

**THE CONTRIBUTION OF SPECIAL PROGRAM ON  
FOOD SECURITY IN KILOSA DISTRICT, TANZANIA**

**BY**

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE  
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**ABSTRACT**

The purpose of this study was to investigate the contribution of Special Program for Food Security (SPFS) introduced by Food and Agricultural Organization (FAO) from 1996 and launched in Tanzania 1998. SPFS aimed at increasing food security at household level through agriculture modernization. However, the contribution of the programme on household food security was not determined in recent years. Hence this study sought to; analyze community perception and attitude towards the program relevance to food security, the extent of farmer's participation in SPFS and to assess household food security status before and after SPFS. Questionnaires with close and open ended questions were administered to 120 respondents selected randomly from three villages namely Chanzulu, Kilangali and Msolwa. A cross-sectional research design was adopted while purposive sampling technique was used to select the region and the districts. Simple random sampling procedure was used to select wards, villages and heads of households. The quantitative data were analyzed using the SPSS computer software while qualitative analysis was analyzed by functional content analysis. The study found changes in food security before and after the program which attributed to the project and other factor like house hold size. Also it found positive attitude and perception towards challenges identified include; increasing of rice yield before and after the programme at significant level at 0.05 and number of months with food shortage has been reduced from 4 months to 2 months.

**DECLARATION**

I, Tatu Said Msuya do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work and that it has neither been submitted nor being concurrently submitted for degree award in any other institution.

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## **DEDICATION**

First and foremost this work is dedicated to my Almighty God who led the way throughout my studies Secondly to my parents Said Ali Msuya and my mother Nuru Saidi Lolila for laying down the foundation of my education and strong encouragement throughout my academic endeavor.

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**LIST OF ACRONYMS**

ARRS	-	Africa Region Rural Strategy
DALDO	-	District Agriculture and Livestock Development Officer
FAMOGATA	-	Fanya Morogoro Ghala la Taifa
FANR	-	Food and Agriculture and Natural Resources Division
FAO	-	Food and Agriculture Organization
FGD	-	Focus Group Discussion
FFS	-	Farmer Field School
HFS	-	Household Food Security
IFAD	-	International Food for Agriculture Development
LIFDCs	-	Low Income Food Deficit Countries
MAFSC	-	Ministry of Agriculture Food Security and Cooperatives
MDGs	-	Millennium Development Goals
NAFCO	-	National Agriculture and Food Cooperation
NAP	-	National Agriculture Policy.
NARCO	-	National Ranching Company
NEPAD	-	New Partnership for African's Development
NGO's	-	Non Governmental Organization
NMC	-	National Milling Cooperation
PEM	-	Protein Energy Malnutrition
SADC	-	Southern Africa Development Community
SPFS	-	Special Program for Food Security

SPSS	-	Statistical Package for Social Science
SSA	-	Sub-Saharan Africa
TDV	-	Tanzania Development Vision
TIP	-	Traditional Irrigation Programme
UNICEF	-	United Nation Children Fund
URT	-	United Republic of Tanzania
LPA	-	Lagos Plan of Action

## **CHAPTER ONE**

### **1.0 INTRODUCTION**

#### **1.1. Background**

Hunger and poverty are major threat to many people particularly in Sub-Saharan Africa. Over 300 million Africans live on less than one US dollar a day (World Food Summit, 2005). More than a quarter of the population of Africa, about 200 million people are chronically hungry, 30 million require emergency food and agricultural assistance in any one year and in 2003 about 14 million people were on the brink of starvation in the Southern Africa Development Community (SADC) alone( FAO, 2004). It is expected that the number of undernourished people in Sub-Saharan Africa will increase from 180 million in 1995–97 to 184 million in 2015 (WFP, 2005). This stands in sharp contrast to the Millennium Development Goal of halving out hunger and poverty by 2015.

The nature of food insecurity in Tanzania, it can be summarized as follows: 6.3 Million people experience protein energy malnutrition (PEM) of which 700,000 people are severely deficient. 2.7 Million People experience nutritional anemia of which 1.6 million severely affected child malnutrition (3.1% of children under five years). Food insecurity is high among vulnerable people particularly lactating mothers, pregnant women, children and low income groups in rural and peril urban areas.

The major causes of food insecurity in Tanzania as indicated in the Tanzania Development Vision includes poor technology, crop and animal husbandry



(rudimentary farm implements, weak research, and extension services), continued dependence on rain-fed agriculture, poor marketing system, poor institutional arrangements, poor frequent changes, poor flow of information, and availability of inputs and many policies which are made by diverse and uncoordinated units.

Other problems include high post harvest losses, inadequate food supply, insufficient food crisis management, inadequate financial and rural credit services and high environmental degradation which result to water shortage, land degradation, soil erosion, water erosion, seasonal salinity, deforestation, drought and flood hazards (URT, 2007).

Several solutions to address food insecurity include increasing agricultural production through technology improvement, provision of micro credits to farmers and diversification to farm enterprises. Also improve consumption and utilization of food through appropriate food preparation methods and eating nutritious food such as food rich in vitamins e.g. Vitamin A, minerals like iodine, iron and many others. Prevention and treatment of disease such as Malaria, HIV/AIDS, de-worming and to reduce women's work load Government intervention to alleviate food insecurity is enhancing agricultural production and as away of generating more income. Tanzania is committed to implement the world food summit plan of action contained in the 1996 Rome Declaration on world food security and the Millennium Development goals (MDGs) as internationally agreed targets for halving poverty, malnutrition and hunger by year 2015. Similarly, Tanzania is committed to implement the Africa Agricultural Program (AAP), under the new partnership for African's Development

(NEPAD) initiative of 2002. The AAP has five pillars of which one is increasing food supply and reducing hunger (UN, 2005).

At the regional level, Tanzania is working with the Southern Africa Development Community (SADC) to achieve food security. SADC through its food and Agriculture and Natural resources Division (FANR) are coordinating efforts towards food security and are working with partner countries to promote national, household and individual food security. Tanzania has rectified international conventions and commitment geared towards addressing food security issues. Tanzania is a signatory to the International Covenant on Economic Social and Cultural Rights (ICESCR) which recognizes the right of every one to adequate standard of living.

Two high-profile agricultural production/food security initiatives are currently underway in Africa. FAO Special Program for Food Security (SPFS) and the World Bank's Africa Region Rural Strategy (ARRS). Another noteworthy initiative is the Sasakawa-Global 2000 Food Production Initiative, has been helping farmers to raise food production since 1986. FAO developed a program of special support for agriculture, known as SPFS in 1996. In Tanzania, SPFS was implemented in three district Councils, namely Korogwe, Iringa Rural, and Kilosa District Councils. The major objectives of SPFS in Tanzania context are to help low income farmers to increase food production and productivity on a sustainable basis, reduce annual fluctuations in food supply, and improve access to food. Also, it seeks to generate rural income and employment, reduce poverty, and enhance social and gender equality. SPFS has four key components: (1) water/moisture management and

irrigation; (2) crop intensification and productivity increases through the development of a technology package providing improved seeds, fertilizers, and plant protection, combined with extension and farm management advice; (3) diversification of the range of products to reduce ecological, market, food supply, and nutrition risks; and (4) policy and institution creation to improve incentives for and access to agricultural services, infrastructure, and knowledge. The program focuses initially on high-potential areas and employs the farmer field school extension model, with outreach demonstrating the effect of innovations to interested farmers through farmers' groups. SPFS has moved attention back to agriculture and its role in enhancing food and nutrition security, as well as to poverty reduction in rural areas.

SPFS program in Kilosa District Council was launched in 1998 at Kilangali, Chanzuru and Msolwa villages where they constructed irrigation infrastructure, crop diversification and productivity through development of technological package with extension and farm management advice in providing improved seeds, fertilizer and plant protection. They also opted for crop diversification of range of products such as: pigs, chicken and fisheries. However the contribution of this program to household food security in Kilosa District is yet to be documented. It was expected that the food insecurity problem in Kilosa District will be solved but transitory food insecurity is still persisting in the district (DED-Kilosa, 2008).

## 1.2. Problem Statement

Reduction of food insecurity has been one of major objectives of the Tanzania Government since independence. There have been a number of mass mobilization campaigns addressing food insecurity such as; *Kilimo cha kufa na kupona of 1971* (“Agriculture as a matter of life and death”) (Chemponda, 1986). *Siasa ni kilimo of 1972* (“Politics is agriculture”). In Arusha declaration 1967, 45 million Tanzania shillings were spent on agriculture development. By 1977 the Government was spending approximately TShs 400 million annually; in addition the Government subsidized the purchase of fertilizer by offering credits to ujamaa villages and cooperatives through rural development bank. *Chakula ni uhai of 1972* (“Food is life”), *Operesheni Vijiji in 1972* (“Villagelization”) and *Kilimo cha kiangazi of 1974* (“Dry season agriculture”). These campaigns were highly successful as the country was able to increase crop production. Unfortunately, such programs as they were highly popularized their implementation was most ad-hoc and short term and hence they were unsustainable. Hence the government had to look for other options including the National Agricultural Policy (NAP) of 1983.

One of the objective of the NAP was to achieve national food self sufficient and raise standards of living. Subsequently, in 1984, government developed a National Food Strategy (NFS) with the objectives of raising the living standards and livelihood of the people. This was implemented mainly through parastatals such as National Agriculture and Food Corporation (NAFCO), National Ranching Company (NARCO) and National Milling Corporation (NMC). Although these approaches contributed to increase production, they concentrated mainly in ensuring food self

sufficiency and less emphasizes on accessibility and utilization. To address those weaknesses, FAO developed a Special Programme for Food Security Support (SPFS), with emphasize on production, accessibility and utilization of food.

SPFS implemented in Districts Councils of Korogwe and Iringa Rural in 1996 before launched in Kilosa District council at Kilangali, Chanzuru and Msolwa villages in 1998. They constructed irrigation infrastructure, crop intensification and productivity through development of technological packages with extension and farm management services aimed at reducing household food insecurity. There is so far little information on the progress of the program. Therefore the study seeks to investigate the contribution of the SPFS program to individual household food security in Kilosa District Council.

### **1.3. Justification and Application of Results**

The study aims to reveal the contribution of SPFS program to household food security while SPFS was established to increase production and productivity, accessibility and utilization of food. Its contribution to food security at household level is yet to be established. Hence this study intends to determine the contribution of SPFS using Kilosa Districts Council as a case study. The study is in line with the National Strategy for Growth and Reduction of Poverty (NSGRP, 2007) which lay emphasis on agricultural productivity and food security by 2010. Also Millennium Development Goal (MDG) addresses the problem of hunger and extreme poverty to be reduced by 2015. (MDG number one and number seven) (URT, 2007). The study is also in line with National strategies and the program called “FAMOGATA”

meaning “*Fanya Morogoro Kuwa Ghala la Taifa*” that is Morogoro region to became National reserve for food therefore, Kilosa district will take advantage for utilizing available resources provided by SPFS. Findings from this study will be useful for SPFS facilitators to improve the performance in future, such as expansion of SPFS in Kilosa and elsewhere in Tanzania.

#### **1.4. Objectives**

##### **1.4.1. General objective**

The general objective of the study was to determine the contributions of SPFS on household food security in Kilosa District.

##### **1.4.2. Specific objectives**

- i. To analyze community perception of household food security
- ii. To analyze community attitude towards SPFS relevance to food security
- iii. To assess the extent of farmer’s participation in SPFS activities.
- iv. To assess household food security status for community before and after SPFS.

