

**THE ROLE OF SOCIAL CAPITAL IN COPING WITH HOUSEHOLD FOOD
INSECURITY IN URBAN AREAS OF TANZANIA: THE CASE OF DAR ES
SALAAM AND MOROGORO MUNICIPALITY**

BY

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN
AGRICULTURAL ECONOMICS OF SOKOINE UNIVERSITY OF
AGRICULTURE. MOROGORO, TANZANIA**

2003

ABSTRACT

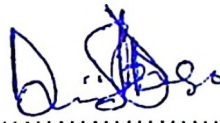
This study was conducted to investigate the role played by social capital in coping with household food insecurity in urban areas of Tanzania. The study entailed surveys conducted in Dar es salaam city and Morogoro municipality. Specifically the study had four objectives namely (a) to identify the various coping options related to social capital that are commonly adopted by households in the study area to contend with food insecurity (b) to determine the characteristics of social capital arrangements which are relevant to household food security (c) to determine the extent to which social capital reduces household food insecurity vulnerability and (d) to determine the effects of household stock of social capital on household income. The study is based on a survey of 180 households. Proportionate stratified random sampling technique was used to select respondents across all income levels in the study area. The data were coded and analysed with the aid of the Statistical Package for Social Sciences (SPSS) computer programme. Data analysis entailed a number of descriptive statistics including frequencies, cross tabulations and chi-square tests. However, regression analysis was the major parametric test employed. The regression analysis made use of, first, a multiple linear regression model aimed at testing the effect of social capital on household income and, second, a logistic regression model which tested the effect of social capital on household food vulnerability. Results revealed that the major food insecurity coping strategies based on social capital commonly adopted by urban households were food purchase on credit, borrowing of money, food offers, reliance on informal credit, money offers, labour sales and exchange of assets for food. The study has also revealed that social capital significantly increases household income in the study area ($p < 0.05$) but did

not significantly reduce household food insecurity vulnerability ($p>0.05$). In addition, some characteristics of the identified social capital based coping strategies were uncovered. Whereas food purchase on credit was a characteristic of the poor and food vulnerable households, borrowing of money was practised by both low and medium income households. On the other hand, lack of social capital was not a major factor restricting low income households from accessing food on credit or getting money offers. Borrowing of money was common among close friends and neighbours while, food and money offers mainly took place between non-blood and blood relatives, respectively. In view of the findings from this study, a number of policy implications are recommended. Development policies ought to advance and nurture social capital strategies commonly used by society in coping with food insecurity. It is also clearly apparent that there is a need for prioritising and clearly targeting beneficiaries of food assistance aimed at reducing food insecurity vulnerability in urban areas. Overall the study strongly alerts on the fact that incomes of urban households are significantly low rendering food items unaffordable.

DECLARATION

I, DANFORD SANGO, do hereby declare to the Senate of Sokoine University of Agriculture that, this dissertation is my own original work and has not been nor is it currently being submitted for a degree award to any other university.

Signature:.....



Date:

17/7/2003

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DEDICATION

This work is dedicated to the members of my family namely my parents, Mr and Mrs Mwakijungu, brothers Abel, Geoffrey and Edward and the only sister Betty. Thank you for your love. Your love has been of valuable contribution to my success in education.

ACKNOWLEDGEMENT

It is true that completion of this dissertation has been possible through a coordination of various contributions made by different individuals and institutions. I hereby therefore wish to acknowledge all the different persons and institutions that have made completion of this dissertation a success.

My first and foremost thanks are due to my supervisor Prof. A.E. Temu for his guidance and invaluable comments throughout preparation and writing of this thesis. I do hereby wish to acknowledge the truth that his constructive comments, and suggestions had always been instrumental in shaping my ideas through all stages in developing the dissertation. Despite of having an always-tight schedule, he always had enough time for my work and I particularly wish to appreciate that. I equally wish to record my appreciation for the friendly relationship we had throughout the year. I feel very privileged to work under his supervision.

I do also wish to extend my gratitude to co-supervisor of this dissertation Dr J. Msuya of the Department of Food Science and Technology for his continuous interest in my work. I deeply acknowledge him for being so eager to share with me his experiences, knowledge and materials whenever I consulted him for assistance.

Special thanks are due to 2020 Vision Research Network for East Africa for offering me a partial research grant which assisted me in undertaking the study. As a privately sponsored student, the grant was a very useful complement to the meagre

financial resources I had from my parents for research. To the network and all its team I say thank you a lot.

I do hereby record my appreciation to my friends Nuhu, George, Fred and Tungwa who assisted me a lot in data collection. I equally wish to express my gratitude to all the respondents who took part in this study. My very special thanks are also due to my classmates Mkude, Ngaruko, Mwalukasa and Mutabazi. The collegial friendship I shared with them made my stay at the campus socially, enjoyable and academically stimulating.

Because it is difficult to specifically mention each and everyone who participated in the study, I hereby pay tribute to everyone who in one way or another took part in the study. To all the ladies and gentlemen I say “akhsante sana”. But above all I thank the Almighty God for the love he showed me throughout my two years of graduate work.

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LIST OF ABBREVIATIONS AND ACRONYMS

BoT	-	Bank of Tanzania
DFID	-	Department for International Development of UK
FAO	-	Food and Agriculture Organization of The United Nations
HBS	-	Household Budget Survey
Ln	-	Natural Logarithm
NGO	-	Non Governmental Organization
NMC	-	National Milling Corporation
SNAL	-	Sokoine National Agricultural Library
SPSS	-	Statistical Package for Social Sciences
SUA	-	Sokoine University of Agriculture
TFNC	-	Tanzania Food and Nutrition Center
UN	-	United Nations
UNDP	-	United Nations Development Programme
URT	-	United Republic of Tanzania

CHAPTER ONE

INTRODUCTION

1.1 Background information

Like many other countries in the world, food insecurity continues to be a big problem in different parts of Tanzania (Ringia, 1990; Wagao, 1991; Kavishe, 1993; FAO, 2000). Many households continue to face problems of obtaining stable availability and access to nutritionally adequate and safe food. Food insecurity therefore remains one of the most visible manifestations of poverty at both household and national levels. Studies over the past ten years show that food insecurity in Tanzania is increasing whereby the number of undernourished people has risen from 23% in 1980, to 40% in 1999 (Mbilinyi *et al.*, 1999).

Despite the truth that most of the food insecurity and malnutrition situation in Tanzania and other low-income countries is found in rural areas, concern over household food insecurity in urban areas is increasingly becoming important. This concern has especially been brought about by some changes in the macro-economic environment in the country. Firstly, economic deterioration of the past two decades has tended to hit hard the urban poor. This has been particularly so because of the urban dwellers' dependency on wage employment for income and the market for food supplies. Secondly, fiscal constraints have prevented the continuation of many urban-biased food subsidy policies. Many governments of low-income countries (including Tanzania) have been forced to restructure their economic policies by cutting back on urban food subsidies and on employment opportunities in government and parastatal organizations (von Braun *et al.*, 1993). These measures

have adversely affected the different facets of household welfare of many urban households in the country. With respect to household availability and access to food, Maliyamkono and Bagachwa (1990) noted that before removal of subsidy in 1983 minimum wage could buy 8 Kg of maize flour (“sembe”) compared with only 2.5 Kg in 1988. The effects of policy change in employment are also apparent; for example, from 1986 to 1989 total wage employment grew at an annual rate of 0.7 percent compared with 1.3 percent growth for the 1981-85 and 5 percent for the 1976-80 periods (URT, 1988). Because many urban dwellers in the country depend on wage employment for income, such a decrease in employment has a direct impact in lowering peoples’ access to food.

In order to meet their desired food requirements, households in urban areas depend mainly on food purchases. Under the prevailing situation of uncertain access to food caused by urbanization and macro economic policy changes, most urban households have adopted a number of alternative strategies for coping with the resulting food insecurity. These strategies include several forms of capital¹ including physical (e.g. asset liquidation), human (e.g. labour sales) and social (e.g. food offer from kin). The current study seeks to shed light on the role of social form of capital in coping with household food insecurity in urban areas of Tanzania. Findings from this study aim to contribute towards proper design of food security interventions particularly for the urban poor who are more food insecurity vulnerable.

¹ The importance of forms of capital in coping with household food insecurity is described in the Sustainable Livelihood Framework on page 34.

1.2 Social capital in Tanzania

Building a nation with a strong sense of national unity and solidarity among its people was recognised as important and accorded a priority by the Tanzanian government since independence in 1961. Deliberate efforts to reduce ethnic and religious differences can actually be traced back to the period before 1961 during the struggle for independence from the British government. The major reason for unity among natives was by then to gather collective action against colonial power. There were two major factors, which enhanced unity among natives in Tanzania. These included possession of common language i.e. Kiswahili within ethnic diversity that was present. Kiswahili language was spoken by most of the natives.

A major breakthrough in instituting collectivism among the people was made in 1967 with the announcement of Arusha Declaration. The declaration was an official move by the country to pursue socialism and self-reliance. The policy had a significant bearing towards social capital formation. It emphasised on collective action, public property ownership and inducing a spirit of co-operation and mutual obligation among the people. One of the practical implementation of this policy was the popular villagization programme that was introduced throughout the country. Under this programme, scattered households were collected to form “ujamaa” villages. In the villages people were made to live together, farm and market together and participate in a communal way of life built under the principles of familyhood and respect to each other. It is no doubt that the programme developed a high level of trust and community networking among people, which are major elements of social capital. Efforts to develop unity among Tanzanians were not exclusive to villages alone. In

the urban areas the spirit of socialism was induced and propagated through the education system. The compulsory National Service for high school and college graduates was also introduced whose aim was to teach people how to live with each other.

The consequence of all these is the presence of high levels of cross cutting ties among Tanzanians. Today, Tanzanians, both in rural and urban areas have developed common values and norms that enable them to share lives and form social networks irrespective of their social, economic and cultural differences. This fact is also shared by Narayan (1999) who noted that although Tanzania is composed of over 300 ethnic groups, years of socialism and villagization programme have led to a strong sense of national identity which appears to supersede ethnic identity. In a participatory poverty assessment exercise conducted in 87 communities across Tanzania, people explicitly linked peace and community economic levels to informal groups with cross ethnic membership. This is particularly manifested by non-existent of ethnic violence or polarization despite acute poverty levels (Narayan, 1999).

1.3 Definition of terms

In undertaking this study a number of terms that can be found in day-to-day language have been specifically used to quantify social capital concepts and other aspects of social networks. The words *household*, *own children*, *blood relatives* and *non-blood relatives* have featured frequently in the text. In normal language these words appear not to bear a single meaning to different people and therefore for the purpose of clarity on how these words have been perceived in this study, the terms are hereby

defined. In addition, the concept and dimensions of social capital are defined as perceived in the context of the study.

A household: A household refers to all individuals residing in a common structure and sharing a common budget. In some cases other members were found to be temporarily away. (e.g. children at boarding schools) at the time of the survey. They were, however, enumerated as being household members.

Own children: A child to a given household was defined as any person born by at least one of the parents in that household. All children born by one of the parents (for example before marriage) including adopted children whether or not living with a household were enumerated as children to a household.

Blood relatives: A blood relative to a person was defined as any individual sharing at least one parent with the person.

Non blood relatives: A non-blood relative to a person was taken to mean any man or woman with family connections of kinship to the person, but did not share parents.

*Social capital*²: Social capital refers to social connections or networks, norms and trust, all of which can facilitate cooperation in society and ultimately have effects on economic performance.

Bonding social capital: Bonding social capital refers to a stock of social capital within groups (i.e. strong ties between immediate family members, neighbours, close friends and business associates sharing similar social economic and/or demographic characteristics).

Bridging social capital: This refers to ties holding people attached to different groups. Social ties which characterizes bridging social capital are referred to as cross

² The concept of social capital is elaborated in the literature review in page 25.

cutting ties and are known to be efficient in opening up economic opportunities to less powerful or excluded groups.

1.4 Problem statement and justification

People normally adopt a variety of coping strategies during hunger and food insecurity periods (Ishengoma, 1998). An understanding of the various coping strategies is an important prerequisite for formulating efficient policy interventions for solving household food insecurity problems. While a number of studies have been conducted to investigate the situation in rural areas, very little is known on household coping strategies against food insecurity in urban areas. For this reason von Braun *et al.*, (1993) advocated the need to research on the complex nature of food insecurity problems in urban areas of developing countries. This entails among others, an investigation of the role played by the various forms of capital. The major forms of capital referred to here are financial, physical, human and social.

Existence of household food insecurity of varying degrees in urban areas of Tanzania has been frequently pointed out and the debate over it will certainly continue in so far as it's solution has not been found. For example, Bryceson (1990) noted that during the late 1970's and early 1980's, the period of command economy in the country, food insecurity was acute, virtually experienced by all segments of the population. Urban residents faced uncertainty of supply and availability of food and found a major portion of their income and working time devoted to food procurement. The decline in reduced access to food in the wake of Tanzania's drastic deterioration of international terms of trade coupled with poor performance of the National Milling

Corporation (NMC) were particularly responsible for the shortages (Bryceson, 1993). Recent evidence suggests that a significant proportion of urban residents in the country are still experiencing insecure access to food. For example it was found in the year 2000 that 46.8% of all Dar es salaam city residents were food insecure (TFNC, 2000). The study further found that 100% of all poor residents in the city were facing a problem of inadequate access to food.

Under these circumstances it is evident that survival in urban areas of Tanzania has been heavily dependent on the use of coping strategies. This proposition is highly supported by an analytical framework articulating relationship between cross cutting ties (form of social capital characterised by links between social groups) and governance as suggested by Deepa Narayan (Narayan, 1999). According to this model, societies with high level of cross cutting ties rather than deep social cleavages and ineffective states are characterised by the substitution of the formal system by informal systems. If the state is not totalitarian or coercive, societies may not disintegrate into wide spread crime, violence or war, but large segments are left to their own devices to cope in the best ways they can. This substitution of informal networks for the failed state forms the basis for coping strategies (Narayan, 1999). Practical examples of the case in point are found nearly all over the developing world where the poor and middle class have developed local strategies to survive. Certainly, substitution of this kind and reliance on social networks for survival instead of the state do take place in urban areas of Tanzania.

Unfortunately however, the role of social capital in coping with household food

insecurity in urban areas of Tanzania appears to be only narrowly considered in social research. Bryceson (1993) identified the role played by social networks in enabling food access to urban households in Dar es salaam from a marketing perspective. She noted that over one third of the households received staple foods from extra household sources mainly from extended family members. She identified that the supply was occasional and the percentage of household foodstuffs covered by such supply was generally below 10% of the total food consumption. Kavishe (1993) acknowledged the usefulness of networking or connectedness between people (mainly urban dwellers) in Tanzania in their efforts to alleviate difficulties caused by Structural Adjustment Programmes through establishment of projects “(miradi)”³. He noted that in the absence of easy access to formal credits, people developed credit systems among themselves “(upatu)”⁴ with the purpose of raising capital for running their projects. Such highlights, though useful, do not provide adequate analysis to the role played by social capital in coping with life constraints. Firstly, the meaning of social capital appears to be largely restricted to horizontal networking arrangements between individuals (bonding social capital) while other dimensions such as bridging and linking social capital are left unmentioned. Secondly, quantitative treatment of the subject is restricted on descriptive analysis alone. Application of more rigorous quantitative treatments such as econometric analysis on the subject appears to be non-existent. Thirdly, characteristics of social capital arrangements mentioned to be commonly adopted as coping options are unexplored. With these circumstances at hand, it appears quite convincing that the current

³ Refers to small/micro income generating projects.

⁴ The popular name of Rotating Savings and Credit system in Tanzania

information, and particularly so for Tanzania is inadequate for policy making.

This study specifically intends to shed light on those aspects of the subject that appear to be inadequately covered by earlier researchers. Thus the study will focus at: (1) consider the role of social capital on its wider dimensions and relate it to how the society contends with food insecurity, (2) apply more rigorous quantitative analyses methods on the subject including hypothesis testing using regression models, and (3) establish a deeper understanding of social capital arrangements that are commonly mentioned as useful safety nets by identifying their characteristics.

1.5 Objectives of the study

1.5.1 General objective

The general objective of this study was to assess the role of social capital in coping with household food insecurity in the city of Dar es Salaam and Morogoro municipality.

1.5.2 Specific objectives

Specifically the study addressed four aspects:

1. To identify the various coping options related to social capital that are commonly adopted by households in the study area to contend with food insecurity.
2. To determine characteristics of social capital arrangements which are relevant for household food security.
3. To determine the extent to which social capital reduces household food vulnerability.

4. To determine the effects of household stock of social capital on household income.

1.6 Research questions

This study had an ultimate aim of answering the following four research questions.

1. What are the various social capital based coping options commonly used by urban households of Morogoro and Dar es Salaam in alleviating food insecurity?
2. What are the characteristics of social capital arrangements relevant to food security commonly adopted by households in the study area?
3. Does social capital significantly reduce household food insecurity vulnerability in Dar es salaam city and Morogoro municipality?
4. What are the effects of household stock of social capital on income?

