

**LIVELIHOODS OF SMALLHOLDER FARMERS IN SOUTHERN
AGRICULTURAL GROWTH CORRIDOR OF TANZANIA: LESSON FROM
HOUSEHOLDS IN IHEMI CLUSTER**

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE
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ABSTRACT

This study assessed livelihoods of smallholder farmers in Ihemi Cluster based on male and female headed-households. The methodology involved a cross-sectional research design with sample size of 150 respondents. Purposive sampling technique was used to select Ihemi Cluster among other Clusters of the SAGCOT intervention and stratified sampling technique was used to select respondents. The main methods of data collection used were structured household questionnaires and focus group discussion. Descriptive statistics, multiple linear regression and independent T-test statistics were used to analyze the data. Research findings found that, majority of the sampled respondents had poor livelihoods status based on measurable indicators assessed. The computed independent T-test for mean production difference revealed that, there was a significant difference in production scores for male-headed households ($M=12.4$, $SD=9.1$) and female-headed household ($M=9.4$, $SD=7.8$) conditions; $t(142) = -3.233$ and $p=0.002$, these results suggest that there was statistically significant differences ($p < 0.01$) in agricultural production between male and female-headed households in the Cluster. Furthermore, multiple linear regression model reveals that land owned, access to credit, number of livestock owned, HH education level and household size were found to have significance influence on male and female headed- households' income inequalities. The study recommends that, livelihood diversification (diversification of income sources) should be encourage, Fostering of community - investor linkage and increase access and control over natural resources such as land to female-headed households who are important actors in agriculture in rural areas as they depend on land for their livelihoods

DECLARATION

I, **Alfred E. Minde**, 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 being concurrently submitted in any other institution.

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Date

The above declaration is confirmed

Dr. G. Fasha

(Supervisor)

Date

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DEDICATION

This dissertation is dedicated to my parents Ephraim Minde and Joyce Shani whom together laid the foundation for my education, patience and support they showed up during the time I was studying up to the very end of writing this dissertation.

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LIST OF ABBREVIATIONS AND ACRONYMS

AfDB	Africa Development Bank
AGRA	Alliance for a Green Revolution in Africa
ASDS	Agricultural Sector Development Strategy
DFID	Department for International Development
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus Group Discussion
FHH	Female Household head
GDP	Gross Domestic Product
HHs	Household Heads
Kg	Kilogram
NEPAD	New Partnership for Africa's Development
NSRGP	National Strategies for Growth and Reduction of Poverty
PPP	Public-private partnership
PRSP	Poverty Reduction Strategy Paper
REPOA	Research on Poverty Alleviation
SACGOT	Southern Agricultural Growth Corridor of Tanzania
SPSS	Statistical Package for Social Science
URT	United Republic of Tanzania
VEO	Village Executive Officer
VIF	Variance Inflation Factor
WEF	World Economic Forum

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background information

Africa's agricultural sector is estimated to support the livelihood of 80% of its population and provide employment to between 60% and 65% of the economically active population (AfDB, 2010; AGRA, 2013). Despite these potentials agricultural sector accounts for an average of 32% contribution to the continent gross domestic product (GDP). The reasons assumed for this tiny contribution being low adoption of improved farming practices, poor mechanization as well as devastating impacts of climate change (URT 2013). Until recent the impact of agriculture sector to the livelihoods of Africa's rural population have not been realized to the expected magnitude as it is in other continents such as Asia and Latin America (AGRA, 2013). The situation in Sub-Saharan Africa reveals no exceptionality from the above observations. Growth in agricultural employment accounts for half of all employment growth (NEPAD, 2015). Although, more people are employed out of necessity than by choice, as only a fraction of the working-age population can afford to depend on buying rather than producing food at their own (Zeigher and Steenst and, 2015).

The contribution of the agricultural sector in Tanzania is not exceptional from the continent's statistics; the sector has employed about 80 percent of its work force and contributes to about 26.4 percent share of the country's GDP and export earnings (REPOA, 2014). From the above reference, the sector forms one of the potential livelihoods option for majority of both rural and urban dwellers in the country. In an

effort to reduce rural poverty the government of Tanzania has paid special attention in transforming the agricultural sector among other things; this is clearly stipulated in many development related policy documents including the Poverty Reduction Strategy Paper (PRSP), Agricultural Sector Development Strategy (ASDS), National Strategies for Growth and Reduction of Poverty (NSGRP), the “Kilimo Kwanza” initiating as well as the National Agricultural Policy (ACT, 2009; URT, 2000; URT, 2001; URT, 2005 and URT, 2013). With that being the case therefore, Tanzania plays an appropriate research ground to carry out the study that envisage on the livelihoods of smallholder farmers in Ihemi Cluster of the Southern Agricultural Growth Corridor of Tanzania (SAGCOT) especially between male and female-headed households.

Literature supports the verity of the fact that women’s lower human and physical capital as well as their inability to soak up economic incentives results in lowering productivity (Jacob, 1991 and Quisumbing, 1996). Therefore, reducing gender inequality in access to and control of key productive resources is a concrete means of accelerating productivity growth and ensure equitable benefit of both male and female-headed households to this growth; hence it’s worthwhile to conduct this study.

1.2 Problem Statement

The international development community has recognized that agriculture is an engine of growth and poverty reduction in countries where it is the main occupation of the poor (FAO 2011a). But the agricultural sector in many developing countries is underperforming, in part because women, who represent a crucial resource in the sector and rural economy at large, are faced by severe constraints than men in accessing productive resources (Appleton, 1996). In Africa, women form the bulk of laborers in agriculture while men get all the proceeds in form of cash income and leaving women economically disempowered (Glopolis, 2012). According to FAO (2011b), women comprise over 40% of the agricultural labour force in the developing world and almost over 50% in East Africa.

The situation in Tanzania is quite similar to the above generalization, the contribution of agricultural sector to her economy and development, based on its competitive leverage in employment and foreign income earning speaks volume. Adversely, the sector's contribution share to the livelihoods of the marginalized especially female-headed households has remained disproportionate despite almost equal percentages (49.9% and 50.1%) of men and women respectively employed in the sector (URT, 2015). Empirical evidences revealed that gender inequality is one of the powerful constraints to growth of the sector (Abdulai and Delgado, 1999). Therefore; removing gender-based barriers will guarantee equitable benefit for all (Amanor, 2010; Escobal, 2001). It is against that background, this study was conducted to assess the livelihoods of small holder farmers with special attention in comparing male and female-headed households in Ihemi Cluster. Specifically, the study will assess institutional factors governing the use of water and land resources; determine factors

influencing income inequality among male and female-headed households as well as compare production between men and female-headed households.

1.3 Justification of the Study

Findings of this study will inform the SAGCOT stakeholders and government at large on areas that need to be adjusted. This will ensure equitable benefits of the agricultural sector to all stakeholders in the agriculture value-chain especially small holder farmers and female-headed households. Furthermore, it will supplement and add a portion to existing literature and act as a reference to other resembling studies.

1.4 Objectives of the Study

This study aimed at achieving the following overall and specific objectives

1.4.1 Overall objective

The overall objective of this study was to conduct livelihoods assessment among the group of small-holder farmers in Ihemi Cluster.

1.4.2 Specific Objectives

The specific objectives of this study were:

- i. To identify institutional factors governing the use of water and land resources
- ii. To determine factors influencing male and female-headed households' income inequalities
- iii. To compare agriculture production between male and female-headed households

1.4.3 Research Question

What are the institutional factors governing the use of water and land resources in the cluster?

1.5 Hypotheses

H₀₁: There is no significant influence of socio-demographic characteristics to income inequality between male and female-headed households

H₀₂: Agricultural production did not differ significantly among surveyed male and female-headed households in Ihemi Cluster

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 SACGOT Intervention

The Southern Agricultural Growth Corridor of Tanzania (SAGCOT) is an inclusive, multi-stakeholder partnership to rapidly develop the region's agricultural potential. SAGCOT was initiated at the World Economic Forum (WEF) Africa summit 2010 with the support of founding partners including farmers, agri-business, the Government of Tanzania and companies from across the private sector (www.sagcot.com). SAGCOT's objective is to foster inclusive, commercially successful agribusinesses that will benefit the region's small-scale farmers, and in so doing, improve food security, reduce rural poverty and ensure environmental sustainability. The risk-sharing model of a public-private partnership (PPP) approach has been demonstrated to be successful in achieving these goals and SAGCOT marks the first PPP of such a scale in Tanzania's agricultural history (Mendelsohn *et al.*, 2014).

SAGCOT investment blueprint was launched nationally by Prime Minister Pinda in Dar es Salaam and internationally by H.E. President Kikwete at the 2011 World Economic Forum in Davos. The Investment Blueprint showcases investment opportunities in the Corridor and lays out a framework of institutions and activities required to reap the development potential (SAGCOT, 2013). SAGCOT has the potential to make a serious and significant impact by bringing together government, business, donor partners and the farming community to pool resources and work

together towards a common goal by addressing the entire agricultural value chain, the SAGCOT approach will go beyond raising agricultural productivity and ensure the necessary infrastructure, policy environment and access to knowledge to create an efficient, well-functioning agricultural value chain (www.sagcot.com).

2.2 Agriculture and Livelihoods

Livelihoods in the least developed countries and for many households continue to depend on small holder agricultural production. The large majority of people in these countries reside in the countryside and their livelihoods of most depends on farming (Rigg, 2006). Although scholars and development partners are acknowledging the role of non-farm activities in economies and livelihoods of rural dwellers, but the abiding sense is that these activities are still regarded as add-ons to the main business of farming (Bryceson, 2002). An increasing number of rural household with less commitment in farming and the increasing rate of rural-urban migration whatsoever cannot be under-estimated in vindicating livelihoods diversification among African rural communities (Horrell and Krishnan, 2007). Citing evidence from various parts of Africa, Bryceson (2002), confirmed that the income diversification efforts of most rural dwellers over the past decade have been directed at meeting daily needs amidst declining returns to commercial agriculture. Individuals and households have experimented with new forms of livelihood, expanding their non-agricultural income sources, while retaining their base in subsistence farming thus, agriculture sector will remain the primary livelihoods source though, not as important as it used to be few decades ago. Various livelihood patterns are emerging, depending on historical, geographical and agro-ecological factors at local and national levels (Chukwuezi, 1999). However,

livelihoods diversification from agriculture is due to a number of factors including recent global changes that have resulted in deepening social differentiation and poverty, smallholder farmers marginalization due to structural adjustment programmes, trade liberalization, a focus on export-oriented agriculture, higher costs of agricultural inputs and consumer goods comparative to decline in price of agricultural produce, as well as devastating impacts of climate change to the sector (Foeken and Owuor, 1999).

2.3 Livelihood Determinants

There is numerous determinant of livelihood strategy although many livelihoods are largely predetermined by accident of birth. Livelihood of this sort may be ascriptive: for instance, in India children may be born into a caste with an assigned role as potters, shepherds or washer (Agrawal, 1989). Gender as socially defined is also a pervasive ascriptive determinant of livelihood activities however, this has been criticized due to fact that a person may be born, socialize and apprenticed into an inherited livelihood, for example as a cultivar with land and tools, a pastoralist with animals or a shopkeeper, all of these may in turn a new household when they interact or household in the same occupation (Chambers, 1997). On the other hand, man livelihoods are also less singular or predetermined. Some people improvise livelihood with degree of desperation, what they do being largely determined by the social, economic and ecological environment which they find themselves, a person or household may also choose a livelihood especially through education and migration. Those who are better off usually have a wider choice than those worse off, and a wider choice is usually generated by economic growth (Beck, 1989).

2.4 Institutional factors and Natural Resources Management

According to North (1991), institutions are "the humanly devised constraints that structure policy, 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)". Over time, people have developed institutions in order to create order and regularity.

Natural resource institution is conceived in a much broader sense than mere organization. Institution herein is referred as a set of rules and definition of the action sets for both individual and collective decision-making in the realm of resource development, allocation, and utilization (Saleth and Dinar, 2000). Since these rules are often formalized in terms of three inter-related aspects, i.e., legal framework, policy environment, and administrative arrangement, institution can be conceptualized as an entity defined interactively by its three main analytical components such as natural resource laws, policy and administration (North, 1990). However, the institutional arrangements governing the land and water sector are undergoing remarkable changes in many countries around the world in order to make adjustment of the sector's arising problems which are caused by several factors (Saleth and Dinar, 2005). For analytical convenience, these factors can be grouped into endogenous factors that are internal to land and water sector and exogenous factors that are outside the strict confines of both land and water resources (Becker and Ostrom, 1995). The endogenous factors include scarcity, conflicts over resources, financial and physical deterioration of water infrastructure, and operational inefficiency of institutions. The exogenous factors include economic

development, demographic growth, technical progress, economic and political reforms, international commitments, changing social values and ethos, and natural calamities including floods and droughts (Saleth and Dinar, 2000).

Since the exogenous and endogenous factors are interrelated and their relative impacts differ by context, it is difficult either to isolate their individual roles or to generalize the direction of their effects. Nevertheless, it is possible to track their effects within the framework of transaction cost theory where they can be conceptualized as to influence either the transaction costs or the opportunity costs of institutional change (Saleth and Dinar, 2005). Therefore, institutional factors are thereby expected to govern and balance resources for future and sustainable utilization.

2.5 Male, Female and Agricultural Productivity

It is often argued that women's lower levels of human and physical capital result in lower productivity or inability to respond to economic incentives and much of the evidence cited to support this argument comes from agriculture (Quisumbing, 1996). However, an evaluation of male-female productivity differences should ideally be based on estimates of total factor productivity, in which an index of output is divided by an index of inputs, aggregated over all types of outputs and inputs, respectively (Jacob, 1991). Existing studies therefore use partial productivity measures, such as yield and labor productivity. These partial measures of productivity are complicated by differences in farming systems and social and cultural institutions. It is feasible to estimate technical efficiency differences between male and female farmers in

farming systems where men and women manage separate plots, as in many African societies (Hare, 1999). It is more difficult to isolate managerial efficiency differences in agricultural settings where plots are cultivated jointly by male and female family members and hired laborers. In the latter, found in the male farming systems of Africa, Asia and Latin America, the farm manager is usually assumed to be the male head of the household, regardless of the actual contribution of women to decision-making and farm labor (Oaxaca, 1973).