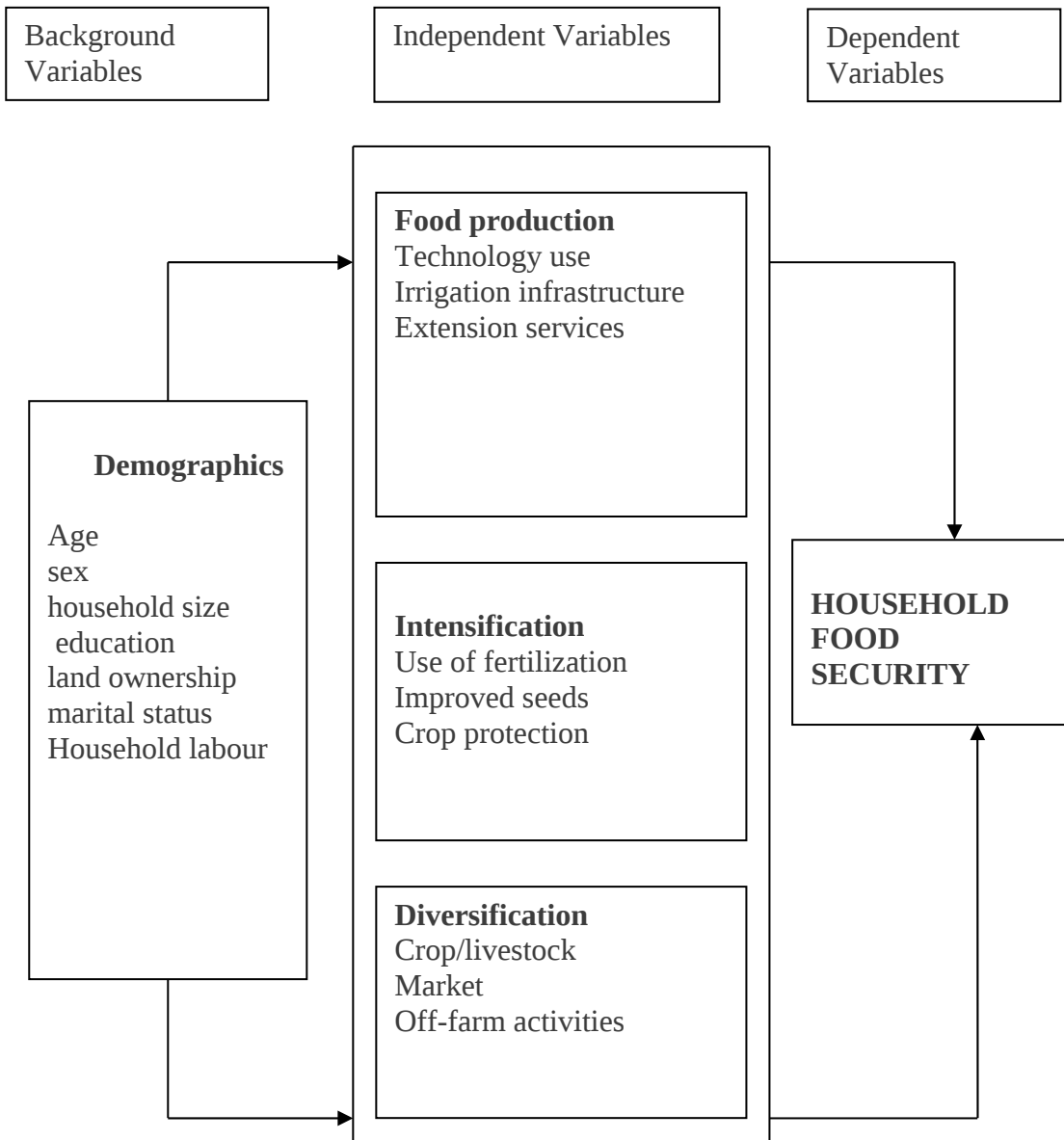
#### **1.5. Conceptual Framework**

This study defines food security as access for all time to enough food to lead to an active health life (World bank, 1986). This study uses a conceptual frame work that includes three components of “food security” – availability that is a (measure of food that is and will be physically capable in the relevant vicinity of population during a give time); accessibility (a measure of population ability to acquire available ability to acquire available food during a given time), vulnerability a

measure of population or household or individuals risk of exposure to different types of shocks and the ability to cope with them and food utilization the entry point of this analysis is the household and individuals within the household. A household can be food secure if can reliably gain access to food in sufficient quantity and quality for all household members to enjoy a healthy and active life (Gillespie and Haddad, 2001; Stamoulisang, 2003).

Accessibility in this study refers to entitlement to production, exchange and utilization of food to all members of the household. Access can be analyzed using various indicators including land ownership and inheritance systems, food utilization, use of technology, crop diversity ,food sheering and exchange dynamics.

Vulnerability in this study refers to what is defined by Chambers (1989), as an exposure to contingencies and stress; and difficulty in coping with them is an aggregate measure for a given household ability to cope with this these events. Vulnerability this has two sides an external side of risk shocks and tress which individual is victim and internal side which individual can not cope without loss (Chambers, 1989; Maxwell and Frankenberger, 1992).



**Figure 1: Conceptual Framework**



**Table 1: Definition of variables and measurable indicators**

<b>Variables</b>	<b>Operational definition</b>	<b>Measurable indicators</b>
Age	Number of years reached by individual after birth	Age of individual
Sex	Being a man or woman in biological term	1= Male 2= Female
Size of H/H	All people living in the same household	Number of individual in the H/H
Education	Level of education in all members in the household	Years of education
Land ownership	Land tenure of H/H	1. Inherited 2. Rented 3. Village government 4. Purchased
Food intake	Food eaten by individual households	Number of meals taken per day
Type of food consumed	Range of food accessible in each household	Number of food type
Food storage	Food kept for future use	Quantity of food stored (number of bags / kg / tones stored)
Food production	Food produced per household per year	Quantity of food in bags or kgs
Technology	Any new innovation	Use of fertilizer and or improved seeds
Off-farm activities	Other non agric income generating activities	Present of OFA

## **CHAPTER TWO**

### **2.0. LITERATURE REVIEW**

#### **2.1. Overview**

This chapter reviews findings from other studies in order to provide a theoretical framework on which data analysis on the study will be based. The chapter is divided into six sections. The First section presents an overview of the chapter. Section two includes definition of key concept. Section three focuses on evolution of the concept of household food security. Section four presents pillars of household food security. Section five shows the review of impact studies on food security in the world, in Africa and in Tanzania and section six analyze policy context of the study.

#### **2.2. Definition of key Concepts**

##### **2.2.1. Food security**

Food security is generally defined as the condition to which all people at all times have enough food for a healthy and productive life. Food security involves three components. Food availability, food access, and utilization; Food availability implies sufficient production or imports to meet the food needs of the population. Food access refers to the ability of people to obtain food either through their own production or by purchasing it with money earned from other activities. Food utilization means that the nutrient intake associated with food consumption which is not impeded by inadequate nutritional information, poor sanitation or problems in intra-household distribution (Haddad, 1997) as cited by (Amani, 2006).

FAO (2004) defines food security as 'exists when all people, at all times have physical, economic and social access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and health life. Issues of food security are multidimensional. On the one hand, such issues cut across socio-economic, political and cultural spheres of life while on the other, they are influenced and indeed, do influence policy and legal frameworks.

### **2.3. The Evolution of the Concept of Food Security**

The roots of concern with food security is traced back to the World food crisis of 1972 – 74; and beyond that at least to the universal Declaration of Human rights in 1948, which recognized the right to food as a core element to an adequate standard of living (UN, 1948). Interest in food security, mostly mushroomed in 1980s, the period which is attributed to three contemporary factors: the contribution of the African famine of 1984 – 85; a concern with deteriorating basic needs during structural adjustment and the fruits of an intellectual progression which stretch from multi sect oral nutrition planning in the 1970s, through entitlement theory in the early 1980s to household food security (Maxwell and Frankenberger, 1992).

In the past several years, much conceptual progress has been made in our understanding of the processes that lead to food insecure situations for households (Frankenberger, 1992). In the 1970's food security was mostly concerned with national and global food supplies. The food crisis in Africa in the early 1970's stimulated a major concern on the part of the international donor community regarding supply shortfalls created by production failures due to drought and desert

encroachment (Davies *et al* 1991). This primary focus on food supplies as the major cause of food insecurity was given credence at the 1974 World Food Conference. The limitations of the food supply focus came to light during the food crisis that again plagued Africa in the mid-1980. It became clear that adequate food availability at the national level did not automatically translate into food security at the individual and household levels. Researchers and development practitioners realized that food insecurity occurred in situations where food was available but not accessible because of an erosion to people's entitlement to food (Borton and Shoham, 1991). Sen.'s (1981) theory on food entitlement had a considerable influence in this change in thinking, representing a paradigm shift in the way that famines were conceptualized. Food entitlements of households derive from their own production, income, gathering of wild foods, community support (claims), assets, migration etc.

Thus a number of socio-economic variables have an influence on a household's access to food. In addition, worsening food insecurity was viewed as an evolving process where the victims were not passive to its effects. Social anthropologists observed that vulnerable populations exhibited a sequence of responses to economic stress, giving recognition to the importance of behavioral responses and coping mechanisms in food crisis (Frankenberger, 1992). By the late 1980's donor organizations, local governments and NGOs began to incorporate socio-economic information in their diagnosis of food insecurity. The household food security approach that evolved in the late 1980's emphasized both the availability and stable access to food. Thus, food availability at the national and regional level and stable

and sustainable access at the local level were both considered essential to household food security. Interest was centered on understanding food systems, production systems, and other factors that influence the composition of food supply and a household's access to that supply over time. What was not clear was how nutritional outcomes were factored into food security deliberations (Nyangito 2004).

Work on the causes of malnutrition demonstrated that food is only one factor in the malnutrition equation, and that in addition to dietary intake and diversity, health and disease, and maternal and child care are also important determinants (UNICEF, 1990). Household food security is a necessary but not sufficient condition for nutritional security. Researchers found that there were two main processes that have a bearing on nutritional security. The first determines access to resources for food for different households. This is the path from production or income to food. The second process involves the extent to which the food obtained is subsequently translated into satisfactory nutritional levels (World Bank, 1989). A host of health, environmental, and cultural/behavioral factors determine the nutritional benefits of the food consumed; this is the path from food to nutrition (IFAD, 1993).

This work on nutritional security demonstrated that growth faltering cannot necessarily be directly related to a failure in household food security. It shifted the emphasis away from simple assumptions concerned with household access to food, resource base, and food systems, by demonstrating the influence of health and disease, "caring" capacity, environmental sanitation, and the quality and composition of dietary intake on nutritional outcomes (Martine 2004).

Research work carried out in the late 1980's and early 1990 have indicated that the focus on food and nutritional security as they were currently conceived needed to be broadened. It was found that food security is but one sub-set of objectives of poor households; food is only one of a whole range of factors which determined why the poor take decisions and spread risk, and how they finely balanced competing interests in order to subsist in the short and longer term (Maxwell and Smith, 1992). People may choose to go hungry to preserve their assets and future livelihoods. It is misleading to treat food security as a fundamental need, independent of wider livelihood considerations. Thus, the evolution of the concepts and issues related to household food and nutritional security led to the development of the concept of household livelihood security. The household livelihood security model allows for a broader and more comprehensive understanding of the relationships between the political economy of poverty, malnutrition, and dynamic and complex strategies that the poor use to negotiate survival. The model places particular emphasis on household actions, perceptions and choices; food is understood to be only one of the priorities that people pursue. People are constantly being required to balance food procurement against the satisfaction of other basic material and non-material needs (Maxwell and Frankenberger, 1992).

The objective of food security as it has been defined earlier is to ensure that all people at all times have physical, social and economic access to the basic food they need. This can be expressed in three specific goals: adequacy of food supplies; stability in food supplies and security of access to supplies. To ensure steady level of food security in a country, or region, or village or for specific households and

individuals, aggregation of efforts of different levels as well as sectoral policies and entitlements among the citizens has to be well organized and addressed.

## **2.4. Pillars of Household Food Security**

### **2.4.1. Food availability**

Food availability is determined by level of food supplies, composed of subsistence production, and marketed supplies stemming from domestic production, food stocks and food imports. In subsistence societies, food availability would be equal to food in stock plus what can be directly obtained from the fields and garden as well as from collection of wild foods. In more market-oriented societies, the situation is more complex whereby agricultural produce can be sold and cash income be used to purchase food available in the market (FAO 2004).

### **2.4.2. Food accessibility**

Access to food involves the physical, economical and social aspects; it is the result of the ability to express food needs (beyond subsistence production) as effective demand. Access to food concerns the processes through which people reach the food. Physical access to food is related to both the adequacy of supply and the efficiency of supply and the efficiency of the distribution systems involving storage processing, preservation, transport and marketing. (Hubbard, 1995) argued that conditions as physical, social and economic accessibility are important. Therefore factors related to food production such as availability of land, access to credit availability of qualified labor force and agricultural practices affect food security situation. Likewise factors that affect stability of food available like storage conditions and

processing, social sustainability and sustainable environment can play important role in food security. Household food security, the concept of household food security (HFS) for rural households in developing countries encompasses all factors affecting a household's access to an adequate year round supply food. Thus it is concern not just with household production of food crops but also the availability of income to households with which to purchase food where this is necessary in examining household it's therefore important for identify their both role in both providing gathered food that contribute to food self sufficiency and marketable products that could supplement income needed to purchase food. In doing so, it is also necessary to consider whether and if so how income generating activities based on forest products affect other aspects of household's capacity to contribute to its food self sufficient traditional always forest products. Non wood forest products have played a major role in household economy of people living in or forested areas (FAO, 1995).