1.7 Hypotheses

The research was governed by the following hypotheses:

1. Household stock of social capital significantly increases household income. A web of social ties, contacts and relationships is an important resource to households. Households normally manipulate this asset in their income generating activities and thereby increasing income.
2. Social capital significantly reduces food insecurity vulnerability in Dar es Salaam and Morogoro municipality. Social capital increases opportunities for income generation and therefore access to sources of food and hence reduces

household food insecurity vulnerability.

1.8 Organisation of the study

This study is organised in five chapters. The first chapter presents an introduction to the study which brings into light some key issues justifying the research to be an important area for analysis. The second chapter presents a critical review of the existing literature. Chapter three covers the methodology used by the study. Chapter four presents a discussion of the findings obtained in the study. The last chapter (chapter five) summarises the findings of the study and presents the general conclusion reached following discussion of the results. The chapter also presents policy implications emanating from the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

This chapter presents literature covering pertinent issues related to social capital, food insecurity and coping strategies. It starts by describing in detail the concept of food security (section 2.2). The section also reviews issues related to household food insecurity and coping strategies. Section 2.3 summarises literature on the concept of vulnerability and its measurement. Section 2.4 discusses social capital and especially its relevance as a coping strategy for food insecurity. Section 2.5 presents literature on the Sustainable Livelihood Framework. The last section (section 2.6) is a summary of the conclusions drawn from the reviewed literature. The summary highlights the implications of the literature on study hypotheses.

2.2 The concept of food security

2.2.1 Historical perspective

Worldwide concern over the problem of food security is known to have been started in 1974 with the convening of World Food Conference. The conference was convened when world food supplies were tight and mass starvation appeared imminent. The earliest efforts to combat the perceived food crisis involved formation of international bodies namely the World Food Council, the Food and Agriculture Organisation of the United Nations, the Committee on Food Security (with its food security assistance scheme) and the Committee on Food Aid Policies and Programmes of the United Nations. These bodies identified the problem of food security as emanating from inadequate food production thus the focus on domestic

food production was adopted as the governing principle towards achieving global food security (Zeitlin and Brown, 1992). With this paradigm, food security was conceptualised as a macro phenomenon – deviations from trend in aggregate consumption (Clay, 1981).

It was not until 1980s when another food crisis plagued Africa when many of the assumptions made at the 1974 conference proved to be unfounded. Growing output and starving millions was the prevailing paradox of the world food problem. In other words it was realized that increased food production was not the simple answer to the hunger problem (Zeitlin and Brown, 1992). Inaccessibility to the available food was ascertained to be caused by erosion of people's entitlement to food. Food entitlement theory (Sen, 1981) has had a considerable influence on a shift in thinking. Thus, in addition to inclusion of the food distribution aspect in meeting the food challenge, this paradigm also acknowledged the role of various social-economic variables that have an influence on household's access to food. This marked the beginning of the current understanding of the complex nature of the food security problem.

2.2.2 Dimensions of food security

In line with the changes in perceptions on the nature of the food security problem, the concept of food security has accordingly been defined in different ways. Similarly, dimensions of the food security problem have accordingly been perceived in changing perspectives. For example, prior to mid 1980s when the problem of food security was still considered to be caused by insufficient domestic food production,

food security was defined as the availability at all times of adequate food supplies of basic foodstuffs... to sustain a steady expansion of food consumption... and to offset fluctuations in production and prices (UN, 1975 cited by Maxwell and Frankenberger 1992). A closer articulation to this definition is the description by Reutlinger and Knapp (1980) cited by Maxwell and Frankenberger (1992) which refers food security to a condition in which the probability of country's citizens falling below a minimum level of food consumption is low. The two definitions above consider food security as an aggregate phenomenon and they are oriented towards increasing production as the solution to the food security problem.

Due to an increased understanding of the concept of food security, particularly resulting from the works on poverty and entitlement (Sen, 1981) and on multidimensional causes of malnutrition (Berg and Austrin, 1984 cited by Maxwell and Frankenberger, 1995) most definitions now give primacy to individual's access to food. There are many definitions, which are based on this outlook. However definitions given by three international organizations namely the Food and Agriculture Organisation of the United Nations (FAO), The World Bank, and European Commission seem to receive wider acceptance.

FAO (1983) defines food security as an assurance that all people at all times have both physical and economic access to the basic food they need. This definition encompasses three specific goals (a) ensuring adequacy of food supplies (b) maximizing stability in supplies and (c) securing access to the available supplies for all those who need them.

The World Bank (1986) defines food security as access by all people at all times to enough food for an active healthy life. Its essential elements are the availability of nutritionally adequate and culturally acceptable food and the ability to acquire it. According to this definition therefore food insecurity refers to the lack of access to enough food.

According to the European Commission, food security can be defined as absence of hunger and malnutrition (Kennes, 1990 cited by Maxwell and Frankenberger 1992). For this to be possible, villages or countries must have enough resources to provide or otherwise obtain food. This condition is necessary but not sufficient because the resources must also be used sustainably.

A wider concept of food security has been proposed by Maxwell (1988, 1989 cited by Maxwell and Frankenberger 1992). According to Maxwell, a country and people are food secure when their food system operates efficiently in such a way as to remove the fear that there will be no enough to eat. In particular food security will be achieved when the poor and vulnerable, particularly women, children and those living in marginal areas, have secure access to the nutritionally adequate and culturally acceptable food they want. Food security will be achieved when equitable growth ensures that these groups have a sustainable livelihood in the meantime, and in addition food security requires the efficient and equitable operation of the food system. Because equitable distribution of food is an important precondition for efficient functioning of food systems, a country is food secure if it has achieved

equitable food distribution.

There are two main dimensions in which food security can be viewed (a) the level of analysis, meaning individual, household, community, national and (b) time frame relating to variability in food consumption at different times for example across seasons. According to the World banks' perspective of time frame, food insecurity can be distinguished into two forms, namely; chronic and transitory food insecurity. Whereas transitory or short-term food insecurity refers to temporally loss of access to food caused by a relatively sudden or unexpected loss of production or income, chronic food insecurity is a long-term lack of secure access to enough food (Zeitlin and Brown, 1992).

2.2.3 The concept of household food security

Primarily the concept of household food security is closely related to national, regional, and individual food security in that in addition to the rest, a household forms just one of the units of analysis in food security studies. The issue of household food security however has emerged as an organizing principle for development thinking and an objective of development. To reduce and monitor food insecurity, efforts have to be directed at (i) identifying food insecure groups, (ii) learning on how and why they become vulnerable, and (iii) locating where they reside. In the past, such analyses were done at regional or national levels (Statz *et al.*, 1990). Many policy makers believed that an analysis at national levels was sufficient in gathering adequate information. Recently, however, many have begun to question the validity of commonly used indicators of food security measured at

national levels as representative indicators of access to food at the household level. For example some studies have confirmed that it is common to have 20%-30% of the population consuming less than 80% of calorie requirements even when per capital income within the country is above 100% (Kennedy and Haddad, 1992). The notion of food entitlement has played an important role in this reassessment. Entitlements are legal means by which an individual or household gains access to their needs (Sen 1981, 1990, 1995).

In using the concept of household food security as a unit of analysis, several conceptual issues arise. Operationalization stands as one of the important issues. Operationalisation of the concept of household food security requires a series of assumptions about the household structure and its organization in order to identify the activities, the relationships and processes essential to improving food security and maintain adequate nutritional status (Maxwell and Frankenberger, 1992). Economic models, though strongly criticized, remain important tools in understanding the nature of households in food security studies.

A theoretical economic model of a household behaviour is built on the hypothesis that all household members do jointly maximize some household level welfare function. The model assumes that as long as the household remains intact, it may be treated as if it is a single individual. All resources are pooled and then reallocated according to some common rule, (Becker, 1981 cited by Maxwell and Frankenberger 1992).

The model though useful in explaining the nature and behaviour of households has been strongly criticized on the basis that households are not truly intact but rather disaggregated. In nutrition studies, for example children, pregnant and lactating women are often identified as priority vulnerable groups implying desegregation of household members on the basis of food security vulnerability. This criticism has brought about an important breakthrough in our understanding of the nature of households with respect to food security. Some of the pertinent ideas raised are (a) the assumption underlying many policies aimed at improving food security and believing that the improvement of household food consumption would automatically result in an increase in food intake of each individual household member is invalid. Thus a closer look at intra household food distribution issues is important, (b) household members do not share a common set of preferences in resource allocation. These criticisms suggest that the best unit of analysis in food security studies is individual level. It is apparent however that, precise analysis of food related parameters at individual level for large populations is rather complex and perhaps impossible. For this reason, a household remains the best unit in analysing and explaining food issues for practical purposes.

2.2.4 Household food insecurity coping strategies

There is a growing body of evidence suggesting that households living in conditions that put their entitlement to food at recurrent risks plan strategically to minimize their risks (Corbett, 1988). A more commonly used term for these self-insurance strategies in minimizing risks of food insecurity and livelihood is referred to as coping strategies. A number of different terms are also used to describe what households and

individuals do when faced with the threat of famine. Although “coping mechanisms” is most commonly used, the term “strategy” appears to be proper because it most readily implies the careful forward planning that has been observed. The term “response” is used for each of the individual actions undertaken within a strategy. Several responses such as sale of livestock, migration or collection of wild foods may be undertaken as part of the same overall strategy (Corbett, 1988).

There are a number of individual case studies, which record how people have in the past responded to severe food crises and famine in Africa, chiefly drawn from Sahelian and Eastern Africa countries. The kinds of famine coping responses that are commonly observed are dispersed grazing, change in cropping and planting practises, migration to towns in search of urban employment, collection of wild foods and use of inter household transfers and loans. Others options include migration to other rural areas in search of employment, rationing of current food consumption, sale of productive household assets, (e.g. livestock and land), consumption of food distributed in food relief programs, sale of possessions e.g. jewellery, break up of the household, increased petty commodity production and trading and distress migration (Corbett, 1988).

Longhust (1986) and Watts (1988) cited by Maxwell and Frankenberger (1992) have explained a systematic analysis of household coping strategies to food insecurity. Their analyses suggest that traditional methods of handling risk can be divided into routine risk minimizing strategies and loss management mechanisms (Walker and Jodha, 1986). Risk minimizing strategies comprise adjustments to production and

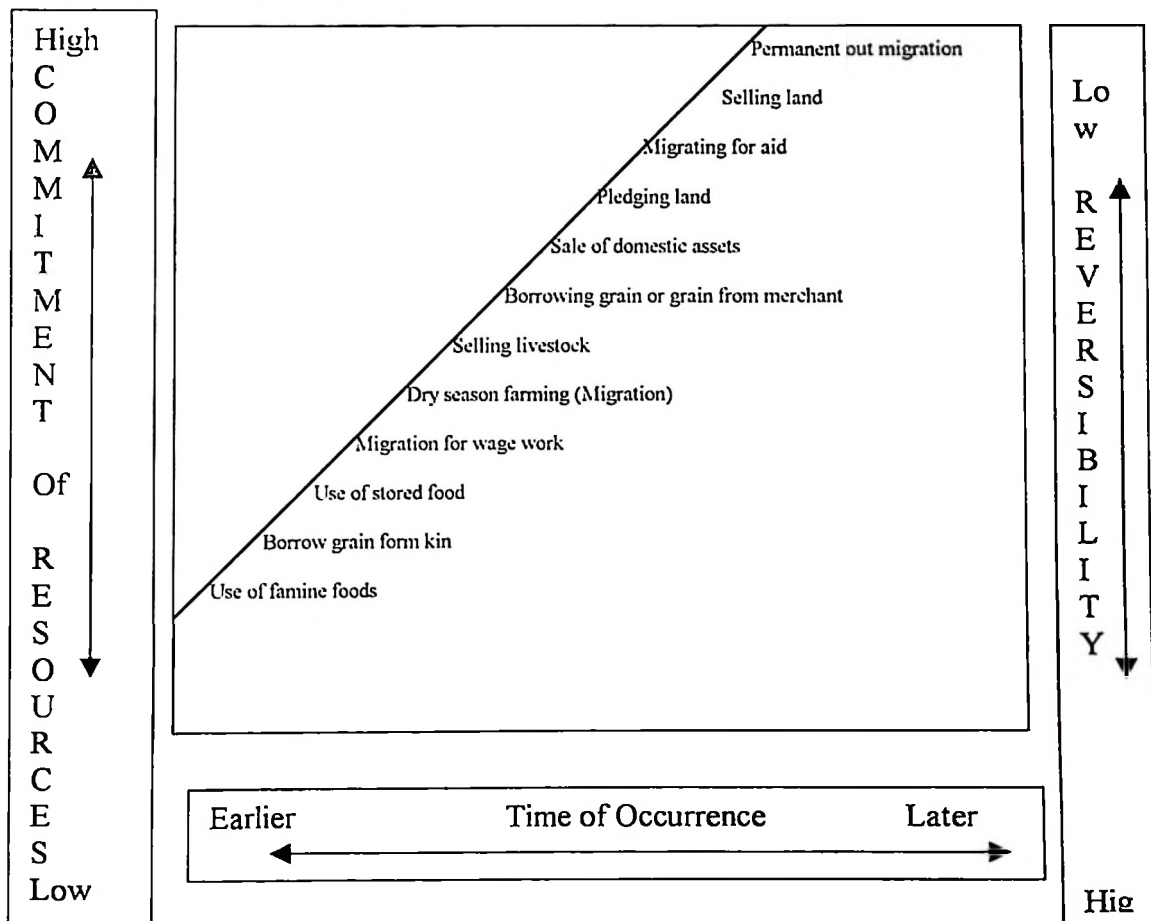
resource use before and during the production seasons. The practises include diversification of resource and enterprises and adjustments within cropping patterns. Strategies that are centred on crop diversification can include choice of crop of differing maturing periods and sensitivities to environmental changes (Ibid, 1986). Farmers may also extend their farming to marginal areas or over-use their plots in their efforts to minimize risk. Loss management strategies on the other hand include farmer's response to lower than expected crop production caused by natural hazards (Ibid, 1986). This reduction in crop production can be compensated through non-farm income (off-farm income), seasonal migration and reciprocal obligation among households. Another commonly adopted loss management strategy with implications for the environmental condition is resource over exploitation such as over fishing.

The above analysis together with many other studies on household coping strategies in Asia and Africa focus on what rural households do in response to threats to their food security. It is known however that urban households are also be prone to various kinds of food insecurity whose relative importance may be growing as urban populations expand (Bryceson, 1990, Von Braun *et al.*, 1993). But for a mix of political and economic reasons, mass starvation and mortality do not seem to be an urban phenomenon in Africa and urban coping strategies in response to less extreme poverty and household food insecurity (e.g., due to unemployment) have not been extensively examined (Corbett, 1988).

Despite the truth that household responses to famine (the most serious form of food insecurity commonly caused by drought) do vary from one place to another, there do

appear to be some typical patterns in these responses. It has further been learnt that coping strategies are not adopted in haphazard or random manner, but typically fall into a distinct sequence (Corbett, 1988). The patterns of households coping strategies (Fig 1) have been clearly diagrammatically presented by Watts (1988) cited by Maxwell and Frankenberger (1992).

Figure 1: A Model of Response to food shortage




Source: Adapted from Watts 1988 cited by Maxwell and Frankenberger 1992

In the literature, this sequence of responses is conveniently divided into three distinct stages (Corbett, 1988). Households in the earliest stage of crisis (stage one) employ certain types of risk minimizing and loss management strategies. These typically involve a low commitment of domestic resources such that quick recovery of the resources is possible once the crisis has ceased. As the crisis persists, households are increasingly forced into greater commitment of resources just to meet subsistence needs (stage 2). The second stage involves gradual disposition of key productive assets, making it harder to return to a pre-crisis stage. At this stage the household food insecurity vulnerability is extremely high. Destitution and distress migration are the key features of stage three. Adoption of those strategies by the households is a clear indication of failure to cope with the food crisis.

2.3 Measurement of food vulnerability

One of the key criteria underlying the delivery of services from social assistance programs, humanitarian and emergency relief operations is vulnerability. Identification of vulnerable groups and the assessment of the cause of vulnerability are critical to designing of appropriate assistance programs. Knowledge of whom and where the vulnerable are, helps to lower the costs for providing assistance to the people in need, therefore enabling effective targeting. This is one of the practical benefits of using the concept of vulnerability (Tollens, 1998).

Vulnerability can either be defined in a general or specific context. Broadly, vulnerability refers to any threat to survival or livelihood. In this context vulnerability can also be defined as a combination of exposure and risks and the



ability of households and individuals to cope with those risks and recover from a shock or deterioration of current status (Dershem and Gzirishvili, 1998). In specific terms, vulnerability is defined as the measure of the risks that one of the status indicators such as poverty, malnutrition, food security, poor health, etc will occur at some point in time (Tollens, 1998).

