



Seasonal Household Food Insecurity: A Case of Lake Tanganyika Basin Community in Mpulungu District of Northern Zambia.

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DEDICATION

I dedicate this work to my wife **Jessie Namfukwe Goma** and two lovely daughters: **Nyawa** and **Lusungu** for their support and understanding to have been away from them for the entire period of course study of one solid year. Lastly, I give thanks to the mighty Lord, God for giving me the wisdom and good health in pursuing this research.

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LIST OF ABBREVIATIONS

CSO – Central Statistics Office

CFS – Crop Forecast Surveys

DoF – Department of Fisheries

FAO – Food and Agriculture Organization

FSRP – Food Security Research Project

FRA – Food Reserve Agency

FSP – Fertilizer Support Programme

GDP – Gross Domestic Product

HHH – Household Head

IMF – International Monetary Fund

LTIRDP – Lake Tanganyika Integrated Regional Development Programme

MAL – Ministry of Agriculture and Livestock

MDG – Millennium Development Goal

SSA – Sub-Saharan Africa

SS – Supplemental Survey

UNDP – United Nations Development Programme

UNICEF – United Nations Children's Fund

WFP – World Food Programme

ZDHS – Zambia District Health Surveys

ABSTRACT

The research study was conducted in Lake Tanganyika basin community located in Mpulungu district in Northern Province of Zambia. The objective of the research was to examine factors causing seasonal household food insecurity in Lake Tanganyika basin community.

This research is based on a case study by obtaining qualitative and empirical data by use of semi-structured check list. Both individual and focus group discussion interviews were conducted in order to collect data leading to factors that were affecting the households in the basin community as regards to seasonal food security. Therefore, 21 households were interviewed in the study area of which eight were female headed households and 13 were male headed households. Supportive interviews were also conducted with one focus group interview with Chashawa women club and individual interviews with one area Agricultural Extension Officer as an informant and a local expert in agriculture and food security.

The results of the findings are that it is evident that household food insecurity was prominent and a threat to Lake Tanganyika basin community in this part of northern Zambia. It was established that 17% of the households were chronically food insecure, 21% temporary food secure, 27% food insecure in critical periods and only 37% were food secure throughout the season.

The major crops grown in the area which are cassava, maize and beans yielded low production due to several factors such as: limited land space, poor soils, crop damage due to pests such as maize stalk borer and cassava mealy bugs, low rainfall and poor distribution, lack of extension service and poor accessibility to farm inputs.

It was also found that there was no any micro-financial institution in the area to offer micro-credit to the community for them to venture into activities that could improve their livelihoods. However, there was only LTIRDP/UNDP that had just introduced soft loans to farmers with only 5% beneficiary coverage.

The study also established that fishing was rated as being a major livelihood activity in the area albeit the depletion of fisheries resource in Lake Tanganyika due to many factors including overfishing. This signaled as an alarm to the community for resilience and start considering taking up agriculture in its diversification as a path way to remove the local poor households from the trap of poverty and food insecurity. Enhanced agricultural productivity for the long term food security of the majority of world's hungry has been deemed crucial, due to the links to jobs, income generation and nutrition well-being of the people in developing countries. Achieving household food security in the study area would need concerted effort through multi-sectoral approach with various stakeholders and the government inclusively. The commitment and sacrifice from the community households will be cardinal and they should be in the forefront otherwise if not, then achieving household food security would remain a pipe dream in the Lake Tanganyika basin community.

CHAPTER 1: INTRODUCTION

1.1 Context

Households are food secure when they have year-round access to the amount and variety of safe foods their members need to lead active and healthy lives. At the household level, food security refers to the ability of the household to secure, either from its own production or through purchases, adequate food for meeting the dietary needs of all members of the household (FAO, 2010a).

Food insecurity is the major underlying cause of malnutrition in Zambia. Only 36% of households in Zambia have enough food to eat, while 19% of households seldom or never have enough to eat, categorizing them as chronically food insecure. This is consistent with data indicating that 64% of Zambians live below the international poverty line (53% Sub-Saharan average) and that 36.5% live in extreme poverty (Food Security Research Project, 2011).

Lake Tanganyika basin community as a focus for this research is located in Mpulungu district in Northern Province of Zambia. The district is situated on the shores of Lake Tanganyika. The Lake Tanganyika basin community has a total number of 85 registered villages while the population size for the whole district is 98, 073 (CSO, 2010). The district receives average annual rainfall of 1000 to 1800mm and has a single farming season.

The main livelihood of the local people in this basin community is fishing as well as subsistence farming by use of a hand hoe. The main crops grown at a small scale are maize, cassava and beans. Fishing levels in the lake has considerably reduced over the past decades due to many factors including overfishing.

In the district there is Lake Tanganyika Integrated Regional Development Programme (LTIRDP) that collaborates with various stakeholders that includes ministry of agriculture, department of forestry, department of fisheries, department of health, department of community and development, local authority and the local community. The main focus of the programme is conserving the local natural resource base; that is controlling the sediment flows from the steep mountains terrain surrounding the lake, sustainable land use for agriculture and forestry. The main emphasis is on institutional strengthening as well as supporting community participation in the area in agriculture, forestry and soil erosion prevention.

Prior to the commencement of the programme in 2010, a baseline survey was conducted by the Lake Tanganyika Integrated Regional Development in the lake basin area in order to ascertain the community status quo. The baseline survey report revealed that in this part of Northern Zambia, the major problem found was food insecurity among the majority (79%) of households in Lake Tanganyika basin community year in year out. The food insecurity in the community is serious in the sense that it is negatively affecting the implementation of the management programme in the area.

The survey report pointed out of the situation being severe in disruptions of eating patterns as households reduced number of meals per day, vividly malnutrition especially in children, increased poverty, stigmatization, embarrassment, wondering about, reduced labour capacity and exposure of the community to food aid. In such a situation the report further highlighted that it was a challenge for the poor to contribute to meaningful economic development in the area.

1.2 Research problem

Food insecurity is major worldwide problem. It is currently estimated that 880 million people in the world are food insecure the majority of whom live in South Asia and Africa with smaller percentages in Latin America, the Middle East and Eastern Europe (World Bank, 1996 cited in World Food Summit document, 1997).

Of all human needs, food is the most basic. People who are physically weakened by hunger will hardly be able to escape from poverty trap: the hungry and malnourished cannot work productively to increase their incomes and improve the living standards of their families; hunger and inadequate diets inevitably lead to poor health and short life expectancies.

However, in Northern Zambia, there is a seriousness of household food insecurity in Lake Tanganyika basin community depending on the state of natural resources and the extent of development of these resources.

According to LTIRDP Baseline Survey Report (2010), the yearly situation of food insecurity in the lake community rated at 79% causes reduction of food intake by household members leading to the disruption of eating patterns. This debilitating circumstance eventually causes malnutrition especially in children, reduction of labour capacity, stigmatization, embarrassment and exposure of the people in the community to food aid. In addition to that, the entire lake community is difficult to access due to poor road infrastructure coupled with rocky soil structures. The severity of the household food insecurity situation is a challenge for the rural poor to participate in meaningful economic development in the area.

Hence it is against the aforesaid background that this research seeks to investigate factors causing seasonal household food insecurity in Lake Tanganyika basin community so as to contribute to appropriate interventions as regards to addressing the situation.