#### **2.4.3. Food stability**

Food stability refers to variation and the risk of short falls in food production supplies and or demand over time. In food stability; concern are income distribution, effective market and various public and informal support and safety nets. A society can be said to enjoy food security if it has that will enable it to sustain the food norm in the face of crises threatening to lower the achieved level of food consumption. Availability of qualified labor force and agricultural practices affect food security situation (FAO 2004).



#### **2.4.4. Food utilization**

Food utilization refers to the use of nutrients in the body for better nutrition and health. The incidence of malnutrition in a society is an outcome of inadequate consumption and / or utilization of food. Food utilization is also a function of dietary habits, food preferences and cultural norms, which define what is considered as food. Work on the causes of malnutrition demonstrated that food is only one factor in the malnutrition equation, and that in addition to dietary intake and diversity, health and disease, and maternal and child care are also important determinants (UNICEF, 1999).

### **2.5. Review of Studies on Food Security**

#### **2.5.1. Food security in the world**

Rich countries have little to fear from hunger is the simple consequences of Engel's Law that "Consumers have a substantial buffer of non food expenditure to rely on even if food prices rise sharply", In market economy the rich do not starve. Without the buffer of Engel's Law, consumers in poor countries are exposed to continuing hunger and vulnerability to shocks that set off famines (Timmer *at.al.* 2004). Despite the World Food Summit Conference in 1974 and the second one in 1996 that pledged 'no child would go to bed hungry by 1985' the failure to place food security in a framework is an issue to debate. Also, Global community's pledge to reach Millennium Development Goals by 2015 which place an end to hunger seems to be unachievable. (UN. 2005).

### **2.5.2. Food security in Africa**

Numerous strategies, policies and programs intended to assist Africa's development have been instituted. AFPLAN and LPA both gave highest priority to the development of the agricultural and food sectors. Their goal was to substantially increase food self-sufficiency by the end of the 20<sup>th</sup> century and, since this sector was at the root of the social and economic development of most African countries, to provide the impetus for their development. AFPLAN and LPA were based on a critical assessment of the African food situation in the 1960s and 1970s, which showed that Africa was the only continent in the world where per capita food production had declined over those two decades. This analysis also showed that the most important characteristics of the food situation were the gap between the increase in food production and the growth in population. Food production increased at 2.3 percent per year in 1960s, yet increased at only 1.5 percent per year in the 1970s. At the same time, population growth accelerated from 2.5 percent per year in the 1960s to 2.8 percent per year in the following decade. As a consequence, food production per capita declined by 7 percent in the 1960s, and fell by 15 percent in the 1970s.

A decline in income, which is the major factor determining food demand, exacerbated the drop in food production, leading to an increased global deficit during this period. To close this food deficit, the region had to double its food imports between 1975 and 1980; the average ratio of food self-sufficiency of the continent, which had been estimated at 98 percent in the 1960s dropped to 86 percent in 1980.

This meant that the region was importing 14 percent of the food it was consuming in 1980. This meant that the region was importing 14 percent of the food it was consuming in 1980, compared to 2 percent in the 1960s. (Achi et.al. 2004).

Furthermore, fluctuations in food production were large and frequent in many regions of the continent. Chronic malnutrition and famine persisted among marginal groups, including the urban poor, nomads, peasant in marginal areas and farmers without land who, for various reasons, were not able to obtain food in sufficient quantities (Hezron 2004). Food and nutrition security were addressed only indirectly in these programs through they aimed at improving economic stability and higher economic growth.

### **2.5.3. Tanzania**

At the state of Arusha declaration in 1967, 45 million Tanzanian shillings were spent on agricultural development. By 1977 the Government was spending approximately Tshs 400 million annually. In addition, the Government subsidized the purchase of fertilizers by offering credits to ujamaa villages and cooperatives through rural development bank. *The Chakula ni Uhai of 1972* (“Food is life”), *Operesheni Vijijini in 1972* (“Villagelization”) and “*Kilimo cha Kiangazi of 1974* (“Dry season agriculture”) campaigns were highly successful as the country was able to increase crop production Although such programs were highly popularized, their implementation was most ad-hoc and short term and hence they were unsustainable. Due to this, the government had to look for other options including the National Agricultural Policy (NAP) of 1983. One of the objective of the NAP was to achieve

national food self sufficient and raise standards of living. Subsequently, in 1984, government developed a National Food Strategy (NFS) with the objectives of raising living standards and livelihood of the people. This was implemented mainly through parastatals such as National Agriculture and Food Corporation (NAFCO), National Ranching Company (NARCO) and National Milling Corporation (NMC). Although these approaches contributed to increase production, they concentrated mainly in ensuring food self sufficiency and less on accessibility and utilization. Recent agricultural production trends shows the structure of crop production in Tanzania more than of half total harvested land area is allocated to cereals of which maize is country dominant staple food. Tanzania is net importer of cereals. Maize yield is typical low (0.88 tones per hectare) because small farmers rely on traditional technology and produce mainly for subsistence (MINAG 2004). And barriers to import substitution for major food crops are among the more binding constraints to reducing poverty and improving nutrition in Tanzania.

## **2.6. Policy Context of the Study**

### ***Agriculture and livestock policy***

The ultimate goal of agriculture and livestock policy is the improvement of the well being of the people whose principal occupation and way of life is based on agriculture (URT, 1997). In Tanzania more than 80% of people live in rural areas. The majority are low income groups, such as small scale farmers and pastoralists. Most of these people are unable to produce enough food to meet their daily requirements. At the same time they can not afford to buy enough food to supplement their needs. The reason behind this unfortunate situation is because they

lack and /or get inadequate farming inputs such as extension services, access to technology, land, storage facilities and credit to increase their agricultural productivity hence food insecurity. In response to this, the Tanzania's 1997 Agriculture and Livestock Policy have included objectives, which support the promotion of national food security. These include: To assure food security for the nation, including improvement of national standards of nutrition, to develop and introduce new technologies for land and labor productivity, to develop human resources, provide support services and to promote access of women and youth to land, credit, education and information (URT, 2000).

However the statistics from URT (2003) show that, agriculture which accounts for about 50% of the National Income, 75% of merchandised exports and a reliable source of livelihood for about 50% of the Tanzanians, its performance is relatively poor. Most of the agricultural activities are performed with rudimentary and low level of technology leading to low yields and low labour and land productivity which automatically leads to food insecurity to many poor families because of low production.

Given the above situation, the agriculture and livestock policy aim at encouraging access to means of production such as land, credit, improved seeds, water, extension services, inputs and appropriate technology. This policy provides support to food production by small scale farmers and livestock keepers enhances household food security and increase the income of farmers as a household and of an individual (FAO, 2004).

## **CHAPTER THREE**

### **3.0. METHODOLOGY**

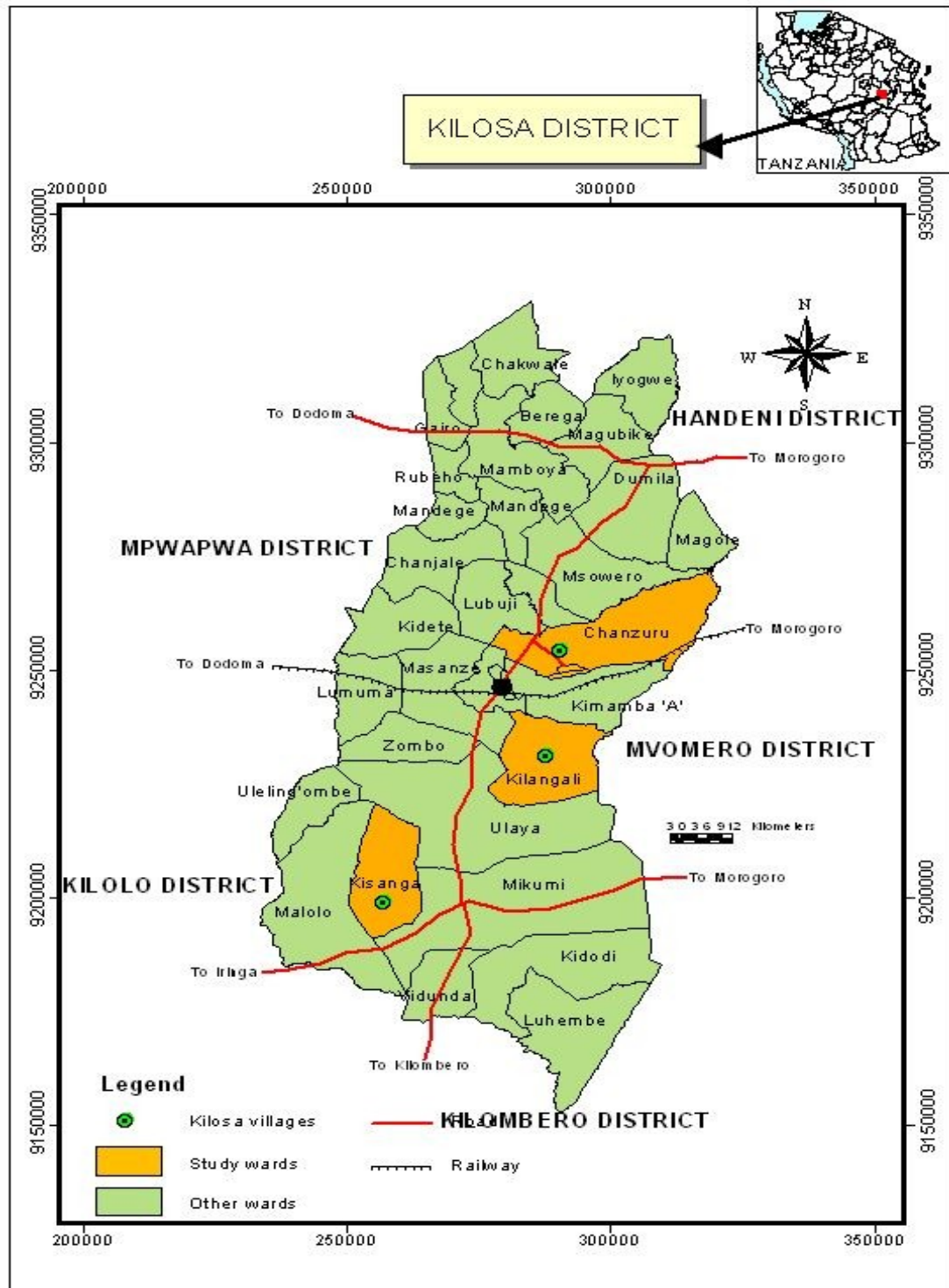
#### **3.1. Overview**

This chapter entails the method of data collection and analysis. The purpose of this chapter is to provide methodological and analytical process used to answer specific objectives given in chapter one. The second section of this chapter describes the study area. In this section the location of study area and agricultural features are described. The succeeding sections presents research phases, sampling strategies and methods of data collection for specific research objectives. Chapter three ends with analytical tools, methods of data analyses focused on specific objectives.

#### **3.2. Description of the Study**

##### **3.2.1. Location of the study**

Kilosa District comprises of five divisions, 37 Wards and 136 villages. The study was conducted in 3 divisions: Kimamba, Mikumi and Masanze respectively in Chanzuru, Msolwa, and Kilangali villages. The district covers an area of 14,245 square kilometers. It is located in east central of Tanzania bounded by latitude  $5^{\circ}55'$  and  $7^{\circ}53'$  south and longitude  $36^{\circ}30'$  and  $37^{\circ}30'$  east. Kilosa share bordered with the following districts Handeni (Tanga) and Kiteto (Arusha) to the North; Mvomero (Morogoro) to the East; and Kilolo to the South and Mpwapwa (Dodoma ) to the West as shown in the Figure 2 below.



**Figure 2: Kilosa district showing the study area**

Source: Digital Map of Tanzania Regional and district Administration Map of Tanzania (Ministry of Land and Settlement)

### **3.2.2. Agricultural features**

Kilosa experience a typical tropical weather condition with a bi-modal rainfall pattern. Short rains start in November to February while long rains commence in March and ends in May. Average rainfall usually ranges between 800mm to 1,000mm. Kilosa District has a potential arable land of 536 590 hectares and about 26 000 hectares are suitable for irrigation but currently 9 410 hectares are under irrigation. There various permanent rivers which can be used for irrigation throughout the year (TIP, 1998).

### **3.2.3. Socio economic and socio cultural**

The main ethnic groups are Kaguru, Sagara, Luguru, Vidunda and Pogoro. Indigenous language is commonly spoken in the village, but Kiswahili the National language is widely understood and spoken by the majority. The main occupation of people of all ages in the area is farming. A few of the people are involved in off-farm activities such as off-season cultivation of maize and vegetables, carpentry and petty trade. Other detailed demographic and socio-economic characteristic are presented and discussed in section 4.2 chapter four.

