based on maintaining of project benefits, maintenance of infrastructures, and access of knowledge and skills to farmers? Is the trend of benefits going on steadily, increasing or decreasing?
11. Is the community aware about the importance of the project in this village? Have their management capability increased as regarding to project implementation?
12. What are the institutional factors (+ve/-ve) that influence the sustainability of the implemented project?
13. Does cross-cutting issues like environmental conservation, gender issues (in the project committee – members, positions), vulnerable groups etc. given consideration in this project? How for each aspect?
14. Was there any a serious conflict or disputes in the course of implementing project in this area/village?
15. How do you see the project to be in five or more years' time? Is there any need of the farmers/livestock-keepers to contribute resources such as labour, cash, etc. for implementation of project?
16. Anything else or suggestion about your project before we fill the table below.



**Appendix 3: Key Informant Interview Schedule**

1. Who are the major actors in community-based agricultural projects? What are the relationships within and between actors? How do you rate the coordination and collaboration between them? Power distribution?
2. How supportive or restrictive is the policy environment for implementation of agricultural infrastructure projects?
3. Does the government (Central and Local) adequately prepare the community to manage, implement and sustain their projects after (donor) funding? Do you think the current projects implementation methods and procedures tend to encourage or discourage smooth implementation and sustainability of the project?
4. Are there any rules (by-laws, norms), regulations, guidelines, or procedures governing the project implementation? Any evidence?
5. Whose property is the project infrastructures? Any evidence (e.g. asset register, written document etc.)? Any support offered post construction of infrastructure projects?
6. When preparing the Village/District Development Plan, does it incorporate and budget for ongoing and/or implemented infrastructure projects? What important things are considered? Was the agricultural project considered to be funded before? Was there any kind of budget for the operation and maintenance costs of the project? Any idea about how much was budgeted for?
7. What do you understand by the term sustainability? Do you think that implemented projects are sustainable? What are the important institutional factors influencing sustainability of the implemented projects?
8. Is there any supervisory, monitoring or follow-up plan for previously completed project? Are there sustainability indicators in place for projects?
9. Is there any consideration for gender, equity and environmental issues during implementation of the agricultural infrastructure projects?
10. Anything else you think is of significance for sustainability of implemented projects.

**Appendix 4: Sustainability assessment framework**





**Appendix 6: Actors and their roles and responsibilities in implementation of  
agricultural projects - district level**

<b>ACTOR/INSTITUTION</b>	<b>ROLES/RESPONSIBILITIES/FUNCTIONS</b>
<b>i) District Council</b> The highest body of decision making in a district (LGA)	-To regulate the cultivation of crops and livestock husbandry -To promote economic well-being of the people and improvement of agriculture. - To co-ordinate and supervise the implementation of all plans, projects and programmes for the economic development. -To employ Agricultural/Livestock Extension Staff -To prepare By-laws for agricultural development and enforce them.
<b>ii) Council By-laws</b> [Subordinate legislation].	-By-laws provide the level of detail required for the council (district/village) to effectively manage a function.
<b>(a)The Korogwe District Council (Cultivation of Agricultural Land) By-Law of 1998</b>	-Ensures compliance of farmers to the type of cultivation, the crops to be grown, use of manure and fertilizers, and the maintenance and use of the land in the area of its jurisdiction.
<b>(b)The Korogwe District Council (Dipping Fees) By-Law of 1999</b>	-Ensures that all animals are dipped (at least once per month) to control animal diseases.
<b>iii) DADPs Guidelines</b> [Interpretive statements or recommendations].	-Facilitates the achieving of policy's objectives by providing a framework within which to implement procedures. - Provide systematic guidance to LGAs in developing and implementing DADPs as envisioned in the ASDP

**NB:**

- i)** The DADPs guidelines (**Interpretive statements or recommendations**) are issued by the Ministry of Agriculture, Livestock, and Fisheries Development to facilitate the achieving of policy's objectives by providing a framework within which to implement procedures. The Guidelines also provide systematic guidance to LGAs in developing and implementing DADPs as envisioned in the ASDP.
- ii)** The WDC (Which consists of the elected councilor representing the ward; chairpersons of all village councils in the ward; and any other person invited by the committee) ensures the implementation of the decisions and policies of the district council, and of the development schemes (for agricultural or any work of public utility), which relates to the ward. It also supervises and co-ordinate the implementation of projects and programmes within the ward, in addition to supervision of all funds established in and entrusted in the ward.

## Appendix 7: Actors and their roles and responsibilities in implementation of projects

### - village level

ACTOR/INSTITUTION	ROLES/RESPONSIBILITIES/FUNCTIONS
<p><b>i) Village Assembly</b> [Is the highest legal body of decision making at village level].</p>	<ul style="list-style-type: none"> <li>-General policy making in relation to the affairs of the village</li> <li>-Elects the village council (executive organ in respect of all affairs in the village).</li> <li>-Oversees the work of the village council, and deliberates proposals for village development plan (VDP) or By-laws.</li> <li>-Election of the village council (village government council) and removal from the village council of any or all of the members of the village council</li> </ul>
<p><b>ii) Village Government Council</b> [Governing body of the village, and answerable to the village assembly]</p>	<ul style="list-style-type: none"> <li>-Discuss priorities for development projects which are later approved by the village assembly.</li> <li>-Plan and co-ordinate the activities of and render assistance and advice to the residents engaged in agricultural, activity.</li> <li>-Encourage the residents in undertaking and participating in development endeavors.</li> <li>-To make by-laws for carrying into effect or for the purpose of any of the functions</li> <li>-Oversight body for development interventions</li> <li>-Overall in-charge of development projects</li> <li>-Supervise and monitor implementation of development interventions.</li> </ul>
<p><b>iii) Project(s) Constitution(s)</b> [A written agreement or set of agreed rules, as it is made by the legal members].</p>	<ul style="list-style-type: none"> <li>-Sets out what is expected from the members and what they can expect in return.</li> <li>-Provides a clear and consistent set of guidelines to define each member's rights and obligations.</li> </ul>
<p><b>iv) Project Committee</b></p>	<ul style="list-style-type: none"> <li>-Management of the project resources e.g. funds and infrastructures.</li> <li>-To prepare monthly and annual project financial (income and expenditure) reports, physical implementation reports and present them to the village assembly and village government council</li> <li>-To ensure that the required inputs for project implementation are available</li> <li>-To mobilize farmers/livestock-keepers to participate in sub-project activities</li> <li>-To collect contributions from farmers/livestock-keepers</li> <li>-To conduct monitoring, and ensure protection of project resources such as infrastructures</li> </ul>
<p><b>v) Farmers/Livestock-keepers</b></p>	<ul style="list-style-type: none"> <li>-Implement project activities</li> <li>-Receive project income and expenditure reports, and discuss them.</li> <li>-Receive project implementation reports and discuss them</li> <li>-Ensure that every farmer/livestock-keeper participates fully in implementation of project</li> </ul>

### NB:

The DADPs guidelines (**Interpretive statements or recommendations**) are issued by the Ministry of Agriculture, Livestock, and Fisheries Development to facilitate the achieving of policy's objectives by providing a framework within which to implement procedures. The Guidelines also provide systematic guidance to LGAs in developing and implementing DADPs as envisioned in the ASDP.