Despite the volume of attempts to document male-female productivity differences, relatively few control for individual characteristics such as education and physical assets were observed. If women systematically had lower levels of education and physical assets than men: which is typical in most agricultural settings in Africa, an approach that did not control for individual stocks of physical and human capital would tend to overestimate productivity differences due to sex. That is, women farmers would be expected to have lower productivity simply because they are female, not because they have fewer resources (Ashraf and Ashraf, 1993). This study will compare income inequality between gender groups specifically male and female in presence of disparities in resource endowment.

2.6 Review of Related Theory

Despite several decades of debate on development and inequality in the distribution of global and national resources, it is difficult to spot the radical improvement in poverty reduction (Petersen and Pedersen, 2010). Thus, it seems that the attempts to eradicate poverty have been unsuccessful so far. Throughout the last century, reflections on this matter have led to different re-conceptualizations of how to

understand poverty and development. Beginning with an understanding of poverty as a lack of economic resources, poverty today is understood as a more multifaceted concept e.g. including social status, health and opportunities to decide over one's life (Banik, 2006). Also, it has been recognized that development has to be done from the perspective of the poor understanding their subjective perception of what it means to be poor, and what a good life includes (Narayan *et al.*, 2000). Therefore, the understanding of poverty and development needs to be incorporated into a theory that can guide the planning of development activities in order to bring out a definition of poverty that tries to capture the actual reality of what it is to be poor includes a subjective focus on poverty (Petersen and Pedersen, 2010). This, however, reveals a number of psychological factors that can play a crucial role in enhancing successful development. In this regard this study will be guided by the psychological theory "motivation and commitment".

2.6.1 Motivation and commitment theory

According to the psychologist Lines (2004) one of the empirically proven effects of participation is that it increases the motivation and commitment of people. In relation to development work this would mean that the poor would be more motivated to make an effort to implement the activities that have been decided which would make it more likely that the changes will lead to a successful improvement of their livelihoods (Oxaca, 1973). Another benefit might be that the poor, due to the increased commitment, will stay in the local area and help develop it, instead of pursuing their luck other places. Glew *et al.* (1995) also asserted that participation is more likely to have a positive effect when people understand the purpose and agree with the change that is going to happen. When doing

development work, it is very likely that the locals agree that development is needed especially when they themselves have had a say in what kind of development will be the best the assumption is that participation will lead to increased motivation which will then result in an increased performance.

2.7 Conceptual Framework

This study has adapted and modified the conceptual framework developed by the department for international development (DFID). This study has adopted the sustainable livelihoods conceptual framework proposed by the Department for International Development (DFID). This livelihoods framework takes a more comprehensive and integrated approach to poverty than traditional interpretations, which largely considered poverty in relation to a narrow set of indicators (such as income and productivity). Sustainable Livelihoods Framework by DFID was developed in order to organize and improve organizations' efforts to eliminate poverty. The framework aims at presenting primary factors, their significance, and the nature of their interactions.

Demographic characteristics: these are socio economic characteristics of a given population, such as age, sex, education level, income level, marital status, occupation, religion and family size. In one way or another, these socio-economic characteristics influence the livelihood assets of the population.

Livelihood assets: The DFID framework outlines assets in terms of five categories necessary for the pursuit of positive livelihood outcomes, these include the following:

Human capital (i.e. the amount and quality of knowledge and labor available in a household); *Natural capital* (i.e. the quality and quantity of natural resources, ranging from fisheries to air quality); *Financial capital* (i.e. savings and regular inflows of money); *Physical capital* (i.e. the infrastructure, tools, and equipment used for increasing productivity) as well as *Social capital* (i.e. social resources, including networks for cooperation, mutual trust, and support).

This element of the framework utilizes a pentagon to describe livelihood assets, with each point assigned to a particular type of asset so that the shape of the pentagon changes as stores of certain types increase. When addressing this component of the framework, humanitarian and development agencies should pay attention to two considerations in particular: the sequence in which certain assets contribute most effectively to the attainment of others, and instances when certain types of assets can be substituted for other types (e.g. human capital for financial). As people acquire more assets, they will become more empowered to influence the next component of the framework, the structures and processes that affect them.

Livelihood outcomes: Livelihood outcomes refer to the outputs of livelihood strategies. Achievements may include higher income, greater well-being (e.g. self-esteem, physical security, political empowerment), reduced vulnerability, greater food security, and/or improved environmental sustainability.

The balance of livelihood goals indicates motivations for behavior, livelihood priorities and, in turn, the types of activities that humanitarian and development

agencies should implement. Livelihood outcomes are not always coherent; they oftentimes conflict, as when the pursuit for income comes at the expense of environmental sustainability. Thus, while the primary goal of agencies is to support the achievement of positive livelihood outputs, conflicting outcomes, the difficulty of translating outputs into indicators of success, and lack of objectivity in the monitoring process make an output-based set of indicators complicated

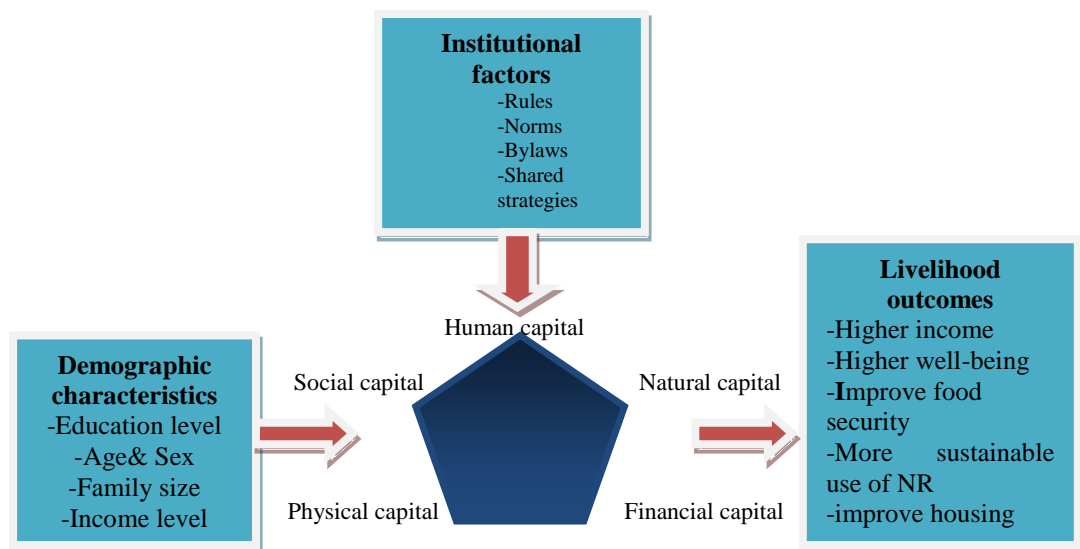


Figure 1: Conceptual framework (Source: DfID, 2000).

CHAPTER THREE

3.0 METHODOLOGY

3.1 Description of the Study Area

This study was conducted in Ihemi Cluster of the SAGCOT intervention. Ihemi is one of the six clusters proposed for SAGCOT intervention along with Sumbawanga, Mbarari, Kilombero, Rufiji and Ludewa Clusters. The selection of Ihemi was due to its potential in agricultural activities and abundance of crops grown. Major crops grown include maize, paddy, pulse, sunflower, banana, potatoes, and wheat; others are vegetables such as onions, tomatoes, tea as well as pine and eucalyptus (SAGCOT, 2013).

The cluster covers much of the Mufindi Highlands belt that lies along a southwest-northeast axis. The climate is comparatively wet as a consequence of high rain fall (1300 – 1600 mm/year) and low rate of evaporation. Unlike the east and northern part with bi-modal seasons, Ihemi has rainfall in a single season extending from November to April making the cluster ideal for agricultural activities (Mendelsohn *et al.*, 2014). The cluster consists of two regions (Iringa and Njombe) and five districts (Iringa Rural, Kilolo, Mufindi, Wanging'ombe and Njombe Districts) with a total area of 1 321 390 m² and a population of around 501 204 people [www.agdvco.com]. The cluster has a total arable land of 617 730 ha, while, the total cultivated area in the cluster is estimated 279 200 ha with only 17 932 ha is land under irrigation.

3.1.1 Map of the study area

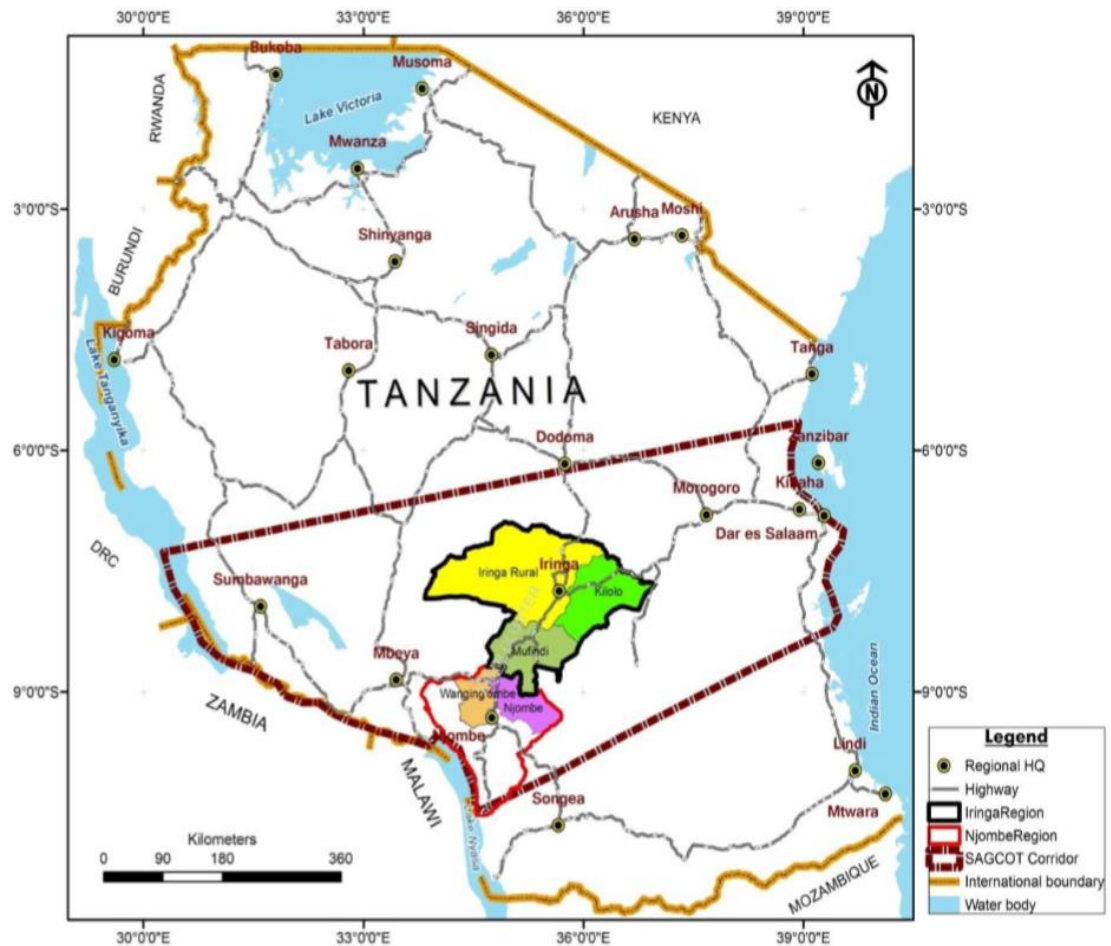


Figure 2: map of the study area

3.2 Research Design

This study adopted a cross-sectional research design, the design allows data to be collected from the sampled respondents at one point in a time (Olsen, 2004), This design was preferred on the basis of its merits in involving groups of people who differ in the variable of interest, but share other characteristics such as socio-economic status, educational background and ethnicity as well as its suitability in describing characteristics that exist in a population and establishing the relationship among variables of interest (Bailey, 1994).

3.3 Sampling Frame (Target population)

According to Kothari (2004) states that, sampling frame refers to the entire group of people, events or things of interest that the researcher wishes to explore, and form a base from which the sample or subjects of the study is to be drawn. The sampling frame of this study comprised of all small scale farmers in Ihemi cluster, taking into account male and female-headed households.

3.4 Sampling Procedure and Sample Size

Both probability and non-probability sampling methods were used. Purposive sampling method was used to select Ihemi among the six clusters of the SAGCOT intervention and focus group discussants. On the other hand, a sample determination formula by Kothari (2004) was used to determine sample size; simple random sampling technique was used to select 2 villages from each district and then stratified sampling method was applied to select respondents from each village in the cluster.

$$n = \frac{z^2 pq}{d^2} \dots\dots\dots (1)$$

Where:

n =sample size in the study area when population > 10 000.

z = Standard normal deviation, set at 1.96 (2.0 approximate) corresponding to the 95% confidence interval level.

p = Proportion of the target population (50% if population is not known).

q = 1.0 – p (1-50) (1-0.5) = 0.5

d = degree of accuracy desired, (set at the 95% equivalent to 0.05).