## **3.3. Research Design and Data Collection Procedures**

This study adopted a cross-sectional design which allows data to be collected at one point at a time (Benard, 1996). In this type of research design, the entire population had equal chance to be selected and data was collected to help answer research objectives. Moreover the design is suitable for descriptive analysis and for determining the relationship between and among variable.

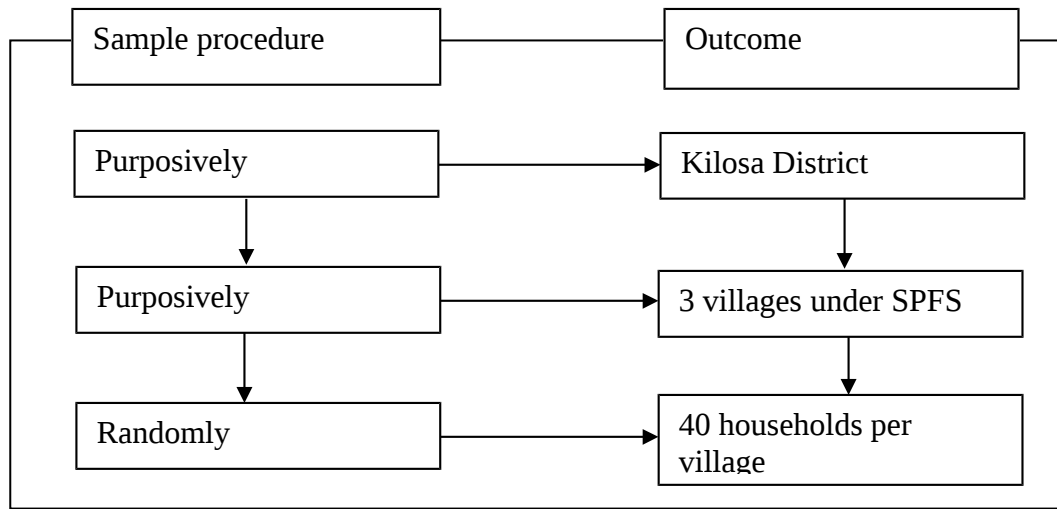


### **3.3.1. Data collection and sampling procedures**

The guiding principles for data collection and eventually data analysis was that of household food security at household level depending on food produced by the household, use of technology and crop diversification to ensure food availability and accessibility.

### **3.3.2. Research Phases**

To capture issues data were collected into two phases. The first phase of data collection was based on reconnaissance survey including introducing the research to village leaders and pre-testing of the questionnaire and FGDs and Key informants. Phase two is about questionnaire survey where data on the contribution of SPFS to household food security was collected. In this case food security status from households were collected and analyses it is important to know that SPSF in Kilosa District is taking place in Central and West zone of Kilosa District. The district was selected as a pilot area since 1998 due to its potentiality. The district is highly potential and famous for paddy production. It is from this reason three villages were selected for data collection. In each study village, two farming systems name basin irrigation and valley bottom is practiced. A total of 120 household were randomly selected for this study. The villages were Kilangali, Msolwa and Chanzuru. Household heads were selected from village registers using random table although registers were not updated ( Figure 3).



**Figure 3: Sampling procedure**

Both inter-household and intra-households variables were considered for data collection. This is important because household decisions are often compromised factors from within the households (Gittelsohn 1991 and Gittelsohn et.al., 1997)

### 3.3.3 Sampling strategies

The need for both qualitative and quantitative information and appropriate generalization of research calls for a statistical representative sample from the target population. Before generalization it is also important to have a clear definition as group of people eating from the same land and recognize the authority of one person, the household head who is the ultimate decision maker of the household (Poate and Kajembe, 1994).

Forty (40) household from each village were picked randomly making a total of 120 household for questionnaire survey. This sample size was thought to be sufficient following (Bailey, 1998) who contends that regardless of population size a sample

of not less than 30 is the minimum accepted size for statistical analysis.

#### **3.3.4. Data collection for objective one**

Objective number one aimed at analyzing community perception of household food security. The specific research question that guided this investigation was how they understand the term food security in their locality. As such likert scale was used for this purpose. Interviewers were asked questions and required to express their feelings if they were strongly agree, agree, disagree or strongly disagree with the statements on the likert scale.

#### **3.3.5. Data collection for objective two**

Objective number two focused on the analysis of community attitude towards SPFS using Likert scale. Respondents were asked to respond to some statements and give their opinions if they strongly agree, agree, disagree or strongly disagree with the statements. The statements focused on three aspects namely SPFS improving yields, Irrigation infrastructure and involvement of farmers in technology development. Overall attitude was cross tabulated with land size, household size, education and form of land ownership to see how they influence attitude towards SPFS.

#### **3.3.6. Data collection for objective three**

The third objective intended to assess household food security status for community before and after SPFS. Research questions that guided data collection for this objective included what happened in the field before and after SPFS in terms of production, number of months with food shortage, number of months with enough food in the store after harvesting. Descriptive statistics were used in analysis.

### **3.3.7. Data collection for objective four**

Data collection for assessing the extent of farmers participation in SPFS was based on objectives of SPFS namely intensification, irrigation infrastructures and crop diversification. Key research questions guide data collection were yield per acre, use of fertilizer and livestock keeping.

### **3.3.8. Questionnaire design both qualitative and quantitative**

Information was collected using a structured questionnaire with closed and open ended questions. Emphasize was placed on the collection of information related to household food security and relevancy to SPFS as a means of food production and to reduce food insecurity. The questions in (Appendix 1) were therefore divided into three important sections. The first section was divided to exhaust background information from respondents including household, socio-economic and demographic characteristics. The second section of questionnaire dealt with the collection of food security status before and after SPFS. The final section of dealt with attitudes and perception of farmers towards SPFS in relation to food security. Pre-tasting of questionnaire was done in the same study area before questionnaire administration. 20 randomly selected individual from the study were picked for pre-tasting the questionnaire items. Pre –tasting was done to solicit answers to the several questions as follows.

- (1) Do respondents understand the question or task being asked of them or whether they answer choices from which they are to select?
- (2) Does the respondent's interpretation of questions coincide with what the researcher intends the question to measure?

- (3) Does the respondent's use different response categories or choice to measure?
- (4) Are respondent attentive and interested in the questions?

A final version of questionnaire was produced based on the results from pre tasting. There after, a fully developed questionnaire was administered to randomly selected households.

### **3.3 9. Data collection on the contribution of SPFS on food security**

In order to assess community perceptions on household food security, the study adopted Likert-scale items for soliciting opinions to measure community perception towards SPFS. Positive and negative statements were interviewed to the respondents in order to capture their perception level toward household food security. Guided by specific research objective for example community perception on food security the study used a Likert scale to measure their understandings and attitude toward SPFS.

### **3.3.10. Determination of food security before and after SPFS**

The indicator used to link food security and SPFS was food production per unit area, expansion of land before and after use of technologies, crop intensification use, and irrigation infrastructure and livestock diversity. This selection is based on assumption that rural population especially small farmers use crop and livestock diversity as their means for household food security.

### **3.4. Data Processing and Analysis**

Data from questionnaire survey and FDGs generated both qualitative and quantitative data. Qualitative information from observation, verbal discussion, reports and other document were analyzed using content and structural – functional analysis. In content analysis the recorded discussion was broken into units of information or themes to synthesize meaning, values and attitudes. Structural Functional analysis was used to analyze social facts (which in this study are facts on food security in relation to SPFS). Qualitative data was analyzed using SPSS Computer software. In this analysis frequency tables, cross tabulation, mean, median and modes for household characteristics and score of household perceptions, attitudes and food security status before and after SPFS were presented. Regression model were used to indicate other factors contributing to household food security. The aim of data analysis was to analyze food security status and contribution of SPFS in the study area.



## **CHAPTER FOUR**

### **4.0 RESULTS AND DISCUSSION**

#### **4.1. Overview**

The chapter is divided into five sections. The first section presents social economic and demographic characteristics of the respondents. They include age, sex, household size and marital status. Others are education, form of land ownership, occupation, land size and originality of respondents. The second section focuses on community perception on household food security as well as an analysis using indicators and perception on food security based on food availability, which is production per unit area. The third section presents the analysis of community attitude towards SPFS and variation of food security by land size, type of land ownership, education of household, and household size. The fourth section indicates the food security status of community before and after SPFS and how they vary with age, education, household size, acreage, land ownership and education. The last section shows the contribution of SPFS on household food security.

#### **4.2. Socioeconomic and Demographic Characteristics of the Respondents**

This section presents the demographic characteristics of 120 households Summarized in Table 1 displaying the frequencies and percentages of the studied population.



**Table 2: Socioeconomic characteristics (N=120)**

<b>Variable</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Age category</b>		
18 -35 years	48	40.0
36 – 55 years	54	45.5
Above 55 years	18	15.0
<b>Sex category</b>		
Male	63	52.5
Female	57	47.5
<b>Marital status</b>		
Married	101	84.2
Single	8	6.7
Divorced	4	3.3
Separate	4	3.3
Widow	3	2.5
<b>Education level</b>		
None	12	10.0
Standard IV	17	14.2
Standard VII	87	69.2
Secondary education	8	6.7
<b>Household members</b>		
2 - 4 members	23	19.2
5 - 7 Members	63	52.5
8 - 10 Members	29	24.2
11 and above	5	4.2
<b>Land acquisition</b>		
Inherited	48	40.0
Purchased	23	19.16
Village government	30	25
Rented	19	15.84
<b>Main occupation</b>		
Farming	85	70.8
Farming and off farm	33	27.5
Off farm	2	1.7
<b>Land size</b>		
<1 ha	17	14.2
1.5 - 2.5ha	64	53.3
2.6 - 5 ha	25	20.8
6 – 10ha	9	7.5
11 - 20 acre	3	2.5
21 - 50 acre	2	1.7

#### **4.2.1. Age of respondents**

Three age categories were made by the study (Table 2). The average age of household heads was 42 years, with a mode of 54 years and ranged from 18 to 63 years. Researchers and village leaders were involved in planning and random selection of respondent. Age is important demographic factor when determining economic status of a household (Ishika, 2005). Age influences experience, wealth and decision-making. The majority of respondents (45.5%) were at the age between 36-55 years. This age category has high accumulation of experience than the lower age groups and energetic than the aged group. Mbwambo (2007) showed that in rural areas households headed by old individuals have tendencies of facing food insecurity and general poverty.

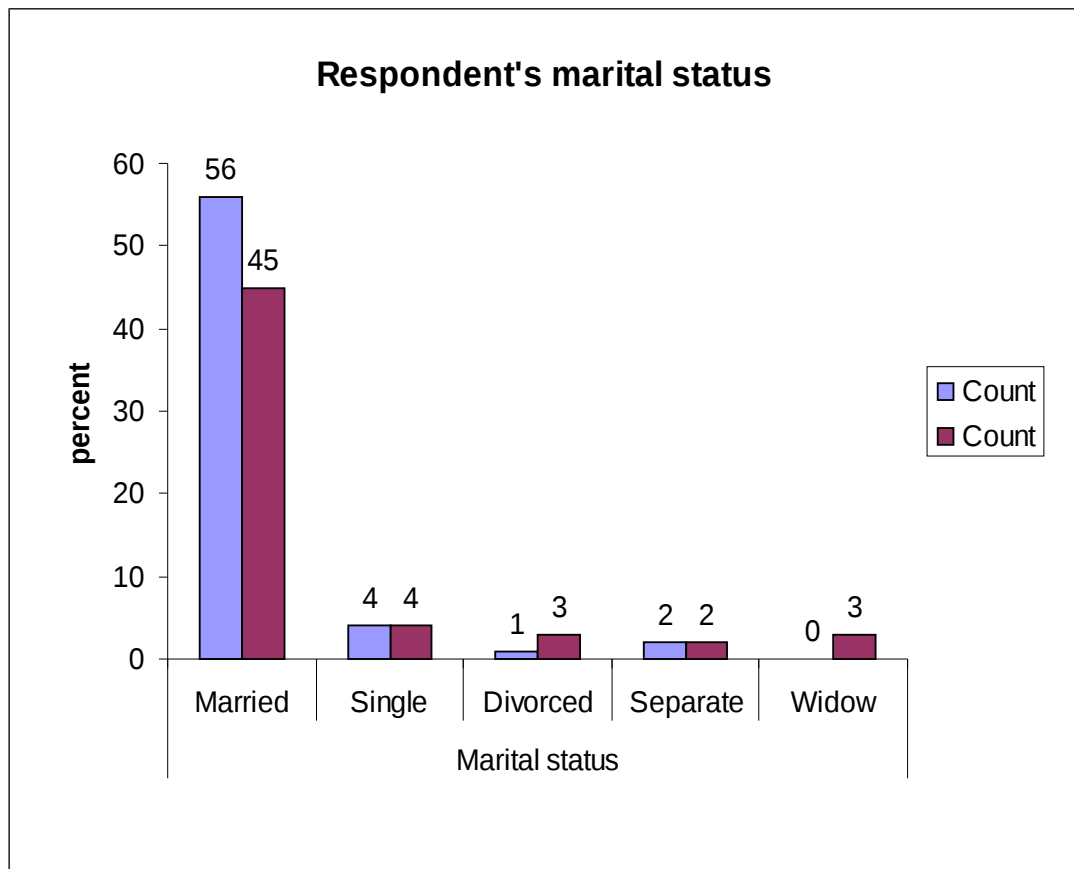
#### **4.2.2. Sex of respondents**

The data in Table 2 also revealed that 63 respondents (52.5%) were male farmers and 57 respondents (47.5%) were female farmers. Despite the emphasis done by SPFS on gender balance, the study revealed that more men than women were engaged in SPFS, probably because men are the one who own land. This result implies that most families have family labour that can participate in food production and income generating activities to earn income as well as participating in SPFS program to ensure household food security.