In the literature, vulnerability is usually explained as a characteristic of poor people. Normally a person becomes vulnerable when his or her initial capital has been depleted. The poor generally owns small initial capital making them more exposed to shocks in their production and trade, consequently leading them to be vulnerable. Apart from poverty, health and other physiological disorders are major causes of vulnerability. Biologically, vulnerable groups include pregnant and lactating women, solitary old persons, widows with children, female headed households the handicapped, prisoners, orphans and unaccompanied children, street children and traumatized persons. Worst enough, biological vulnerability is usually superimposed on social economic vulnerability (Tollens, 1998). One of the important welfare aspect to which both the poor and biologically disadvantaged individuals are vulnerable to is food.

Maxwell (1992) categorises food unsecured vulnerable households in Africa into 5 groups:

Families with little productive capital in food surplus regions;

1. Capital poor families in arid and other marginal areas;
2. Poor cattle breeders;

3. Urban poor;
4. Refugees, homeless and other war victims

Each of these categories of food vulnerable households is subjected to a particular source of risk. In the case of urban poor for example, the major sources of risks are changes in food price (large sudden price rises) and employment.

In the literature there are several measures of food vulnerability. The strongest recommended method of identifying the vulnerable in a community is through the use of participatory methods (Tollens 1998). Advocates of this method argue that the vulnerable in a given community are invisible in the sense that they can't be identified through visiting the community for only a short while. They argue that identification of vulnerable groups can only be successful if the concerned community members will be involved in the assessment activity using participatory appraisal techniques for longer periods. Literatures also suggest two other alternative measures of food vulnerability named as introspective and non-introspective measures. Non-introspective measures consider resources such as cash income and number of durable goods owned by a household in the analysis of vulnerability. On the other hand introspective measures are for example personal ratings and comparisons of observations and experiences. Non-introspective and introspective measures are sometimes also referred to as objective and subjective measures of food vulnerability respectively. Pertaining to this, Dershem and Gzrishvili (1998) argue that the terms introspective and non-introspective measures are better expressions than subjective and objective because the term subjective denotes biased and objective denotes unbiased. During the past, non-introspective measures of

vulnerability were thought to be more appropriate than introspective. Recently, however, the use of people's perception (introspective measures) as a measure of vulnerability is increasingly becoming important. The conviction that non-introspective measures provide a more objective assessment of vulnerability is increasingly being questioned (Hobbs 1987; Littrell and Hobbs, 1989; Upholf, 1991 cited by Dershem and Gzrshvili 1998).

2.4 The concept of social capital

2.4.1 Historical outlook

The concept of social capital has existed for along time, however it is only recent that it has started to be used in economic studies. The concept has practically been neglected because of the traditional focus of development economics on what governments and markets can and cannot do to improve social/economic welfare in developing countries. The recent shift in focus towards an analysis on what an organized civil society can achieve as a development agent has accelerated the thinking on social capital (Molinas, 1998). The field of development economics has recently recognized that there are many economic problems such as internalisation of ecological externalities, the provision of local public goods, and the access to credit by the poor that neither the market nor the state can readily solve. In solving such economic problems, an organized civil society may play an important role as a complement to (and sometimes as a substitute for) the market (Heller, 1996; Lam, 1996; Ostrom, 1996; de janvry *et al.*, 1993; Upholf, 1993; Thorbecke, 1993 cited by Molinas, 1998). In economic analysis the focus on institutions is known to be particularly relevant in the evolution of social capital. It is well known that such

analysis goes back to the 1920s. However, it is only recent that vigorous economic research on institutions started to be undertaken under the field of new institutional economics in which the concept of social capital is being intensively studied (Mbiha *et al.*, 2001)

2.4.2 The meaning of social capital

The evolution of the concept “social capital” has come along with a number of alternative definitions. In political science, sociology and anthropology literature, social capital refers to the set of norms, networks, and organizations through which people gain access to power and resources and through which decision-making and policy formulation occur (Mbiha *et al.*, 2001).

The World Bank defines social capital as the institutions, relationships, and norms that shape the quality and quantity of societal interactions. According to this view, social capital is perceived not just as the sum of institutions that underpin a society- but rather as glue that holds them together (Poverty net (a), 2001).

Putman (1993) has put forward the narrow view of social capital. According to this view, social capital is a set of horizontal associations between people, consisting of social networks and associated norms that have an effect on community productivity and well-being. According to this view, an important characteristic of social capital is that it facilitates coordination and cooperation for mutual benefit amongst members of the association.

A broader view of social capital accounts for both the positive and negative aspects including vertical and horizontal associations between people, and includes behaviour within and among organizations, such as firms. According to this view, horizontal associations are important as they give communities a sense of identity and common purpose (Poverty net (a), 2001).

The broadest and most encompassing view of social capital has been explained by North (1990). The author considers social capital to include the social and political environment that enables norms to develop and shape social structure. This analysis extends the importance of social capital to the most formalized institutional relationships and structures such as government, political regime, rule of law, the court system, and civil and political liberties. Such institutions have an important effect on the rate and pattern of economic development (North, 1990).

2.4.3 Dimensions of social capital

In the literature, the concept of social capital has been described in different dimensions. Perhaps the most widely known categorization of social capital is bonding and bridging social capital. Narayan (1999) expresses bonding social capital as a stock of social capital within groups (i.e. strong ties between immediate family members, neighbours, close friends and business associates) sharing similar demographic characteristics. Bridging social capital on the other hand is expressed as the ties holding people attached to different groups. In addition to these two, ID21Insights (2000) explained linking social capital as the ties between poor people and those in positions of influence in formal organizations such as banks, agricultural

extension offices, schools, housing authorities or the police. With respect to this categorization, ID21Insights (2000) argues that the poor have plenty of bonding social capital-links with people in similar circumstances to themselves. It appears that, they have some bridging social capital (scattered friends and acquaintances) and distinct relatives in other areas but they lack linking social capital or friends in high places to help them deal with commercial, educational, legal or political organizations.

In another dimension, social capital has been explained to be falling into government and civil social capital (Collier, 1998). According to this perspective, government social capital encompasses enforceability, contracts, rule of law and the extent of civil liberties. Civil social capital on the other hand includes common values, norms, informal networks and associational membership.

Uphoff (1999) distinguishes between structural and cognitive social capital. In this perspective structural social capital is perceived to include a variety of forms of social organizations including roles, rules, precedents and procedures as well as a variety of networks that contribute to cooperation. Cognitive social capital on the other hand consists of norms, values, attitudes and beliefs. Commenting on the above forms of social capital, Krishna (1999) argues that structural and cognitive social capitals are complementary. If norms of reciprocity are practised, then efforts to create structures and procedures ought to be easier. Indeed, structures help in translating norms and beliefs into a well-coordinated goal oriented behaviour. The theory of social capital assumes that there are distinct ways through which each of

the above dimensions assists households in reaching livelihood objectives including facilitating access to food. With regard to coping with food insecurity, for example, ties with immediate family members (bonding social capital) may help households with receiving food offers from kin, whereas links with people with positions of influence (linking social capital) may on the other hand provide the household with food aid from government authorities or Non Governmental Organisations.

2.4.4 Influence of social capital in the development processes

There is growing evidence that social capital plays a role in societies to prosper economically. Associations and institutions provide informal frameworks for effective cooperation amongst individuals. Cooperation is achieved mainly because of social capital's influence on information sharing, co-ordination of activities, and collective decision-making. What makes social capital work is the peer monitoring, common set of norms and local level cooperation (Bardhan, 1995). Several studies have confirmed existence of a positive influence of social capital to various areas pertinent to development. For example, Coleman and Hoffer (1987), Braatz and Putman (1996) and Francis *et al.*, (1998) cited by Poverty Net (2001b) found that schools are more effective when parents and local citizens are actively involved. Teachers are more committed, students achieve higher test scores, and better use is made of schools' facilities in those communities where parents and citizens take active interest on children's educational well-being. Doctors and nurses are more likely to show up for work and to perform their duties attentively where their actions are supported and monitored by citizen groups (Dreze and Sen 1995 cited by Poverty Net (b), 2001). On the downside, however, social capital was also at work when

disgruntled local elites joined together to close health clinics in Uttar Pradesh (Dreze and Sen, 1995 cited by Poverty Net (b), 2001). Despite of the truth that negative effects of social capital on development processes have also been documented, most literature suggest existence of overwhelmingly large beneficial influences of social capital compared to their negative counterparts. The above presentation suggests that the effects of social capital to development extend to different spheres. Literatures suggest that one of the most important development sphere influenced by social capital is facilitating peoples access to food including coping with food insecurity.

2.4.5 Social capital and livelihood

There is a wide consensus among researchers and policy makers that social capital is an important asset, which reduces peoples' vulnerability to poverty and its associated problems. It is generally assumed that the extent to which a community by itself can be considered as an asset that reduces vulnerability or increases opportunities depends on its stock of social capital (Moser, 1998). In the context of Asset Vulnerability Framework, social capital is recognized as an intangible form of capital that together with other resources (such as labour, human capital and housing) reduces people's vulnerability to poverty. In this framework social capital is generally explained as reciprocity within communities and between households based on trust derived from social ties (Moser, 1998).

When viewed in the context of the Sustainable Livelihood Framework, the concept of social capital generally refers to the social resources upon which people draw in pursuit of their livelihood objectives. In this context, the use of social capital as a

safety net can take any of the following broad categories of forms. First, networks and connectedness either vertical (patron/client) or horizontal (between individuals with shared interests) that increases peoples' trust and the ability to work together and expand their access to wider institutions such as political or civic bodies. Second, membership of more formalized groups which often entails adherence to mutually agreed or commonly accepted rules, norms and sanctions. Third, relationship of trust reciprocity and exchanges that facilitates cooperation, reduce transport cost and may provide the basis for informal safety nets amongst the poor (Mbiha *et al.*, 2001).

A study by Moser (1998) focusing on poverty reduction strategies in urban areas identified the several ways through which people coped with poverty. The identified ways were increased reliance on informal credit arrangements, increased informal support networks among households, and increased community level activity. The author observed that 50% and 75% of all households in Chawama in Lusaka Zambia and Cisne Dos in Guayaquil Ecuador respectively borrowed money from friends and neighbours in 1992 to pay for their food. The study found that 42% of all households in Cisne Dos had credit arrangements with private doctors and more than half of households in commonwealth borrowed from informal lenders for medical expenses. The study found that 57% of the poorest households borrowed from neighbours and relatives to meet daily needs. In the same study it was observed that 15% and 25% of all households with children under the age ten years depended on neighbours for childcare in 1992. With respect to the increase in community level activity in livelihood sustenance, the study highlighted that communities achieved provision of urban services such as school repairs, latrines, and pre-school equipments through

local and international NGO projects that required community participation. The above literatures depicting positive influences of social capital in reducing vulnerability to poverty and enabling households access to livelihood needs provide an insight that perhaps this social asset (social capital) fosters households access to food including facilitating food insecurity coping strategies. This hypothesis stems from the fact that poverty and food insecurity are twin problems such that any factor that reduces household vulnerability to poverty does as well reduce food insecurity i.e. enables households access to food.

2.4.6 Social capital and coping strategies against food insecurity

The influence of social capital in development outcomes has been shown by many studies done at different parts of the World. Some of the studies have confirmed the effect of social capital in bringing about food entitlement. For example, De Waal and el Amin (1986) conducted a study on the pastoral and farming populations in Northern and Southern Darfur Sudan in 1984/1985 to identify their food security coping strategies. In their analysis the authors summarised household coping strategies into three stages of destitution with the influence of social cohesion appearing at each stage. At the first stage of destitution, borrowing of money or food from relatives and forms of inter household assistance were the dominant forms of social capital with a bearing on food security. Borrowing food or cash from relatives and friends as a prominent social capital based coping strategy has also been mentioned by Mngodo *et al.*, (1996), Care International (1995) and Wagao (1991). Rahmato (1987) conducted a coping strategy study in Northeast Ethiopia and came up with four distinct stages. Unlike Dewaal and el Amin (1986) who identified the

influence of social capital at each stage of coping strategy, Rahmato (1987) suggested the existence of positive influence of social capital only at the first stage. The identified social capital based coping mechanisms were inter-household transfers of food and livestock, barter exchange with neighbours and credit arrangements with neighbours. In addition to all these, Care International (1995) identified food aid as yet an important coping strategy in Shinyanga region. It has further been revealed that redistribution of children and livestock are minor coping strategies. Many poor households send their children to be looked after by relatives over a period of time when the household is experiencing difficulties in meeting livelihood needs. Redistribution of livestock on the other hand is done by rich families to poor families (Care International, 1995). Presence of reciprocal obligation with relevance to food security between rural and urban households has also been suggested by von Braun *et al.*, (1993). Complementary to the above analysis Mhinte (2000) identified remittance as an important coping strategy for rural households.

Three social capital studies in Tanzanian context with relevance to food security are Narayan (1997), Narayan and Pritchett (1997) and Le Ferrara (1999). They are all based on data collected in Social Capital and Poverty Survey (SCPS) conducted in 1995 by the World Bank. An important finding from these studies in relation to household food security is that village level social capital increases household income. Isham (2000) did a study in Tanzania to investigate the influence of social capital in technology adoption. The author found that tribal based social affiliations act as a form of social capital in the adoption decision. On his side Mwangi (2002) found that community based source of seed is an important social capital parameter

affecting adoption of improved seed for sorghum and pearl millet in central Tanzania. It can be argued here that because some of the extension packages are meant to assist farmers to improve their food production and preservation, the finding suggests that social capital is relevant to household food security.

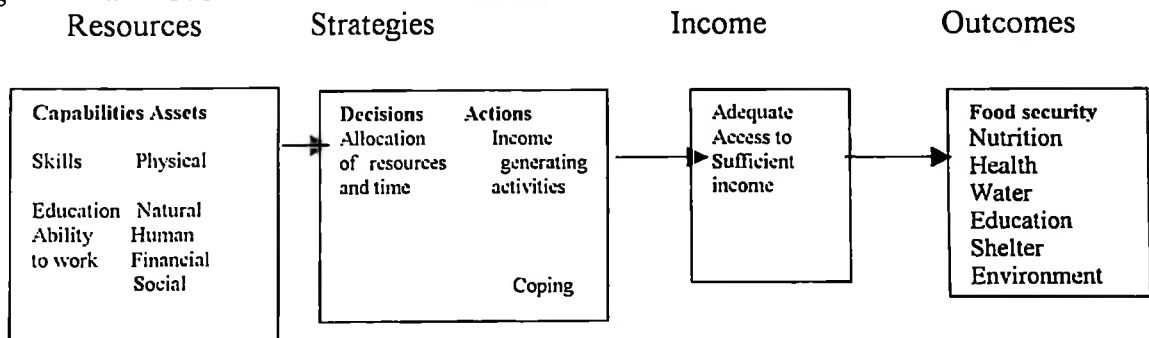
Unlike other studies that have suggested powerful influences of social capital in coping with food insecurity, Wagao (1991) has expressed the weaknesses of social cohesion as a long-term means of survival. According to him, during hunger and food insecurity periods, the element of community reciprocity breaks. Under such circumstances female-headed households are more prone to loss of entitlement mainly due to reduced claims from parents or from husbands or relatives (Wagao, 1991).

2.5 The Sustainable Livelihood Framework

The livelihood approach to development has been applied by many development agencies including DFID, OXFARM, CARE and UNDP (Carney *et al.*, 1999 cited by Mbiha *et al.*, 2001). Application of the concept has grown out of the recognition that sustainable livelihoods are more readily attained if development assistance can be directed at increasing people's capacity to utilise their own resources more efficiently. Application of the livelihood approach however differs from one agency to another. The common thread uniting the agencies is the theoretical Sustainable Livelihood Framework also sometimes referred to as the Livelihood Security Framework.

Sustainable livelihood approach to development research offers a holistic approach for assessing resources and assets that are available to households and analysing how these are linked to the strategies that are used to reach the desired household welfare outcomes such as food security, health and education. The basis for using the notion of livelihood in analysing relationships between food and other welfare outcomes and resources is centred on the traditional theory of entitlements. Sen (1981) defines entitlements as legal means by which an individual or household gains access to their needs. These include exchange (commonly labour for money), production using resources and labour, and transfers and inheritance. Figure 2 depicts the pictorial representation of the Sustainable Livelihood Framework. It summarises the pathways by which household resources are manipulated to achieve attainment of household welfare needs.

Figure 2: The Sustainable Livelihood Framework



Adopted from Maxwell et al., 2000

The framework presented above suggests that household welfare outcomes can only be achieved if the household has adequate access to sufficient income. It stresses that income is of paramount importance in the attainment of outcomes, thus households need to establish effective strategies that ensure sustainable access to sufficient income. The strategies can take two forms; they can either be decisions related to

allocation of resources and time or actions, which are income generating activities and coping strategies. The framework further assumes that household strategies are done through manipulation of resources presented in the leftmost box. Social capital is one of the important resources.