Therefore:

$$n = \frac{(2)^2(0.5)(0.5)}{(0.05)^2} = 4 (0.25)/0.0025 = 400$$

Based on the above calculation, the sample size for this study was supposed to be 400 respondents, but due to resources limitation only 150 respondents were involved in this study, the selection of 150 based on the fact that a sample of 30 respondents, according to Bailey (1994), irrespective of the population size is bare minimum for a study in which statistical analysis is to be done. Relatively, Kumar (2005) asserts that a sample size of between 80 and 120 respondents is suitable for rigorous statistical analysis. This has vindicated the choice of 150 cases for this study.

3.5 Data and Data Collection Tools

The study used only primary data. Data was collected using a structured questionnaire consisting of both open and closed-ended questions. Closed-ended questions were used because they ensure uniformity of responses and they were easy to code and amenable to statistical analysis. On the other hand, open-ended questions permit free responses whereby, respondents were able to explain, comment or qualify their responses without being limited to certain stated alternatives. However, open-ended questions were used barely due to the fact that they are difficult to handle, interpret, compare and are subjected to interviewer bias (Kothari, 2004).

3.6 Data Processing and Analysis

Collected data was summarized coded and entered in Statistical Package for Social Science (SPSS) for analysis whereby, both descriptive and inferential analyses were

performed. Descriptive analysis involved computation of standard deviation, means, maximum and minimum values, frequency and percentage while inferential analysis included the multiple linear regression model and independent sample t-test. Descriptive analysis was used so as to describe what we have in our data likewise inferential analysis was applied so as to make inferences from our data to more general conditions.

For objective 1:

Descriptive and content analysis was carried out, which involved computation of standard deviation, means, maximum and minimum values as well as frequency and percentage.

For objective 2:

Multiple linear regression model was used in the analysis to determine factors influencing male and female-headed households' income inequalities and tested the first hypothesis. The regression equation was:

$$\ln Y_i = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \epsilon \dots \dots \dots (2)$$

α = Intercept when all independent variables are equal to zero.

Y_i = Household average annual income

X_1 = Age

X_2 = Education level

X_3 = Occupation

X_4 = Total land owned

X_5 = Land ownership status

X_6	=	Number of livestock owned
X_7	=	Access to credit
X_8	=	Household size
$\beta_1 - \beta_8$	=	Coefficients of determination of independent variables
ε	=	Stochastic disturbance (Error term)

For objective 3:

An independent sample t-test was applied to compare agricultural production between female and male-headed households and tested the second hypothesis.

On the other hand, information from focus group discussions was summarized into meaningful scriptures and supplemented findings from collected data through content analysis.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Socio-economic characteristics of households surveyed

A summary of socio-economic characteristics of the households in the study area is given in Table 1. The table mainly summarizes sex, age, education, marital status and household size for household heads across all five districts in the Ihemi Cluster.

4.1.1 Marital status and sex of the household head

A majority (66.7%) of respondents in Mufindi and Wanging'ombe District were married followed by Kilolo (56.7%) (Table1). Very few respondents (3.3%) in Iringa district were single and very few had divorced (3.3%) in Mufindi District. Further, findings indicate that the number of Female Headed Households (FHH) is slightly higher in Njombe District (46.7%) followed by Kilolo (43.3%), Iringa District (40%), wanging'ombe (36.7%) and relatively less in Mufindi (33.3%) (Table 1). Several reasons were attributed to the increase in FHH in the area including death of a spouse due to HIV/AIDS, divorce/ separation, while other single mothers decided not to marry (single motherhood by choice). On the other hand, the percentage of widows is increasing as compared to widowers. This is because the majority of widows do not prefer second marriage after death of the husband, unlike men who marry soon after the death of a wife (Kashaigili *et al.*, 2016).

4.1.2 Education level of respondents

Education was one of the social demographic characteristics assessed during the study. Based on Table 1, majority (96.7%) of respondents in Wanging'ombe, 93.3%

in Njombe and 86.7% in Mufindi and Iringa Districts had primary school level of education. Very few had attained college level of education (e.g. 3.3% in Kilolo District) with none having a university degree. the reason for having majority of the people with primary education level was that it is a compulsory for every individual in Tanzania to have at least a primary school education, so as to be able to read and write. On a surprise note, a good proportion of respondent (20%), (13.3%) and (10%) in Kilolo, Mufindi and Iringa Districts respectively had no education at all. From this finding it can be concluded that majority of the sampled respondents were literate with primary education, similar finding was reported in (Agea *et al.*, 2011), who stated that, such education status is typical of many rural areas in Tanzania and sub-Sahara Africa in general. Although majority of the rural dwellers are literate they cannot afford formal employment therefore, their livelihoods option is limited to only farming and collection of forest good (Manonga, 2013).

4.1.3 Age of the respondents

Majority of the respondents were aged between 30 - 59, implying that most of them were young and in their active reproductive age, where they work hard in the fields applying new technologies available to them. Young age implies that they are confident enough to interact with the investors available in the area and learn new technologies.

4.1.4 Household size

Majority 76.7%, 73.3%, 63.3%, 63.3% and 60% (Table 1) of respondents in, Njombe, Wanging'ombe, Iringa rural, Mufindi and Kilolo Districts respectively indicated that they have 1- 5 household members. Such household size is

manageable when it comes to provision of basic needs. On the other hand, very few households in Kilolo (3.3%) have more than 10 household members.

Table 1: Demographic profile of the Households head

Household head profiles	Variables	Iringa region			Njombe region	
		Iringa	Kilolo	Mufindi	Njombe	Wanging'ombe
Marital status	Married	13(43.3)	17(56.7)	20(66.7)	13(43.3)	20(66.7)
	Single	1(3.3)	-	2(6.7)	2(6.7)	2(6.7)
Sex	Divorced	3(10)	1(3.3)	1(3.3)	2(6.7)	-
	Widow	13(43.3)	11(36.7)	7(23.3)	11(36.6)	8(26.7)
	Widower	-	1(3.3)	-	2(6.7)	-
	Male	17(53.3)	17(56.7)	20(66.7)	16(53.3)	19(63.3)
	Female	12 (40)	13(43.3)	10(33.3)	14(46.7)	11 (36.7)
Education	None	3(10)	6(20)	4(13.3)	2(6.7)	1(3.3)
	Primary	26(86.7)	23(76.7)	26(86.7)	28(93.3)	29(96.7)
	Secondary	1(3.3)	-	-	-	-
	College	-	1(3.3)	-	-	-
	University	-	-	-	-	-
Household size	1- 5	19(63.3)	18(60)	19(63.3)	23(76.7)	22(73.3)
	6- 10	11(36.7)	11(36.7)	11(36.7)	7(23.3)	8(26.7)
	>10	-	1(3.3)	-	-	-
Age						
	20- 29	-	2 (6.7)	3 (10)	-	2 (6.7)
	30- 39	6 (20)	8 (26.7)	5 (16.7)	7 (23.3)	11 (36.7)
	40- 49	9 (30)	9 (30)	9 (30)	10 (33.3)	4 (13.3)
	50- 59	8 (26.7)	7 (23.3)	7 (23.3)	8 (26.7)	8 (26.7)
	60 & above	7 (23.3)	4 (20)	6 (20)	5 (16.7)	5 (16.7)

Note: Numbers in the brackets indicate percentages

4.2 Main socio-economic activities

The main socio- economic activities in the cluster include farming which is the most dominant socio- economic activity undertaken by 46%, 56.7%, 53.3%, 50% and 53.3% (Table 2) of households in Iringa, Kilolo, Mufindi, Njombe and wanging'ombe Districts respectively. Households (20% to 33.3% in Kilolo and Iringa Districts respectively) are undertaking both farming and livestock keeping, very few households are undertaking both farming and petty business, casual labor, and formal business.

Table 2: main socio- economic activities

Socio-economic activities	Iringa region			Njombe region	
	Iringa	Kilolo	Mufindi	Njombe	Wanging'ombe
Farming	14 (46.7)	17 (56.7)	16 (53.3)	15 (50)	16 (53.3)
Farming and livestock keeping	10 (33.3)	6 (20)	8 (26.7)	8 (26.7)	7 (23.3)
Petty business e.g. local brewing, pottery, weaving, fishing	2 (6.7)	2 (6.7)	2 (6.7)	1 (3.3)	1 (3.3)
Formal employment	-	-	-	-	-
Casual labor	1 (3.3)	1 (3.3)	-	1 (3.3)	2 (6.7)
Both farming and formal business	2 (6.7)	2 (6.7)	2 (6.7)	2 (6.7)	4 (13.3)
Both farming and petty business	1 (3.3)	1 (3.3)	2 (6.7)	3 (10)	

Note: Numbers in the brackets indicate percentages

4.3 Major crops grown in the cluster

Various crops are grown in the cluster. The main crops grown include maize, irish potatoes, finger millets, paddy, groundnuts, peas, sorghum, beans and simsim. Majority of the households grow maize (over 60% in all districts), this is due to the fact that, maize is the main food in the cluster. Other mentioned crops are as well grown for food and business purposes (Table 3)

Table 3:Major crops grown in the cluster

Major crops grown	Iringa region			Njombe region	
	Iringa	Kilolo	Mufindi	Njombe	Wanging'ombe
Maize	18 (60)	20 (66.7)	24 (80)	23 (76.7)	21 (70)
Paddy	5 (16.7)	-	-	-	-
Irish potatoes	-	3 (10)	-	1 (3.3)	3 (10)
Finger millet	-	-	1 (3.3)	2 (6.7)	1 (3.3)
Groundnuts	1 (3.3)	1 (3.3)	1 (3.3)	2 (6.7)	1 (3.3)
Sorghum	2 (6.7)	-	-	-	1 (3.3)
Peas	-	3 (10)	-	1 (3.3)	-
Beans	3 (10)	1 (3.3)	2 (6.7)	1 (3.3)	2 (6.7)
Simsim	1 (3.3)	1 (3.3)	2(6.7)	-	1 (3.3)

Note: Numbers in the brackets indicate percentages

4.4 Decision making over natural resources use

Table 4 captures decision making over natural resources use between men and women in the cluster. Majority (53.3%), (56.7%) and (60%) of respondents from Iringa, Wanging'ombe and Njombe Districts respectively agreed that women have the power to make decision over natural resources use. However in the FGD, they stated that, big resources such as land and forest are controlled by men. The findings also indicated that, women participate in various natural resources committees by (73.3%), (76.7%) and (83.3%) in Kilolo, Njombe and Iringa Districts respectively. Being members of various committees entails that women are aware of what is going on as far as natural resources management is concerned. Over (70%) of respondents in all districts agreed that women participate in setting norms and regulation concerning natural resource. However more than 60% of respondents within the cluster disagree that women benefit equally with men over natural resource products.

Being members of different committees, women are believed to participate in conflict resolution. This is confirmed by (76.7%), (73.3%), (66.7%), (76.7%) and (70%) of respondents in Iringa, Kilolo, Mufindi, Njombe and Wanging'ombe districts respectively agreed that women are fully involved in conflict resolution over natural resources. However more than 60% of respondents disagree that women are involved in marketing natural resource products and this is the reason why women do not benefit equally with men over natural resource products.

Table 4: Decision making over natural resources use

Responses		Iringa region			Njombe region	
		Iringa	Kilolo	Mufindi	Njombe	Wanging'ombe
Women have the capacity to control land	Agree	16 (53.3)	14 (46.7)	12 (40)	18 (60)	17 (56.7)
	Disagree	14 (50)	16 (53.3)	18 (60)	12 (40)	13 (43.3)
Involved in NR committee	Agree	25 (83.3)	22 (73.3)	19 (63.3)	23 (76.7)	20 (66.7)
	Disagree	5 (16.7)	8 (26.7)	11 (36.7)	7 (23.3)	10 (33.3)
Women participate in setting norms and regulation	Agree	24 (80)	23 (76.7)	22 (73.3)	22 (73.3)	21 (70)
	Disagree	6 (20)	7 (23.3)	8 (26.7)	8 (26.7)	9 (30)
Women benefit equally with men over NR products	Agree	10 (33.3)	9 (30)	11 (36.7)	11 (36.7)	10 (33.3)
	Disagree	20 (66.7)	21 (70)	19 (63.3)	19 (63.3)	20 (66.7)
Women are knowledgeable about NR conversation	Agree	15 (50)	15 (50)	12 (40)	17 (56.7)	14 (46.7)
	Disagree	15 (50)	15 (50)	18 (60)	13 (43.3)	16 (53.3)
Women are involved in conflict resolution over the use of NR	Agree	23 (76.7)	22 (73.3)	20 (66.7)	23 (76.7)	21 (70)
	Disagree	7 (23.3)	8 (26.7)	10 (33.3)	7 (23.3)	9 (30)
Women are involved in marketing NR products	Agree	11 (36.7)	10 (33.3)	8 (26.7)	12 (40)	7 (32.3)
	Disagree	19 (63.3)	20 (66.7)	22 (73.3)	18 (60)	23 (76.7)

Note: Numbers in the brackets indicate percentages

4.5 Livelihood Status of the Sampled Respondents

On assessing livelihoods of smallholder farmers, this study concentrated on measurable indicators of which can be attributed to farmers' livelihoods. Such indicators used were farmers' accessibility to the natural capital such as land, access to water, housing, sanitation facilities, access to electricity services, as well as source of energy for lighting and cooking. This study has tried to assess whether the participation of small holder farmers in agriculture in Ihemi cluster has helped to boost their access to adequate natural capital mentioned above. Citing evidence from various part of Africa, (Rigg, 2006) argued that livelihoods in the least developed countries and for many households continue to depend on subsistence agricultural production. The majority of people in these countries reside in the countryside and

their livelihoods dependents on farming (Bryceson, 2002). Thus, this study support the livelihood definition suggested by (Chambers and Conway, 1992), that is the capabilities, assets (including both material and social resources) and activities required for a means of living.