#### **4.2.3 Respondents' marital status**

Marital status was cross tabulated with sex so as to determine the relationship between two variables. Results in Figure 4 show that most of male respondents

(56%) were married compared to 46% of females who were married. There was no significance difference between sex and marital status as chi-square is 0.297 which is greater than 0.05.



**Figure 4: Marital status**

#### 4.2.4. Education level of respondents

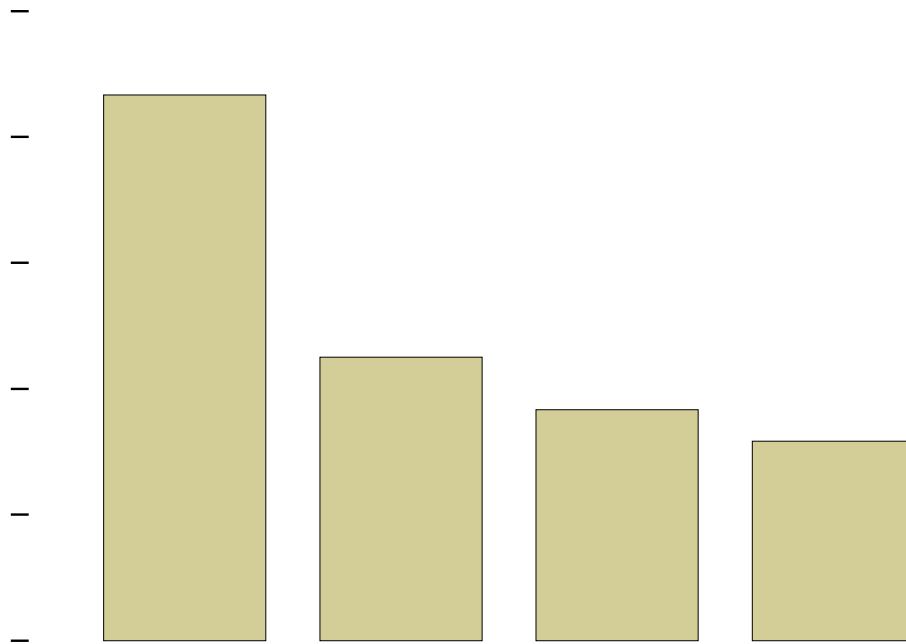
According to the study findings, more than 69.2% of the respondents completed primary education. This implies that most of respondents can read and write. Hence they can benefit from SPFS by getting information to create awareness, adopting and testing of innovations from SPFS program, while the rest which are 10% can not read and write. However, this group can equally benefit from SPFS program because SPFS approach rely mostly farmers Field School demonstrations.

#### **4.2.5. Household size**

During the study, respondents were requested to indicate the size of their households. Household comprised all family members including dependants (young and old people) present at the time of interview. Their responses (Table 2) indicate that 53% majority of respondents have average household of between 5-7 members, 19% have minimum household size of 2-4 members, 24.2% have maximum household size of 8-10 members, while 4.2% have large household of between 11-15 members, which exceeds the national average household size of 4.9 members (URT, 2003). Kavishe, (1993) associated large family sizes with food insecurity. Focus group discussion reported the tendency of distant relatives leaving their household to go and live to their relative which in turn increases household size.

#### **4.2.6. Land ownership and land tenure system**

The study identifies four ways of land acquisition in the study area namely inheritance, purchase, renters /hiring and allocation by village government as indicated in Figure 5. According to the study 40% of the respondents inherited land from their parents or relatives, 19.16% reported that they bought the land, 25% obtained land through village government land and 15.84% rented land from others. Existence of individuals who rent land indicates that rice farming is profitable. They are assured with the high yield due to reliable water through irrigation scheme.



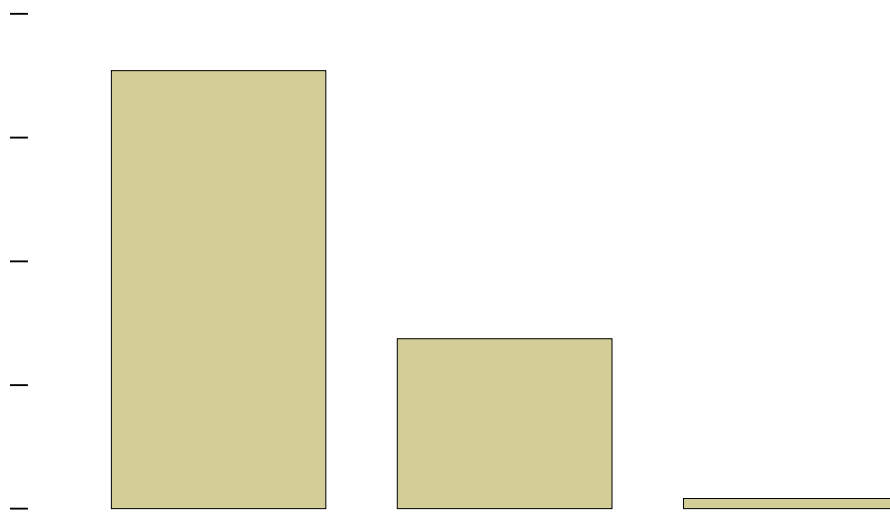
**Figure 5: Forms of land ownership**

Focus group discussions revealed that there was a tendency for those who inherited lands to sell their land to immigrants to obtain money, especially during food shortages as a coping strategy. Due to this practice, this type of ownership is declining over time.

#### **4.2.7. Occupation of respondents**

Figure 6 shows that 70.8% of the respondents are engaged in farming only, while 27.5% are engaged on farming and off-farm activities and 1.7% engaged on off-farm activities only. This implies that the majority of respondents were involved in

agricultural production, growing mainly paddy for their own household food security and income. They were also engaged in off-farm activities including petty business. This further implies that people in Kilosa District that depend on agricultural crops, supplement livelihood earning with other off-farm activities.



**Figure 6: Main occupation of household head**

#### **4.2.8. Land size owned by respondents**

Most of respondents owned 1.5 – 2.5ha. This result is slightly higher than national average of 0.2-2ha reported by Agriculture Sample Census 2002-03. The study found out that there is a significant difference between land owned and land used. Average land owned was 2.86 acres while average land used was 2.36 at a statistical significant level of  $P < 0.000$  at 30df. However Table 2 indicates that majority of respondents (53.3%) have land size of 1.5 acres to 2.5 acres, 14.2% have minimum land of less than one acre.

#### 4.2.9. Main crops grown

Table 3 shows that significant number of respondents 56.33% grow paddy followed by maize 20.56%. This implies that farmers concentrate their resources to paddy which is supported by the programmes. Also paddy has market enabling farmers to sell the crop easily and buy other necessities.

**Table 3: Main crops grown**

<b>Crop</b>	<b>Number</b>	<b>Percentage</b>
Maize	25	20.58
Paddy	66	56.33
Beans	6	4.38
Vegetables	10	8.33
Banana	4	3.33
Cassava	5	4.17
Sun flower	4	3.37
<b>Total</b>	<b>120</b>	<b>100</b>

#### 4.3. Community Perception towards Household Food Security

Maxwell (1997) argued that, people's perception on food needs is an important aspect of food security; the author continued arguing that even when people have access to food that can meet their nutritional requirements, the food may not be culturally accepted or even considered as food. Majority of respondents (75.8%) at least agree with the statement that a household which is food secured should have varieties of food. This implies that the issue of balanced diet matters. Also most of respondents (82.5%) agreed the statement that household which is food secured should have enough food all year. This result conforms to one of definition of food security, (Table 4). Moreover, 58.3% and 61.77% at least agreed with the statement that food security means eating most preferred food and Nutrition value has nothing to do with food security respectively, Table 4.

**Table 4: Community perception towards food security**

Statements	Strongly agree (%)	Agree (%)	Undecided (%)	Disagree (%)	Strongly disagree (%)
A household which is food secured should have varieties food	29.1	46.7	9.2	10.0	5.0
A household which is Food secured should have Enough food all year	54.2	28.3	4.2	5.0	9.2
Food security means having/ eating most preferred food	5	53.3	20.8	19.2	1.7
Nutrition value has nothing To do with food security	19.2	42.5	23.3	10.8	4.2

#### 4.4. Community attitudes towards SPFS

##### 4.4.1. SPFS approaches on Household Food Security

The study found that respondents have good attitude towards the programme as indicated in Table 5. 41.7% of respondents' strongly agreed with the statement that SPFS approaches had helped farmers to increase rice yields while only 5.8% were undecided. On the statement that programme approach in involving farmers' participation in technology development/testing; the study found that 49.2% strongly agreed with it while 13.2% disagreed. Most of the respondents 41.7% at least agree with the statement that SPFS had improved irrigation infrastructures. A significant number of respondents 58.3% strongly agreed with the statement that SPFS innovations were compatible with farmers' condition. 46.7% agreed on the statement that SPFS approaches are effective in monitoring farmer's problems. About 59.0% of respondents agree with the statement SPFS has changed production per acre while 35% disagreed with the statement. Most of respondents 62.5% and 60% disagree with the statements SPFS approaches were too difficult to adopt and SPFS has distorted irrigation infrastructure respectively. These results are in line



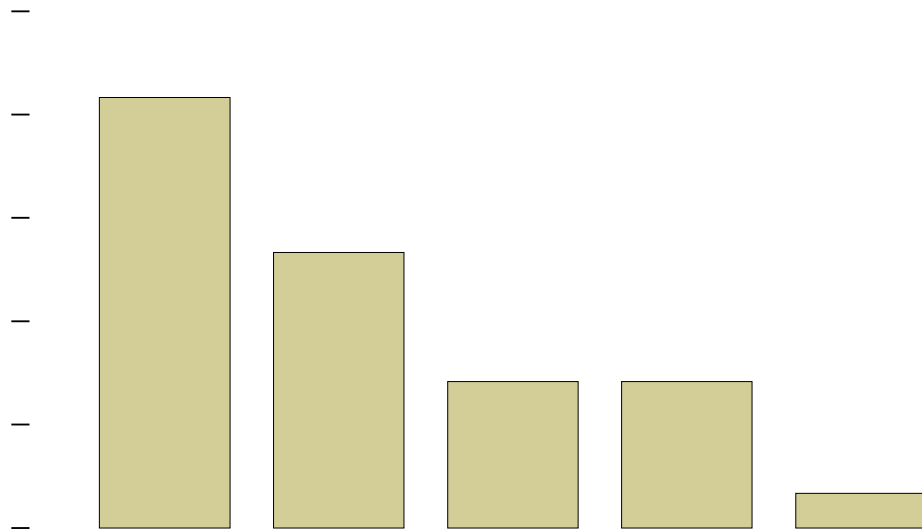
with study's presumptions SPFS has improved irrigation infrastructure. Last but not least most of respondent 40%strongly agreed and 14% agreed with the statement that the program has contributed to other social benefit this implies that community appreciated some benefit accrued from program.