2.6 Conclusion

The literatures reviewed above suggest that social capital plays an important role in enabling households' access to food. The literatures suggest that there are two ways through which social capital facilitates households' access to food. By enabling access to income, social capital improves household's ability to procure food from markets. On the other hand social capital provides households with the ability to cope with food shortages. Through both ways social capital reduces households food insecurity vulnerability. In view of this review, two hypotheses can be drawn. First, social capital increases household income and second social capital reduces food insecurity vulnerability. The two hypotheses are tested in this study.

CHAPTER THREE

METHODOLOGY

3.1 Overview

This chapter describes the methodology used in conducting the study. It is divided into five sections. Section 3.2 explains the sources and types of data used in this study whereas section 3.3 presents the sampling procedure employed in targeting appropriate respondents from the study area. Section 3.4 highlights the survey instrument used and reports the process of data collection. The last sections (section 3.5 and 3.6) describe the method of data analysis employed in the study and location of the study area.

3.2 Data sources

Both primary and secondary data were used in this study. The survey covered collection of both qualitative and quantitative information. Secondary data collected for this study were from various reports and publications such as BoT bulletins and Household Budget Surveys. Most of these publications were found at the Sokoine National Agricultural Library (SNAL). Primary data were sought from residents in surveyed areas. The study collected from the respondents information regarding their risk reduction behaviour, particularly on the role played by social capital in coping with household food insecurity.

3.3 Sampling

The selection of respondents in Dar es salaam was done using stratified random sampling technique. An equal number of respondents were chosen from the three

districts of the city, namely Kinondoni, Temeke and Ilala. It was considered that, with respect to prosperity, households in Dar es Salaam can be categorized into three groups namely high, medium and low-income strata. Respondents were proportionately chosen from each of the income category such that equal number of respondents was chosen from each. The survey involved 30 respondents from each of the income category in Dar es Salaam such that a total of 90 respondents from the city were involved in the study. In other words a total 90 respondents took part in this study such that 10 respondents were selected from each of the three income categories of each of the three districts.

Similarly, stratified random sampling technique was used in the selection of respondents in Morogoro municipality. The study involved thirty respondents from each of income category (i.e. low, middle and high). In both study areas identification of respondents of each income group was based on locations where they live. The municipal officers assisted the researcher in identifying appropriate respondents by providing information on possible locations within the municipality where households with low, medium and high income could be found. A total of 90 respondents were selected from Morogoro municipality such that 10 respondents were selected from each of the three income categories in each district.

3.4 Instrumentation and the data collection process

The major survey instrument used in the collection of primary information was a structured questionnaire. The questionnaire was designed to collect sufficient data intended to address the four objectives of the study. In this regard, the questionnaire

included questions properly set to collect information required in running all the anticipated statistical and econometric analyses for testing hypotheses and answering research questions (section 1.6). The major sections of the questionnaire (Appendix 1) were those aimed at collection of information on basic household characteristics, household stock of physical, social and human capitals, household income and food expenditures and perception of household members on their extent of food vulnerability. A section was also included for collection of information on household strategies employed in coping with food insecurity.

The data collection process was conducted in February 2002. The actual process of data collection was preceded by two weeks of pre-survey and adjustments of the questionnaire. The data collection exercise was done by the researcher assisted by four enumerators. Prior to their active involvement in data collection the enumerators received thorough training on the research and received instructions on how each question included in the survey instrument need to be asked to respondents. Generally, no serious problem was encountered in the process of data collection as all of the possible problems had already been identified and rectified during the pre-survey. The major problem encountered during data collection was deliberate intentions of some respondents (especially high income households) to under report their income levels. Under these circumstances attempts were made by the enumerators to guide the respondent in estimating his/her income by reminding him/her households monthly expenditures.

study i.e. to estimate the effects of social capital on household income.

(a) The model

The analysed linear regression model in this study was of the form shown below:

$$\text{LnI} = \alpha + \beta_1 \text{LnHc} + \beta_2 \text{LnA} + \beta_3 \text{LnSc} + \varepsilon$$

Where:

LnI = Natural logarithm of household income in Tanzanian shillings

Ln Hc = Natural logarithm of household stock of human capital

LnA= Natural logarithm of the value of household physical capital

LnSc = Natural logarithm of household stock of social capital

α = the intercept

ε = the error term.

(b) Measurement of variables included in linear regression model

(i) Household income

The sum of income from different major sources including reported salary, allowances and profits from business of bread earners of a household was taken to represent household income.

(ii) Social capital

Overview

In this study an indicator of social capital was developed by averaging an index derived from connectedness with friends, relatives and neighbours and an index derived from membership and characteristics of groups in which the respondents are members. This is basically an extension of Mallucio *et al.*, (2000) who used

membership and characteristics of groups alone as an index of social capital. Key indicators of social capital from the viewpoint of membership in groups were density (number of group memberships per household), performance (average reported performance) of the most important groups in the household and participation (average reported frequency) of meeting attendance for the most important groups in the household. On the other hand, indicators of connectedness used in this study were education levels (human capital) of children and relatives of respondents and value contributions offered during problems.

Estimation of sub index 1: Membership in groups and characteristics of groups.

This sub index was estimated by measuring density, performance and attendance separately followed by multiplication of the results. Density was measured as number of group membership per household. Performance of the groups was measured by requesting respondents to rate performance of their two most important groups by choosing one of the following response options, 1= very weak, 2= weak; 3 = average, 4 = strong, 5 = very strong. In this 5 scale points 3 was taken as a normalising factor. To get an estimate of group performance, all responses were then averaged and normalised by dividing the outcome by three. Similarly attendance in meetings was measured by requesting respondents to rate their attendance to meetings of their two most important groups by choosing one of the following response options, 1=none, 2=a few, 3= some, 4=many, 5=all. In the same way, to get an estimate of attendance in meetings all the responses given were averaged and the outcome divided by 3. After normalising the performance and participation scores (dividing them by their midpoints), the index was computed by multiplying the three

components. Thus the index was expected to increase with better than average performance and/or increased meeting attendance and decrease with less than average performance and/or decreased meeting attendance.

Estimation of sub index 2: Connectedness with friends relatives and neighbours

This index was estimated by measuring education and contribution separately and multiplying the results. Education levels were estimated by requesting respondents to give education levels of their children and those of the blood relatives of the father and the mother. The education levels were indexed using the following scale 1= no formal education, 2= primary education, 3= secondary education (form four) 4=form six, certificate or diploma, 5=university degree and above. All the responses given were then averaged and divided by a normalising factor of three. To get an estimate of contribution, respondents were asked to tell the amount of contribution given to them in Tanzanian shillings during the latest incidence of problem. The figures given were then assigned groups as follows: Between 0 and 10,000=1, between 10,001 and 50,000=2, between 50,001 and 100,000=3, between 100,001 and 1,000,000=4 and above 1000,000=5. In the same way, 3 was taken as the normalising factor. Thus to obtain an estimate all the responses were averaged and divided by 3. After getting values of education and contribution separately the index was computed by multiplying the two.

Deflation of contributions into current (2001) prices

Because the contributions reported by the respondents were made at different time periods they couldn't mean the same purchasing power due to the problem of

inflation which varies from year to year. This problem could ultimately hamper comparisons which were supposed to be done. To remedy the problem, reported values of all the contributions were deflated into their corresponding real values. The figures were converted into their current (2001) prices using Consumer Price Index data. Year 2001 was taken as the current because the survey and data analysis for this study were all done during the first quarter of 2002 when the figures of National Consumer Price indices were not yet released. To convert values of contributions of a given year into 2001 values, the figure was multiplied with the ratio between Consumer Price Index for 2001 and Consumer Price index for that year. For example Tshs 25,000 reported in 1988 when converted into 2001 values will be equal to 25,000 times consumer price index for 2001 divided by consumer price index for 1988 ($=25,000 \times 225.2/19.5 = 288,700$). The National Consumer Price index data were obtained from three BoT publications namely BoT (1996), BoT (1998) and BoT (2001).

(iii) Human capital

A proxy for household stock of human capital was constructed on the assumption that human capital increases with education levels of household members. Education levels of bread earners in a household were assumed to have far reaching effect on stock of human capital in the household and were thus taken as the representative of the rest of household members. Human capital was thus measured as the sum of years in formal education of a household head and his/her spouse.

(iv) Physical capital

Stock of physical capital was measured as the value of household major assets (Appendix 1 section 3d).

(c) Expected signs of coefficients in the linear regression model

Coefficient α in the model above represents the values of the natural logarithm of household income when all the independent variables are assumed to be equal to zero. It is theoretically expected that at the absence of all the independent variables the household will still hold income thus coefficient α will be positive.

Coefficient β_1 in the model stands for marginal change in natural logarithm of household income, caused by a unit change in natural logarithm in human capital. It is expected that as human capital increases, household income will increase and therefore the sign of coefficient β_1 will be positive.

Coefficient β_2 in the model stands for marginal change in natural logarithm of household income, due to a unit change in the value of household major assets. It is expected that household income increases with the value of assets and therefore the sign of coefficient of B_2 will be positive.

Coefficient β_3 above represents incremental change in natural logarithm of household income, caused by a unit change in natural logarithm of social capital. It is expected that as social capital increases household income also increases. Thus the expected sign of coefficient β_3 will be positive.

(d) Rejection and acceptance of hypothesis in the linear regression model

The model was used in testing the null hypothesis that social capital has no significant effect on household income. This was tested against alternative hypothesis that household stock of social capital has significant effect on household income. The null hypothesis was expected to be rejected and alternative hypothesis be accepted if significance of t test for the coefficient β_3 would be observed to be significant at 0.05 levels or less.

3.5.2.3 The Logistic regression model

This model was meant for assessing objective number 3 of this study i.e. to estimate the effects of social capital on household food insecurity vulnerability.

(a) The model

The proposed logistic regression model for this study had the logic that household vulnerability (expressed as a dichotomous variable basing on household perception as 1 = vulnerable, 0 = otherwise) is a function of three resources namely human, social and physical capital as shown below.

$$V = \beta_0 + \beta_1 Hc + \beta_2 A + \beta_3 Sc + \varepsilon$$

Where V stands for vulnerability whereas Hc, A and Sc stands for human, physical and social capitals, respectively.

Presenting the odd ratio (for the dependent variable) for the model above, the model becomes:

$$\ln (P_i / 1 - P_i) = \beta_0 + \beta_1 Hc + \beta_2 A + \beta_3 Sc + \varepsilon$$

Where

P_i = Probability of respondent to perceiving food security situation of his/her household as being vulnerable.

$1-P_i$ = Probability of the respondent to perceiving food security situation of his/her household as being non vulnerable.

$P_i/1-P_i$ = Odd ratio in favour of the respondent to perceiving food security situation of his household as vulnerable

ε = The error term

(b) Measurement of household food insecurity vulnerability

The study used introspective measures in the measurement of food vulnerability. The respondents were firstly requested to describe the food security situation of their households by selecting one of the four response options given to them in the questionnaire (Appendix 1). These options were then rescaled into nominal level as food vulnerable and food non vulnerable. All the respondents who described the food security situation of their household using the first two response options (option 1&2) were rated not food insecurity vulnerable where as those who described food security situation using the other two options (option 3&4) were rated as food insecurity vulnerable.

(c) Expected signs of coefficients for model 2

Coefficient β_0 in the model represents autonomous odd ratio i.e. the value of odd ratio when all the independent variables are assumed to be equal to zero. It is expected that at the absence of all the independent variables the probability of the

household evaluating its food security situation as being vulnerable will be higher than that of being non vulnerable. The odd ratio will be positive and thus the expected sign of coefficient β_0 is positive.

Coefficient β_1 in the model represents marginal change in odd ratio due to a unit change in human capital. It is expected that as human capital increases the probability of the respondent to evaluate food security situation of his household as being vulnerable decreases while that of evaluating themselves as being non vulnerable increases. The odd ratio will therefore be negative and thus the expected sign of β_1 will be negative.

Coefficient β_2 in the model stands for incremental change in odd ratio resulting from a unit change of the value of household major assets. It is expected that as the household increases its assets the probability of respondent to judge its food security as being vulnerable (P_i) decrease. As P_i decreases and $1-P_i$ increases the odd ratio becomes negative and therefore the sign of coefficient β_2 is expected to be negative.

Coefficient β_3 in the model stands for marginal change in the odd ratio resulting from a unit change in social capital. The theory assumes that social capital increases the probability of the respondent to evaluate food security of his household as being non vulnerable (P_i). Thus it is expected that as social capital increases the attribute $P_i / 1-P_i$ becomes negative thus the expected sign of β_3 is negative.

(d) Rejection and acceptance of hypothesis in the logistic model

The logistic regression model was used to test the null hypothesis that social capital has no significant effect on the likelihood of a respondent judging his/her household as being food secure. This was expected to be tested against alternative hypothesis that social capital has significant effect on the likelihood of the respondent to judge his/her household as food secure.

Null hypothesis was expected to be rejected and alternative hypothesis be accepted if the observed significance of t test for coefficient β_3 on the model were found to be significant at 0.05 levels i.e. less than 0.05.

3.6 Location of the study area

This study was conducted in Dar es salaam city and Morogoro municipality. The two areas were purposely selected to represent the rest of the Tanzanian urban areas. Dar es salaam is one of the largest commercial cities in the country and was therefore selected to represent other cities. Morogoro municipality is a small town and was chosen to represent other similar Tanzanian towns. The two were also chosen so as to allow comparison on various aspects of food security and social capital between a city and a town.

Dar es salaam city is located on the coast belt between latitude $6^{\circ}60'$ and $7^{\circ}14'$ south of Equator and longitude $39^{\circ}12'$ and $39^{\circ}67'$ east of Greenwich. Administratively the city is divided into three municipalities of Kinondoni, Temeke and Ilala. From each of the municipality, three wards were selected for the study. The selected wards for

Kinondoni district were Msasani, Kinondoni, and Manzese; for Ilala district were Upanga Magharibi, Ilala and Jangwani. Temeke district included Kurasini, Temeke and Keko.

Morogoro municipality lies between latitude $6^{\circ}86'$ and $6^{\circ}87'$ south of Equator and Longitudes $37^{\circ}62'$ and $37^{\circ}81'$ East of Greenwich. The municipality was estimated to have a population of 201,740 people in 2000 (Planning Commission, 1997) Administratively Morogoro urban district is divided into 12 wards. Of these 6 wards were selected for the study. These were Mafiga, Mbuyuni, Kilakala, Boma, Mwembesongo and Mji mpya.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Overview

This chapter presents empirical findings of the study and observations made during the field surveys together with their discussion. The chapter is divided into four sections. Section 4.2 highlights relevant social economic and demographic characteristics of the surveyed households. Section 4.3 describes the observed income of households and their expenditure pattern on food. Section 4.4 summarises the findings on household assets possessed by surveyed households. Findings on household food insecurity vulnerability including results of the two regression models are presented in section 4.5. The last section (section 4.6) is a description of social capital arrangements commonly used by urban households in the study area in coping with food insecurity.

4.2 Social economic and demographic characteristics of households

4.2.1 Household size

Total number of members in a household has an important social-economic implication in household's ability to access enough food. A large number of members imply more mouths to feed and more people to share the household budget. The issue is important in Africa where large family sizes are common due to extended family networks. The household sizes for both Dar es salaam and Morogoro municipality are shown in table 1 below.

Table 1: Distribution of surveyed households in Dar es salaam and Morogoro municipality according to household size

Item	Dar es salaam (n=90)	Morogoro (n=90)
Mean	5.1865	6.038
Standard deviation	1.865	2.306
Maximum	11	12
Minimum	1	2
Percentage distribution		
Less than 5	56.3	75
5-7	36.3	25
More than 7	7.4	0

The table shows that households in Morogoro municipality have slightly more members (6.038) than Dar es salaam households (5.20). The results also show that most households in the study areas have less than 5 members. The proportions of households with 5 to over 7 members are also presented. These results are similar to those in the 1991/92 Household Budget Survey (HBS) whereby the majority (59.2%) of non-farm households in Tanzania mainland had less than 5 individuals (Planning Commission, 1996).

4.2.2 Age structure and composition

Composition of household members in terms of their age distribution has implications for the household's ability to meet its food requirements. People who are capable of being involved in productive activities are only those within certain

age limits. Very young members (conventionally taken as below 15 years) and very old members (assumed to be above 64 years) cannot be involved in productive activities due to their physiological incapability. Normally household members in these age groups do depend on the economically active members to fulfil their needs. For this reason it is important to assess household's age structures, especially and particularly so the dependency ratio, when undertaking studies related to food security. Table 2 highlights age structure patterns in the study area.