1.3 Research Objective

To examine factors causing seasonal household food insecurity in Lake Tanganyika basin community.

1.4 Main research question:

- What are the factors causing seasonal household food insecurity?

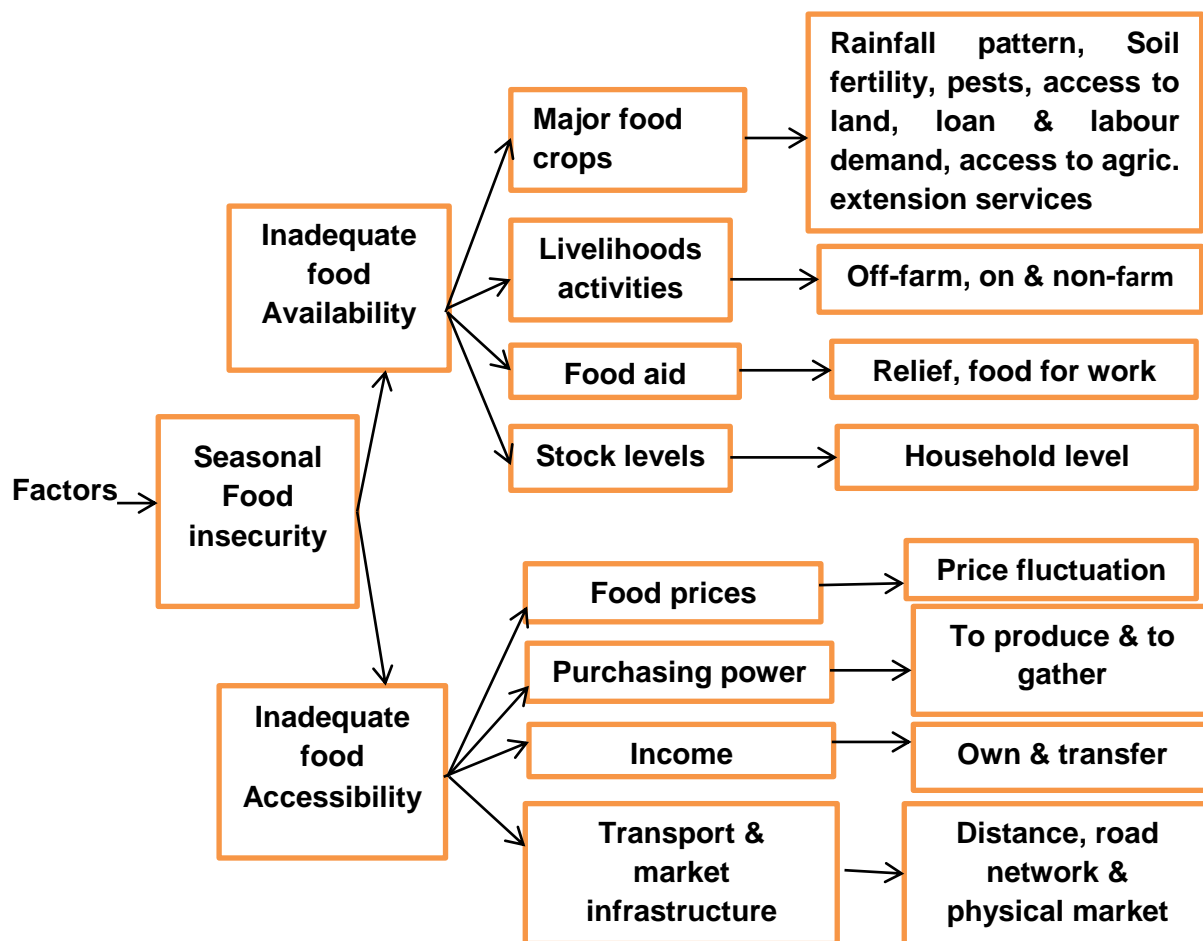
1.4.1 Sub-questions

- What are the factors that limit the production of major staple food crops consumed in the area by the households?
- To what extent do the livelihood activities affect household food availability?
- How does income affect household food insecurity during the year?
- How do food prices affect household food accessibility during the year?
- What coping mechanisms do households practice while facing seasonal food insecurity?

1.4.2 Operationalization

In operationalizing the seasonal household food insecurity case as shown in figure 1.1, the research will concentrate on food availability and accessibility of the four dimensions of food security that would help to reveal the situation in order to ascertain the food insecurity in Lake Tanganyika basic community of northern Zambia.

Figure 1.1: Operationalizing seasonal household food insecurity model



1.4.2 Conceptual framework

This research used the sustainable livelihood framework to support the seasonal household food insecurity model which forms a major concept. The sustainable livelihood framework has been used in the research to help understand and analyze the livelihoods of the rural poor households and how secure they are regarding food security. Spicker (2007) noted that the framework is useful in assessing the effectiveness of existing efforts in reducing poverty and food insecurity: thus the simplification being the full diversity and richness of livelihoods that can only be understood by qualitative and participatory analysis at a local level.

From the seasonal food insecurity model, responses were unfolded by the respondents in terms of factors limiting production of major food crops in the research area, how livelihood activities affects household food insecurity, food price trends, household incomes and their purchasing power including the transport and market infrastructure development in the area as this affect food accessibility.

On the components of the frame work the areas of concentration are as follows:

Vulnerability context: Vulnerability is defined as a high degree of exposure to risk, shocks and stress; and proneness to food insecurity (Chambers, 1989; Davies, 1996). The concerns

here are on seasonality of pests' incidences, rainfall pattern and trends in food prices as exemplified in chapter four.

Transforming structures and processes: According Ellis (2000, p.37) exemplify that transforming structures and processes are institutions, organizations, policies, legislation and social relations including incentives that shape livelihoods. The policy and institutional environment and how it supports multiple livelihood strategies for equitable access for all the people in the research area is a cardinal phenomenon in improving food at household level.

Livelihood strategies: These are the choices, opportunities and diversity of activities to be taken advantage of by the household in order to achieve food security as exemplified in chapter four part five.

Livelihood outcomes: This is the achievement of the people's livelihood strategies i.e. food security in this case.

Livelihood: A livelihood comprises the assets (natural, physical, human, financial and capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household (Ellis, 2000, p.10). According to Chambers and Conway (1992, p. 7) a livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the near future, while not undermining the natural resource. Below in figure 1.2 is the sustainable livelihood framework illustrating various components as defined above.