**Table 5: Community attitude towards SPFS**

Statements	Strongly agree	Agree (%)	Undecided (%)	Disagree (%)	Strongly disagree
SPFS approaches have helped farmers to increase rice yields	41.7	17.5	5.8	20.8	14.2
SPFS approaches are effective in involving farmers' participation in technology development/testing.	49.2	36.7	0.8	13.2	0.0
SPFS has improved irrigation infrastructures.	14.2	41.7	14.2	26.7	3.3
SPFS innovations are compatible with farmers' condition.	58.3	31.7	1.7	5.8	2.5
SPFS approaches are affective in monitoring farmers' problems.	21.7	46.7	19.2	10.8	11.7
SPFS has changed production per acre	0.0	59.0	5.8	35.0	0.0
SPFS is too demanding and hence not cost effective	22.5	41.7	14.2	20.0	1.7
SPFS approaches are too difficult to adopt	0.0	19.2	18.3	62.5	0.0
SPFS has distorted irrigation infrastructure	0.0	30.0	10.0	60.0	0.0
SPFS has contributed to social benefit	40.1	15.0	13.3	14.2	17.2

#### 4.4.2. Irrigation infrastructure

The study findings summarized in figure 6 indicate that 41.7 agreed that SPFS have improved irrigation infrastructure although 26.7% disagree, probably of the poor irrigation infrastructure in Msolwa village. The overall attitude of farmer towards infrastructure was found to be good.



**Figure 7: Attitude of farmer's towards Irrigation infrastructure**

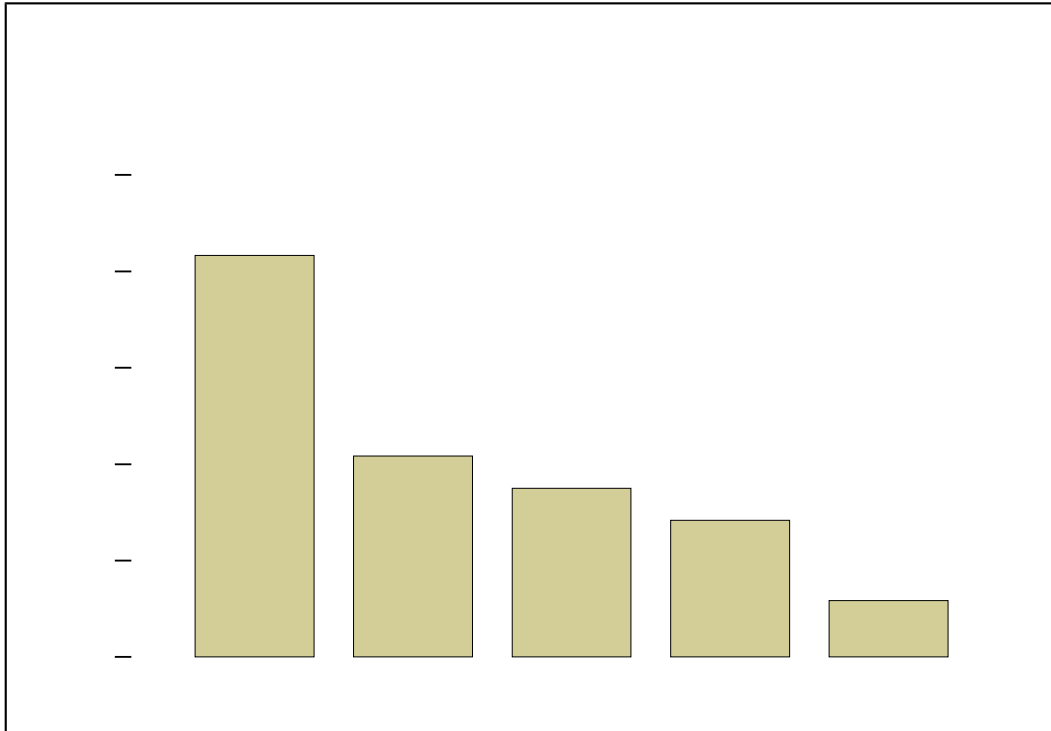
#### **4.4.3. Farmer's Attitude towards involvement in technology development**

Result summarized in figure 7 shows that 49.2% and 36.7% of farmers agreed that SPFS approach had involved farmers in technology development while only 13.3% disagreed probably because farm trial conducted by Ilonga research station not in their village.

**Figure 8: SPFS approaches are effective in encouraging farmers' participation in technology development/testing**

#### **4.4.4. Attitude of farmers towards rice yields**

The study observed that there is positive attitude on SPFS on increasing yield of rice to farmers figure 8 indicate that 41.7% strongly agree that SPFS approach have helped farmers to increase their yield while only 14% disagreed. This implies that people has good attitudes towards SPFS so that they are likely to participate in the SPFS activities.



**Figure 9: SPFS approach have helped farmers to increase rice yield**

#### **4.4.5. Farmers' participation in technological development and testing**

Most of respondents (85.9%) at least agree that SPFS managed to encourage farmers' participation in technological development and testing (Figure 9). This indicate that the programme succeeded in achieving its overall objective of modernizing agriculture by enabling farmers develop and adopt new technology.

**Figure 10: PFS approaches are effective in encouraging farmers' participation in technology development/testing**

#### **4.5. Community Food Security Status**

##### **4.5.1. Household food security status before and after SPFS**

The study shows that there have been some changes in food availability after SPFS programme had increased productivity. The minimum yield/acre before SPFS was 3 bags, whereas the maximum yield/acre was 20 bags, with average bags/acre been 9.54 bags before the SPFS programme. After SPFS the minimum yield increased to 8 bags and the maximum yield was 32 bags, with average of 17.60 bags/ acre (Table

6). The findings shows that there is statistical significant difference in respect to food security status before introduction of SPFS at  $p < 0.025$  this implies that the improved irrigation infrastructure, use of improved seed varieties and farm practices introduced by SPFS has increased food security in the community.

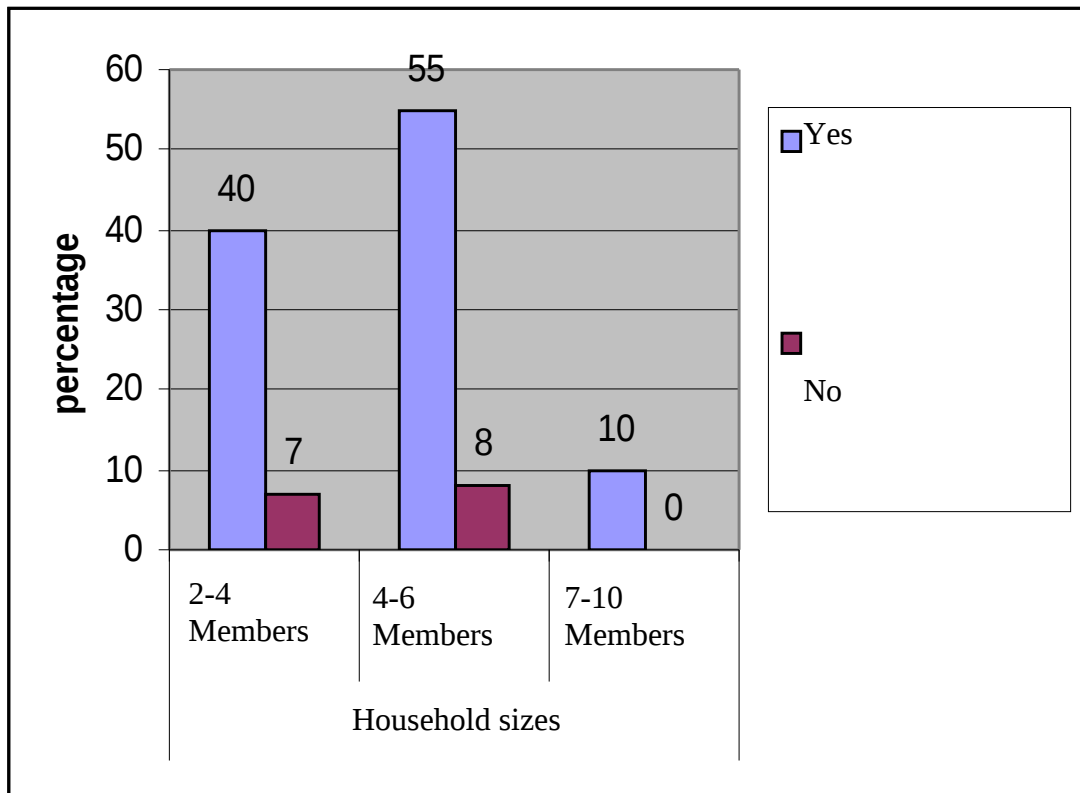
**Table 6: Household food security status before and after SPFS**

Variable	Farmers Involved in SPFS		Farmers Not Involved in SPFS		Significance	
	N	Mean	N	Mean	t	Sign
Rice Yield Before (Bags/Acre)	105	9.70	15	8.47	1.424	0.171
Rice Yield After (Bags/Acre)	105	17.86	15	15.80	2.359	0.025***
Number of rice prod. Annually - Before	105	1	15	1	1.421	0.158
Number of rice prod. Annually - After	105	1	15	1	2.511	0.014***

Note\*\*\* = Significant at 0.05

#### 4.5.2. Household size and food status

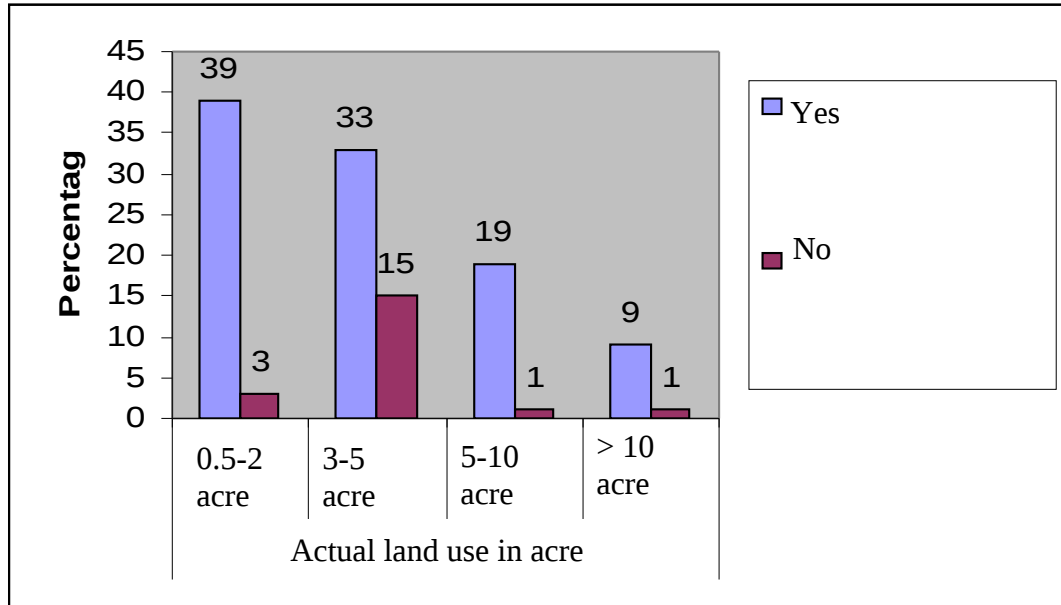
The study also crosses tabulated households size and food security status to determine the relationship between these two variables. Families with large household size (10%) responded that food security status had not improved while families with small and medium household members (90%) reported substantial improvement of food security status Figure 10. This is similar to Kavishe, (1993) findings that large family size is one factor contributing to food insecurity



**Figure 11: Household size Improvement of food security due to SPFS**

#### 4.5.3. Size of land owned and food security

Results show that respondents with 0.6 – 1.9 acres reported that SPFS had improved food security (Figure 11) implying that land size is one of determinants of food security. The case with those who owned large sizes of land had large households.