Table 2: Percentage distribution of surveyed households in Dar es salaam and Morogoro municipality by age categories

Age category In years	Dar es salaam (n=90)	Morogoro municipality (n=90)
Less than 15	31.6	25.8
15-64	67.9	72.4
65 and above	0.5	1.8

Results in table 2 above show that households in the study area are characterised by high proportion of individuals aged between 15 and 64 years. This is contrary to the usual results expected in Sub Saharan Africa. The overall dependency ratio obtained in this study is 29.7% implying that there are almost 30 dependants for every 100 people of economically productive age. The ratio obtained in this study is very low compared to 94%, which is the average in Sub Saharan Africa (Planning Commission, 1996). The divergence noted above could best be explained by the fact that the focus of this study was urban areas only. In urban areas of developing countries people are quickly adopting new lifestyles including adoption of birth

control and family planning measures and thus reduce the number of children. The sampling procedure used in this study may also provide a useful explanation for the possible source of divergence. The study used proportionate stratified random sampling targeting income as the variable of interest for stratification. Thus, the characteristics of respondents presented above refer to the population consisting of equal number of respondents from each of the three income categories in the surveyed areas. In the actual situation however, inhabitants in the surveyed areas are not such evenly distributed. A larger proportion of them belong to low and perhaps medium income strata. Thus the sampled households above contain proportionately higher number of households with high incomes than the actual situation. High-income households are known to consist of many elites who normally don't bear many children like non-elites (low income) counterparts. Low dependency ratio obtained in this study suggests that the sampled households contain a relatively higher proportion of non-vulnerable households to food insecurity. By virtue of being perceived as not food insecurity vulnerable such households are commonly thought of not employing food insecurity coping strategies for their livelihood. This assumption has been analysed in this study. Results of the characteristics of social capital based coping strategies (Section 4.6.1.) provide some answers to this assumption.

4.2.3 Education level

In both, theoretical and practical situations, educational level of bread earners in a household plays a significant role in enabling household's access to food. Skills and education increase working efficiency and productivity making households with

more educated bread earners more entitled to income and food. In this study the education levels of household heads were analysed and results are presented in table 3.

The Tanzanian education system consists of seven years of primary education followed by four years of ordinary level secondary education. After completing the ordinary level, a person proceeds to two years of advanced level secondary education before joining the higher education system. The higher education could either be a college (for certificate and diploma courses) or University for degree programs. Instead of proceeding for advanced level secondary education studies, a person finishing ordinary level secondary school can alternatively pursue a professional course for a certificate or diploma.

Table 3: Percentage distribution of surveyed households according to the education levels attained by household heads.

Education level	Dar es salaam (n=90)	Morogoro (n=90)
No formal education	9.09	12.82
Primary education only	31.16	25.64
Secondary education form four and six only	16.98	17.54
Lower college (certificate and ordinary diploma)	16.79	13.24
Advanced diploma/degree and above	25.97	30.76

Results indicate a very high level of literacy among the household heads in the surveyed areas. The proportion of heads of households who have no formal education is 9.09 and 12.82 per cents for Dar es salaam and Morogoro municipality respectively. Results in the table also show high proportion of household heads with higher education. In view of the location of the study area and the adopted sampling technique the observed findings are expected. Unlike countrywide surveys such as Household Budget Surveys, which collect information from both urban and rural areas, this study was only conducted in urban areas. Most elites migrate into urban areas in search for jobs, thus it should not surprise one to observe such a pattern. Furthermore, the study captured a good number of high-income households. This high literacy levels (high human capital) among household heads in urban areas helps to explain why urban households are relatively less food insecurity vulnerable compared to their rural counterparts.

4.2.4 Religion and ethnicity

The composition of members of a society according to their religion and ethnicity is one of the factors with a bearing on social capital formation. Formation of bonding social capital, for example, requires the existence of strong ties between members of different social economic and cultural backgrounds. Religion and ethnicity of the members of a society are some of the inherent barriers to the formation and strengthening of social ties. Religion separates people on the basis of faith. On the other hand, ethnicity demarcates societal members on the basis of their cultural backgrounds. It is therefore expected that a society composed of members with wide ethnic and cultural diversity will have weak cross cutting ties. The same is also

expected in the case of significant religious differences. In this study, religious and cultural diversity of households in the surveyed areas were analysed. Results of religion composition are presented in table 4 below.

Table 4: Percentage distribution of surveyed households according to the religion of household heads

Religion	Dar es salaam (n=90)	Morogoro urban district (n=90)
Christian	53.8	65
Moslem	45.0	35
Others	1.2	0

Results show that there is lack of dominance by one religion over the other in the surveyed area. There are two dominant religions in the surveyed area, which are Christian and Moslem. Both religions constitute a large proportion of members in the society. Some minor religions are also available in Dar es salaam. It implies therefore that people of different religious background live in urban areas of Tanzania making it difficult for social capital formation.

Results of ethnic diversity for Dar es salaam and Morogoro are also instructive. The ninety interviewed respondents in Dar es salaam were found to belong to 34 different ethnic groups. A more or less close picture is also shed in Morogoro municipality whereby the 90 interviewed respondents were found to belong to 26 different ethnic groups. A basic conclusion drawn is that there is a wide ethnic diversity in urban areas of Tanzania, making it difficult to form social capital based on ethnicity. It

implies that formation of strong cross cutting ties between people of such varying religious and cultural backgrounds can only happen if strong long-term investment on social capital formation had been deliberately made. Some empirical findings of this study (sections 4.5.2 and 4.5.3) show that today, social capital brings about food entitlement to households in the surveyed areas. The findings suggest high level of social cohesion among households in urban areas confirming long-term investments of social capital formation most likely made during the era of socialism.

4.3 Household income and food expenditure

The Sustainable Livelihood Framework asserts that households manipulate resources available at their disposal to generate income. With adequate income, households are able to purchase their consumption needs and fulfil their welfare outcomes such as food security. In the context of urban areas the issue of income becomes even more important because most households access food through purchase. In addressing issues related to household food security including prediction of the extent of food insecurity vulnerability as it is done in this study three parameters related to income were analysed. These include value of income itself, amount of household income spent on food and the proportion of income spent on food. The results are presented in table 5 below.

Table 5: Average monthly income and food expenditure among the surveyed households in Dar es salaam and Morogoro Municipality

Item	Dar es salaam (n=90)	Morogoro municipality (n=90)
Average monthly income	386,106	202,938
Average monthly food expenditure	104,608	96,560
Percentage of income spent on food	27	48

Results in table 5 show the average monthly household income for Dar es salaam and Morogoro municipality are Tshs 386,106 and Tshs 202,938 respectively. The figures compare favourably with those of 1991/92 Tanzanian Household Budget Survey. For example data of the 1991/92 HBS for Tanzania indicate that annual household income (expressed as total household expenditure) was Tshs 322,947. When deflated into the current (2001) prices the figure is 136,500 Tshs per month. The obtained average household monthly income in this study appears to be slightly higher because of the sampling method employed. The sampling method used in this study is proportionate stratified random sampling. In real sense the distribution of households in Dar es salaam is not proportional. There are proportionately more poor households than rich households in the city. As a result of the sampling method, very large number of high-income households was interviewed in this study making the value of income larger than that found in the household survey. The value of monthly household expenditure on food is Tshs 104,608 and Tshs 96,560 for Dar es salaam and Morogoro municipality, respectively. Again, these figures compare well with those of 1991/92 Household Budget Survey (Tshs108,091 per month). The

percentage of income spent on food for Dar es salaam and Morogoro municipality are 27 and 48 percent, respectively. Dar es salaam residents spend a lower proportion of their income on food compared to Morogoro residents. This is not surprising due to the fact that the income earned by the surveyed households in Dar es salaam is significantly higher than that of Morogoro municipality. Normally high-income households spend a smaller proportion of their income on food. Results from the 1991/92 Household Budget Survey indicate that Dar es salaam households spend 80% of their income on food, a figure which is very large compared to the 27% obtained from this study. The discrepancy observed can be explained by two reasons. First, with respect to the method of data collection and secondly pertaining to the sampling technique employed. This study collected income data from respondents by requesting them to estimate and provide their monthly income from different sources. This is different from the approach used in the HBS 1991/92 in which total annual expenditure was taken as a proxy for household income. Second, with respect to sampling, this study used proportionate stratified random sampling with income as the parameter for stratification. This method results into including proportionately larger number of respondents from high-income households, who characteristically spend a lower proportion of their income on food.

4.4 Household resources

The Sustainable Livelihood Framework describes human, physical, social, financial and natural capital as resources (capability and assets) available to households. The framework considers these resources as the key to the household in achieving welfare outcomes. In this regard Tollens (1998) insists that among all these

resources, physical, human and social are the most basic in the reduction of food vulnerability. Data for the three forms of resources were collected and analysed in this study. Results are presented here below.

4.4.1 Human Capital

Human capital represents the skills, knowledge, ability to work and good health that together enable people to pursue different livelihood strategies including decisions and actions and achieve welfare outcomes. At the household level human capital is a factor of the amount and quality of labour available. This is determined by, among other things, the level of training and skills the household members have. Assuming other factors to be constant, the level of education measured by the number of years a person attended formal education classes, is a good proxy of human capital (Narayan, 1997; Mallucio *et al.*, 2000). In this study, household level human capital was taken as the sum of years of formal education by the household head and his/her spouse. The results are presented in Table 6 below.

Table 6: The extent of stock of human capital among the sample households in Dar es salaam and Morogoro municipality

Item	Dar es salaam	Morogoro municipality
Mean	22.11	22.94
Standard deviation	9.46	8.23
Maximum	55.31	49.50
Minimum	0.67	0.94

Results in table 6 show that households in Morogoro municipality and Dar es salaam

have nearly equal levels of human capital. This is not surprising because both places are urban areas sharing people of similar social economic characteristics. It is theoretically expected that households with higher human capital will also have higher income. To test this proposition a correlation analysis between human capital and income was conducted. Results of the analysis show presence of significant correlation ($r = 0.654$, $p < 0.01$) between human capital and income thus confirming the presence of positive linear relationship between the two (Appendix 2).

4.4.2 Physical capital

Physical capital represents tangible resources available at the disposal of a household which can be manipulated to achieve some household welfare outcomes. The resources can either be directly put into production process e.g. machines or sold / liquidated to generate income. They include physical assets such as houses, land plots, farms, vehicles and machinery. In this study the value of major assets in a household represented physical capital. The findings are presented in table 7 below.

Table 7: Values of physical capital among sample households in Dar es Salaam and Morogoro municipality households in Tsh

Item	Dar es salaam	Morogoro municipality
Mean	18,516,519	13,846,377
Standard deviation	32,673,188	47,362,806
Maximum	146,810,000	309,874,500
Minimum	23,000	50,500

The average value of physical capital per household for Dar es salaam and Morogoro

municipality obtained from this study are Tshs 18,516,519 and Tshs 13,846,377 respectively. Households in Dar es salaam have higher incomes than those of Morogoro hence it should not be surprising for such households to possess assets of higher value. This finding is also supported by correlation analysis, which shows that there is a significant positive correlation ($r = 0.664$, $p < 0.01$) between household income and physical capital owned. Results of a t-test analysis for comparing the means suggest that the difference in physical capital between the two study areas is not significant indicating that it possesses equal importance in the two areas (Appendix 3).

4.4.3 Social capital

The adopted method for this study in quantifying household stock of social capital has been explained in section (3.5.2.2b sub section ii). It was pointed out that the study has adopted two proxies in the measurement of household level social capital namely, membership in groups and connectedness with friends, relatives and neighbours. The section describes indicators of social capital from the view point of group membership being density (number of group membership per household), performance (average reported performance) of the two most important groups in the household and participation (average reported frequency) of meeting attendance for the two most important groups in the household. On the other hand, indicators of connectedness used in this study were education levels (human capital) of children and relatives of respondents and the value of contributions offered to the household by close friends, relatives and neighbours. Results of social capital for the surveyed households are presented in table 8.

Table 8: Stocks of social capital among the interviewed households in Dar es Salaam and Morogoro Municipality.

Item	Dar es salaam	Morogoro municipality
Mean	7.6231	6.7603
Maximum	49.50	55.31
Minimum	0.94	0.67
Standard deviation	9.9232	10.0599

Results in the table above basically show that households in Dar es salaam and Morogoro municipality have nearly same levels of social capital. These households are subjected to almost similar social economic and political influences. Results of a t-test analysis comparing means of social capital for the two areas confirm the absence of significant difference in social capital (Appendix 4).

The postulates of the Sustainable Livelihood Framework that social capital increases income brings about an idea that perhaps household income increases with stock of social capital. It is also believed that values of human and physical capital also increase with social capital. In this study empirical investigation of the anticipated relationships were analysed using multiple correlation analysis (Appendix 2). Results of the analysis confirm presence of significant correlation ($r = 0.654$, $p < 0.01$) between social capital and income. The analysis also confirms significant linear relationship ($r = 0.432$, $p < 0.01$) between social and physical capital. The result also confirms the presence of a positive linear relationship ($r = 0.115$) between social and human capital at 10% level of significance. These results re-affirm our anticipated influence of social capital on income and other forms of capital.

4.5 Household food insecurity vulnerability

4.5.1 Household perception on food vulnerability

The concept of vulnerability has been discussed at section 2.3. It was argued that perceptions of household members on their food security situation are one of the good indicators of food insecurity vulnerability. Using this indicator, the study intended to establish the proportion of households in the study area that are food insecurity vulnerable (see section 3.5.2.3). Results of the analysis are presented in table 9.

Table 9: Perception of the interviewed members of households on food vulnerability

Perception on food vulnerability	Dar es salaam	Morogoro
Not vulnerable	56.3	52.23
Vulnerable	43.8	47.76

A relatively higher proportion of Dar es salaam households (56.3%) perceived their households to be food secure compared to Morogoro municipality (52.23%). The converse is also true that the figure of food vulnerable households is higher for Morogoro municipality (47.76%) compared to Dar es salaam (43.8%). The observation that a higher proportion of Morogoro households perceived their households as being food insecure compared to those of Dar es salaam can be explained by the finding that the households in Morogoro municipality have lower incomes compared to their Dar es salaam counterparts. However the difference in food vulnerability between the two areas does not differ much due to the fact that the

difference in household incomes between the areas is not significant (Appendix 5).

Identification of food vulnerable households by introspective measures using perception of household members of food security situation has also been done elsewhere in the world. Using this measure TFNC (2000) found out that 46.8% of households that were food insecurity vulnerable in Dar es salaam. This figure is very close to the one reported in this study. Dershem and Gzrshvili (1998) also applied a closely resembling methodology to assess food vulnerability in Russia. Their study found that 66.9% of Russian households perceived their households as being food insecurity vulnerable.

It has frequently been pointed out that “poverty is a warehouse of hunger”. One the operational meaning of this famous saying is that in most cases a higher proportion of food vulnerable households belong to low-income households compared to the high-income category. Using this operationalisation, this study tested this hypothesis by comparing perception of household vulnerability between income categories. Findings of this comparison are presented in table 10.

Table 10: Percentage distribution by cross tabulation between income quartile and perception of food vulnerability

Income quartile	Household food insecurity vulnerability	
	Vulnerable	Not vulnerable
Lowest income quartile	88.6	11.4
Middle income quartile	54.3	45.7
Highest income quartile	0	100

Chi square value = 47.720, df = 2, Significant at 0.01

The findings show that the high-income quartile contains no single household, which perceived itself as being food insecurity vulnerable. The findings also show a significant association ($p < 0.01$) between household income and vulnerability. Taking household income as a proxy of poverty and food vulnerability as a proxy for hunger, findings from this study conform to the hypothesis that poverty is a warehouse of hunger. These results are comparable to those obtained and reported by TFNC (2000) whereby none of households from high income households in Dar es salaam were food vulnerable and all the vulnerable households were low income households.

4.5.2 Results of linear regression: Impact of household's levels of social capital on income

Most urban households access food through purchasing. To these households, sufficient access to adequate income is of paramount importance as far as meeting food needs is concerned. Any factor, which brings about access to income to these households plays a significant role in increasing food entitlement. In this study, social capital was postulated to be one of the household assets in addition to human

and physical, which increases income and thereby enabling households' access to food. Results of the linear regression model presented in table 11 provide empirical evidence to the assertion.

Table 11: Results of linear regression analysis

Dependent variable: Natural logarithm of household income in Tshs

Independent	Beta coefficient	t-statistics	t-significance
Constant	0.820	0.949	0.345
Natural logarithm of social capital	0.297	2.206	0.030*
Natural logarithm of human capital	1.237	4.117	0.000**
Natural logarithm of physical capital	0.445	6.165	0.000**

Multiple R = 80.5%,

Adjusted R-square = 0.637

F-statistic = 61.942

Significance of F-statistic = 0.000

*Significant at 0.05

** Significant at 0.01

Source: Survey 2002

Regression analysis estimates the effects of independent variables on the dependent variable. The most common parameters of interest on regression analysis are **F-ratio**, coefficient of determination and beta coefficients.

Results in table 11 show the value of the coefficient of determination (adjusted R-square) to be equal to 63.7 percent. This coefficient of determination measures the goodness of fit of the model. The observed value implies that 63.7% of the variation of the dependent variable (household income) is explained by the variation of the independent variables. This is an impressive figure because a larger proportion of the

variation of the dependent variable has been explained by the variables of interest and only a small percentage is explained by the error term.