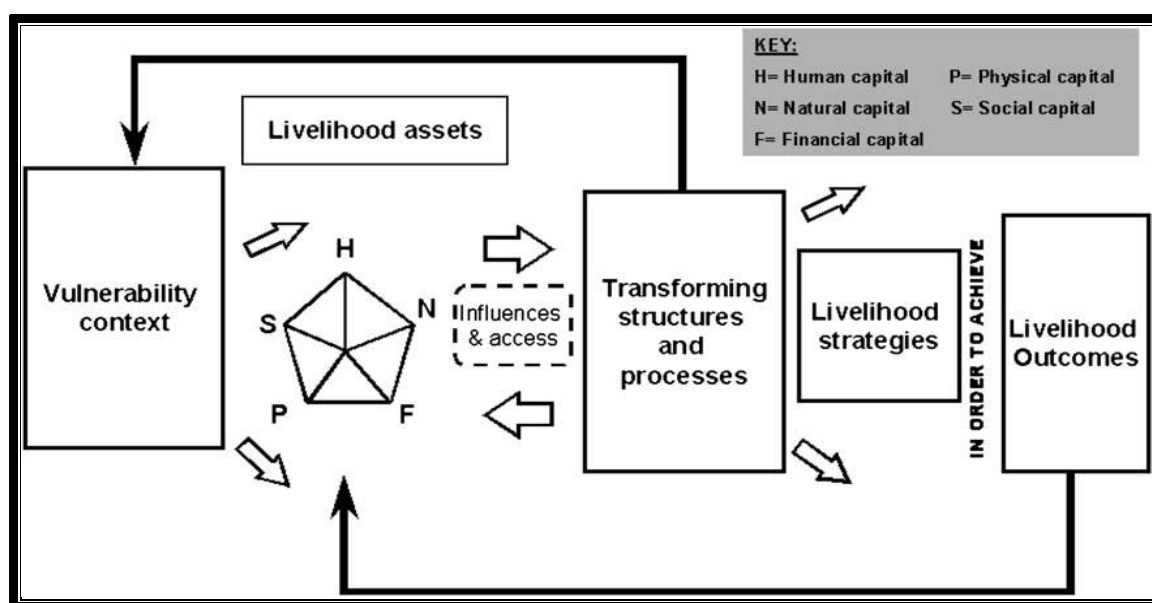


Figure 1.2: The sustainable livelihood framework

Source: DFID 1999

1.5 Research Methodology

1.5.1 Method of data collection

This research is based on case study by obtaining qualitative and empirical data by use of semi-structured interview check list. Through this method, in depth data was collected from households as regards to factors that have led to seasonal household food insecurity in Lake Tanganyika basin community in Northern Zambia.

1.5.2 Primary data collection

For this research, some literature was reviewed in order to have enough information before going into the field for data collection concerning the context of the problem as described above.

Interviews: Both individual and focus group discussion interviews were conducted. Individual interviews were conducted for in-depth extraction of data from respective interviewees. This method was used as it guaranteed confidentiality and allowed asking of sensitive questions that could not be asked on focus group discussion.

On the other hand the focus group discussion was also conducted to obtain as much information as possible from group members by ensuring equal participation without dominance by certain group members. This method stimulated thinking and participation.

However, this study conducted depth interviews using semi-structured checklist in Lake Tanganyika basin community with 21 respondents as households and supportive interviews with one focus group, one informant and one local expert. The criterion used for picking interviewee was through selective sampling broken down as follows:

Respondents:

Eight female headed households

13 male headed households

The selection of both female and male headed households was vital to understand and compare various factors that contribute to food insecurity by different type of households in terms of gender.

Focus Group Interview:

One women club called Chashawa

Women club was picked so as to gather in as much information as possible from the group that would enrich the research findings. Women are mostly considered to be more involved with food security matters at household level in Sub-Sahara Africa.

Informant:

One: The area agricultural extension officer was interviewed that provided relevant agricultural information as regard to the study area.

Expert:

One: An expert in agricultural and food security from Mpulungu district was interviewed and rendered his advice and technical knowledge in this research pertaining to food security issues in the research area.

1.5.3 Secondary data collection

Qualitative data was reviewed in order to have in depth understanding and knowledge for the proposed topics. The secondary data was gathered through various articles, journals, books, reports including departmental reports. After collection of primary data from the field, the secondary data were reviewed and analyzed accordingly. The extracted data was elaborated and the results were summarized in the final report.

1.5.4 Data analysis

Empirical data were analyzed by the use of content analysis with the respondents during interviews, focus group discussion and by observations. Then the gathered data was examined for similarities and differences in order to draw conclusion. Thereafter, the data was processed and interpolated into tables, graphs and pie charts.

1.6 Research limitations

The researcher faced challenges in extraction of relevant data about the background description of the research area as no information could be accessed through internet during desk study. It was also discovered that in the study area there were no direct previous research work conducted on household food security issues that could have added significant input to this study. The research area was very difficult to access due to poor road infrastructure and the only and risk means was by water transport. There was no access to internet and electricity in the area was not reliable as there were numerous power cuts during day and night time.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The literature review comprises first and foremost definition of concepts of household food security and insecurity and over view of household food insecurity at the global level, Africa and Zambia situation. The revelations of the food insecurity at all of the levels as mentioned above is looked as a building block in helping to understand the household food insecurity in Lake Tanganyika basin community hence contribution to appropriate interventions as regards to the situation.

2.2 Definition of concepts

Food security exists "when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 1996).

This widely accepted definition points to the following two of the four dimensions of food security that will be used in this research:

Food availability: Food availability is achieved when sufficient quantities of food are steadily available to all individuals within a country. This kind of food can be supplied through household own production, other domestic output including stock levels, commercial imports, or food aid.

Food access: Access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. Entitlements are defined as the set of all commodity bundles over which a person can establish command given the legal, political, economic and social arrangements of the community in which they live (including traditional rights such as access to common resources). At household level Food can be accessed through trade, barter, collection of wild foods and community support networks; it can also be received as a gift (or even through theft). Remember that access to food is influenced by market factors and the price of food as well as an individual's purchasing power, which is related to employment and livelihood opportunities.

Household: For the sake of this research, the household is defined as collection of individuals living together, headed by a man or woman, not necessarily sharing the same roofing of a housing unit as housing units may be clustered. These individuals carry out productive, reproductive and sometimes are involved in communal roles for their benefit as a unit. They also pool some, or all, of their income and wealth and consume certain types of goods and services collectively.

Household food insecurity in this research is defined as when there is no ability to obtain or eat enough quantities of food in a way that is culturally accepted at the household level. This can often be linked to the financial capabilities of the household to gain access to adequate food.

Chronic food insecurity: Those that do not have sufficient quality food year in year out are perpetually or chronically food insecure. This is as a result of not meeting minimum food requirements over a long period of time due to prolonged poverty, lack of productive assets and financial resources.

Seasonal food insecurity: This takes place as a result of recurring pattern of inadequate availability and access to food. This is linked to seasonal variations in the climate, cropping pattern, labour demand, food price trends and pest/disease incidences.

2.3 Global household food insecurity

Food security at the individual, household, regional, and global levels is achieved when all people, at all times, have physical, social, and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for a healthy and active life (FAO, 2001).

In 2012, food insecurity is still major global concern as one billion people are still suffering from starvation, under-, and malnutrition, and the Food and Agricultural Organization of the United Nations has concluded that we are still far from reaching Millennium Development Goal (MDG) number one: to halve extreme poverty and hunger by 2015.

In 2010, the regional distribution of people suffering from hunger was the following: 578 million in the Asia Pacific region; 239 million in Sub-Saharan Africa; 53 million in Latin America and the Caribbean; 37 million in North Africa; and 19 million in developed countries.

However, the majority of the world's undernourished people as exemplified from above live in the developing countries. Two-thirds live in just seven countries that are China, India, Indonesia and Pakistan. And over 40 percent live in China and India alone.

According to FAO (2010, pp.10-12) states that the projections for 2010 indicate that the number of undernourished people will decline in all developing regions, although with different pace. The region with most undernourished people continues to be Asia and the Pacific but with 12 percent decline from 658 million in 2009 to 578 million, this region also accounts for most of global improvement expected in 2010.