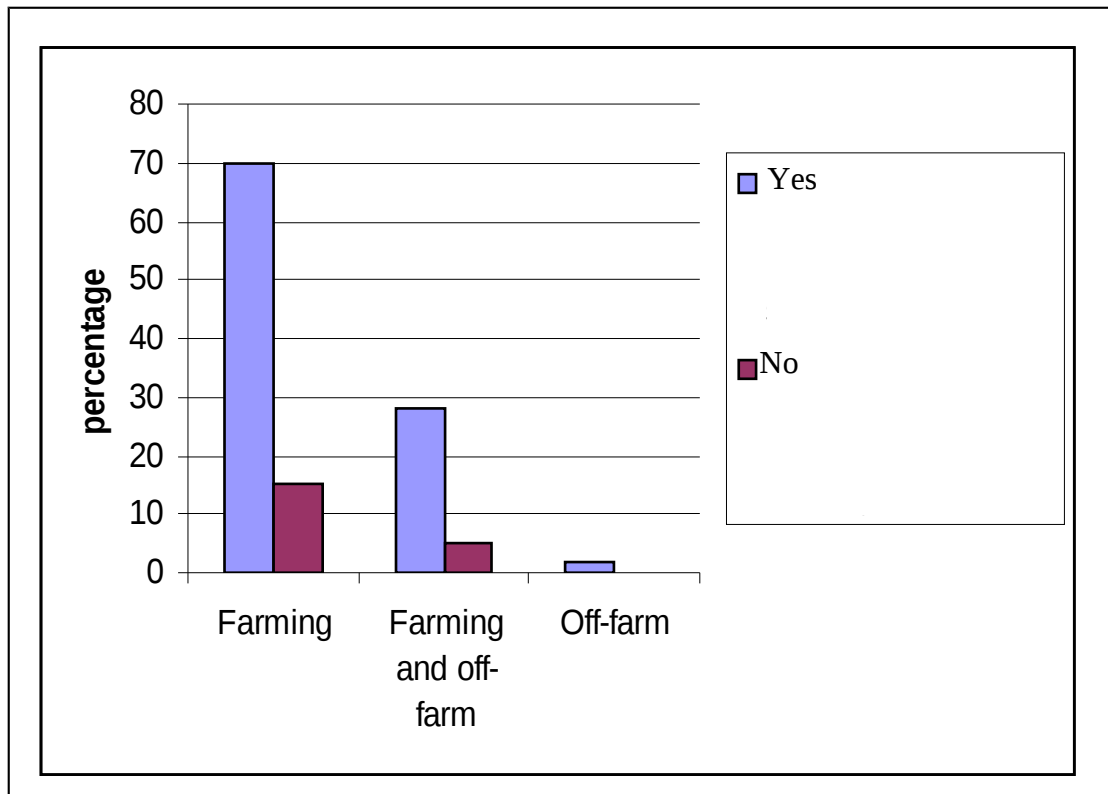


**Figure 12: Improvement of food security by land size**

#### **4.5.4. Main occupation and improvement of food security under SPFS**

Respondents' main occupation was cross tabulated with improvement on food security to result in Figure 12 indicates that respondents who were engaged in farming reported improvement on their food security because the programme had enabled farmers to increase their paddy yields and number bags per acre, increase size of acreage as well.

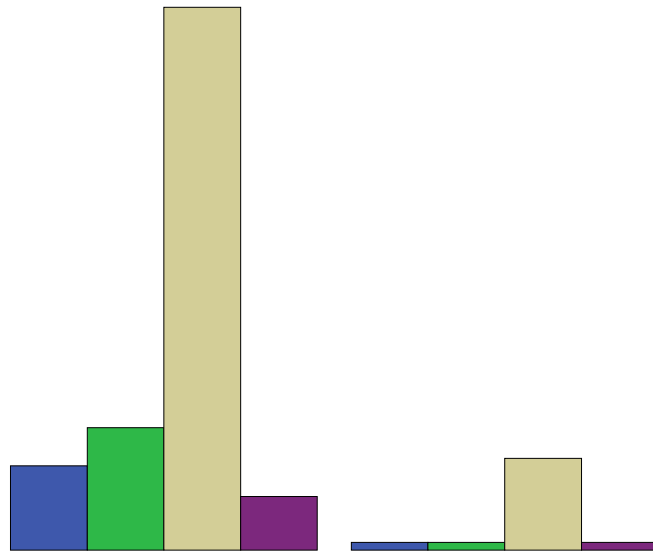




**Figure 13: Main occupation and Improvement of food security due to SPFS**

#### **4.5.5. Education level and improvement of food security under SPFS.**

The study cross tabulated respondents education level and their improvement on food security by SPFS to determine the relationship between the two variables. Figure 13 show that respondents with standard seven education reported that the Programme had increased food security situation. However, this was expected since most of participants had employed in agriculture production, while those attained secondary education go for employed job.



**Figure 14: Education level and Improvement of food security**

#### **4.5.6. Number of months with food security after harvest**

The study considered the number of month of food shortage after harvest. The findings show that 63.8% of household are food secured for more than 5 months after harvest, 22.5% reported households are food secured between 4 –5 months after harvest, while 11.0% are food secured for only 2 - 3 months after harvest. Furthermore, only 2.5% reported that they are food unsecured immediately after one month (Table 7). The number of months with food shortage has been reduced from 4 months to 2 months because production per acre has increased significantly due to the improvement of irrigation infrastructure.

**Table 7: Number of months with food security after harvest after SPFS**

Months	Frequency	Percentages
One	3	2.5
Between 2 - 3	14	11.0
Between 4 -5	27	22.5
More than 6	76	63.8

Variations in response probably are due to income level of individual. Most likely their sell produce to obtain their hard cash. Another reason for those who are food secured for only 1-3 months they sell all the produce soon after harvest to get income and to service their debt from money lenders commonly known as *mkopo wa majani* (means green loan). This is an informal credit system where paddy which is still in the field is used as loan collateral. The lenders recover their loan during paddy harvest.

#### **4.5.7. Factors attributed to food security**

Regression model analysis was used to indicate other factors attributed to the project. The result below in table 8 shows that household size has significant relationship at 0.007 increase over household food security but there we no significant implication or land size., and involvement of SPFS have significant contribution of household food security significant level of 0.043.

**Table 8: Other factors attributed to food security**

Binary Logistic Model					
<b>Independent Variables</b>	<b>B</b>	<b>S.E.</b>	<b>Wald</b>	<b>Sig.</b>	
Gender	-0.503	0.417	1.453	0.228	
Age in years	0.022	0.020	1.262	0.261	
Household size	-1.076	0.401	7.215	0.007	****
Education	-0.120	0.287	0.174	0.677	
Occupation	-0.556	0.423	1.722	0.189	
Size (Acres) of land owned	-0.031	0.402	0.006	0.939	
Size (Acres) of land in use	-0.373	0.433	0.744	0.388	
Size (Acres) of land actually used	0.158	0.219	0.518	0.472	
Land expanded after SPFS	0.043	0.081	0.276	0.599	
Fertilizer application	-0.034	0.566	0.004	0.953	
Involvement in SPFS	-1.081	0.622	3.015	0.082	***
Constant	4.555	2.252	4.093	0.043	***

Note: Dependent Variable = Food Security  
 Food Insecurity (0) = none, one month and two months  
 Food Secured (1) = Three and beyond months  
 \*\*\* = Significant

## 4.6. Contribution of SPFS on Household Food Security

### 4.6.1. Overview

The study included water control component, which aim at optimizing the scarce water resource, crop intensification, use of improved technological packages and techniques to improve yield and stability in production. Incorporation of high value food and cash crop to raise farm incomes and food security were also included. The diversification of production system coupled with the development of such activities as cash crop, small-scale animal husbandry, and aquaculture and at artisan fisheries and provide additional cash to support livelihood need (health, education, improved housing). The contribution on SPFS in Chanzuru village was still in early stage of implementation and such was not expected to produce significant measurable contribution in such areas in production and food security.

#### **4.6.2. Water control**

Focus group discussion (FGD) revealed that there is a great contribution on irrigation infrastructure and efficiency use of water in some villages. Kilangali channels and water intake is well constructed and distribute in the whole field while Msolwa village water intake not well constructed and the channels not distributed in the fields. 27 respondents out of 40 respondents in this village reported that the channels are constructed only 10 meters from water intake, only 13 out of 40 respondents in Msolwa has benefited from this channels. In Kilangali village the main complaint was the pastoralists invading their fields and destroying the water channels. Respondent from this village reported that sometimes pastoralist sabotage the water intake so as to get water for their animals. In Chanzuru the problem of irrigation scheme is the scarcity of water for irrigation.

#### **4.6.3. Crop intensification**

Productivity means to increase production per unit area. The study assumed that the number of production per year will increase after the improvement of irrigation scheme. The results in table 9 revealed that only 1.7% grow rice twice per season while 98.3% grow rice per season. This entails that people relax after harvesting rice instead of growing other varieties of crops like vegetable or any other early maturing varieties so that can grow twice per season, instead of selling and consuming what they have produced and experience food shortage soon after harvesting.

**Table 9: Number of production of rice per season before and after SPFS**

<b>Production</b>	<b>Frequency</b>	<b>Percent</b>
Once/season	118	98.3
Twice/season	2	1.7
<b>Total</b>	<b>120</b>	<b>100</b>

#### 4.6.3.1 Fertilizer uses

There is no contribution on fertilizer use table 10 shows 12% use fertilizer while 87.5% do not. This entail low productivity, but in terms of technique used only 20.8% used the suggested techniques while 79.2% adopted at transplanting rice implying optimum plant population hence high yield. The study tried to assess the adoption of crop diversification and the findings in table no 13 shows that there was an increase in livestock keeping where 60.8% keep small animals and 39.2 do not keep any livestock. However the use of fertilizer has not been adopted because farmer's lack capital to buy fertilizer the price of it is shooting up recently. During interview farmers believes that when they use fertilizer they are going to destroy their soils, this means that people on the study area are ignorant on fertilizer use.

**Table 10: Responded on fertilizer use**

<b>Responded on fertilizer use</b>		
<b>Responses</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	15	12.5
No	105	87.5
<b>Total</b>	<b>120</b>	<b>100</b>

#### 4.6.4. Crop diversification

There is an increase in number of people who are keeping small animals. Before SPFS farmers used to keep local chicken only but after SPFS they keep different small animals like diary goat, pigs and improved local chickens as shown in table no 11. There is a slight increase in animals kept especially pigs 38% are keeping pigs

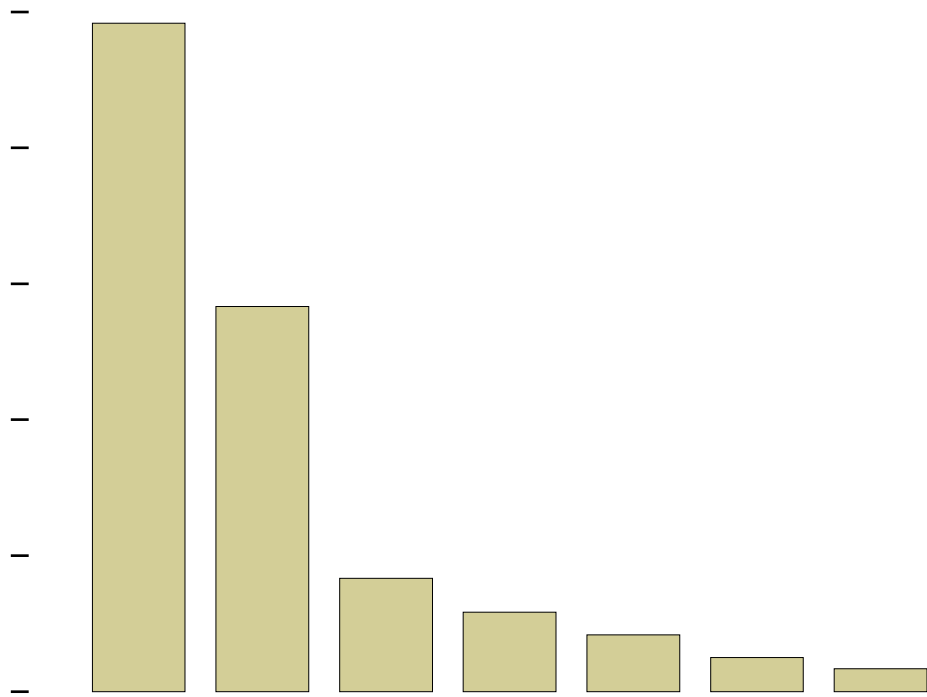
especially in Msolwa village and few in Kilangali. Only 2% are keeping dairy cattle this may high investment costs.

**Table 11: Respondent keeping livestock**

<b>Responses</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	73	60.8
No	47	39.2
<b>Total</b>	<b>120</b>	<b>100</b>

#### **4.6.5. Distribution over social benefits**

The study also looked the social benefits accrued by respondents from SPFS. Figure 14 indicates that major social benefits reported by respondents are construction of modern houses (49.2), payment of school fees (28.3). Therefore, SPFS contributed to ward accessibility of social benefits of respondents as well.



**Figure 15: Respondent distribution over social benefits**

The study also looked at the approach used for strengthening and empowerment of farmers FFS (Farmer Field School) the result indicate that only 31 respondents which is 34.2% are involved in FFS while 79 respondents which is 65.8% are not involved in FFS. The table 12 shows respondent result in involvement in FFS. This implies that the approach used to provide extension services doesn't reach many people to bring the intended contribution to adoption of technology .