F-ratio measures the overall significance of a regression model. It is the test statistic for the coefficient of determination on whether it is significant or not. The regression equation is usually outright rejected (considered useless) once the obtained value of F-ratio is found to be insignificant. Results in table 11 show the value of F-ratio to be significant at 0.01 level of probability. At this level of significance the proposed regression equation is technically acceptable to explain the relationship between the dependent and independent variables.

Results of the regression analysis presented above show a positive sign of beta coefficient for each of the independent variables included in the model. This implies that income increases as social, physical and human capitals increases. Significance levels of t-test for each of the explanatory variables in the model shows that social, physical and human capitals have significant influence on the level of household income. The finding that social capital increases household income is also shared with those by three prominent studies done in Tanzania namely, Narayan (1997), Narayan and Pritchett (1997) and Le-Ferrara (1999). The findings also conform with study by Ruben and Van Strien (2001)

In the context of human capital, Narayan (1997) observed that the effect of household social capital was ten times larger than that of human capital in rural Tanzania. Results from this study differ from that of Narayan (1997). This study

shows that the effect of social capital is approximately 4 times less than that of human capital. This difference can be explained by the locations of the study. This study was conducted in urban areas whereas Narayan (1997) was conducted in a rural setting. People in these areas differ in both human capital as well as social cohesion. Urban areas harbour many elites than rural areas and therefore the effect of human capital is expected to be more pronounced than in rural areas. On the other hand, there is a lower degree of local cooperation processes (an indication of low social capital) in the urban areas compared to rural areas. For this reason, it is not surprising to note a relatively low impact of social capital on income in the urban areas as compared to rural areas.

Regression models are usually associated with some problems. Heteroscedasticity and multicollinearity are the commonest problems encountered. In this study, the problem of heteroscedasticity has been taken care of by building a logarithmic transformed model (Appendix 12). Multicollinearity refers to presence of high correlation among explanatory variables in a model. The problem of multicollinearity becomes serious when at least one of the independent variables highly correlates with other variables, with Pearson correlation coefficient of at least 0.8 (Menard, 1995).

In this study, an assessment of the presence of multicollinearity was done by running a correlation matrix. The matrix showed there being no pair of independent variables that correlates with a correlation coefficient value approaching 0.8, hence confirming the absence of the effects of multicollinearity (Appendix 2).

4.5.3 Results of logistic regression: Impact of social capital in the reduction of food vulnerability

The link between household level of social capital and food security is clearly depicted in the Sustainable Livelihood Framework (Section 2.5). The framework postulates that social capital is one of the household assets that can be manipulated through alternative household strategies to generate adequate income. Through income the household can then purchase food needs and reduce its food insecurity vulnerability. The other line of argument is that related to coping strategies in the sense that household social capital is assumed to provide households with support in case of food problems and therefore reduces household food insecurity vulnerability. Results of logistic regression presented on table 12 below provide empirical findings on whether and to what extent household level of social capital reduces household food insecurity vulnerability.

Table 12: Results of a logistic regression model

Dependent variable: Household perception on their food insecurity vulnerability.

Independent variables	Beta coefficient	Significance
Constant	4.1914	0.0000*
Social capital	-0.027	0.4354
Human capital	-0.1762	0.0000*
Physical capital	-0.78 E-8	0.0366**

Model chi-square = 0.000

* Significant at 0.01 levels.

** Significant at 0.05 levels

The signs and significance levels of the beta coefficients for the three independent variables are presented on table 12 above. The signs of beta coefficients for each of the independent variables included in the model conform to priori expectations. It was postulated that each of the independent variable in the model reduces the likelihood of the respondent to judge his household as being food insecurity vulnerable, thus the expected sign of coefficients for each of the variable was negative (Section 3.5.2.3c). Of the three independent variables, human capital has been observed to have the highest value of a beta coefficient and is the most significant variable implying that human capital has the strongest effect on the reduction of vulnerability. This is followed by physical capital. Social capital apparently has an insignificant effect in the reduction of vulnerability.

Human and physical capital significantly reduce household perception of food insecurity vulnerability This can be explained by the fact that in urban areas a household is strongly entitled to the benefits of it's human and physical capital than social capital. A household usually owns its human and physical capital directly and it can manipulate such resources because they are private properties of the household. The effect of these resources on the reduction of vulnerability is strong because the household is guaranteed of the possibility of exchanging its labour and physical capital for money. The mere presence of these resources therefore influences the household's feeling of being food secure. This is because household have all powers of transforming them into income and purchase food in case the need arises. Social capital on the other hand, is a resource that is not directly owned by a household. A household usually does not own a web of social networks but rather

share it with other members of the society. In this way a household is not entitled to receive claims from members of social networks unless the members approve the claim. In this way the presence of social capital in a household does not influence perception of being food secure. This is because a household owning a web of social ties is not certain as to whether relatives, friends and neighbours will actually provide assistance when the need for food assistance arises.

In logistic regression analyses, the goodness of fit of the model is usually tested using model chi-square. Results for this parameter is 0.000 implying that the model is highly significant at 0.01 probability level.

4.6 Social capital arrangements commonly used by households in surveyed areas in coping with food insecurity

In order to capture information on coping responses based on social capital, respondents were requested to respond to two different but somehow related questions. They were first requested to mention the various ways through which they normally get help from close friends, relatives and neighbours during periods of food shortages in their households. The respondents were then requested to mention means known to them through which other households in their locality assist each other in dealing with problems related to food inadequacy. In the course of interviewing and data analysis, it was observed that many respondents refrained from responding to first question. The respondents were found to be relatively more willing to respond to the second question. Findings highlighted in table 13 below are therefore drawn from the latter question.

Table 13: Social capital based coping options used by households in Dar es salaam and Morogoro municipality

Coping option mentioned	Percentage of responses
Food purchase on credit	36
Borrowing of money	28
Food offers	14.7
Use of informal credit	9.3
Offer of money and remittances	8
Labour sales to close friends	2.7
Exchange of assets for food	1.3

Findings presented in table 13 show the relative importance of alternative social capital arrangements adopted in urban areas. The relative importance of these various coping options are indicated by the percentage of responses reported. The responses show that food purchase on credit is the most common local arrangement where as exchange of assets for food is the least used arrangement.

In interpreting the meaning and implications of the findings, two aspects have to be considered. First, the response options provided by interviewees do not constitute any single coping strategy. According to Corbett (1988), a coping strategy implies a careful forward planning and it involves the use of a number of coping options in a pattern reflecting severity of the experienced hunger. The above-mentioned responses above do not demonstrate any clear pattern and this might be attributed to two factors. First, the study areas are historically not affected by severe food shortages such as famine. It is possible therefore that no series of coping options can be observed, as they have not developed over time. Second, the mentioned coping

options are only those based on social capital, thus they may not reflect the preferred options by the households. During food shortages, households adopt a number of alternative coping options irrespective of their form of capital.

It is also important to note that labour sales to close friends and exchange of assets for food do not appear to be directly belonging to social capital based coping strategies. Sale of labour is more closely related to human capital, whereas exchange of assets for food can be linked to physical capital. In the context of this study, both approaches are regarded as social capital arrangements because they reflect a particular bearing to social capital. It was learnt from the survey that in both cases the major function of the exchanges are aimed at helping a fellow rendering them more of social capital coping options.

4.7 Characteristics of some important social capital arrangements commonly used by households in the study area in coping with food insecurity

To investigate the concept of social capital at work in communities, one of the important areas of analysis can be to assess the dynamics of people's local level cooperation. There are plenty of local arrangements that significantly help people to achieve their livelihood objectives including coping with shocks. It is possible that a thorough analysis of these arrangements may bear some important policy implications. This study intended to establish the status of the existing forms of networking that reduces people's vulnerability to food problems. Of the seven coping options identified, the major five were analysed to draw their characteristics. The analysis revealed some interesting features of each of the arrangement. These are presented in subsequent sections.

4.7.1 Food purchase on credit

Food purchase on credit was identified as the most widely adopted social capital arrangement to cope with food insecurity. The analysis shows that a large proportion (32.3%) of residents in the study areas regularly purchase food on credit to meet their household needs. The study further discovered that majority of households which regularly purchase food on credit in the two study areas are those with low income (Table 14).

Table 14: Percentage distribution of surveyed households by income quartiles showing their food purchase habit.

Type of household in terms of purchasing food on credit	Income quartiles	Lowest	Middle	Highest
Regularly purchase food on credit		53.1	40.6	6.3
Do not regularly purchase food on credit		32.4	29.6	38.0

Pearson Chi Square = 11.168, df=2, Significant at 0.01

There is a declining proportion of households that purchase food on credit with income quartiles. The results of chi-square test for the cross tabulation reveal a significant association between household income and household behaviour of purchasing food on credit whereby the behaviour of purchasing food on credit is mainly a characteristic of low-income households. This finding is also supported by findings of a t-test analysis comparing means of income. Results of the t-test show that the average income of households who regularly purchase food on credit is

significantly lower than those who do not (Appendix 6).

Results of a cross tabulation of household food insecurity vulnerability by tendency of purchasing food on credit confirmed the prediction of a relationship between household vulnerability and regular purchasing of food on credit. Table 15 below presents findings that the majority (82.9%) of households, which regularly purchase food on credit, judge their households as being food insecure compared to only 17.1%, which are food secure. Similarly, the majority of those who do not regularly purchase food on credit felt that they were food secure (63.8%) compared to only 36.3% who felt insecure.

Table 15: Percentage distribution of households which purchase food on credit by perception of food vulnerability

Type of household in terms of purchasing food on credit	Household perception of food insecurity vulnerability	
	Secured	Unsecured
Regularly purchasing food on credit	17.1	82.9
Do not regularly purchase food on credit	63.8	36.3

Pearson Chi Square = 19.836, df = 1, Significant at 0.01

Results of a chi-square test presented above show a significant association between the tendency of purchasing food on credit and perception of food insecurity vulnerability, whereby the behaviour of purchasing food on credit is mainly a characteristic of households that are food insecurity vulnerable.

It is logical to deduce that it requires a household to have established strong social ties with entities selling food on credit in order to use it as a means to address food

insecurity. In fact, a household is required to have strong social networks with the rest of the society and be trusted. In other words, the household must have high social capital for it to have access to food on credit from food selling business entities. One of the useful extensions of this assertion is that perhaps some food vulnerable households don't purchase food on credit primarily because they lack social capital. In this study, an analysis of the above assumption was conducted by comparing means of household stock of social capital between those food vulnerable households, which purchase food on credit, and those who do not. Results of the t-test (Appendix 7) confirm that there exists no significant difference between the two. This implies that social capital is not an important factor hindering households to access food on credit in the study area. It suggests that those food vulnerable households, which do not regularly purchase food on credit, do not necessarily lack social capital.

Frequency of purchasing food on credit is one of the important characteristics of the arrangement. This study attempted to establish the frequency of purchasing food on credit by households in the surveyed areas and found that on average households access food on credit about 4.5 times each month (Table 16).

Table 16: Frequency of food purchase on credit

Item	Frequency (Number of times per month)
Mean	4.5
Maximum	10
Minimum	1
Standard deviation	2.53

The average of 4.5 times a month is very close to the average of once per week. This suggests that those households, which regularly purchase food on credit, do so by approximately once in every week. This study identified retail shops as the most common business establishment, which offers food sales on credit. Other business establishments mentioned by respondents as important partners in this local arrangement are presented in table 17 below according to their level of importance.

Table 17: Sources from which households in Dar es Salaam and Morogoro municipality purchase food on credit

Business enterprises	Percentage of responses
Retail shops	56.9
Stalls	25.0
Market places	12.5
Food vendors	2.8
Whole sale shops	2.8

The highest value of food that can be purchased on credit and the length of time by which a household can stay with the loan prior to repayment are some important attributes of the food purchase on credit coping response to food insecurity. These parameters do shed light on the level of trust embedded in the social network, which is an important attribute of social capital. It was observed that on average, the highest value of food that can be obtained on credit was Tshs 11,000. The study also found out that on the average a household could stay with the loan up to 20 days. It was reported earlier in this study that all these transactions are being done purely on grounds of “trust” without any enforcement mechanism, security or structured repayment. This finding partially suggests the presence in the study area of rich social life built on grounds of trust. In other words the finding suggests existence of high “bonding social capital” in Dar es salaam and Morogoro municipality.

4.7.2 Borrowing of money

Borrowing of money from friends, relatives and neighbours has been identified as one of the most common alternative adopted by urban households in coping with the problem of food insecurity. This study found that 26% of all the interviewed households had borrowed some money to facilitate access to food in the year 2001. Each of these households was found to borrow about 1 to 3 times a year in their efforts to cope with food shortages. The study further investigated the characteristics of households that borrowed money for purchasing food by establishing their income levels, food insecurity vulnerability and their status of social capital. Results of cross tabulation between household income and the tendency of borrowing are presented in table 18 below.

Table 18: Money borrowing and income levels

Type of households in terms of Income quartiles borrowing money for food in 2001			
	Lowest	Middle	Highest
Borrowed	33.33	36	7.5
Not borrowed	66.67	64	92.5

Pearson Chi square = 10.365, df=2, Significant at 0.05

All households in the study area, irrespective of their income levels did borrow money so as to cope with the food insecurity problem. However, the majority of those who borrowed money belong to the low and medium income categories. About 7.5% of all households from the high income group borrowed money compared to 33% and 36% from low and middle-income strata, respectively. Table 18 presents two interesting insights. First, there is a significant association between household income and the behaviour of borrowing. It is shown that money borrowing is practised more by low-income households. Second, the tendency of borrowing money to cope with food problem is equally common amongst medium and low-income groups.

For a given household to be entitled to regular access to money loans, sufficient networking with other members of society is required, and especially the level of trust accorded by the rest of societal members. In other words, a given household needs to possess substantial stock of social capital as a requisite to accessing loans. It follows, therefore, that those households which were observed to have not borrowed, couldn't do so because they lack social capital. This assumption was investigated by comparing the average of social capital between households that borrowed and those,

which did not. Results of the analysis are presented in appendix 8. The findings suggest that there is no significant difference in social capital between households which borrowed and those which did not borrow money in coping with food insecurity.

One of the important areas in characterising social networks is an analysis of the relationships between members of the network and their spatial distribution. Analysis of the relationship between members of social networks for example, may have implication for the strength of social ties between people in the immediate community. In light of this, the study sought to characterise the relationships between lenders and borrower households of money in the study area. Results of the analysis are presented in Table 19 below.

Table 19: Relationship between lender and borrower households.

Relationship between members	Proportion of all borrowing cases reported in percentage
Blood relatives	32
Other relatives	19
Friends and neighbours	64

Results in table 19 show that most of lending transactions (64%) took place between friends and neighbours. This finding may be due to the reason that in urban areas most people have few relatives hence tend to associate more with friends and neighbours. This finding suggests the presence of a rich social life in the study area. Furthermore the majority of borrowing transactions take place between households

within close location proximity (Appendices 9 and 10).

4.7.3 Food offer

Offering of food to each other has been mentioned as one of the most common coping response in the study area. About 29.8% of all interviewed households reported to have received a direct food offer from either friends or relatives to help them meet their food needs. This study found out that the households receiving food offers had relatively low income. Results of a t-test analysis for comparing means of incomes (Appendix 11) revealed a significant difference in income between households regularly receiving food offer and those, which do not ($p < 0.1$).

One of the important components in the analysis of the role played by social networks in buffering shocks is the identification of acceptable reasons for help among the members of a network. This study found out that apart from food being offered mainly for the purposes of helping each other to cope with food insecurity, there are many cases in which offers of food as gift (not due to food shortages) commonly take place in the study area. The study found that 19.23% of all cases of food offer were mere gifts and not necessarily food assistances. The study further found that there are some typical reasons for giving or receiving food offers. Table 20 summarises some most common reasons for giving or receiving food offers in the study area. Poor harvests experienced by households rank as the top most acceptable reason for a house to deserve food offers.

Table 20: Reasons for receiving food among households in Dar es Salaam and Morogoro municipality

Reason motivating households to give each other food offer.	Percentage of all cases of food offer
Bad harvests	23.07
Mere gift	19.23
Apparent lack of food in the community	15.38
Death of household member	15.38
Sickness of household member(s)	11.38
Loss of job	7.7
Divorce	4.06
Imprisonment	2.7

Another useful component in the analysis of social networks is the relationship between members of the network themselves. Table 21 presents the percentage of cases of food offer according to relationships among households.

Table 21: Donor-recipient relationships in food offers

Relationship between food donors and recipients.	Percentage of all food offer (%)
Blood relatives	32
Non blood relatives	52
Friends and neighbours	16

Unlike the observations in the case of money lending transactions whereby the majority of borrowings took place between friends and neighbours, food assistance

in the area was mainly taking place between non-blood relatives.

When asked whether the practise (food offers) is increasing or decreasing, the majority (53%) were of the opinion that the trend is of decreasing nature (Table 22). Others indicated that the practise remained constant (28%) and increasing (19%).