4.5.1 Farm size and ownership status

The result as presented in Table 5 indicates that majority 100%, 100%, 100%, 83.3% and 93.3% of respondents in Wanging'ombe, Mufindi, Njombe, Iringa and Kilolo Districts respectively own land ranging from 0.25- 4 acres. A study by (Quan, 2006) asserts that land is a key asset which rural people use to make a living out of it. During the focus group discussion, participants indicated clearly that the size of land owned depict the wealth status of the farmer. Very few respondents had over 10 acres of agricultural lands. On the other hand over 83.3% of respondents across all five districts own agricultural lands and most of them own more than one parcel of land (farm). There were few cases of respondents, 16.7%, 6.7% in Iringa and Kilolo respectively had no agricultural lands. Most of these respondents who had no farms, usually rent farms for farming activities. All the respondents in Mufindi, Njombe and Wanging'ombe have agricultural lands.

However, Majority of respondents (70%), (86.7%), (83.3%), (76.7%) and (90%) from Iringa, Kilolo, Mufindi, Njombe and Wanging'ombe Districts respectively had no official documents over their land. The land Act No 5 of 1999 states clearly that an individual could be offered a certificate right of occupancy as an official document, yet most of people in this cluster had no official documents over their land (Kashaigili *et al.*, 2016). This situation would prevent them from accessing

loans from various financial institutions using land as collateral, farmers in this cluster should be given education on the importance of these documents. On the other hand, very few 6.7% and 3.3% of respondents in Iringa and Njombe districts had right offer of occupancy while only 13.3%, 6.7%, 13.3% and 6.7% of respondents in Iringa, Kilolo, Mufindi and Njombe districts respectively had title deed. Through probing, it was discovered that, the procedures for obtaining the offer of right of occupancy and title deed were very tedious and the system is corrupt.

Table 5: Agricultural land ownership status

Land ownership status	Iringa region			Njombe region	
	Iringa	Kilolo	Mufindi	Njombe	Wanging'ombe
Yes	25 (83.3)	28 (93.3)	30 (100)	30 (100)	30 (100)
No	5 (16.7)	2 (6.7)	-	-	-
Ownership document					
Title deed	4 (13.3)	2 (6.7)	4 (13.3)	2 (6.7)	-
Right of offer of occupancy	2 (6.7)	-	-	1 (3.3)	-
Customary title deed	3 (10)	2 (6.7)	1 (3.3)	4 (13.3)	3 (10)
No document	21 (70)	26 (86.7)	25 (83.3)	23 (76.7)	27 (90)
Number of parcels owned					
1	3 (10)	5 (16.7)	8 (26.7)	6 (20)	4 (13.3)
2	8 (26.7)	9 (30)	9 (30)	15 (50)	8 (26.7)
3	6 (20)	9 (30)	7 (23.3)	6 (20)	11 (36.7)
4	6 (20)	1 (3.3)	4 (13.3)	3 (10)	5 (16.7)
5	2 (6.7)	3 (10)	2 (6.7)	-	1 (3.3)
6 & above	-	1 (3.3)	-	-	1 (3.3)
None	5 (16.7)	2 (6.7)	-	-	-
Land size (acres)					
Below 4	22 (73.3)	21 (70)	24 (80)	23 (76.7)	26 (86.7)
5 - 9	1 (3.3)	4 (13.3)	3 (10)	4 (13.3)	2 (6.7)
10 - 14	2 (6.7)	2 (6.7)	2 (6.7)	1 (3.3)	2 (6.7)
15 & above	-	1 (3.3)	1 (3.3)	2 (6.7)	-
None	5 (16.7)	2 (6.7)	-	-	-

Note: Numbers in the brackets indicate percentages

4.5.2 Access to water

Access to water is one of the indicators for livelihood improvement (falls under the category of natural capital). Respondents were asked to mention the nearest source of water. With reference to Table 6, majority of respondents had the opinion that

50%, 50%, 46.7%, 43.3% and 33.3% of respondents in Njombe, Mufindi, Wanging'ombe, Iringa rural and Kilolo respectively use shared tap water. Such distribution of water taps enhances working efficiency and reduces workload among women as their gender role at household level (Kashaigili *et al.*, 2016). The only challenge with shared taps is management of the taps especially in time services such as replacing of corks. A good proportion (23.3%) and (20%) of respondents (Table 6) in Wanging'ombe and Kilolo Districts respectively had water piped in their houses, this is an indication for improved livelihood of people in the two regions. Most of the villages with water piped in house are those near to urban areas such as Bomalango'ombe and Ihemi villages of Kilolo and Iringa rural Districts. The two regions of Iringa and Njombe have a lot of rivers and streams; however, these were rarely used as sources of water for domestic purpose by the communities. Availability of water in the area is one of the attractions for investment in agriculture.

Table 6: Water sources

Water sources	Iringa region			Njombe region	
	Iringa	Kilolo	Mufindi	Njombe	Wanging'ombe
Shared tap	13 (43.3)	10 (33.3)	15 (50)	15 (50)	14 (46.7)
Piped in house/tap in yard	3 (10)	6 (20)	3 (10)	3 (10)	7 (23.3)
Piped outside house	5 (16.7)	1 (3.3)	1 (3.3)	4 (13.3)	2 (6.7)
River	1 (3.3)	4 (13.3)	5 (16.7)	1 (3.3)	2 (6.7)
Stream	1 (3.3)	1 (3.3)	1 (3.3)	2 (6.7)	-
Borehole	4 (13.3)	-	-	-	2 (6.7)
Spring	-	5 (16.7)	2 (6.7)	1 (3.3)	1 (3.3)
Hand pump	3 (10)	-	1 (3.3)	1 (3.3)	1 (3.3)
Covered tube well	-	3 (10)	2 (6.7)	3 (10)	1 (3.3)

Note: Numbers in the brackets indicate percentages

4.5.3 Perception of households towards the quantity and quality of water

Households were asked to indicate as to whether water for domestic use was enough in terms of quantity and quality. From table 7 (56.7%), (53.3%) and (50%) of respondents in Mufindi, Njombe and Wanging'ombe Districts respectively indicated that water for use is adequately supplied. In some districts such as Kilolo, water for domestic use is somehow scarce because the area is a bit dry and mountainous. For the case of quality of water, majority (80%), (76.7%) and (73.3%) of respondents in Mufindi, Njombe and Wanging'ombe respectively indicated the quality of water was good. Very few (10%) and (3.3%) of respondents in Iringa and Kilolo Districts said the quality of water was very bad, this is due to the fact that during rainy season mud and other impurities mix in the water sources (Table 7).

Table 7: Perception of HHs towards the quality and quantity of water

Perception of HHs towards quality and quantity of water	Iringa region			Njombe region	
	Iringa	Kilolo	Mufindi	Njombe	Wanging'ombe
Quantity of water					
Extremely scarce	1 (3.3)	3 (10)	-	2 (6.7)	1 (3.3)
Adequate	14 (46.7)	14 (46.7)	17 (56.7)	16 (53.3)	15 (50)
inadequate	14 (46.7)	12 (40)	10 (33.3)	8 (26.7)	10 (33.3)
More than adequate	1 (3.3)	1 (3.3)	3 (10)	4 (13.3)	4 (13.7)
Water quality					
Very bad	3 (10)	1 (3.3)	-	-	-
Bad	6 (20)	7 (23.3)	2 (6.7)	2 (6.7)	2 (6.7)
Good	19 (63.3)	16 (53.3)	24 (80)	23 (76.7)	22 (73.3)
Very good	2 (6.7)	6 (20)	4 (13.3)	5 (16.7)	6 (20)

Note: Numbers in the brackets indicate percentages

4.5.4 Houses and sanitation facilities

Houses and sanitation facilities constitute some of the important indicators of human welfare, they partly indicate the level of livelihoods of the given community. During the study, an attempt was done to take record of the housing and sanitation facilities owned by the sampled households. The findings revealed that, majority (more than

80% of the sample households) owned houses of different qualities and 16.7% were renting in Iringa district (Table 8). Majority of the respondents owned 2 separate buildings (53.3%), (53.3%), (50%), (40%) and (33.3%) for Iringa, Kilolo, Njombe, Wanging'ombe and Mufindi districts respectively. Separate buildings include, kitchens, stores and other habitable houses.

Table 8: Houses/dwelling

Houses/dwelling	Iringa region			Njombe region	
	Iringa	Kilolo	Mufindi	Njombe	Wanging'ombe
Houses					
Home provided	1 (3.3)	-	3 (10)	3 (10)	2 (6.7)
Owned	24 (80)	30 (100)	27 (90)	27 (90)	28 (93.3)
Rented	5 (16.7)	-	-	-	-
Separate buildings					
1	2 (6.7)	11 (36.7)	9 (30)	10 (33.3)	8 (26.7)
2	16 (53.3)	16 (53.3)	10 (33.3)	12 (40)	16 (53.3)
3	7 (23.3)	2 (6.7)	7 (23.3)	5 (16.7)	5 (16.7)
4	4 (23.3)	-	4 (13.3)	3 (10)	1 (3.3)
5 & above	1 (3.3)	1 (3.3)	-	-	-

Note: Numbers in the brackets indicate percentages

4.5.5 House building materials

During the study, the quality of the houses was evaluated by using types of building materials used for roofing, wall, window and floor construction and the results are presented in Table 9 below. The most roofing material used was corrugated iron sheet, constituting 46.7% in Iringa district to the highest of 76.7% in Wanging'ombe District. This was followed by thatch grass which ranged from the lowest of 10% in Wanging'ombe district to the highest of 26.7% in Iringa District. Alike observation was reported in the study by (Ravillion, 1992). On the other hand, many houses (33.3% to 46.3% in Iringa and Wanging'ombe Districts respectively) were built using burnt bricks not plastered and floors built using cements (40% to 66.7% in Kilolo and Njombe Districts respectively). From Table 8 below, it can be observed

that the overall housing condition among the sampled respondents was not impressive and it can be concluded the SAGCOT intervention has not yet yielded to the anticipation of many small holder farmers

Table 9: Housing building material

House building materials	Iringa region			Njombe region	
	Iringa	Kilolo	Mufindi	Njombe	Wanging'ombe
Roof material					
Dilapidated thatch grass	8 (26.7)	5 (16.7)	4 (13.3)	4 (13.3)	3 (10)
Asbestos	3 (10)	-	-	-	-
Corrugated iron sheet	14 (46.7)	20 (66.7)	22 (73.3)	19 (63.3)	23 (76.7)
Well maintained thatch grass	-	5 (16.7)	1 (3.3)	3 (10)	1 (3.3)
Tin or metal	3 (10)	-	1 (3.3)	2 (6.7)	3 (10)
Thatch and mud	1 (3.3)	-	-	-	-
Corrugated iron sheet and thatch grass	1 (3.3)	-	2 (6.7)	2 (6.7)	-
Wall material					
Poorly constructed poles and mud	-	1 (3.3)	-	-	1 (3.3)
Mud bricks without plaster	4 (13.3)	2 (6.7)	3 (10)	7 (23.3)	2 (6.7)
Burnt bricks without plaster	10 (33.3)	13 (43.3)	11 (36.7)	12 (40)	14 (46.3)
Mud bricks with plaster	2 (6.7)	3 (10)	2 (6.7)	3 (10)	3 (10)
Burnt bricks with plaster	4 (13.3)	6 (20)	7 (23.3)	6 (20)	7 (23.7)
Cement and stones	-	1 (3.3)	1 (3.3)	-	-
Well- constructed poles and mud	-	1 (3.3)	1 (3.3)	-	-
Cement blocks	-	-	2 (6.7)	-	-
Mud and grass	6 (20)	2 (6.7)	-	1 (3.3)	-
Mud	4 (13.3)	1 (3.3)	2 (6.7)	1 (3.3)	3 (10)
Floor material					
Dust/rough	-	2 (6.7)	2 (6.7)	3 (10)	1 (3.3)
Mud/smooth	6 (20)	11 (36.7)	8 (26.7)	4 (13.4)	9 (30)
Dust/smooth	3 (10)	3 (10)	3 (10)	1 (3.3)	3 (10)
Mud and cement	4 (13.3)	-	3 (10)	2 (6.7)	-
cement	15 (50)	12 (40)	13 (43.3)	20 (66.7)	17 (56.7)
Cement and tiles	2 (6.7)	2 (6.7)	1 (3.3)	-	-

Note: Numbers in the brackets indicate percentages

4.5.6 Sewage system and Toilet facilities

The sanitation facilities (i.e. toilets and sewage systems) were generally dominated by pit latrines (more than 60%) and more than 50% of households had no sanitation for sewage system across all five sample districts. Very few households (13.3%),

(3.3%) and (10%) for Iringa, Mufindi and Wanging'ombe had improved toilet facilities i.e. flush toilets. Poor sanitation and hygiene condition could cause break out of water borne diseases in the study areas (Table 10).