The chronically tight food supply the world is facing is driven by the cumulative effects of several well-established trends that affect global demand and supply. On the demand side, the trends include the continuing addition of 70 million people per year to the earth's population and the desire of the four billion people to move up the food chain and consume livestock products.

In China, for instance, annual per capita consumption of meat has risen from 20kg to 50kg in less than 30 years. About half of the grains produced in the world are used to feed the livestock. That is why the increases in cereal and fodder prices have strong impact on livestock products: milk rose 80% to 200% while poultry rose to 10% (Brown, 2008).

There are many examples of food insecurity in Sub-Saharan Africa, some of them having reached catastrophic dimensions, for example in the horn of Africa or southern Madagascar. Food insecurity is not just about insufficient food production, availability and in-take; it is also about the poor quality or nutritional value of the food. The detrimental situation of women and children is particularly serious, as well as the situation among female teenagers, who receive less food than their male counterparts in the same households (FAO, 2010, pp.3-7).

The soaring food prices and food riots are among the many symptoms of prevailing food crisis and insecurity. Climate change and weather vagaries, present and forecast, are generally worsening food insecurity and drastically reforming farming activities, as diagnosed by the Consultative Group on International Agricultural Research (CGIAR) in June 2011.

The key cause of food insecurity is inadequate food production. Since the global food crisis of 2007 to 2008, there has been an increasing awareness throughout the world that we must produce more and better food; and we should not be derailed from this goal, despite some relief brought by good cereal harvest in 2011-2012. This is true in Sub-Saharan Africa, which needs and wants to make its own green revolution.

The African challenge indeed is key to mitigating food insecurity in the world. Commitments were made by heads of states and governments of African union to double the part of their domestic budgets devoted to agriculture in 2010-2011, as to reach 10 %. Technical solutions

exist and there are indeed, throughout Africa, good examples of higher-yielding and sustainable agriculture. But good practices have to spread throughout the continent while at the same time social and economic measures, as well as political will, are indispensable ingredients of Africa's green revolution. It is also necessary that international donors fulfill their commitment to help Africa farmers and rural communities and protect them against unfair trade, competition, and dumping of cheap agro-food products from overseas (Sasson, 2012).

2.4 Household Food Insecurity in Africa

Food security in Africa is generating development debate and it will probably remain a major development issue in Sub-Saharan Africa for the anticipatable future. According to FAO (2009) noted that the compounding effects of acute increases in food prices in 2007 and mid 2008 coupled with the global economic crisis of 2009 are approximated to have reversed the stable decline experienced from the late 1960s to 2004 up to 2006 in the proportion of undernourished population in developing countries.

Most countries in Africa are still experiencing the interlocking constraints of low incomes, high portion of food in household budgets, a very high dependency on imports for food and for fossil fuel-based energy supply, deplorable agricultural growth performance, and feeble institutional abilities that predispose them to acute risks of food insecurity.

Hunger and malnutrition still pose a serious challenge throughout the continent, particularly in Sub-Saharan Africa. Over the past decade, vivid progress has been done in many countries and across the sub regions but to no avail.

The Food and Agriculture Organization of the United Nations estimates that globally, 925 million people were undernourished in 2010. In the Sub-Saharan Africa, the region that has the highest demographic growth in the world, 239 million people still suffer from acute hunger representing a staggering 30 percent of its whole population. Given that poverty and vulnerability to hunger are strongly correlated, food insecurity mostly affects the poor in rural and urban areas. Whereas the proportion of undernourished people varies widely at the country level, many of the current and predicted constraints to ensuring food availability, food access and food adequacy for all are similar across the continent. One of the major constraints predicted to affect food security in Africa is climate change.

Shah (2011) noted that several countries in Africa more especially East Africa, countries such as Somalia, Kenya, Ethiopia, South Sudan and Djibouti, access to food is becoming a core matter. The crisis in terms of food in the region is becoming a humanitarian calamity and western institutions, organized, and shipping tons of food to the region.

However, Sub-Saharan Africa cannot sustain human development unless it eliminates the hunger that affects nearly a quarter of its people, the United Nations Development Programme (UNDP) argues in the newly released African Human Development report 2012: towards a food secure future. Looking beyond agriculture, the report looks into four broad categories of policy options that are agriculture production, nutrition, resilience and empowerment.

If countries in Sub-Saharan Africa are to realize their potential, they will need to overcome the undernourishment that afflicts more than a quarter of their people. Neither food security nor sustained human development can be met through economic growth alone. The character of growth matters and public action is needed urgently to make the development process more pro-poor. Food security extends beyond sectoral mandates and needs to move to the centre of the development debate (UNDP, 2012).

The Africa Human Development report (2012.p.3), towards a food secure future notes that with more than one in four of its 856 million people undernourished, Sub-Saharan Africa

remains the world's most food insecure region. More than 15 million people are at risk in the Sahel the semi-arid belt from Senegal to Chad and an equal number in the horn of Africa remain vulnerable after last year's food crisis in Djibouti, Ethiopia, Kenya and Somalia.

The UNDP warn: "hunger and extended periods of malnutrition not only devastate families and communities in the short term, but leave a legacy with future generations which impairs livelihoods and undermines human development." It also emphasizes that food security that is the ability to consistently acquire enough calories and nutrients for a healthy and productive life which is vital for human development.

To boost food security, it argues for actions in four interrelated area: agricultural productivity, nutrition, access to food and empowerment of the rural poor. It asserts that increasing agricultural productivity in sustainable ways can bolster food production and economic opportunities, thereby improving food availability and increasing purchasing power. Effective nutrition policies can create conditions for the proper use and absorption of calories and nutrients. Finally, empowering the rural poor especially women and harnessing the power of information, innovation and markets can promote equitable allocation of food and resources with families and across communities (UNDP, 2012b, p.18).

2.5 Household food insecurity in Zambia

Rapid population growth and urbanization are contributing to increased pressure on Zambia's food, health care, sanitation, and education systems. This in turn poses a growing threat to levels of food insecurity, malnutrition, and poverty, particularly for the poorest and most vulnerable segments of the population (CSO, 2010).

According to the 2000 census, Zambia's population was projected to grow from 9,885,591 in 2000 to 13,273, 571 in 2010 with 64% of the population residing in rural areas and 36% in urban. Zambia is therefore highly urbanized by regional standards. The 2000 census projects urban populations to nearly double between the years 2000-2025. Providing this growing population with reliable access to nutritious and culturally acceptable foods at tolerable prices is critical for reducing poverty, stimulating economic growth, and improving the nutritional status of Zambians (CSO Population Projections Report, 2003).

Crop forecast surveys 2001-2010 also recorded increases in the number of farm households in Zambia. This has contributed to the increasing fragmentation of landholdings and decreases in the mean farm size.

While the overall poverty rate in Zambia has declined over time, poverty rates in rural Zambia remain stubbornly high, with 80% of the rural population living in poverty. Despite its rich agricultural resources, Zambia has continued to experience chronic food and nutrition security problems. Stunting rates in Zambia stand at 45%, with 21% being severe. Stunting remains the most common nutritional disorder affecting under five years children in Zambia, above the Sub-Saharan Africa average of 42%; and (ZDHS, 2007). Stunting peaks at 18-23 months when 59% are below -2SD (moderate or severe). Stunting is a proxy indicator for national development, inversely related to household wealth, high in all wealth quintiles (48% and 33.2% in the lowest and highest quintiles respectively.) Zambia District Health Surveys (ZDHS 2007, p.162) indicate that children born to mothers with no education are more likely to be stunted (44.6 %) than children born to mothers with a secondary education (38.6 %).