Table 22: Reported opinion regarding the trend in food offers practise

Respondents perception	Surveyed households (%)
Decreasing	53.1
More or less the same	27.7
Increasing	19.2

Most of the respondents explicitly linked the declining trend of people helping each other through food offer with increasing cost of living in towns leading to diminishing capacities of households to offer support to others in need.

4.7.4 Use of informal credit

There are many informal credit arrangements used by urban dwellers in urban areas of Tanzania. Results from this study reveal that informal credit arrangements are widely practised to cope with food insecurity. Thirty five percent of surveyed households have at least one household members being a member of an informal credit arrangement. The majority (96%) of households acknowledged that being a member of informal credit arrangement is an option approach to assist the household in accessing food during periods of shortages.

Respondents were members in 1 to 3 informal credit groups. On the average they were found to be members in at least 1 group. Research results indicate that informal credit groups have an average of 16 members (Table 23).

Table 23: Reported size of informal credit groups.

Item	Number of members
Mean	15.9459
Maximum	80
Minimum	3
Standard deviation	13.62

It is apparent that there is broad diversity in terms of size, organisational structure and modes of operation. The study found out that group sizes range between 3 and 80 with an average of 16 people. Analysis of the characteristics of informal credit arrangement with respect to the composition of members yielded results presented in table 24 below.

Most informal credit groups found in towns were formed on the basis of gender. Results in table 24 show that more than 55% of all the identified groups were gender based (35.9% women only groups and 20.5% men only groups). Apart from gender, the study identified four other social economic factors attracting households to establish informal credit groups. The identified factors were income homogeneity of households, in neighbourhood, religious affiliation and workmateship (Table 24).

Table 24: Credit group composition.

Characteristics of members of informal credit	Proportion of informal credits arrangements (%)
Groups composed of women only	35.9
Groups composed of men only	20.5
Groups composed by low income households only	15.4
Groups composed of members living in close neighbourhood	15.4
Groups composed of members of similar religion	7.7
Groups composed of members working in the same company	5.1

Another important characteristic related to informal credit arrangements is the length of time by which informal credit arrangements stay before collapsing. Table 25 presents results of the ages of informal credit groups found in this study.

Table 25: Ages of informal credit arrangements.

Item	Age (Years)
Mean	2.7785
Maximum	10
Minimum	0.17
Standard deviation	2.2189

The results above show that the youngest group identified in the study had existed for only 0.17 years (2 months) whereas the group that had existed for the longest

time had a life of 10 years. On the average the study found that informal credit groups have existed for 2.78 years equivalent to 2 years and 9 months before they collapsed.

4.7.5 Offers of money

Means to help each other in dealing with the food problem in urban areas of Tanzania also include offering of cash to the household facing food shortages. This study found out that 23% of all the interviewed households were offered some money in the year 2001 to help them deal with food problem.

It was learnt that the majority of money offers in the study area took place between blood relatives (table 26). The table summarises the distribution of donor-recipient relationships in the study area.

Table 26: Money offers: Donor – recipient relationships.

Relationship between money donors and recipients	Proportion of cases of money offer
Between blood relatives	46.6
Non blood relatives	29.3
Between friends and neighbours	24.1

These results are interesting especially when compared with those of borrowing. The majority of money borrowing took place between friends and neighbours whereas food offers were a feature common between non-blood relatives. The pattern of

relationships suggested in the three scenarios suggests that though friends, blood and non-blood relatives are members of social networks, the manner they assist each other differs. It appears that extension of loans is a bit less sensitive so long as the assistance will be recovered and therefore simple to do it. Giving food, on the other hand, is somehow more difficult than extending loans and therefore it is not commonly practised by friends but rather non-blood relatives. Extending assistance in terms of liquid cash is the most difficult and therefore involves blood relatives, who are actually the most obligated persons.

Relationships between members of social networks who help each other with money offers according to locations were also investigated. Tables 4.27 and 4.28 present results of the analysis for Morogoro urban district and Dar es salaam respectively.

Table 27: Location relationships between members of social networks who help each other with money offers in Morogoro urban district

Location relationships	Proportion of all cases of money offers (%)
Within Morogoro municipality	54.5
Within Morogoro municipality and other towns in Tanzania	18.1
Morogoro municipality and village	27.3

The above results (table 27) show that the majority of money offers (54.5%) took place between members of social networks residing within Morogoro municipality.

These results resemble those of Dar es salaam (Table 28) in that the majority of money offers in the city also took place between households within the city.

Table 28: Location relationships between members of social networks who help each other with money offers in Dar es salaam.

Directional relationships	Proportion of cases of money offers (%)
Within Dar es salaam	96.4
Between Dar es salaam and other towns in Tanzania	0
Dar es salaam and village	3.6

An outstanding difference between the two, however, lies on the observation that the proportion of households who assist each other with money within the same town is higher in Dar es salaam city than in Morogoro municipality. One of the possible explanations for the above observation is that in terms of number and diversity in composition of inhabitants, Dar es salaam (a city) is more populated than Morogoro municipality (a town). Due to the presence of many inhabitants of varied social economic situations, the probability of a household to receive money offers from another household in the same city increases.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Overview

This study intended to investigate the role played by social capital in coping with food insecurity among urban households of Tanzania. The specific surveyed areas, which represented the rest of the country's urban areas, were Dar es salaam city and Morogoro Municipality. The study was meant to come up with findings on four objectives which were: (i) to identify the various coping options based on social capital commonly adopted by urban households in the study area to contend with food insecurity, (ii) to determine the characteristics of social capital arrangements which are relevant to food security, (iii) to determine the extent to which social capital reduces household food vulnerability, (iv) to determine the effects of household stock of social capital on household income. The study further intended to test two hypotheses namely (a) social capital increases income and (b) social capital reduces household food insecurity vulnerability.

5.2 Summary

This sub section highlights the results of the study. The results are organised according to the objectives of the study. These results are:

1. The major options based on social capital commonly used by urban households in coping with food insecurity according to their order of importance are food purchase on credit, borrowing of money, food offers, informal credit arrangements, labour sales and exchange of assets for food.

2. The characteristics of each social capital arrangement commonly used by households in coping with food insecurity are as follows:
3. Household stock of social capital significantly increases household income.
4. Household stock of social capital does not significantly reduce food insecurity vulnerability.

(a) Food purchase on credit

Proportion of urban households in the studied areas that regularly purchase food on credit to meet their basic food needs is 32.3%. These households purchase food on credit at an average of 4.5 times a month equivalent to approximately once per month. The households are characterised by poverty and food vulnerability. It is clear however that lack of social capital is not a major hindrance restricting these low-income households from accessing food on credit regularly.

In terms of market entities for selling food on credit, it was learnt that retail shops and stalls (“genge”) were the dominant enterprises frequently used by urban households. These enterprises offer food sales on credit worth a maximum of Tsh 11,000, which can stay with the borrower as a loan for up to a maximum of 20 days.

(b) Borrowing of money

Proportion of urban households in the studied areas that regularly borrow some money to help themselves in meeting their food needs is 26%. The households borrow cash from friends and neighbours by about one to three times a year. The study noted that the behaviour of borrowing money for the purpose of purchasing food is a characteristic of both low and middle-income households. Households in

these income brackets, which do not purchase food on credit, do not do so due to lacking of social capital.

(c) Food offers

The proportion of urban households which regularly receive food offers to help them in meeting their food needs is 29.8%. Low-income households receive more food offers than high-income households. Under normal circumstances one would expect that such philanthropic acts would take place amongst most intimate people, i.e. relatives. However, in this study, the tendency was more pronounced amongst non-blood relatives. The practice is currently a well-accepted means for helping households facing food shortages. The society clearly see genuine reasons such that one would be despised for receiving such an offer. Based on the interviewed individuals from urban households, the practise is currently decreasing over time.

(d) Reliance on informal credit arrangement

The proportion of urban households, which have at least one of the household bread earners being a member of an informal credit arrangement, is 34.38%. It has been observed that for those households that consider informal credit as a means to cope with food constraints do so extensively and they apparently happen to be members of more than one group or informal credit arrangement. It was further learnt that informal credit groups in urban areas that happen to support food-deprived households are mainly based or anchored on gender basis, most of them being women groups. Pertaining to ages of informal credit groups the study highlights that the average life of such informal credit groups is 2 years and 9 months.

(e) Money offers

About 22.72% of all households in the urban areas of Tanzania that face food shortages depend on money offers to meet their basic household food needs. Unlike food offers which were mainly found to be taking place between non-blood relatives, offers of money for the purposes of helping each other to contend with food shortages takes place between blood relatives. The majority of these offers take place between households residing in the same towns.

5.3 Conclusion

Dar es salaam and Morogoro urban districts contain heterogeneous households of varying ethnic and religious backgrounds. Such households also differ in terms of education and income levels. Despite of their diversity in various social economic and cultural backgrounds, they share a kind of life rich in mutual and reciprocal obligations. The degree of social cohesion amongst the households is quite high as manifested by the observation that large proportion of households in these areas are members of various social networks which help households to contend with food insecurity. Social capital is in fact part and parcel of human life in these areas and it plays a big role in sustaining household's livelihood. People in these areas face tough life conditions and many of them are vulnerable to food entitlement. In these areas, trust and networking among community members (social capital) plays a useful role in facilitating household's access to food thus reducing food insecurity vulnerability. Relative to other forms of capital, empirical estimates undertaken in this study suggest that the effect of social capital on reduction of food insecurity vulnerability is much less than the effect of physical and human capitals. One of the ways through

which social capital reduces household food insecurity vulnerability is through its effect on income. Like other forms of capital analysed in this study, namely human and physical, social capital significantly increases household income. However, effect of social capital on income is relatively less compared to those of human and physical. Apart from reducing food vulnerability through its positive effect on household income, social capital in these areas also provide a web of informal social networks which facilitates coping with food shortages. In view of the finding that high proportion of households in the study areas are food vulnerable (43.8% for Dar es salaam and 47.76% for Morogoro municipality) and that many do make use of the identified social capital arrangements in contending with food insecurity, it is logical to deduce that social capital plays a big role in coping with food insecurity in the study area.

5.4 Recommendations

Four deductions with bearing to policy implications can be made out of the findings of this study. The deductions are presented below as policy recommendations for the study area. The recommendations are also applicable to the rest of Tanzanian urban areas.

1. It pays to invest in social capital formation in urban areas of Tanzania. The Government and other development agencies should prioritise development programmes whose implementation increases social capital. Programmes such as group lending to investment financing and Community Based Rehabilitation Programmes to child health and malnutrition, for example, are

known to forge cooperation among people. The study advocates formulation and implementation of such programmes.

2. Development programmes to be implemented in urban areas of Tanzania should consider the useful role played by local level cooperation such that the programmes should nurture the existing local level networks. There are plenty of processes of local level cooperation in urban areas such as Rotating Savings and Credit Associations (“upatu”) and parents associations for building and managing schools that need encouragement from the government and NGOs.
3. Efforts to reduce food insecurity vulnerability in Dar es salaam and Morogoro municipality should be directly targeted to the urban poor who are the principal victims of the problem. This study found out that 43.8% and 47.76% of Dar es Salaam and Morogoro municipality households are food insecure. It is important therefore to identify and clearly target these food vulnerable households in case of providing assistances meant to enhance their welfare
4. Deliberate efforts should be directed at reducing life difficulties in urban areas of Tanzania so as to reduce the number of food vulnerable households. Central to the policies should be targeting at increasing income of poor households through various actions such as income transfer programmes and income generating activities.

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APPENDICES

Appendix 1: Questionnaire used in the collection of primary data

1. Basic household characteristics

(A) Name of respondent.....

(B) Age of respondent.....

(C) Sex of respondent (Please put a tick where appropriate)

1 = Male []

2 = Female []

(D) Religion of respondent (put a tick where appropriate)

1 = Christian []

2 = Moslem []

3 = Other []

(E) Ethnicity of respondent.....

(F) Marital status of respondent

1 = Single []

2 = Married []

3 = Divorced []

4 = Widowed []

(G) Is the head of this household a man or a woman?

1 = A man []

2 = A woman []

(H) For how many years have you attended formal education classes?.....

Grade of education	Years of being in class
Nursery school	
Primary school	
Secondary school O- Level	
Secondary school A-level	
College education	
Short courses	
Others	
Total	

(I) For how many years has your wife/husband attended formal education classes?.....

Grade of education	Years of being in class
Nursery school	
Primary school	
Secondary school O- Level	
Secondary school A-level	
College education	
Short courses	
Others	
Total	

(J) How many members does this household have?.....

Note: Household members consists of all those people residing under the same roof and sharing same budget plus those who are away (e.g. students in boarding schools but still under the guidance of their parents)

(K) Kindly complete the table below by explaining the age and sex composition of your household members

(Use the following scores for sex 1 = Male, 2 = Female)

Number	Name (Not very necessary)	Sex	Age
1			
2			
3			
4			
5			
6			
7			
8			

2. Measurement of social capital

Case 1: Affiliation with friends, relatives and neighbours

(A) How many children do you have?.....

Note: Children referred to here include those who are already adults and those who are independent.

(B) What is the education level of each of your child? Please answer the question by filling on the table below

(Use the following scores for education levels 1 = No formal education, 2 = Primary education, 3 = Secondary education (form four), 4 = Diploma/ certificate/form six, 5 = University graduate)

Number	Name (Not very necessary)	Education level score
1		
2		
3		
4		
5		
6		
7		
8		

(C) How many relatives do you have whom you share at least one parent?.....

(D) What is the education level of each of your blood relative whom you share at least one parent

(Use the following scores for education levels 1 = No formal education, 2 = Primary education, 3 = Secondary education (form four), 4 = Diploma/ certificate/form six, 5 = University graduate)

Number	Name (<i>Not very necessary</i>)	Education level score
1		
2		
3		
4		
5		
6		
7		
8		

(E) How many blood relatives does your household has whom you share at least one parent?.....

(F) What is the education level of each of your wife's/husband's relatives

(Use the following scores for education levels 1 = No formal education, 2 = Primary education, 3 = Secondary education (form four), 4 = Diploma/ certificate/form six, 5 = University graduate)

Number	Name (<i>Not very necessary</i>)	Education level score
1		
2		
3		
4		
5		
6		
7		
8		

(G) Has this household ever encountered a problem (such as a wedding or funeral), which required people to make contributions?

1 = Yes []

2 = No []

(H) If yes, what was the problem and how much did people contributed

Reason for contribution	Year	Total amount of money contributed

(I) If no, which among the following amounts of money do you think your friends, relatives and neighbours will be able to raise for you in case you happen to have a problem such as funeral?

1 = Less than 1,000 shillings []

2 = Between 1,000 and 10,000 shillings []

3 = Between 10,000 and 100,000 shillings []

- 4 = Between 100,000 and 1,000,000 shillings []
- 5 = More than 1,000,000 []

(J) In a case you happen to have a problem such as weeding or funeral, which requires contribution/borrowing, how much do you think that you may be able to rise from relatives alone?

- 1 = Less than 1,000 shillings []
- 2 = Between 1,000 and 10,000 shillings []
- 3 = Between 10,000 and 100,000 shillings []
- 4 = Between 100,000 and 1,000,000 shillings []
- 5 = More than 1,000,000 []

Case 2: Membership in groups

(A) Are you a member of any of the following groups? Please answer by putting a tick in groups in which you are a member and a cross in groups in which you are not a member

	Name of groups	Yes / No	In how many places are you a member in each group
1	Church		
2	Mosque		
3	Political party		
4	Women's group		
5	Men's group		
6	Burial societies		
7	<i>Sungusungu</i> /traditional security guards		
8	Informal credit		
9	Youth group		
10	Ethnic/tribal group		
11	Occupational group		
12	Sports club		
13	Choir		
14	Drinking club		
15	Community welfare group		
16	Physical fitness club		
17	Any other		
18			
19			

(B) Is your husband/wife a member of any of the following groups?

	Name of groups	Yes / No	In how many places are you a member in each group
1	Church		
2	Mosque		
3	Political party		
4	Women's group		
5	Men's group		
6	Burial societies		
7	<i>Sungusungu</i> /traditional security guards		
8	Informal credit		
9	Youth group		
10	Ethnic/tribal group		
11	Occupational group		

12	Sports club		
13	Choir		
14	Drinking club		
15	Community welfare group		
16	Physical fitness club		
17	Any other		
18			
19			

(B) Which 2 of the above groups in which your wife/husband is member do you consider the most useful to your family/household?

- 1.....
2.....

(C) For each of the above 2 groups in which your wife/husband is a member, how can you rate the attendance of meetings by your husband/wife?

(Use the following scores for attendance in meetings)

- 1 = None
2 = Poor
3 = Average
4 = Good
5 = Excellent

	Name of group	Attendance score
1		
2		
3		
4		

(D) Generally how can you rate performance of each of the above 2 groups in which your wife/husband is a member?

Use the following scores for group performance 1 = very poor

- 2 = Poor
3 = Good
4 = Good
5 = Excellent

	Name of group	Performance score
1		
2		
3		

3. Household income and assets

(A) What are the major sources of income for this household? Tick the sources, which are

applicable.