Table 10: sanitation facilities

Sanitation facilities	Iringa region			Njombe region	
	Iringa	Kilolo	Mufindi	Njombe	Wanging'ombe
Sewage system					
Water-borne sewage	5 (16.7)	-	2 (6.7)	3 (10)	2 (6.7)
No sanitation	16 (53.3)	18 (60)	21 (70)	15 (50)	15 (50)
Pit- hole	9 (30)	12 (40)	7 (23.3)	12 (40)	13 (43.3)
Toilet facilities					
None	3 (10)	1 (3.3)	-	-	-
Pit latrine	18 (60)	29 (96.7)	27 (90)	28 (93.3)	26 (86.7)
Flush toilets	4 (13.3)	-	1 (3.3)	-	3 (10)
Ventilated and improved pit latrines	5 (16.7)	-	2 (6.7)	2 (6.7)	1 (3.3)

Note: Numbers in the brackets indicate percentages

4.5.7 Access to electricity

Power supply and its availability (which falls under the category of physical capital-infrastructures) is among of the indicators for improvement of the livelihoods of the people in a certain area. The study revealed that, (50%) and (56%) in Iringa and Kilolo Districts respectively had electricity supply while in Mufindi District majority (76.7%) of respondents had no electricity supply in their areas (Table 11). For the areas where there is already electricity supply, very few households had electricity connection. Table 10 also shows the high service cost (connection fee and monthly bills) and unavailability of the service in the area are the key reasons hindering electricity use in most of the households. However, given the recent developments in rural electrification projects, some of the villages have started receiving electrification installation at village level. For instance, some areas in Makifu village in Iringa District and Matembwe and Iyembela Villages in Njombe

District have electricity poles close to their households, although few are already connected. There are few households (16.7%), (13.3%), (13.3%), (10%) and (20%) in Iringa, Kilolo, Mufindi, Njombe and Wanging'ombe Districts respectively which are using alternative sources of energy apart from electricity (solar energy) and the reason behind is solar is cheap, reliable and readily available

Table 11: Access to electricity

Responses	Iringa region			Njombe region	
	Iringa	Kilolo	Mufindi	Njombe	Wanging'ombe
Is your area Electrified					
Yes	15 (50)	17 (56.7)	7 (23.3)	14 (46.7)	11 (36.7)
No	15 (50)	13 (43.3)	23 (76.7)	16 (53.3)	19 (63.3)
HH with electricity connection					
Connected	5 (16.7)	4 (13.3)	4 (13.3)	3 (10)	6 (20)
Not connected	25 (83.3)	26 (86.7)	26 (86.7)	27 (90)	24 (80)
Reasons for no electricity					
The area is not electrified	9 (30)	4 (13.3)	16 (53.3)	11 (36.7)	13 (43.3)
Connection fee is too expensive	8 (26.7)	20 (66.7)	9 (30)	13 (43.3)	9 (30)
Monthly bills for electricity are too expensive	5 (16.7)	-	1 (3.3)	3 (10)	-
HH cannot afford electricity appliances	3 (10)	1 (3.3)	-	2 (6.7)	2 (6.7)
Alternative source (solar is available)	5 (16.7)	4 (13.3)	4 (13.3)	3 (10)	6 (20)

Note: Numbers in the brackets indicate percentages

4.5.8 Energy for lighting and cooking

Findings from the study show that, across all districts kerosene and solar energy were most dominant form of energy source for lighting (Table 12). For instance, 53.3% of respondents in Mufindi District were using solar for lighting, followed by 43.3% of respondent in Wanging'ombe District. Solar is preferred because is affordable/cheap and easily available. During FGD, one of the discussants also added that solar is more reliable, and once installed has no additional cost.

Firewood is the main source of energy for cooking across all surveyed districts. Majority of the respondents (over 90%) reported using firewood for cooking (Table 12). Like in other rural areas of Tanzania, firewood is widely used across the study villages, and this indicates high rate of forest dependence. A study by (Mungure, 2015), concluded that most of the rural and urban communities adjacent to forests are highly depending on forests for fuel wood supply as their main source of cooking energy. Firewood is preferred due to its affordability and availability unlike gas and electricity which are expensive and not readily available in some areas.

Table 12: Energy for lighting and cooking

Energy for lighting/cooking	Iringa region			Njombe region	
	Iringa	Kilolo	Mufindi	Njombe	Wanging'ombe
Main energy for lighting					
Kerosene	10 (33.3)	16 (53.3)	7 (23.3)	10 (33.3)	8 (26.7)
Electricity	5 (16.7)	4 (13.3)	4 (13.3)	3 (10)	6 (20)
Solar	8 (26.7)	9 (30)	16 (53.3)	7 (23.3)	13 (43.3)
Torch (Batteries)	3 (10)	-	1 (3.3)	3 (10)	1 (3.3)
Chinese solar lights	4 (13.3)	1 (3.3)	2 (6.7)	7 (23.3)	2 (6.7)
Main energy for cooking					
Firewood	27 (90)	28 (93.3)	27 (90)	27 (90)	26 (86.7)
Charcoal	3 (10)	2 (6.7)	3 (10)	3 (10)	4 (13.3)
Electricity	-	-	-	-	-
Gas	-	-	-	-	-

Note: Numbers in the brackets indicate percentages

From these findings an overall conclusion that can be drawn is that majority of the sampled respondents had poor livelihoods status and therefore, one might argue that SAGCOT interventions has to act as catalyst for improving livelihoods for majority of these small holder farmers.

4.6 Institutional factors governing the use of water and land resources

4.6.1 Institutional factors governing the use of water

There are two broad categories of water sources identified, these are community owned and privately owned water sources. Community owned water sources include boreholes, streams, river, spring, shared taps, covered tube wells on the other hand, privately owned water sources include tap inside houses/outside, covered tube wells and deep wells. Institutional factors governing the use of water sources differ depending on the type of source whether community owned or private owned. Rules and regulations governing the use and access to the various community-owned water sources are presented in the table below. A variety of rules and regulations apply to the different community-owned water sources, some rules are generic whilst others are specific to the type of water sources. Table 13 shows the water source, uses and the rules that apply to each of the sources. In most cases the rules and regulations that apply to community-owned water sources are not written down, they are just rules of the heart.

Table 13: Institutional factors governing the use of water

Water source	uses	Institutional factors (rules & regulation)
Shared taps	Domestic purposes (drinking, cooking and laundry)	<ul style="list-style-type: none"> • General hygiene should be maintained around the tap (cleanliness) • Every household using the shared taps should contribute agreed amount for repair if taps break down • If children plays with the tap, the parents are fined
Covered tube wells, deep wells	Domestic uses	<ul style="list-style-type: none"> • No laundry around the wells, at least 50m from the well
boreholes	Domestic purposes	<ul style="list-style-type: none"> • No one is allowed to do laundry at the borehole • When pumping the water, people should not hit the hand pump against the ground • General hygiene should be maintained around the tap (cleanliness) • Every household using the borehole should contribute agreed amount for repair if there are any breaks down
springs	Domestic purposes only	<ul style="list-style-type: none"> • General hygiene should be maintained around the spring • There are special vessels for fetching water. • Anyone who dirty the spring is fined • Laundry is not allowed at all near springs
streams	Domestic use, livestock watering and watering gardens	<ul style="list-style-type: none"> • No laundry around the streams, at least 50m away • Livestock watering is done at a specific spot and usually at the lower spot of the stream • No grazing around the stream as it may cause soil erosion, only watering is allowed
Rivers	Domestic use, irrigation and livestock watering	<ul style="list-style-type: none"> • No farming near the river, at least 60m from the river
Private owned taps and wells	Domestic purposes	<ul style="list-style-type: none"> • Households pay for water services e.g. per bucket or per month

4.6.2 Institutional factors governing the use of land

Land ownership was grouped into two categories; private owned land and community/state owned land, land acquisition was through; purchasing, inheritance, acquisition from village government. Several number of institutional factors

governing the use of land were identified, some were functioning in both private and community owned land, such institutional factors include; planting of trees, penalties imposed to those cutting down trees, Farming near the sources of water such as rivers, streams is prohibited. There are no wide differences in land uses in private owned land with that of community/state owned land. Detailed institutional factors are presented in the Table 14 below.

Table 14: Institutional factors governing the use of land

Parameters	Uses	Acquisition	Document of ownership	Rules and regulation
Private owned land	<ul style="list-style-type: none"> • Own cultivation • Renting out • Fallowing • Grazing land • Woodlot • Residential purposes • Laying bricks • Beehives • Firewood collection 	<ul style="list-style-type: none"> • Purchased • Inherited or gift • Acquired from village government • Cleared 	<ul style="list-style-type: none"> • Title deed • Offer of right of occupancy • Customary title deed • No document 	<ul style="list-style-type: none"> • Planting trees and maintain medicinal trees such as miulungu,minyang a,madihanyi • Buying and selling land should involve village officials e.g. VEO • Fines imposed to those cutting down trees • Land and boarder disputes are first solved by village or ward councils • Farming near the sources of water such as rivers, streams is not allowed.
Community/state owned land	<ul style="list-style-type: none"> • Building of offices, hospitals, schools, markets. • Renting out for cultivation and leasing land • Laying bricks • Grazing land • Woodlot • Mining activities • Hunting activities • Firewood collection 	<ul style="list-style-type: none"> • Purchased • Acquired from village government 	<ul style="list-style-type: none"> • Title deed • Customary title deed • No document 	<ul style="list-style-type: none"> • Fines imposed to those cutting down trees however cutting down trees is allowed upon special permission from V.E.O and instruction and approval from natural resource committee. • Selling land to investors must be approved by village general assembly • Farming near the sources of water such as rivers, streams is not allowed. • Firewood collection is only allowed to dried tree branches and old dried tree. • It is forbidden to live and cultivate in forest reserved areas. • Forest burning is prohibited.

4.6 Male and female-headed households agricultural Production

In order to characterize production among the sampled respondents, a cross-tabulation descriptive analysis was used. Results indicate that the mean production (100 kg/bag) was 11.25 bags ranging from 0 to 52 bags with more than half (58%) of the sampled respondents reported producing below 10 bags, compared to very few (1.3%) with production of 50 and above bags. However, results also indicate that female headed households had less agricultural production in almost all categories of production compared to their male counterpart. There were slightly difference in production between male and female headed households at the production category below 10 bags whereby, there were (51.7%) and (48.3%), male and female respectively. A vast difference was observed between the category 10 and 19 bags where, third-quarter (74.4%) were male-headed households relatively to quarter (25.6%) their counterpart; similar observation was made at category 20-29 bags with more than half (69.2%) male and above quarter (30.8%) female-headed households. There were no female-headed household falling under production category 30-39 and 40-49 respectively, on a surprising note however, there were equal proportion (50%) each male and female-headed households falling under production category of 50 bags and above (See Table 15).

Table 15: Male and female-headed household's production

Production categories (Bags)	Male HHS production	Female HHs production	Total
< 10	45 (51.7)	42 (48.3)	87 (100)
10- 19	32 (74.4)	11 (25.6)	43 (100)
20- 29	9 (69.2)	4 (30.8)	13(100)
30- 39	-	3 (100)	3 (100)
40- 49	-	2 (100)	2 (100)
50 and above	2 (50)	2 (50)	2 (100)

4.6.1 T-test results to compare production

An independent sample t-test was conducted to compare agricultural production between male and female-headed households. Results indicate that there was a significant difference in production scores for male-headed households ($M=12.4$, $SD=9.1$) and female-headed household ($M=9.4$, $SD=7.8$) conditions; $t(142) = -3.233$ and $p=0.002$. These results suggest that there was statistically significant differences ($p < 0.01$) in agricultural production between male and female-headed households in Ihemi cluster (See Table 16 below). Therefore, the null hypothesis that, "agricultural production did not differ significantly among surveyed male and female-headed households in Ihemi Cluster" is rejected by this study and an alternative hypothesis is accepted.

Table 16: Male and female-headed households' production t-test

Household head sex	Levene's Test for Equality of Variances			t-test for Equality of Means					95% Confidence Interval of the Difference	
	n	F-value	P-value	t-test	Degree of freedom	P-value	Mean difference	Standard deviation	Lower	Upper
Female	57	0.520	0.041	-3.23	142	0.002	-0.36	0.68889	-0.58387	-0.1408
Male	87			-3.18	113.1	0.002	-0.36	0.63648	-0.58807	-0.1366

4.7 Factors influencing male and female-headed households' income inequalities

Multiple linear regression analysis was carried out to investigate factors influencing male and female-headed households' income inequalities. The results show that, some variables had significant influence on male and female headed- households' income inequalities where as some had no any influence on that (Table 16). The results in Table 17 show that 63.7% of variation in male and female- headed households' income inequalities can be explained by variables included in the model. The findings show that total land owned is statistically significant influencing male and female- headed households' income inequalities at ($P=0.000$) and it was positively related to the dependent variable ($\beta = 0.565$) . This implies that households with big total land owned have higher chances of getting high incomes. A similar observation was reported in the study by (Mashayekhi, 2013), on economics survey of crop implications on optimized farm size and land consolidation which reveals that the average total cost decreases with the increase in farm size. Thus, smallholder farmers can optimize revenue through increasing farm size while other things remaining constant.

Furthermore, the results from regression analysis show that the education level of the household head was positively related to the dependent variable and was statistically significant at ($P=0.008$).The implication of this is that households head with high education level (for this case is primary education and few secondary education) have high income than those with no education at all. Number of livestock owned was also positively related to the dependent variable ($\beta = 0.159$)

and was statistically significant at ($P < 0.05$) as shown in Table 17. This indicates that households owning livestock have high incomes than their counterpart.

Also, the results from regression analysis show that the variable access to credit was statistically significant at ($p = 0.000$) and negatively related to the dependent variable ($\beta = -0.264$). This implies that the diminishing in access to credits widens the income gap between male and female-headed households. On the other hand, some factors that were thought to influence income inequality were not statistically significant. Such factors include land ownership status, primary occupation and household head age ($p > 0.05$). The insignificance of land ownership status can be attributed to the fact that majority of the respondents were owning land, likewise for the case of primary occupation, majority of respondents had the same primary occupation which is farming and livestock keeping. From these results (Table 17). There is clear justification and evidence that there is influence of social-demographic characteristics of the household head on income inequality as majority of these characteristics were statistically significant (both education level and household size were significant 99% and 95% level of confidence respectively). Therefore, the null hypothesis "there is no statistically significant influence of socio-demographic characteristics of the respondents on income inequality" is rejected.

Table 17: Multiple linear regression results

Independent Variables	Std. error	coefficients	t	Sig.
Constant	0.172		32.335	0.000***
Total land owned	0.007	0.565	8.610	0.000***
Land ownership status	0.160	-0.087	-1.123	0.264
Access to credit	0.063	-0.264	-4.102	0.000***
Number of livestock owned	0.088	0.159	2.141	0.034**
Household head occupation	0.013	0.054	0.826	0.410
Household head age	0.002	-0.017	-0.262	0.794
Household head education level	0.066	0.173	2.708	0.008***
Household size	0.053	0.130	2.063	0.041**

Note ***= Significant at the 99 % level of confidence; **= Significant at the 95 % level of confidence

4.7.1 Overall evaluation of the model

The adjusted R^2 value of 0.637 implies that 63.7% of the variation in income inequality among male and female-headed households were explained by the parameters estimated in the model equation. However, it also implies that there are other parameters which significantly influence income inequality but were missed during the model equation estimation. Such parameters are open for further investigation.