Wasting (5%), a short-term effect reflecting more recent or acute weight loss, can be a result of recent illness, sudden lack of appetite or inadequate food intake causing muscle and fat loss. Underweight (15%) is a composite index for stunting and wasting. A child can be underweight for age because of stunting, wasted, or both. Weight for age is a good overall indicator of a population's nutritional health.

According to Supplemental Survey (SS) conducted periodically by the Food Security Research Project (FSRP), 2008, agriculture in Zambia supports the livelihoods of over 70% of the population. 78% of women in Zambia are engaged in agriculture, compared with 69% of men. Zambia's economy has grown steadily in real terms since 2001. However the percent contribution of the agricultural sector to GDP has declined from 16% in 2001 to 12.6% in 2009.

Food insecurity is the major underlying cause of malnutrition in Zambia. Only 36% of households in Zambia have enough food to eat, while 19% of households seldom or never have enough to eat, categorizing them as chronically food insecure. This is consistent with data indicating that 64% of Zambians live below the international poverty line (53% Sub-Saharan average) and that 36.5% live in extreme poverty (Food Security Research Project, 2011). Some dimensions of food security of concern in Zambia include seasonal fluctuations in access to sufficient food resulting in quantitative deficit of energy, generally matched by deficits in food quality reflected in insufficient essential micronutrients including vitamin A, iron, zinc, folate, and many others; adequate quantity to meet energy needs of growing children and adolescents as well as pregnant and lactating women and working adults; dietary diversity that provides essential micro and macro nutrients needed for good health; and distribution of food stocks within the country to enable those who must purchase food to do so.

Using the UNICEF (1980) conceptual framework, (in Maxwell and Frankenberger 1992) three main underlying determinants of nutritional status are identified; thus household food security, quality of feeding and care giving practices and the healthy environment and access to health care services, providing feasible points of intervention entry.

Caloric intake among Zambians is overwhelmingly dominated by a single food crop, maize. According to FAOStat (2009) maize accounts for 57% of Zambians' daily caloric consumption. Government spending on agriculture is just under 10% of the total government budget, which is approaching the spending goal agreed upon under the 2003 Maputo Declaration. However, procurement and distribution of maize through Food Reserve Agency and input subsidies through FSP/Farmer Input Support Programme account for over 43% of the total agricultural budget.

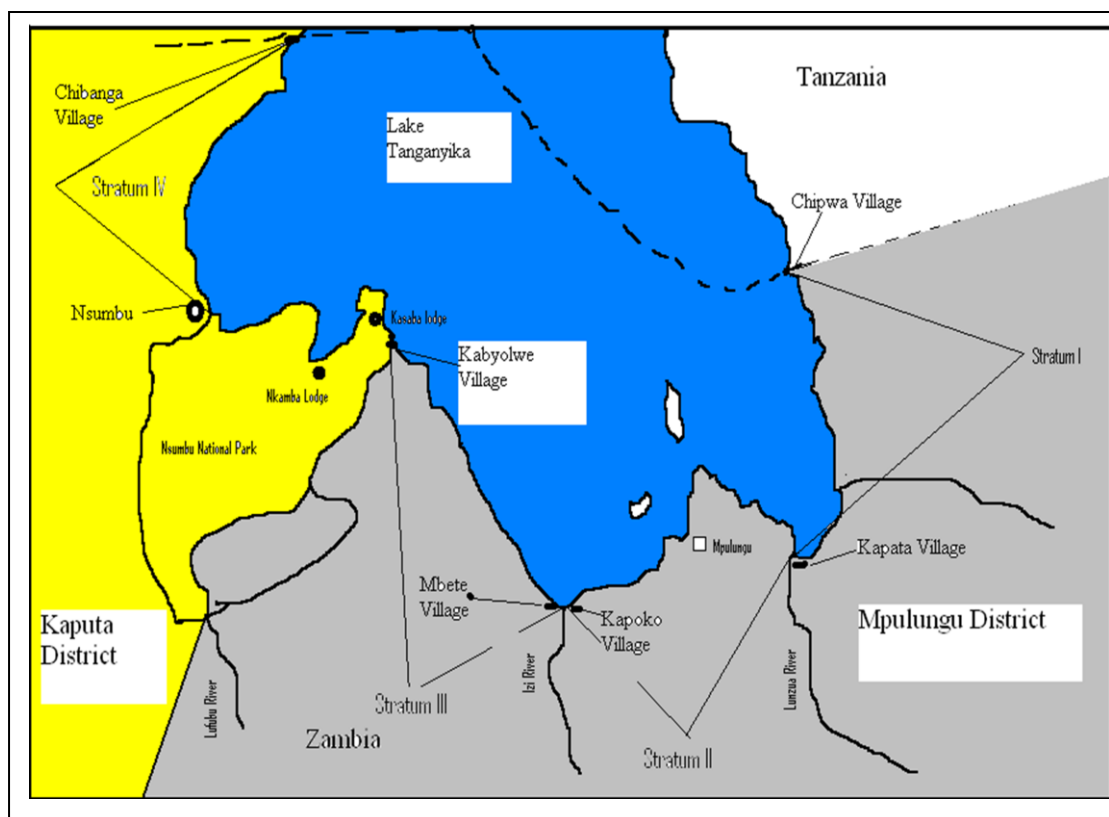
Suffice to note that while food production and household food security, income and in many cases food consumption and diet quality increase, childhood malnutrition persist. This leads to the conclusion that increasing agricultural production and income are probably necessary but not sufficient conditions to reducing malnutrition. There is need to cast the net wider beyond food security issues.

CHAPTER 3: THE STUDY AREA - LAKE TANGANYIKA BASIN COMMUNITY

3.1 Background of Research Area: Lake Tanganyika basin community - Mpulungu district

Lake Tanganyika basin community the area of this research is situated in Mpulungu district which is one of the nine districts in Northern Province of Zambia. The district lies about 206 kilometres from provincial capital Kasama with a surface area of 7,700 square kilometres. It is located on the shores of Lake Tanganyika that shares international boundaries with Burundi in the north-east, Tanzania in the east and Democratic Republic of Congo in the north. Neighbouring districts include Mporokoso in the south-east, Mbala in the south and Kaputa in the west. See figure 3.1.

Figure 3.1 Map highlighting Lake Tanganyika basin villages by strata in Mpulungu district of Zambia



Source: LTIRD, 2010.

According to Zambia Census of Population and Housing (2010), the district has a population of 98, 073: 48,651 male and 49, 422 female while Lake Tanganyika basin community has a total number of 85 registered villages with estimated population of 21, 620, with the total district households of 19, 650 at 3.2% growth rate. The province has an average population density of 14.2 persons per square kilometer with an average household size of 6 persons.