- 1 = Salary of father []
- 2 = Allowances of father []
- 3 = Salary of mother/wife []
- 4 = Allowances of mother / wife []
- 5 = Wages of mother/wife []
- 6 = Rent of properties []
- 7 = Business (es) []
- 8 = Any other

.....

(B) What is the average monthly income from each source?

Income source	Average monthly income	
	Husband	Wife
Salary		
Allowances		
Wages		
Rent of properties		
Businesses		
Others		

(C) What is your household's monthly expenditure on food?.....

(D) The following question intends to capture the information on the value of households major assets

Imagine that you intend to sell all of your households major assets, how much price will you accept for each of the asst you have? Please answer the question by completing the table below.

Name of asset Select those assets you have	Put a tick if you have otherwise put an X	Number of assets	Selling price at which you are wiling to accept
House(s)			
Plot(s)			
Farm(s)			
Business site e.g. milling machine (including the available sock of goods)			
Computer(s)			
Television screen(s)			
Video deck(s)			
Radio(s)			
Electrical cooker(s)			
Other cooker(s)			
Iron			
Cellular phone (s)			

Coach/Sofa			
Bcd(s)			
Cupboard(s)			
Chair(s)			
Stool(s)			
Car/Vehicle(s)			
Motorcycle(s)			
Bicycle(s)			
Any other asset(s) Kindly mention			

4. Household perception of their food security situation

(A) For the past 10 years have you ever had any food shortages in your household>

- 1 = Yes []
2 = No []

(B) Generally how can you describe the situation of food availability for this household over the past 12 months?

1. We have been able to get enough to eat throughout the year. Every household member had been able to choose whatever to eat at any day. Getting of food had not been a major problem to this household.
2. Good: Every household member had been able to get enough to eat but to the extent of choosing what to eat.
3. Fearful: We have been facing problems of getting enough food for all household members. In some cases we had to reduce amount of food or even skip a meal. The financial situation was very unpredictable and the question of getting food used to cause a major headache to household heads.
4. Very bad: We used to face a very big problem of getting food such that some household members become malnourished

5. Forms of social capital arrangements commonly used by households in urban areas in coping with household food insecurity.

(A) During periods of food scarcity by which of the following ways has your household been getting assistance from fiends, relatives and neighbours.

1. Food offers from friends, relatives and neighbours
2. Food purchase on credit
3. Borrowing of money from friends, relatives and neighbours
4. Remittances
5. Financial assistances from friends, relatives and neighbours
6. Any other please mention

.....

(B) Is there any other way you know that people in urban areas co-operate in order to get food needs?

1 = Yes [], 2 = No []

If yes please explain

.....

(C) Has your household ever got food needs through assistance from any organisation/NGO?

1 = Yes [], 2 = No []

(D) If yes, which organisations have ever helped your household to get its food needs?

.....

(E) For any NGO that have assisted you in getting your households food needs, what was the nature of assistance given? (Use the following scores: 1 = Food, 2 = Money 3 = credit 4 = advice 5 = Other- please specify

Name of organisation	Type of assistance given (Use scores above)

(6) Characteristics of social capital arrangements**(i) Money offers**

(A) During last year (2001) is there any specific time that you assisted your relatives and/or friends by providing cash income to enable him obtain their consumption needs particularly food?

1 = Yes []

2 = No []

(B) If yes, kindly complete the table below by explaining your relationship with the person you assisted, amount you assisted and location where he/she is living

Note1: people referred to here are those whom you are not living in the same household

Note2: Use the following scores for location 1 = Dar es salaam

2 = Morogoro town

3 = Other regions but not in towns

4 = Rural areas

Relationship with the person you assisted	Amount of money you assisted in Tanzanian shillings	Location where the recipient person is living
Wife		
Husband		
Father		
Mother		
Brother		
Sister		
Son		
Daughter		
In law		
Uncle		
Aunt		
Friend		
Others		

(C) During last year, is there any time you relied on cash income from your friends, relatives and neighbours in meeting your consumption needs particularly food?

1 = Yes [], 2 = No []

(D) If yes, kindly complete the table below by explaining your relationship with the person who provided with the income, amount he/she assisted and location where he/she is living

Note1: people referred to here are those whom you are not living in the same household

Note2: Use the following scores for location

1 = Dar es salaam

2 = Morogoro town

3 = Other regions but not in towns

4 = Rural areas

Relationship with the person who provided you with income	Amount of money provided in Tanzanian shillings	Location where the person is living
Wife		
Husband		
Father		

Mother		
Brother		
Sister		
Son		
Daughter		
In law		
Uncle		
Aunt		
Friend		
Others		

(ii) Food offers from relatives/friends.

(A) Does this household ever receive food offer from friends, relatives or neighbours?

1 = Yes [], 2 = No []

(B) Is there any specific time when you used to get large quantities of food offers

1 = Yes [], 2 = No []

(C) If yes, what period was that?

.....

(D) What is the relationship with the person who mostly used to send to you food?

.....

(E) Where was the person who used to send to you most was staying?

- 1 = Dar es salaam
- 2 = Morogoro town
- 3 = Other regions but not in towns
- 4 = Rural areas

(F) How is the person who used to send to you most was getting that food?

- 1 = Produced himself []
- 2 = Purchased []
- 3 = Any other (Please specify)

.....

(G) What were the reasons for getting large quantities by that period unlike the rest?

.....

(H) Do you think that the tendency of people to help each other in terms of providing food is increasing, decreasing or is just the same as time goes on? Please give reasons

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

iii) Food purchase on credit

(A) Has this household ever purchased food on credit over the past 10 years? Tick where appropriate.

1 = Yes [], 2 = No []

(B) If yes, do you purchase food on credit these days?

1 = Yes [], 2 = No []

(C) If yes, how many times per month on the average do you purchase food on credit these days?.....

(D) In which of the following business types do you purchase food on credit

- 1 = Retail food markets ("genge")
- 2 = Retail shops
- 3 = Whole sale shops
- 4 = Cooperative shops
- 5 = Market
- 6 = Food vendors
- 7 = Any other

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

(E) In how many places are used to purchase food on credit?.....

(F) If there is place where you regularly purchase food on credit, what is your relationship with the owner of the business? Please tick where appropriate

- 1 = relative []
- 2 = friend []
- 3 = neighbour []
- 4 = Any other (Please specify)

.....
.....

(G) How many other people who also purchase food on credit regularly at the same place do you know?

- 1 = All of them
- 2 = Majority of them
- 3 = only few of them
- 4 = None

(H) Do those people you to be purchasing food on credit fall in any of the following categories below? Please tick where appropriate

- 1 = Men only
- 2 = Women only
- 3 = They are of the same religion
- 4 = they are of the same ethnicity
- 5 = They all have low income
- 6 =All of them have stayed here for a long time
- 7 = Any other please explain

.....

(I) For how long are you able to stay with the loan before repaying?.....

(J) What mechanisms are applied to ensure that the loan is being paid back?

.....

(IV) Borrowing of money from friends, relatives and neighbours

(A) During last year is there any time that due to financial constraints you borrowed money to be able to purchase your household consumption needs particularly food?

- 1 = Yes [], 2 = No []

(B) If yes, how much number of times among the following do you estimate that you borrowed in order to get money to be able to purchase your consumption needs particularly food?

- 1 = About 1 to 3 times
- 2 = About 4 to 10 times
- 3 = More than 10 times

(C) Kindly complete the table below by describing the first two people whom you normally consult first in case you intend to borrow some money?

Number	Relationship with the first person you consult first in case you intend to borrow	Location where the person is residing
1.		
2.		

(V) Informal credit arrangement

(A) Are you a member of any informal credit group?

- 1 = Yes [], 2 = No []

(B) To how many informal credit groups do you belong?.....

(C) How many members does your group has?

(D) Is your group composed of members conforming to any of the following characteristics?

- 1 =Men only
- 2 = Women only
- 3 = They are of the same religion
- 4 = They are of the same ethnicity
- 5 = They are all of low income
- 6 = All of them have stayed here for a long time
- 7 = Any other please explain

(E) Apart from raising money for group members does your group have any other objective?

1 = Yes [], 2 = []

(F) If yes, what are the other objectives of your group?

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

(G) For how long has your group being in existence?.....

(H) Do you think that being a member of informal credit assists you in meeting your day-to-day food needs? 1 = Yes [], 2 = No []

THANK YOU FOR YOUR COOPERATION

Appendix 2: Correlation matrix

		average monthly household income	value of household major assets	Household stock of human capital	household level social capital
average monthly household income	Pearson Correlation	1.000	.664**	.654**	.356**
	Sig. (1-tailed)	.	.000	.000	.000
	N	129	124	110	129
value of household major assets	Pearson Correlation	.664**	1.000	.501**	.344**
	Sig. (1-tailed)	.000	.	.000	.000
	N	124	149	127	149
Household stock of human capital	Pearson Correlation	.654**	.501**	1.000	.153*
	Sig. (1-tailed)	.000	.000	.	.038
	N	110	127	136	136
household level social capital	Pearson Correlation	.356**	.344**	.153*	1.000
	Sig. (1-tailed)	.000	.000	.038	.
	N	129	149	136	160

** . Correlation is significant at the 0.01 level (1-tailed).

* . Correlation is significant at the 0.05 level (1-tailed).

Appendix 3: t-test for comparison of means of physical capital between households of Dar es Salaam and Morogoro urban district.

Parameter	t-Statistic	Df	Sign (2-tailed)
Equal variances assumed	-0.70	147	0.485
Equal variances not assumed	-0.701	131.57	0.484

**Appendix 4: t-test for comparison of means of social capital between households
of Dar es Salaam and Morogoro urban district**

Parameter	t-Statistic	Df	Sign (2-tailed)
Equal variances assumed	-0.546	158	0.586
Equal variances not assumed	-0.546	157.97	0.586

Appendix 5: t-test for comparison of income between households of Dar es Salaam and that of Morogoro

Parameter	t-Statistic	Df	Sign (2-tailed)
Equal variances assumed	-2.965	127	0.004
Equal variances not assumed	-3.136	126.927	0.002

**Appendix 6: t-test for comparison of means of income between households,
which regularly purchase food on credit, and those, which do not**

Parameter	t-Statistic	Df	Sign (2-tailed)
Equal variances assumed	-3.965	123	0.000
Equal variances not assumed	-4.983	114.406	0.000

Mean income of households which purchase food on credit = 152423.9130

Mean income of households which do not purchase food on credit = 388987.3418

**Appendix 7: t-test for comparison of means of social capital between households
which regularly purchase food on credit and those which do not**

Parameter	t-Statistic	Df	Sign (2-tailed)
Equal variances assumed	-0.803	151	0.423
Equal variances not assumed	-0.822	123.042	0.413

Mean social capital of households which regularly purchase food on credit = 6.2205

Mean of social capital of households which do not regularly purchase food on credit

= 7.5108

Appendix 8: t-test for comparison of means of social capital between households that borrow money to cope with food insecurity and those which do not borrow

Parameter	t-Statistic	Df	Sign (2-tailed)
Equal variances assumed	-0.888	147	0.376
Equal variances not assumed	-1.069	100.140	0.288

Mean social capital of households which borrow to cope with food insecurity =
5.9211

Mean social capital of households which do not borrow to cope with food insecurity
= 7.5232

Appendix 9: Location relationships between households which borrow each other some money in Morogoro urban district

Location relationship	Percentage of cases
Dar es salaam	13.6
Within Morogoro urban district	54.5
Morogoro urban district and other towns in the country	4.5
Village	27.3

Appendix 10: Location relationships between households which borrow each other some money in Dar es Salaam

Location relational relationship	Percentage of cases
Within Dar es salam	96.5
Dar es salaam and village	3.6

**Appendix 11: t-test for comparison of means of income between households
which regularly receive food offer and those which do not get food offer**

Parameter	t-Statistic	Df	Sign (2-tailed)
Equal variances assumed	-1.437	124	0.153
Equal variances not assumed	-0.597	82.242	0.114

Mean income of households which regularly receive food offers to cope with food insecurity = 242208.3333.

Mean income of households which do not regularly purchase food on credit = 339311.1111.

Appendix 12: Heteroscedasticity and logarithmic transformations in linear regression

In addition to other forms of presenting regression models (such as exponential and reciprocal) linear regression models are constructed to predict the effect of independent variables to the dependent variable. Regression models are perceived as being linear in two perspectives namely linearity in variables and linearity in parameters.

A model in which the independent variable appears to be not raised to any power is called linear models. This is the most natural way of describing a model as being linear. Technically, a model $Y = f(X)$ is said to be linear in variable if conditional expectation of Y is a linear function of X .

E.g. $Y = \alpha + B_1X + \mu$

A model is said to be linear in the parameters say B_1 if B_1 appears with a power of only one and is not multiplied or divided by any other parameter.

E.g. $Y = \alpha + B_1X^2 + \mu$

Of the two interpretations linearity in parameters is the most relevant in development of the regression theory, thus in most cases models are considered linear from a perspective of linearity in parameters.

Compared to other forms of regression models, linear models are more extensively put to use because they can be estimated by one of the most powerful methods of estimation namely the method of ordinary least squares (OLS). Under certain assumptions the method of least squares has some very desirable properties that made it one of the most powerful and popular method of regression analysis

(Gujarat, 1995). One of the assumptions is homoscedasticity.

The term homoscedasticity refers to equal variance of the error term. Consider a consumption function $C = f(Y)$ where C represents consumption and Y is income. The function suggests that as income increases consumption increases accordingly. In situations the collected data shows that as income increases the variance of consumption expenditure increases is referred to as homoscedasticity. The condition arising in cases when the assumption of homoscedasticity is violated is known as heteroscedasticity.

Heteroscedasticity is the converse of homoscedasticity and it refers to the unequal variance of error term. The effect of heteroscedasticity is to reduce the precision in testing hypothesis using t and F statistics. With heteroscedasticity the confidence intervals becomes unnecessarily larger therefore t and F ratios may likely give wrong results because what appears statistically insignificant may actually be significant if the correct confidence intervals were established on the basis of usual method.

A logarithmic transformation is one of the methods used to contend with the problem of heteroscedasticity. This results because log transformations compresses the scales in which the variables are measured, thereby reducing a tenfold difference between the two values to two fold difference. For example the number 80 is 10 times the number 8 but $\ln 80 = 4.3280$ is about twice as large as $\ln 8$ (2.20794)

Appendix 13: Logistic regression

There are a number of cases in econometric analyses in which some variables of interest are qualitative. These variables also called dummy variables are devices for incorporating into the model variables that cannot be easily quantified such as sex, religion and colour. Since such variables usually indicate presence or absence of a quality or attribute one method of quantifying such attributes is by constructing artificial variables usually one for presence of an attribute and 0 for absence of any attribute.

In situations in which the dependent variable is a dummy, the model is called dummy dependent variable regression models. There are four approaches of estimating such models namely using linear probability models, the logit (logistic) model, probit and tobit model. Each of these approaches bears distinctive features and methods of model estimation.

In logistic regression, the probability that an event Y will occur is represented by the formula below.

$$P_i = E (Y = 1/X_i) = \frac{1}{1 + e^{-(B_1 + B_2 X_1)}} \dots\dots\dots(i)$$

Where X_1 = the independent variable

b_1 = the intercept

B_2 = Coefficient of X_1

e = Base of natural logarithm equal to 2.71828

For easy of exposition the model can be written as:

$$P_i = \frac{1}{1 + e^{-Z}} \quad \text{Where } Z = B_1 + B_1 X_i \dots\dots\dots(ii)$$

The model above is known as the (cumulative) logistic distribution function. The model suggest that as the independent variable X_i vary from $-\infty$ to $+\infty$ the parameter Z will also range from $-\infty$ to $+\infty$ at the same time parameter P will range between 0 and 1 confirming that P is a probability.

If P = probability that an event will occur, then $1-P$ = probability that an event will not occur.

$$\text{Given that } P = \frac{1}{1 + e^{-Z}} \quad \text{then } 1-p = \frac{1}{1 + e^Z}$$

Rearranging the above we get

$$\frac{P}{1-P} = \frac{1 + e^Z}{1 + e^{-Z}} = e^Z$$

Now $\frac{P_i}{1-P_i}$

is simply the odd ratio in favour of occurrence of an event i.e. the ratio of the probability that the event will occur. For example if $P=0.8$ then the odds are 4 to 1 in favour of occurrence of an event.

Thus taking natural logarithm we get

$$L_i = \ln \left(\frac{P_i}{1 - P_i} \right) = Z_i = B_1 + B_2 X_i \dots\dots\dots(iii)$$

Model (iii) above is the logistic model. The interpretation of the odd ratio is as follows. B_2 is the slope i.e. Change in L for unit change in X_i i.e. how the log of odd ratio in favour of the event to occur change as the independent variable changes by a unit. Like most interpretations of intercepts, this interpretation may not have any physical meaning. The most important issue is on observing the sign of coefficient.