**Table 12: Respondent distribution over FFS involvement**

	<b>Frequency</b>	<b>Percentage</b>
Involved in FFS	31	34.2
Not involved in FFS	79	65.8
<b>Total</b>	<b>120</b>	<b>100</b>

#### **4.6.6. SPFS contributions by respondents**

Figure 15 show that 64% of respondents reported that SPFS increased both their income and food security. This is evidence that even sampled farmers agree that the programme had achieved its primary goal of increasing food security. The study concludes that increase of income would enable respondents to purchase food items enhancing their food security.

**Figure 16: Responses as to SPFS contributions**

The study seeks to identify other factors which contributing household food security. Table 13 shows that 35% of responds reported that overselling of grain after harvesting, 24% of respondents reported that of low production, 9% reported luck of capital, 8% reported land scarcity.

**Table 13: Factors contributing to household food insecurity**

<b>Factor</b>	<b>Frequency</b>	<b>Percent</b>
Overselling	42	35
Low production	29	24
Drought	11	9
Poor post harvest mgt	3	3
Poor implement	1	1
Laziness of individuals	9	8
Pastoralists invasion	2	2
Lack of land	11	9
Lack of capital	10	8
Lack of off farm activities	2	2
<b>Total</b>	<b>120</b>	<b>100</b>

#### **4.7 SUMMARY OF MAJOR FINDINGS**

The study revealed that 52.5% were male farmers while 47% were female farmers involved in the programme. Despite the fact that male are more participating in agriculture activities, probably this is because female can not own land due to traditional gender roles. Most of respondents 69.2%, completed primary education thus was able to benefit in SPFS by getting information to create awareness, adopt and test innovations. The study revealed that household size have a great influence in household food security, thus large household size is prone to household food insecurity. The study also found that main occupation in the study area is farming and 56% depend on rice production and 20% depend on maize farming, that there were over dependency on one type of crop. There were no reliable cash crops to support farmers. Community perception toward food security was revealed by the

study that household that has enough food throughout the year is said to be food secured, and those household eating most preferred food were food secured.

Community attitude toward the programme was good as farmers appreciate that SPFS approaches were effective in involving farmers' participation in technology development. Also SPFS has increases farmers production through improving irrigation infrastructure. The study found out that community food security status has improved, that is minimum yield per acre before SPFS was 3-4 bags with maximum yield of 20 bags per acre after the programme minimum yield has increased to 8 bags/acre and maximum of 32 bags per acre. That food availability has been increased by a statistical significant difference in respect to food security status before the introduction of SPFS at  $P < 0.05$

Number of month with food security after harvest the study found that 68.5% of household were food secure for more that 5 months after harvesting. The study also revealed that there are other factors attributed to household food security as shown in table 10 of regression model that household size attributed to household food security at significant level of  $P < 0.007$  (Kavishe, 1993)

- Use of technologies

The study found that there were no increases in fertilizer use only 12% use fertilizer while 87.5% do not use fertilizer.

- On Crop diversification

The study found that there were slight increase on farmer keeping livestock only 60.8% keep small animals and 39.2% do not keep any. The study also revealed that there are other factors contributing to house hold food insecurity like, overselling of food crops 35%, low production 24%, drought 9% and lack of capital 9%. (Table 15)

The study also revealed that there are other social benefits accrued from programme like housing, accessible road throughout the year, training, introduction of SACCOS, employment, school fees as indicated in figure 15. 64.2% agreed that the programme has increased both food securing and income.

## **CHAPTER FIVE**

### **5.0 CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 OVERVIEW**

The general objective of the study was to determine the contribution of SPFS programme at household food security level in Kilosa district. Specifically the study sought to; analyze community perception of household food security, analyze community attitude towards SPFS relevance to food security, assess the extent of farmers' participation in SPFS activities and assess household food security status for community before and after SPFS. Based on the specific objective this chapter is divided into two sections. The first section presents conclusions while the second section draws recommendations based on major findings and conclusions.

#### **5.2. CONCLUSIONS**

The results showed that community perception on household food security varies greatly from different groups of people. However, majority responded that household food security means availability and having enough food particularly rice throughout the year.

Community attitude towards SPFS was positive. Irrigation infrastructure has contributed to sustainable production. Approaches used by SPFS was accepted and adopted by farmers. Among other things farmers have benefited socially and economically as the roads are passable throughout the year, others managed to build modern houses. Also the Programme had distributed free of charge small livestock to few members of selected community in diversify their farming activities Research findings showed that farmer's participation in SPFS activities is low. There were

only two inactive farmer's field schools. Moreover, adoption of agricultural technologies such fertilizer and pesticides was also low. Although almost all farmer improved adopted use of innovations like transplanting and improved seeds. The study revealed that community food security has improved. The months with food secure increased from eight months before the Programme to ten months after the Programme. Production and productivity has increased significantly. Rice production has risen from average of 9.5 bags per acre to 17.6 bags per acre, this results increase in food availability.

The study unearthed a number of challenges facing farmers and the Programme. First there is lack of water reservoirs leading to shortage of water for irrigation shortly after rains as a result rice cultivation is done once per annum. Second is overdependence on one crop (rice). Third is the tendency of the studied community to ignore nutritional value of food which may lead malnutrition, Last but not least is problems caused by pastoralists in Kilangali village.

### **5.3. RECOMMENDATION**

The Programme in collaboration with other agriculture stakeholders should construct a large water reservoir so that there will be enough irrigation water all the year round to enable farmers grows rice and other crops several times per year. Disadvantages of relying on a single crop cannot be overstated. Therefore the government through extension workers should encourage farmers of the study areas to diversify their farming activities. This should go hand in hand with efforts to convince this community to eat more varieties of food.

Nutritionists should sensitize the community on health advantages of food nutrients so that the communities know that delicious food does not mean nutritious food. Tanzania is now full with cases of clashes between crop farmers and pastoralists which more often cause loss of innocent lives. Thus the problem of pastoralists in Kilangali village should addressed quickly by national and local leadership.

Credit unions should be established so that farmers can access loans easily. Since this study centered on contribution of SPFS to food availability, studies focused on the contribution of the Programmes to other two pillars of food security should be encouraged.

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## APPENDICES

### **Appendix 1: Questionnaire The contribution of SPFS in Kilosa district**

#### **A: IDENTIFICATION OF RESPONDENT**

1. Date of interview:.....
2. Village name: .....
3. Division: .....
4. Household head (name): .....

**B: SOCIO-ECONOMIC CHARACTERISTICS**

5. Respondent gender: [1] Male  
[2] Female
6. Marital Status  
1)Single  
2)Married  
3)divorced  
4)Sepatrtd  
5)widow
- 7)Size of the house hold  
1) 1-4  
2) 4-5  
3) 5- 6  
4) 6- 10
- 8) Age of household head: [1] Less than 18 years  
[2] 18-35 years  
[3] 36-55 years  
[4] Above 55 years
- 9) Origin of the household head: [1] Native  
[2] Immigrant
- 10). Education level of household head: [1] none  
[2] Standard 4  
[3] Standard VII  
[4] Secondary  
[5] Post secondary
- 11). Main occupation of household head: [1] Farming  
[2] Farming and off-farm activities  
[3] Off-farm activities

**C: LAND OWNERSHIP**

12. How did you obtain you land: [1] Inherited  
[2] Purchased  
[3] Given by village government  
[4] Rented  
[5] All of the above  
[6] 2& 3
13. How much land do you own? ..... (Acres)



- 1) 0-1
- 2) 1-2
- 3) 3-4
- 4) Above 5

14. How much land have you expanded after you have joined the program? .....  
(Acres)

15. Land and crop yield

Crop	Land area before SPFS (Acres)	Land area after SPFS (Acres)	Yield before (Kg)	Yield after (Kg)	Number of production per year before SPFS	Number of production per year after SPFS	Methods of sowing [see CODE]
Maize							
Rice							

**CODES** [1] Broadcasting [2] Transplanting [3] Dibbling

17) Output of paddy/ acre by methods of planting

Method of planting	Output/acre
Broadcasting	
Transplanting	
Dibbling	

18). Do you use fertilizer in production [1] Yes  
[2] No

19). If yes, what is the output level per acre? .....

20). If no, what is the output level per acre? .....

**D: HOUSEHOLD HEAD INVOLVEMENT IN SPFS**

21). Were (are) you involved in the SPFS in this village? [1] Yes  
[2] No

22). If yes, at what level were you involved? [1] Irrigation scheme

- [2] Farmers field schools [3] Livestock programs
- [4] SACCOS [5] All of the above [6] 1-3 above

23) Do you think your involvement in the SPFS has made you/your family improved livelihood security? [1] Yes  
[2] No

24). If yes, what livelihood security have you attained? [1] Involvement in farmers groups  
[2] Training and study visits  
[3] Increased household income  
[4] Increased HH food security  
[5] Both 3 & 4

**E: SUSTAINABILITY OF IRRIGATION SCHEME**

25). Is there any water users association in your village? [1] Yes  
[2] No

26). How leaders of the association are elected? [1] Democratically from water users  
[2] From district level  
[3] From SPFS coordinators

27). Is there any contribution from water users for irrigation scheme management?  
[1] Yes  
[2] No

28). How do you contribute? [1] Own labour  
[2] Cash  
[3] Both 1&2

29). If own labour is provided, in which activities do you engage? .....

.....

.....

If cash, how much per season/year per individual farmer? ....[Tshs.]

30). In which activities the paid cash are used?  
[1] Maintenance of irrigation channel  
[2] Wages of association management  
[3] Both 1 & 2

**F: HOUSEHOLD FOOD SECURITY**

31). Do you think your involvement in the program has made your household food secure? [1] Yes

[2] No

- 32) If yes, how many months are you food secured? [1] None  
 [2] Between 1-3 months  
 [3] Between 4-6 months  
 [4] More than 6 months

- 33. In the last 12 months, did you eat less than you felt due to lack of food?  
 [1] Yes  
 [2] No

- 34. In the last 12 months, did you bought food for household consumption?  
 [1] Yes  
 [2] No

- 34. In the last 12 months, have you ever cut or skip the size of you meals because there wasn't enough food? [1] Yes  
 [2] No

- 35). Number of months with food shortage after harvesting  
 1) None  
 2) 1 month  
 3) 2 months  
 4)3 months and above

36. What are the factors contributing to household food insecurity? .....

.....

.....

.....

**G: LIVESTOCK OWNERSHIP**

- 36. Are you engaging in livestock keeping? [1] Yes  
 [2] No

- 37. If yes, which livestock do you own? [1] Cattle  
 [2] Goats  
 [3] Pigs  
 [4] Improved chicken  
 [5] 1-2 above  
 [6]1-3 above  
 [7] All of the above

38. When did you start livestock keeping? ..... (Year)

39. Has the number of livestock increased in the last 3 years? [1] Yes  
[2] No

40. If yes, indicate the increment or reduction of livestock in the last three years

Type of animal	Three years a go	Recent	Increment/Reduction
Cattle			
Goats			
Ships			
Chicken			

41. If, there is any increase in the number of livestock related with you involvement in program? [1] Yes  
[2] No

42. If yes,  
how? .....

.....

.....

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.....

..

43. What benefits do you get from Farmer Field School (FFS) as developed by SPFS? .....

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44. What other socio- economic benefits linked with SPFS?

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45. What are the major problems in irrigation farming developed by SPFS?

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 .....  
 .....

#### 46 Attitude towards SPFS programm intervention

We would like to know the extent to which you feel about the following statements  
 SPFS

s/no	Statement/Description of activities	Strongly agree	Agree	Undecided	Disagree	Strongly Disagree
Effectiveness of SPFS approaches						
1.	SPFS approaches have helped farmers to increase rice yields					
2.	FFS approach has influenced high adoption of disseminated technologies					
3.	SPFS was useful for creating awareness of farmers					
4.	SPFS approaches have been effective to improve farmers organizations					
5.	SPFS approaches are effective in monitoring farmers problems					
6.	SPFS approaches are effective in involving farmers participation in technology development/testing					
7.	SPFS innovations are compatible with farmers' condition					
8.	SPFS approaches are flexible to farmers; conditions					

#### 47. Likert-Scale on community perception towards food security.

Statements	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
A household which is food secured should have varieties food.					
A household which is food secured should have enough food all year					
Food secured means having enough grain throughout a year					

Food security must include availability ,accessibility and food utilization

Food security is very important in development of any community

Food security means having eating most preferred food

Nutrition value has nothing to do with food security

Food security means having only enough grain throughout the year

A household selling grains means is food secured

Not eating less preferred food means food security

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***Thank you for cooperation***