3.2 Education level of household heads in the basin community

The education level attained has an implication on the literacy level of the basin community on local development. The baseline survey conducted by LTIRD (2010) indicated that 22% of household heads in Lake Tanganyika basin community have never been to school, 57%

have been to primary school, 20% attained secondary school and 1% reached tertiary education as shown on figure 3.2.

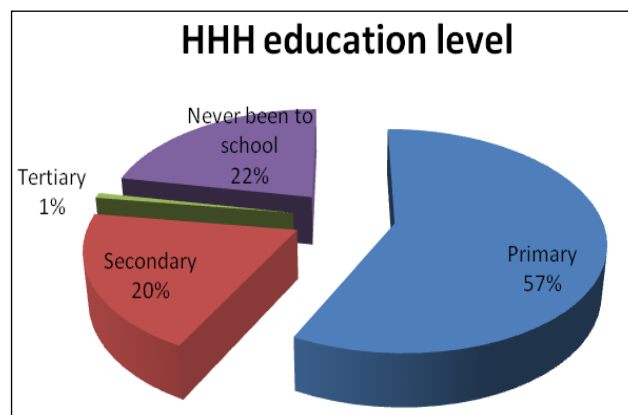


Figure 3.2: Education level of household heads

3.3 Rural - Urban location of households

Considering the location of households covered during the study by LTIRDP, 2010, 2% stay in urban areas while 98% in rural areas refer to Figure 3.3. This is indicative of a true picture on the ground because most of the lake shore communities are basically rural dwellers; the only developed area is Mpulungu central and partly Nsumbu. For the rest there is no access to electricity and other basic infrastructure and services required in an urban setting. The need for infrastructure development is thus immense.

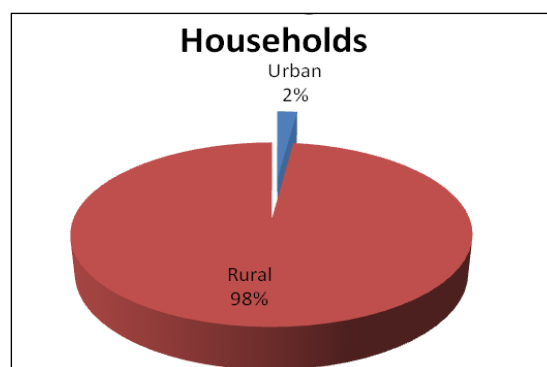


Figure 3.3: Rural-Urban Location of households

3.4 Stakeholders in Lake Tanganyika basin community

Stakeholder may refer to a person, group, organization, member or system who affects or can be affected by an organization's actions (Freeman, 1984). Stakeholders are an integral part of a project in a community. They are the end-users or clients, the people from whom requirements are drawn, the people who influence the design and, ultimately, the people who reap the benefits of the completed project.

Therefore, there are several stakeholders that give service delivery in Lake Tanganyika basin area of Mpulungu district of northern Zambia. The type of stakeholders and their role played in the basin area are broken down as follows on table 3.1 below.

Table 3.1: Stakeholder Analysis

Stakeholder	Role	Remarks
Households	Involved in subsistence farming and fishing activities.	Primary stakeholders.
Women clubs	Involved in income generating activities	Not very active. There 3 women clubs in the area
Cooperative societies	Organizing farmers into farmer groups.	Only active during farming season. Cooperatives formed only for farm input acquisition. Only one cooperative in the area is functional.
Ministry of education	Provision of education to the community.	Active. There are several primary schools in the area
Ministry of agriculture	Agricultural extension service provision.	Poor extension services to the community only about 30% provision.
Ministry of health	Health service provision	There are no clinics in the basin area but health posts and tradition birth attendance.
Lake Tanganyika Integrated Region Development Program (LTIRDP)	Management of natural resource base and provision of infrastructure development and loans to the community.	The communities are appreciating the services though the program is ending in 2012. It is building schools; give soft loans to farmers and other infrastructure development.
Department of Community Development and social services	Provision of social welfare service.	Not very active.
Forestry department	Management of natural resources.	Active through LTIRDP.
Action Aid	Sensitization of communities in project identification and linking to donors for funding.	Low coverage though effective.
Fisheries department	Management of fisheries resources	Active.
Local authority	Working with community and various stakeholders to support local development.	Active.

Source: Field

3.5 Agricultural situation

3.5.1 General information

Mpulungu district geographic formation is divided into a plateau and valley with a single annual rainfall farming season from October to May. The district is demarcated into three (3) agricultural blocks which include Chitimbwa, Chinakila and Mpulungu Central. It is further sub-divided into fourteen (14) agricultural camps. A larger population living on the plateau is engaged in farming which is largely conducted under rain fed conditions. Fishing is the main economic activity along the lakeshore areas while crop and animal production is concentrated in the swamp areas and the plateau. The major food and cash crops cultivated include cassava, maize, beans, groundnuts and finger millet. Although there is large potential for rice cultivation in the district, it is only grown on subsistence level. The yearly increase in allocation of government subsidized fertilizer and maize seed has boosted maize production in the district. Horticultural crops such as vegetables and winter green maize are also grown in the district during the dry season using various methods of irrigation. General information about the district is contained in table 3.2 below:

Table 3.2: General information

s/n	Attribute	Specification
1	Area covered by the district	7, 700 square km
2	Area covered by swamps and dambos	501 square km
3	Area covered by Lake Tanganyika	4, 125 square km
4	Game parks and game management areas	-
5	Hills, escarpment and plateau	-
6	Arable land	493, 801 Ha
7	Number of agricultural zones	64
8	Number of farmer groups	64
9	Number of farm households	13, 830
10	Male headed farm households	8, 530
11	Female headed farm households	5, 300

Source: Department of Agriculture Mpulungu, 2010.

3.5.2 Climatic situation

The prevailing rainfall and temperature conditions in the district are conducive for arable farming though the plateau receives more rainfall than in the valley where rainfall is not evenly distributed. The district being in northern region which is a high rainfall area receives an average of annual rainfall of about 1000mm. There are three distinct seasons, namely, the warm wet season from November to April, the cool dry season from May to August and the hot dry season from September to October. Lake Tanganyika basin being a valley is generally drier and hotter than the plateau. The beginning of the dry season is usually relatively warm (20-25 degrees Celsius), but night temperatures fall sharply, especially in June and July. The annual minimum temperatures usually occurring in July, varies between 5 and 10 degrees Celsius. The mean annual temperatures are between 22.5 and 25 degrees Celsius with annual maximum temperatures approximately 30 degrees Celsius. Below in table 3.3 are rainfall and temperature data during 2010-2011 farming season for the district.

Table 3.3: rainfall and temperature situation during 2010-2011 farming season

Month	Rainfall days	Amount (mm)	Minimum Temperature (degrees Celsius)	Maximum Temperature (degrees Celsius)
October	0	0	24.8	31.6
November	2	48.5	25.3	33.8
December	11	278.5	23	31
January	12	130.9	22.2	29.3
February	9	311.2	21.1	29.2
March	10	171.5	22.4	28.8
April	4	22.1	22.7	31.4
May	0	0	22.9	30.8
Total	48	962.7	23.03	30.7

Source: Department of Fisheries Meteorological Station, 2011.