Results presented in Table 18 reveal that the F-value of 17.525 was significant at the 99 % level of confidence ($p = 0.000$) which implies that all predictors estimated in the model equation were well fitted and possess an influence to the dependent variable.

Table 18: Summary of the model

Model	Sum of squares	df	Mean square	F-value	Sig.
Regression	11.231	7	1.604	17.525	0.000***
Residual	13.000	142	0.092		
Total	24.231	149			
R	R^2	Adjusted R^2	Std Error of estimate		
0.681	0.663	0.637	0.30257		

Note: *** = Significant at 99% level of confidence

4.7.2 Multicollinearity and singularity test

The regression equation was tested for the multicollinearity, this refers to the relationship among independent variables estimated in the model. Multicollinearity exists when the independent variables are highly correlated ($r > 0.9$) whereas, singularity occurs when one independent variable is actually a combination of another independent variable. Testing the model on multicollinearity was done by using tolerance and Variance Inflation Factor (VIF) test built in regression of each

independent variable. Therefore, the higher the inter-correlation of independent variables the more the tolerance approaches zero, thus suggest for multicollinearity. It can be noted in the results presented in Table 19 that tolerance values do not approach zero and VIF values for independent variables were below 10 which justifies that there is no multicollinearity in the model equation (Gujarat, 2004; Pallant, 2011).

Table 19: Multicollinearity and singularity test

Independent variables	Tolerance (<i>r</i>)	Variance Inflation Factor (VIF)
Total land owned	0.877	1.141
Land ownership status	0.623	1.605
Access to credit	0.915	1.093
Number of livestock owned	0.687	1.456
Household head occupation	0.888	1.126
Household head age	0.932	1.073
Household head education level	0.928	1.077
Household size	0.926	0.080

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study was conducted to assess livelihoods among small-holder farmers in Ihemi Cluster. Specifically, the study focused its attention to comparing agriculture production between male and female-headed households, investigating factors that are influencing income inequalities between male and female-headed households and identifying institutional factors that are governing the use of water resources. In reference to the specific objectives above and their findings, the following conclusion and recommendations can be drawn.

A cross sectional single-visit survey was conducted involving smallholder farmers from Iringa Rural, Kilolo, Mufindi, Njombe and Wanging'ombe Districts which form Ihemi Cluster in the SACGOT intervention areas. Study hypotheses were tested based on the analytical methods applied. The null hypothesis of no statistical difference in production between male and female-headed households was tested using an independent sample T-test and we gathered enough evidence to reject the null hypothesis above, while the null hypothesis of "no statistical significance influence of socio-demographic characteristics to income inequality between male and female-headed households" was tested using multiple linear regression model was also rejected.

On livelihoods assessment of small-holder farmers in Ihemi Cluster, measurable indicators were attributed to farmers' livelihoods, these indicators were farmers' accessibility to the natural capital such as land, access to water, housing, sanitation

facilities, access to electricity services, as well as source of energy for lighting and cooking. Based on the findings of these measurable indicators, an overall conclusion that can be drawn as majority of the sampled respondents had poor livelihoods status.

Institutional factors governing the use of water differ depending on the type of source whether community owned or private owned, Water sources such as shared taps, private owned taps, wells, covered tube wells are for domestic purposes only while water sources such as streams, springs, and rivers can be used for domestic purposes, livestock watering, watering gardens and irrigation. Some of the rules and regulations governing the use of water are generic whilst others are specific to the type of water sources, these rules include; General hygiene should be maintained which is generic, there is contribution agreed for maintenance in case of breakdowns. Fines for misuse, no laundry around wells, springs, streams, rivers, at least 50m from sources.

On comparison between male and female-headed households' production, it was clear that, there was a significant difference in production scores for male-headed households ($M=12.4$, $SD=9.1$) and female-headed household ($M=9.4$, $SD=7.8$) conditions; $t(142) = -3.233$ and $p=0.002$. These results suggest that there was statistically significant differences ($p < 0.01$) in agricultural production between male and female-headed households in Ihemi Cluster. Land owned, access to credit, number of livestock owned, HH education level and household size were found to have significance influence on male and female headed- households' income inequalities.

5.2 Recommendations

Based on the findings of the study the following recommendations are suggested for the improvement of sustainable livelihoods of smallholder farmers in Ihemi cluster.

- i. Livelihood diversification (diversification of income sources). Smallholder farmers should be encouraged to diversify their sources of incomes to reduce much dependency on crop production. Adding up multiple income streams through other economic activities such as livestock keeping, mining, local manufacturing, commerce, haunting, fishing, would protect a smallholder farmer from a down economy. If one loses from one source of income can simply turn to another source of income generating activity.
- ii. Fostering of community - investor linkage. Large scale investors should adopt investment models which are socially inclusive with which smallholder farmers can benefit and learn from them. There are already such kind of fostering in the cluster. The Rutuba (Mawambala) farm for instance, trains farmers on good agricultural practices through the Clinton Foundation Program. There is also Silverland which operates a poultry project, the company buys crops such as maize, soybeans and sunflower from smallholder farmers. Silverland is also establishing a poultry training college for smallholder farmers.
- iii. Based on livelihood conditions and the increasing number of female-headed households, deliberate measures should be taken to improve their living conditions, specifically on having access and control over resources such as land. Women are the important actors in agriculture in rural areas as they depend on land for their livelihoods

- iv. Many smallholder farmers had no title deed, offer of right to occupancy even the customary title deed. The acquiring right of occupancy among smallholder farmers will enable them towards accessing loans from financial institutions. Loan would act as catalyst in improving agriculture as well as other non- agriculture activities.
- v. Reform agricultural sector and transform subsistence farming to medium-scale commercial farming through partnership with investors in the cluster.

5.3 Areas for Further Research

Multiple linear regression model results revealed that only (63%) of the factors that influence male and female- headed households' income inequalities were included during the model equation estimation, the remaining (37%) of the factors are open for investigation in further researches. Additionally, since the study was done in one among the six clusters of SAGCOT intervention, there are rooms for other studies to be conducted in other clusters.

REFERENCES

- Abdulai, A. and C. Delgado (1999), Determinants of non-farm earnings of farm-based husbands and wives in Northern Ghana. *American Journal Agricultural Economics*, Vol. 81: 117–30 pp.
- Agrawal, B. (1989). Social, Security and Family in Rural India. *Development Economics Journal*, Vol. 24 (2): pp. 183-193.
- Agricultural Council of Tanzania (2011). Kilimo Kwanza Resolutions [www.Actanzania.org site visited on 15th September, 2015].
- Amanor, K. S. (2010) Family Values, Land Sales and Agricultural Commodification in Southeastern Ghana. *Journal of Africa*, Vol. 80 (1): 104–25 pp.
- Appleton, S. (1996). Women-Headed Households and Household Welfare: An Empirical Deconstruction for Uganda. *World Development*, Vol. 24 (12): 1811-1827.
- Ashraf, B. and Ashraf, J. (1993). Analysis of the Male-Female Earnings Differential in Pakistan. *Pakistan Development Review Journal*, Vol. 32 (4): pp. 895-904.
- Bailey, K. (1994). Methods of Social Research. Free Press Inc., New York: pp. 345.

Banik, D. (2006). *Poverty, Politics and Development: Interdisciplinary Perspectives*.

Fagbokforlaget, Munich: pp. 85.

Baulch, R. (1996). Neglected trade-offs in poverty Measurement. *IDS Bulletin*,

Vol.27: pp. 36-43.

Beck, T. (1989). Survival Strategies and Power among the Poorest in West Bengal

Village. *IDS Bulletin*, Vol. 20 (2): pp. 23-32.

Becker, C. D. and Ostrom, E. (1995). Human Ecology and Resources Sustainability:

The importance of Institutional Diversity. *J Stor Annual Review of Ecology and Systematics*, Vol. 26: 113-133.

Bromley, D. W. (1989). *Economic Interests and Institutions: The Conceptual*

Foundations of Public Policy, BasilBlackwell, New York: pp. 83.

Bryceson, D. F. (2002). Multiplex Livelihoods in Rural Africa: Recasting the Terms

and Conditions of Gainful Employment. *Journal of Modern African Studies*, Vol. 40 (1): 1-28.

Chambers, R. (1994). The origins and Practice of Participatory Rural Appraisal.

World Development Journal, Vol. 22, (7): pp. 953-969

Chambers, R. and Conway, G. R. (1992). Sustainable Livelihoods: Practical

Concepts for the 21st Century. *IDS Discussion Paper No. 296*: pp. 1-27.

Chukwuezi, B. (1999). Deagrarianization and Rural Employment in Rural Igboland South-Eastern Nigeria, Kano: Center for Documentation and Research: *African Studies Working Paper, Vol. 37: 1-17.*

Davies, S. (1996). Adaptable Livelihoods: Coping with Food Insecurity in the Malian Sahel, MacMillan, London: pp. 82.

Economic and Social Council, (2014). Food and Agriculture Organization of the United Nation's Contribution to the United Nations Economic and Social Council (ECOSOC) Integration Segment. ECOSOC, New York: 1-45 pp.

Escobal, J. (2001). The Determinants of Non-Farm Income Diversification in Rural Peru. *World Development*, Vol. 29 (3): 497-508 pp.

Foeken, D. and Owuor, S. O. (1999). Multi-spatial Livelihoods in Sub-Saharan Africa: Rural Farming by Urban Households in Nakuru Town Kenya. *African Urban Quarterly Journal*, Vol. 11 (3): pp. 170-179.

Food and Agriculture Organization (2011a). The role of Women in Agriculture. *ESA Working Paper*. 11-02 Rome, Italy.

Food and Agriculture Organization (2011b). Women in Agriculture: Closing the Gender Gap for Development. Rome, Italy: 160 pp.

Franzoi, S. L. (2003). Social Psychology, 3rd Edition. McGraw-Hill, New York: pp. 83-86.

Glew, D. J., O'Leary-Kelly, A. M., Griffin, R. W. and Van Fleet, D. D. (1995). Participation in Organizations: Preview of the Issues and Proposed Framework for Future Analysis. *Journal of Management*, Vol. 21, (3) pp. 395 – 421.

Greeley, M. (1994). Measurement of Poverty or the Poverty of Measurement. *IDS Bulletin*, Vol.25 (2): pp. 50-57.

Gujarat, D. N. (2004). Basic Econometrics, Fourth Edition. Mac Graw-Hill. Washington DC: 217 pp.

Hare, D. (1999). Women's Economic Status in Rural China: Households Contribution to Male-Female Disparities in a Waged Labour Market. *World Development Journal*, Vol. 27 (6): pp. 1011-1029.

Heller, F. (2003). Participation and Power: A critical Assessment. *International Association for Applied Psychology*, Vol. 52(1): pp. 144-163.

Holling, C. (1993). Investing in Research for Sustainability. *Ecological Applications Journal*, Vol. 3: pp. 549-555.

Horrell, S. and Krishnan, P. (2007). Poverty and Productivity in Female-headed Households in Zimbabwe. *Journal of Development Studies*, Vol. 22 (2): pp. 80-102.

http://www.agdevco.com/sysimages/appendix_v_cluster_development_2015_rpt24.pdf [site visited on 25th September, 2015].

<http://www.sagcot.com/who-we-are/what-is-sagcot> [site visited on 16th September, 2015].

Jacoby, H.(1991). Productivity of men and women and the sexual division of labor in peasant agriculture of the Peruvian Sierra,” *Journal of Development Economics*, Vol. 3 (1 & 2): pp. 265-287.

Jodha, N. (1988). The poverty Debate in India: Minority Viewpoint. *Economic and Political Weekly*, Vol. 21: 1169-1181.

Kashaigili J.J., Kadigi R.M.J., Sikira A., Sirima A., Placid J., Mbungu W., Mbwambo E. and Minde A.(2016). Laying the Foundation for Effective Landscape-level Planning for Sustainable Development in the SAGCOT Corridor: Ithemi Agricultural Development Cluster. Morogoro. Tanzania: pp. 43- 150.

Kothari, C. R. (2004). Research Methodology: Methods and Techniques (2nd Ed.). New Age International Publishers. New Delhi, India: pp. 56-67.

Kumar, R. (2005). Research Methodology: A step by step Guide for beginners. Pearson Education press, Sydney: pp.93- 165.

- Lines, R. (2004). Influence of Participation in Strategic Change: Resistance, Organizational Commitment and Change Goal Achievement. *Journal of Change Management*, Vol. 4. (3): pp. 193-215.
- Lipton, M. (1991). Growing Points in Poverty Research: Labour Issues. International Institute for Labour Studies Discussion Paper No. 66, Geneva: pp. 231.
- Lowder, S.K., Scoet, J. and Singh, S. (2014). What do we really know about the number and distribution of farms and family farms worldwide? Background paper for The State of Food and Agriculture 2014. ESA Working Paper No. 14-02. Rome, FAO.
- Mashayekhi, S. and Ghaderzadeh, H. (2013). An economics survey of barley crop, implications on optimized farm size and land consolidation: Case of Tehran Province of Iran. *Journal of Agricultural Research*, Vol. 8 (33): 4380-4385 pp.
- Mendelsohn, J.; Robertson, T. and Jarvis, A. (2014). Tanzania: The Measure of a Land. Vital Signs Ontario Canada: pp. 7-9.
- Narayan, D., Patel, R., Schafft, K., Rademacher, A., and Koch-Schulte, S. (2000). *Voices of the Poor: Can Anyone Hear Us?* Oxford University Press, New York: pp. 92-97.
- New Partnership for Africa's Development (2015). *Agriculture in Africa: Transformation and Outlook*. NEPAD, Accra: 76 pp.