3.5.3 Soils

According to the soil surveys carried out by the soil survey unit of department of agriculture, the soils of northern Zambia, Mpulungu district in particular are generally highly leached as a result of the rainfall characterizing much of the region. Their fertility is generally poor and they are often acidic, with low base saturation and low cation-exchange capacity. They are also rich in exchangeable aluminum. The soils in Tanganyika basin area are more of alluvial and sandy (Department of Agriculture, 2012).

3.5.4 Crop production

The main food crop production in the district is maize, cassava, finger millet, beans and rice. There are no serious incidences of crop pest and disease outbreak in the district. Tables 3.4 illustrate the district crop production for two farming seasons of 2009/2010 and 2010/2011 respectively. The production figures show an annual increase in production in maize, cassava and beans while finger millet, rice and groundnuts are decreasing. The yields per unit area are not optimal due to poor soils and other factors.

Table 3.4 crop productions for 2009/2010 and 2010/2011 farming seasons

Crop	Number of growers		Area cultivated (ha)		Production (50kg bag)	
	2009/2010	2010/2011	2009/2010	2010/2011	2009/2010	2010/2011
Maize	3,231	6,237	3,231	4,717.5	207,012	297,202.5
Cassava	17,230	25,845	6,184.5	12,922.5	1,385.5	310,140
Finger millet	1,643	471	623.54	227	15,210	7,264
Beans	2,430	3,294	1,334.18	1,647	35,560	39,528
Rice	84	589	58	192	1,856	9,216
Groundnuts	5,448	6,432	1,603.17	804	34,974	9,648

Source: Department of Agriculture Mpulungu, 2011.

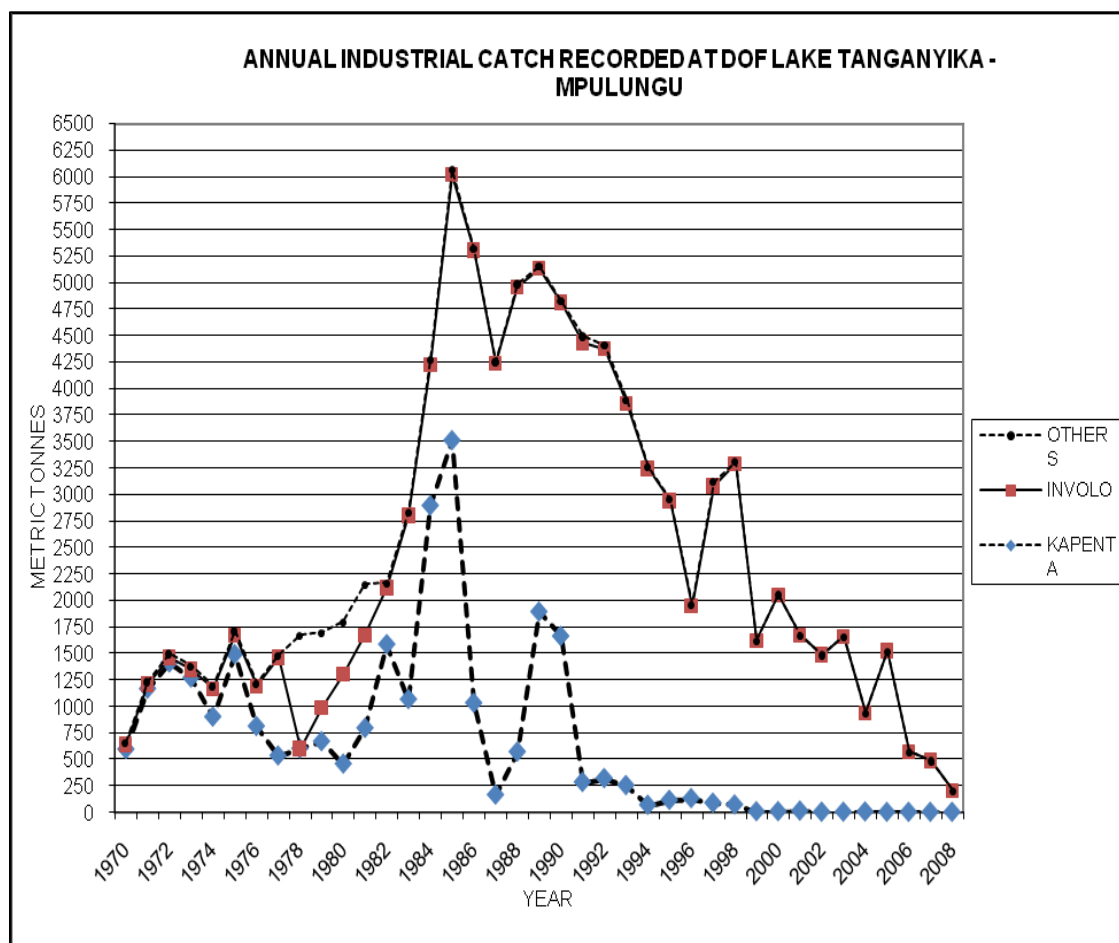
3.5.4 Market trends

The department of agri-business and marketing in Mpulungu district collects market prices of selected food commodities from the town market, old location market, open markets every week. The price trends for commodities such as maize grain, maize-meal, beans and groundnuts increase in the first and second quarters of the year and part of the fourth quarter. But the price of other commodities like meat, flour, rice, cassava chips and cooking oil remain constant throughout the year (Depart of Agri-business, 2012). The agri-business report highlighted that the government of Zambia through Food Reserve Agency (FRA) only provide market for maize but the rest of the farm products, market is born by the producer.

3.6 Fish catch trends in Lake Tanganyika

The Department of fisheries in Zambia has been collecting fisheries statistics from all the fisheries of Lake Tanganyika ever since it started its activities in 1959. Figure 3.4 below shows catch trends for the industrial fishery on Lake Tanganyika of **Clupieds (*Stolothrissa tanganyicae*)** and ***Limnothrissa miodon*** locally known as **Kapenta** or **dagaa**) and **Lates species (*L. Marie*, *L. Steppersi*, *L. Microlepis*, locally known as **Buka, Nvolo, Pamba, Nvuvi**).**

Figure 3.4: Industrial catches for fish in Lake Tanganyika 1970 to 2008.



Source: DoF, 2010.

The above chart shows a typical yield trend of a multi species tropical fresh water fishery. There was an initial increase in fish catches up to 1985; thereafter a downward trend in catches for all species is observed indicating that probably the stocks are depleting and under very high fishing pressure. The Stock levels are so low that it is now uneconomical for some industrial fishers to go fishing. In Mpulungu about 60% of industrial fishers have stopped fishing. They depend on buying fresh fish from the small scale ring net fishers. Consequently the number of Ring net fishers in Zambia has increased immensely.

Although data for the traditional Gill net fishery was not available at reporting time, the situation in the Gill net fishery, investigated in this study, is very much the same. More than 80% of respondents indicated that fish stock levels are less now than they were five years ago.

This is a case where earnings by the fishing communities from fishing activities in the lake basin are reducing rapidly. Provision of alternative livelihoods and sustainable management of natural resources is therefore long overdue.

Even if the number of fishing villages has, over 5 years, remained the same fishing effort has on the other hand increased tremendously due to increased demand for fish driven by increased population growth in Zambia (DoF, 2010).