North, D. C. (1990b). A transaction cost theory of politics. *Journal of Theoretical Politics*, Vol. 2 (4): pp. 355–367.

Oaxaca, R. (1973). Male-Female Wage Differentials in Urban Labour Markets. *International Economic Review Journal*, Vol. 14 (3): pp. 693-709.

Olsen, C. (2004). Cross-sectional Study Design and Data Analysis. Walden University Press. Chicago, Illinois: pp. 7-8.

Pallant, J. (2011). SPSS Survival Manual: A Step by Step Guide to Data Analysis Using SPSS, Fourth Edition. Allen and UNWIN, Midland Typesetters-Australia: 152 pp.

Payne, P. and Lipton, M. (1994). How Third World households adapt to dietary energy stress: Evidence and the issues. Food Policy Review 2, Washington: IFPRI: pp. 180-183.

Petersen, E. K. and Pedersen, M. L. (2010). The Sustainable Livelihoods Approaches from a Psychological Perspective: Approaches to Development. Institute of Biology, University of Aarhus: pp. 45-58.

Quan, J (2006). Land Access in the 21st century: Issues, trends, linkages and policy options.

Quisumbing, A. R. (1996). Male–Female Differences in Agricultural Productivity: Methodological Issues and Empirical Evidence. *World Development Journal*, Vol. 24 (10): pp. 1579-1595.

Ravallion, M.(1992). Poverty Comparisons: Guide to Concepts and Measures. Living Standards Measurement Paper No. 88, Washington: World Bank: pp. 43-52.

Research on Poverty Alleviation (2014). Increasing Use of Quality Seed for Ensuring Food Security in Tanzania. REPOA Policy Brief No.2: pp. 1- 4.

Rigg, J. (2006). Land, Farming, Livelihoods and Poverty: Rethinking the Links in the Rural-South. *World Development Journal*, Vol. 34 (1): pp. 180-202.

Saleth, R. M. and Dinar, A. (2000). Institutional Changes and in Global Water Sector: Trends, Patterns and Implications. *Water Policy Journal*, Vol. 2 (4): pp. 175-199.

Saleth, R. M. and Dinar, M. (2005). Water Institutional Reforms: Theories and Practice. *Water Policy Journal*, Vol. 7 (1): pp. 1-19.

Schaffer, P. (1996). Beneath the Poverty Debate: Some Issues. *IDS Bulletin*, Vol. 27(1): pp. 23-35.

Sen, A. (1984). Rights and capabilities in A., Sen, Resources, Values and Development, Oxford: BasilBlackwell: pp. 307-324.

Sen, A. (1987). *The Standard of Living*. Cambridge University Press, Cambridge: pp. 88.

Sen, A.(1975). *Employment, Technology and Development*. Clarendon Press, Oxford: pp. 34.

Southern Agricultural Growth Corridor of Tanzania (2013). *Indicative Programme of Development to 2015-Sequencing and Coordination*. SAGCOT, Dar es Salaam.

United Republic of Tanzania (2000). *Poverty Reduction Strategy Paper (PRSP)*. [<http://Poverty.worldbank.org.org/files/TanzaniaPRSP.pdf>].

United Republic of Tanzania (2001). *Agriculture Sector Development Strategy*: pp. 63.

United Republic of Tanzania (2005). *National Strategy for Growth and Reduction of Poverty (NSGPR)*. Vice president's Office: pp. 38.

United Republic of Tanzania (2013). *National Agriculture Policy*. Ministry of Agriculture Food Security and Cooperatives, Dar es Salaam.

United Republic of Tanzania (2014). *Tanzania in Figures 2013*. National Bureau of Statistics, Dar es Salaam.

United Republic of Tanzania (2015). Tanzania in Figures 2014. National Bureau of Statistics, Dar es Salaam.

Zeigler, M. and Steenstand, A. (2015). Global Agricultural Productivity (GAP) Report. Global Harvest Initiative, Washington D C.: 80 pp.

APPENDIX

Appendix 1: Questionnaire for smallholder farmers in the SAGCOT Corridor: Ithemi Agricultural Development Cluster (LiFeLand) August 2015

HOUSEHOLD BASELINE SURVEY

Household

A household is a group of individuals, who may or may not be related, living under the same roof (sharing food and income) and under the care of a head of household whose authority is recognized by all the members of the household. An ordinary household is made up of the head of household, his/her spouse(s) and their own unmarried children, possibly with other family members or persons with no family relationship. The household may be reduced to one person living alone or with his/her children.

In the case of a **polygamous household**, where one of the wives lives in a different residence, she is the head of that household.

SECTION 1: IDENTIFICATION PARTICULARS, STAFF & SURVEY TIME DETAILS

1. DISTRICT:							
2. DIVISION:							
3. WARD:							
4. VILLAGE/HAMLET:							
6. HEAD OF HOUSEHOLD:							
7. SEX:						<input type="checkbox"/> Male <input type="checkbox"/> Female	
8. DATE OF INTERVIEW		DD		MM		YYYY	

SECTION 2: HOUSEHOLD DEMOGRAPHICS

We would like to make a complete list of household members. For the purpose of this survey, a household is defined as persons eating under the same roof three or more days per week for at least six months out of the past year.

Person ID	Name	Sex 1= M 2= F	How old is [NAME] in completed years?	What is the relationship of [NAME] to head of the household? 1= Head 2= Spouse 3= Son/daughter 4= Grandchild 5= Step child 6= Parent of head or spouse 7= Sister/Brother of head or spouse 8= Nephew/Niece 9= Other relative 10= Servant 11= Non-relative 12= Other (specify)	During the past 12 months , how many months did [NAME] live in this household? <i>WRITE 12 IF ALWAYS PRESENT OR IF AWAY LESS THAN A MONTH</i>	What is the highest grade of school that [NAME] completed?	
						0= none N = nursery 1= P1 2= P2 3= P3 4= P4 5= P5 6= P6	7= P7 8= S1 or P8 9= S2 or P9 10= S3 11= S4 12= S5 13= S6
1	2	3	4	5	6	7	
01							
02							
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							

SECTION 3: LAND OWNERSHIP, USE & CHARACTERISTICS**(Agricultural land, Forest, crops, grassland, bush, etc – gradient, fallow period, inputs, yield)****Section 3A: Current Land Holdings****3A1: Land Currently Owned by the Household (with Ownership Rights)**

We would like to ask about all the land **owned** by this household during the last cropping season . This includes grazing and fallow land. It also includes land belonging to this household that was rented or lent out to another household.

1. During the last cropping season, does any member of your household own any agricultural land including woodlots and forest land with ownership rights?

1= Yes

2= No (>> SECTION 3A2)

P A R C E L I D	Parcel Name <i>COMPLETE THIS COLUMN FOR ALL PARCELS. THEN ASK COLUMNS 4-12 FOR EACH PARCEL BEFORE GOING TO THE NEXT PARCEL. COLUMN 5 WILL BE FILLED IN AT THE END OF THE INTERVIEW.</i>	Size of this parcel in acres/owner?		Location 1= Within village 2= Outside village but within same ward 3= Outside ward but within same district 4= Other district	How did you acquire this parcel? 1= Purchased 2= Inherited or gift 3= From village gov't 4= Cleared 5= Other (specify)	In which year did you first acquire this parcel?	What is or will be the primary use of the parcel during the current cropping season? 1= Own cultivation 2= Rented out 3= Cultivated by family/clan member outside household 4= Fallow 5= Grazing land 6= Woodlot 7= Residential 8= Other (specify)
		Acre	Owner (code of HH member as in section 2)				
		3	4	5	6	7	8
01							
02							
03							
04							
05							
06							
07							
08							
09							
10							

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3A2: Land that the Household Accesses through Use Rights**INTERVIEWER: THIS CATEGORY REFERS TO LAND FOR WHICH THE HOUSEHOLD HAS USE RIGHTS ONLY.**

1. During the past cropping season, does any member of your household have access to agricultural land (including woodlots and forests) belonging to someone outside the household?

1= Yes**2= No (>> SECTION 3A4)**

P A R C E L I D	Parcel Name <i>COMPLETE THIS COLUMN FOR ALL PARCELS. THEN ASK COLUMNS 4-12 FOR EACH PARCEL BEFORE GOING TO THE NEXT PARCEL. COLUMN 5 WILL BE FILLED IN AT THE END OF THE INTERVIEW.</i>	Size of this parcel in acres?		Location 1= Within village 2= Outside village but within same ward 3= Outside ward but within same district 4= Other district	In which year did you first use this parcel?	If response to column 8=4: How much rent are you paying per year (12 months) for this parcel?	What is or will be the primary use of the parcel during the current cropping season? 1= Own cultivation 2= Sub-contracted out 3= Cultivated by family/clan member outside household 4= Fallow 5= Grazing land 6= Woodlot 7= Residential 8= Other (specify)
		Acres	Remarks on owner				
		3	4	5	6	7	8
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

3A3: Land Characteristics and Rights

INTERVIEWER: ASK THE FOLLOWING QUESTIONS ON EVERY PARCEL IDENTIFIED IN SECTIONS 3A1 AND 3A2.

P A R C E L I D*	Distance from homestead in kilometres? <i>IF PARCEL IS LOCATED AT HOMESTEAD, WRITE 0.</i> <i>IF RESPONDENT CANNOT ANSWER, WRITE "Don't know".</i>	How do you and members of your household primarily go to this parcel ordinarily? 1= By foot 2= By bicycle 3= By public transportation 4= By private vehicle 5= Other (specify)	Using the mode of transportation identified in column 3, how long does it take you to go to this parcel? Minutes	Do you have any document of ownership for this parcel? 1= Title deed 2= Offer of Right of Occupancy 3= Customary title deed (Hati ya Kimila) 4= No document 5= Parcel is rented/borrowed
	2	3	4	5

* Copy parcel numbers from Sections 3A1 and 3A2.

SECTION 4: HOUSING/DWELLING**Section 4A: Structure of the House**

4A1: Do you own or rent your house or are you provided with accommodation? <i>1 = Own; 2 = Rent; 3 = Home provided</i>	4A2: If renting or paying nominal fee – how much are you paying per month? <i>Tshs</i>	4A3: How many separate buildings make up your house/dwelling excluding separate toilet(s) but including separate kitchen(s)?	4A4: How many habitable rooms in total are there in your house/homestead? Excluding farm buildings, buildings used for work, and buildings that form part of another household's homestead.	4A5: Please indicate numbers for rooms used for commercial purpose if any.
1	2	3	4	5

4A6: Toilet facilities <i>1=Flush toilet; 2=Ventilated Improved Pit latrine (VIP) 3=Pit latrine; 4=None; 5=Others</i>	4A7: Sewerage system <i>1 = Water-borne sewerage; 2 = Pit-latrine; 3 = No sanitation facility; 4 = Other (specify)</i>	4A8: Roof material (<i>observe or ask</i>) <i>1 = Tiles; 2 = Concrete; 3 = Asbestos; Corrugated iron sheets; 4 = Well-maintained thatched grass; 5 = Dilapidated thatched grass; 6 = Grass and plastic; 7 = Plastic; 8 = Tin or metal sheets; 9 = Coconut leaves; 10 = Thatch and mud; 11 = Other (specify)</i>	4A9: Wall material (<i>observe or ask</i>) <i>1: Cement blocks; 2 = Burnt bricks with plaster; 3 = Burnt bricks without plaster; 4 = Mud bricks with plaster; 5 = Mud bricks without plaster; 6 = Cement and Stones 7 = Mud and stones; 8 = Well-constructed poles and mud; 9 = Poorly constructed/maintained poles and mud; 10 = Mud and grass; 11 = Metal/tin sheets; 12 = Hardboards; 13 = Coconut leaves/grass; 14 = Other (specify)</i>	4A10: Floor material (<i>observe or ask</i>) <i>1 = Cement and tiles; 2 = Cement; 3 = Timber; 3 = Mud and cement; 2 = Mud/smooth; 3 = Dust/smooth; 4 = Dust/rough; 5 = Other (specify)</i>	4A11: Window material (<i>observe or ask</i>) <i>1 = grass and aluminum frame; 2 = wood; 3 = wood and grass; 4 = Corrugated iron sheets and wood; 5 = Elephant grasses; 6 = Other (specify)</i>
6	7	8	9	10	11

SECTION 4: ACCESS TO WATER**Section 4A: Water for domestic use**

4A1: What are the common sources of drinking water for your household? <i>1 = Piped in house/tap in yard; 2 = Piped outside house; 3 = Shared tap; 4 = River; 5 = Stream/river; 6 = Spring; 7 = Borehole; 8 = Hand pump; 9 = Tube well/ Covered well; 10 = Uncovered surface Well; 11 = Tank/Rain Water; 12 = Bought Water; 13 = Other (specify)</i>	4A2: If your main source of water for drinking is a nearby river, what are your perceptions about quantity ? <i>1 = More than adequate; 2 = Adequate; 3 = Inadequate 4 = Extremely scarce</i>	4A3: If your main source of water for drinking is a nearby river, what are your perceptions about quality ? <i>1 = Very good; 2 = Good; 3 = Bad; 4 = Very bad</i>	4A4: Reason for the answer in 4A2	4A5: Reason for the answer in 4A3
1	2	3	4	5

4A6: If your household is not using an inside tap or tap in the yard, what is the distance to the nearest tap? <i>1 = Less than 100m; 2 = 100m to 199m; 3 = 200m – 500m; 4 = More than 500m</i>	4A7: If more than 500m, specify the distance in kilometres	4A8: If no access to tap water, what is the distance to the nearest protected water source (well, borehole etc)? <i>1 = Less than 100m; 2 = 100m to 199m; 3 = 200m – 500m; 4 = More than 500m</i>	4A9: If more than 500m, specify the distance in kilometers	4A10: Who fetches water in the family <i>1 = Girls; 2 = Adult women; 3 = Girls and adult women; 4 = Boys; 5 = Adult men; 6 = Boys and adult men; 7 = All household members</i>
6	7	8	9	10

Section 4B: Water for IrrigationASK THE FOLLOWING QUESTIONS ON EVERY PARCEL CULTIVATED BY THE HOUSEHOLD.

P A R C E L I D*	4B1: Did you irrigate this parcel in the last season? <i>1=Yes (>> 3)</i> <i>2=No (>> Next Parcel)</i>	4B2: Through what kind of furrow does water reach this parcel? <i>1= Traditional</i> <i>2= Improved</i> <i>3= Other (specify)</i>	4B3: How do you irrigate this parcel? <i>1= Furrow</i> <i>2= Kinyungu</i> <i>3= Bucket</i> <i>4= Treadle pump</i> <i>5= Sprinkler</i> <i>6= Drip</i> <i>7=Other (specify)</i>
1	2	3	4
01			
02			
03			
04			
05			
06			
07			

* Copy parcel numbers from Sections 3A1 and 3A2.

SECTION 5: OTHER ASSETS**Section 5A: Household and Enterprise Assets**

Type of asset	Asset code	Did your household's ownership of this asset change in the past 12 months? 1=Yes 2=No (>>Next Section)	By how much has your household's holding of [...] changed in the past 12 months?		Compared with 2010 , would you say that your [...] is 1= Much more now 2= More now 3= About equal 4= Less now 5= Much less now
			Number (positive or negative)	Change in estimated value (Tshs) (positive or negative)	
1	2	3	4	5	6
Household Assets					
Other buildings (besides houses covered under section 4A)	001				
Furniture	002				
Furnishings (e.g., carpet, mat, mattress, etc.)	003				
Bed nets	004				
Household appliances (e.g., kettle, iron, etc.)	005				
Electronic equipment (e.g., TV, radio, CD player, etc.)	006				
Generators	007				
Solar panel / electric inverters	008				
Bicycle	09				
Motorcycle	010				
Other transport equipment	011				
Jewelry and watches	012				
Mobile phone(s)	013				
Other household assets	014				

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Section 5A: ...Continued

Type of asset	Asset code	Did your household's ownership of this asset change in the past 12 months? 1=Yes 2=No (>>>Next Section)	By how much has your household's holding of [...] changed in the past 12 months?		Compared with 2010 , would you say that your [...] is 1= Much more now 2= More now 3= About equal 4= Less now 5= Much less now
			Number (positive or negative)	Change in estimated value (Tshs) (positive or negative)	
1	2	3	4	5	6
Enterprise (Agricultural and Non-Agricultural) Assets					
Hoes	101				
Ploughs	102				
Pangas, slashers, etc.	103				
Sprayers	104				
Wheelbarrows	105				
Tools (for carpentry, electrical, mechanic work, etc.)	106				
Ox carts	107				
Tractors	108				
Power tillers	109				
Irrigation sprinklers and pipes / hoses	110				
Drip irrigation equipment	111				
Water pump for irrigation or other agricultural uses	112				
Other agricultural equipment	113				
Crop storage containers (drums, etc.)	114				
Computer equipment for enterprise	115				
Sewing machine	116				
Transport equipment for enterprise	117				
Other enterprise equipment (specify)	118				

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Section 6: Disposition of Crops: Last Crop Season

Now I would like to ask about your harvest from crops that were planted during the last cropping season.

P A R C E L I D	C R O P N U M B E R	Crop		How much [...] did you harvest during the last season			How much of the [...] that you harvested during the last season was sold and in what condition/state? <i>IF NONE, WRITE 0 IN QUANTITY AND GO TO 17</i>		What was the total value of the sale of [...]?	Where is the residence of the buyer? (% adding up to 100)				To whom do you sell [...]?	How much of the [...] harvested during the last season was used to produce processed food products for sale and for animal feed?	
		Crop name	Code (see code sheet)	Unit code (see code sheet)	Quantity	Condition/state code (see code sheet)	Factor to convert to kg*	Quantity	Condition/state code	Tshs	% This village	% Nearby	% District centre	% Outside the district		Quantity
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	1															
	2															
	3															
	4															
	5															
	6															
	7															
	8															
	9															
	10															

* To be filled in after interview

Section 6B: Livestock Enterprise

Section 6B1: Cattle

1. Has any member of your household raised or owned cattle during the **last 12 months**? *I = YES*

2= NO (>> Sec 6B2)

[illegible]

Section 6B2: Small Animals

1. Has any member of your household raised or owned small animals during the **last 6 months**?

1= YES

2= NO (>> PART 6B3)

[illegible]

Section 6B3: Poultry and Others

1. Has any member of your household raised or owned poultry, bees or other domesticated birds during the **last 3 months**? *1= YES*

2= NO (>>SECTION 6B4)

Type of livestock	Livestock code	During the last 3 months , has any member of your household raised or owned any [...]? 1= Yes 2= No (>> NEXT ANIMAL)	How many of [...] are owned by your household now? (present at your farm or away from your farm) <i>IF ZERO, GO TO 8</i>	How many did you own 3 months ago (present at or away from your farm)?	If you would sell one of the [...] today, how much would you receive from the sale? Tshs
2	3	4	5	6	7
Local chicken	13				
Layers (exotic)	14				
Broilers (exotic)	15				
Turkeys	16				
Ducks	17				
Geese	18				
Rabbits	19				
Dogs	20				
Beehives	21				

Section 6F: Access to Credit in the Last 12 Months**Section 6F1: Loans**

Source of Credit	Code	Have you or any other members of your household applied to [...] for a loan during the last 12 months ?	Why did neither you nor any other member of your household apply to this source?	Was a loan received from this source?
1	2	3	4	5
Formal financial institutions (banks and other government agencies subject to central monetary authority regulation)	101			
“Semiformal institutions” such as microfinance institutions, cooperatives, non- governmental organizations, etc.	102			
Informal source such as friends and relatives, local money lenders, shop keepers, landlord/employers, village level associations (rotating savings), etc.	103			

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Section 6F2: Borrowing Capacity

Name of borrowing source	Code	If they wanted to, could the head or his/her spouse borrow money from [SOURCE]? 1= Yes 2= No (>> NEXT SECTION)		If column 3 = 1 or column 4 = 1: What is the maximum amount the head or his/her spouse could borrow from [SOURCE]? (Tshs)	
		Head	Spouse	Head If column 3 = 1	Spouse If column 4 = 1
1	2	3	4	5	6
Friends / relatives	201				
Private money lender	202				
Landlord	203				
Employer	204				
Bank	205				
Microfinance institutions	206				
Input trader / shop keeper (credit for goods or services)	207				
Others (specify)	208				

SECTION 7: ACCESS TO ENERGY

Now we would like to know what type of fuels are used by the household.

7A1: What is the main fuel, second and third fuels the household uses for **lighting, cooking, heating water and ironing?** (If household does not have a third fuel, write 0)

End-use	What is the main fuel, second and third fuels the household uses for lighting, cooking, water heating and ironing? <i>Electricity [1] Candles [2] Kerosene (paraffin) [3] Gas [4] Wood [5] Dung/crop residues [6] Coal [7] Charcoal [8] Solar [9] Other (specify).....</i>		
	Main fuel	Second fuel	Third fuel
A. Lighting			
B. Cooking			
C. Water heating			
D. Ironing			

7A2: What are the most important reasons the household uses this as the main fuel for **lighting and cooking?** (Put the code in the 1st column in the box, which most closely reflects the respondent's first answer. If there is more than one response do the same for the 2nd and 3rd choices).

A. LIGHTING				B. COOKING			
Reasons	1 st	2 nd	3 rd	Reasons	1 st	2 nd	3 rd
Affordable/cheap [1]				Affordable/cheap [1]			
Easily available [2]				Easily available [2]			
Bright light [3]				Bright light [3]			
Easy to use [4]				Easy to use [4]			
Safe [5]				Safe [5]			
Other (specify				Other (specify			

7A3: If you had a choice and all fuels were available in your area, which fuels would the household like to use most for **lighting, cooking, heating** and **ironing?** What are the reasons?

End-use	Which fuel would the household like to use most if it had a choice? <i>Electricity [1] Candles [2] Kerosene (paraffin) [3] Gas [4] Wood [5] Dung/crop residues [6] Coal [7] Charcoal [8] Solar [9] Other (specify).....</i>	If the fuel of your choice is not used regularly, what are the reason(s) for this? <i>Too expensive to use [1] Fuel/electricity not available in the area [2] Have no electricity connection [3] Don't have appliances [4] Other (specify).....</i>
A. Lighting		
B. Cooking		
C. Heating		
D. Ironing		

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7A4: Is your area electrified? <i>1 = Yes; 2 = No</i>	7A5: Does the household have an electricity connection? <i>1 = Yes; 2 = No</i> <i>If yes, >> 7A7 (Column 4)</i>	7A6: If no, why not? <i>1 = Connection fee/deposit is too expensive; 2 = Monthly bills for electricity are too expensive; 3 = Connection fee/deposit and monthly bills are too expensive; 4 = Household can't afford electrical appliances; 5 = Household does not like electricity; 6 = Other (specify)</i>	7A7: Average amount of money paid per month <i>Tshs</i>
1	2	3	6

7B6: How often does your household use charcoal? <i>1 = Every day; 2 = 3 to 4 times per week; 3 = 2 times per week; 4 = Once per week; 5 = 3 times per month; 6 = 2 times per month; 7 = Once per month; 8 = Less often/irregularly; 9 = During power failures; 10 = When no electricity units; 11 = Other (specify)</i>	7B7: Does the household make charcoal or buy or do both? <i>1 = Make charcoal; 2 = Buy charcoal; 3 = Make and buy charcoal</i> <i>If they do not make, but buy charcoal, >>7B11</i> <i>If they make charcoal >> 7B8</i>	7B8: How often does the household make charcoal? <i>1 = Once per week; 2 = Once a month; 3 = Two times per month; 4 = Other (specify)</i>	7B9: How much charcoal does your household usually make at one time? <i>1 = Three bags (include weight in kg); 2 = Five bags (include weight in kg); 3 = Other (specify)</i>	7B10: How long does this charcoal last? <i>1 = Less than 1 week; 2 = 1 week; 3 = 2 weeks; 4 = 1 month; 5 = Other (specify)</i>	7B11: How often does the household buy charcoal? <i>1 = Every day; 2 = 3 to 4 times per week; 3 = 2 times per week; 4 = Once per week; 5 = 3 times per month; 6 = 2 times per month; 7 = Once per month; 8 = Less often/irregularly; 9 = During power failures; 10 = When no electricity units; 10 = Other (specify)</i>
6	7	8	9	10	11

7B12: How much charcoal is generally bought at one time? (<i>number of sacks and weight in kg</i>)	7B13: How much does the household pay for this charcoal? (<i>Tshs</i>)	7B14: How much does your household spend on charcoal per month?	7B15: Does your household sell charcoal? <i>1 = Yes; 2 = No</i> <i>If no >> 7B22. If yes >> 7B16</i>	7B15: How much charcoal does your household sell per month? (<i>Quantity and weight (kilogram)</i>)	7B15: How much income does the household get per month from selling charcoal? (<i>Tshs</i>)
12	13	14	15	16	17

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7B22: Does the household use any firewood at any time of the year? 1 = Yes; 2 = No. *If no, >> 7B35*

7B23: *If yes*, what are the main things your household does with firewood? *Indicate Yes [1] or No [2]*

Cooking		Ironing		Heating water for ceremonies	
Heating the home		Baking		Other (specify)	
Brewing beer		Heat water			

7B24: How often does your household use firewood? <i>1 = Every day; 2 = 3 to 4 times per week; 3 = 2 times per week; 4 = once per week; 5 = 3 times per month; 6 = 2 times per month; 7 = once per month; 8 = less often/irregularly; 9 = during power failures; 10 = when no electricity units; 11 = Other (specify)</i>	7B25: Does the household collect firewood or buy or do both? <i>1 = Collect firewood; 2 = Buy firewood; 3 = Collect and buy firewood</i> <i>If buys firewood >> 7B30</i> <i>If collects firewood >> 7B26</i>	7B26: How often does the household collect firewood? <i>1 = Every day; 2 = Every second day; 3 = Once a week; 4 = Other (specify)</i>	7B27: How much firewood does the household generally collect at one time? <i>1 = One head load collected by one person; 2 = Two head loads collected by two people; 3 = One truck load; 4 = One cart load; 5 = Other (specify)</i>	7B28: How long does this firewood last? <i>1 = Less than one week; 2 = 1 week; 3 = 2 weeks; 4 = 1 month; 5 = Other (specify)</i>	7B29: Who in the household usually collects firewood? <i>1 = Women; 2 = Men; 3 = Female children; 4 = Male children; 5 = Other (specify)</i>
24	25	26	27	28	29

7B30: How often does your household buy firewood? <i>1 = Every day; 2 = 3 to 4 times per week; 3 = 2 times per week; 4 = once per week; 5 = 3 times per month; 6 = 2 times per month; 7 = once per month; 8 = less often/irregularly; 9 = during power failures; 10 = when no electricity units; 11 = Other (specify)</i>	7B31: How much firewood does your household generally buy at one time?	7B32: How long does this firewood last? <i>1 = Less than one week; 2 = 1 week; 3 = 2 weeks; 4 = 1 month; 5 = Other (specify)</i>	7B33: How much does the household pay for this firewood? <i>(Tshs)</i>	7B34: How much does your household spend on firewood per month? <i>(Tshs)</i>
30	31	32	33	34