3.7 Food Security Situation

Mpulungu district as stated earlier on is divided into two ecological zones, namely the valley and the plateau. Most of farming is done on the plateau where households commonly grow crops such as maize, cassava and beans. However, Lake Tanganyika basin community is on the valley with the main livelihood of the people being fishing, subsistence farming using a hand hoe and trading. The main crops grown in the basin area are cassava, maize and beans; they also keep small livestock such as chicken, ducks and goats. Most of the people in the basin community used to raise huge incomes from fishing but for the past decade, the fish stocks from the Lake Tanganyika have considerably declined due to many factors including overfishing (DoF, 2010).

The baseline survey report carried out by Lake Tanganyika Integrated Regional Development Programme (2010) indicated that the basin community was facing many challenges in perpetuating their livelihoods and food insecurity was the major problem rated at 79%. The community was failing to contribute to meaningful development in the area to improve their local economy and wellbeing.

Additionally, the District Food and Nutrition report (2012) further reported that food security in Mpulungu district is not certain due to high poverty levels amongst household families. Farm households on the plateau strive hard to produce a crop but there is always crop failure due to the following reasons: poor soils, bad rainfall pattern and farmers' not taking farming as a business.

The report also highlighted that farmers do experience bumper harvest in some seasons but it does not mean that the district is food secure because of the reasons below: Due to high poverty levels amongst households, crop produce are sold off immediately after harvest leaving households with nothing; Limited crops grown such as maize, cassava and beans as it is not nutritionally balanced as dominated by energy giving food, maize and cassava. On the other hand other households only grow one crop; Most household strive hard to have food on the table but they fail due to low crop harvests; and There is food altering during handling especially during food preparation, processing and storage and other attributes to completion of actual food to be put in the mouth.

And it is from the above food insecurity background that I decided to carry out this research to examine the factors that are causing seasonal household food insecurity in Lake Tanganyika basin community in order to contribute to suitable interventions to address the situation.

CHAPTER 4: RESULTS AND DISCUSSION

This chapter will simultaneously present the findings from field data collection and analyze or discuss the results. The main focus is on the following:

- ❖ Factors that limit the production of major staple food crops consumed in the study area by the households;
- ❖ Alternative livelihood activities engaged by household and how it affects household food availability;
- ❖ How income levels affects household food insecurity during the year;
- ❖ The effects of food prices by household food accessibility during the year; and
- ❖ The coping mechanisms practiced by households while facing seasonal household food insecurity.

During field data collection, 21 households were interviewed of which eight were female and 13 were male. One focus group was conducted with a women club and also interviewed one informant and one agricultural expert from Lake Tanganyika basin area. The results are presented and discussed below.

4.1 Factors limiting production of major staple food crops

- **Major food crops**

According to the interviews conducted with 21 households in Lake Tanganyika basin community revealed that the main food crops grown in the area according to their importance are cassava, maize and beans. Bean crop is only grown on the upland as shown in figure 4.1. The crops are grown at a subsistence scale with not more than a hectare per crop per household. The information that was gathered from the respondents as well as from district agriculture office suggests that the production levels were very low in the area as low as 1.4 metric tons/ha for maize. Cassava yielded 1.6 tons dry-chips/ha and 3.5 tons fresh tubers/ha. The reasons for low crop yield especially for maize were cited as due to poor soils, erratic and poor rainfall pattern as well as non-accessibility to farm inputs especially hybrid maize seed and fertilizer by 95% of the community. 80% of households interviewed mentioned that it was a challenge to grow maize without fertilizer due to poor soils hence many people were giving up to grow the crop despite being a staple food crop thereby compromising household food security.

90% of the respondents testified that cassava crop among other crops adapted well to the local environment; it was drought tolerant and did not require chemical fertilizer for it to be grown.

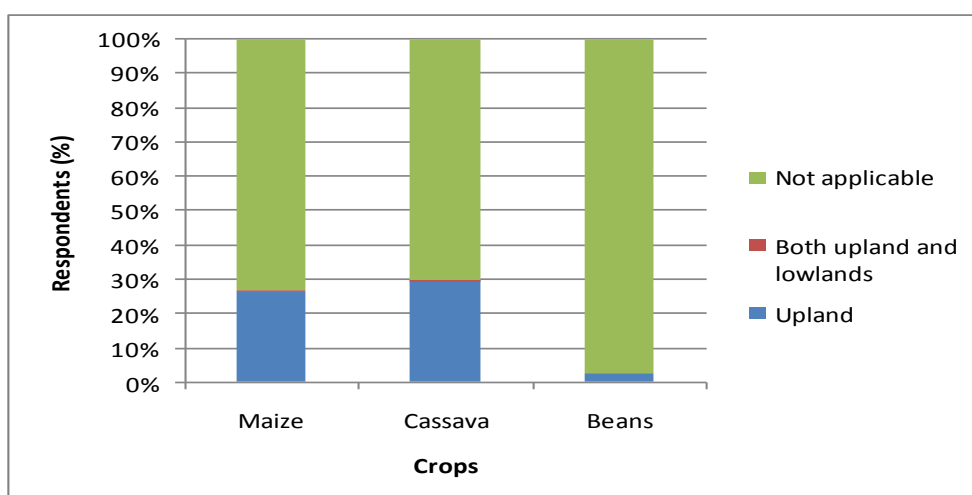


Figure 4.1: sites for crop production in the lake basin

According to the findings stated above on major staple crops grown in the area, it is clear that only three crops are grown that is cassava, maize and beans. It can also be noted that the crops are grown at a small scale with less than one hectare per crop per household hence limiting production. Moreover the crop yields of 1.6 metric tons of maize per hectare and 3.5 metric tons fresh tubers per hectare of cassava were very low if compared to standard production of 4.4 metric tons and 6-12 metric tons/ha respectively. The main reasons to low crop production was due to poor soils, erratic and poor rainfall pattern, non-accessibility to farm inputs especially fertilizer and hybrid seed.

From literature findings, it was noted according to Food Security Research Project (2011) that one of the primary constraints to yield improvement was limited to access to inputs among Zambian smallholders. While input use had trended up since 2001, 60% of Zambia farmers still do not use fertilizers on their fields and while more than 60% do not use hybrid maize seeds hence limiting production due to poor soils and use of local seeds.

In other countries such as Nigeria, food security situation is characterized by the threat of hunger and poverty, which confronts the 69 percent of the population that lives on less than Naira 100 (US\$ 0.7) per day (Nigeria Bureau of Statistics, 2009). Smallholder farmers account for 80 percent of all farm holdings, but crop yields are far below potentials. This is due to inadequate access to and low uptake of high quality seeds and inefficient production systems, leading to regular shortfalls in production (NAIP, 2010).

- **Pest incidences**

Crop pests' prevalence in the area was a source of worry. A wide range of diseases and pests were reported to be affecting maize and cassava the two most important food security crops in the lake basin. 70% of the respondents mentioned of mealy bugs infestation in cassava and stalk borers in maize. The households in all the parts of the study area complained of increase pest and disease pressure in their fields. Almost all the farming households interviewed indicated that they did not take any control measures for most of the crop diseases and pests because of lack of knowledge and capacity to implement the remedy. Cassava and maize which are both very important food and cash crops were particularly singled out as being severely attacked by pests and diseases.

It is evident therefore that crop pests were negatively impacting on crops yields in Lake Tanganyika basin area as noted by 70% of the respondents during the interviews. The major pests as indicated in the findings were cassava mealy bugs and maize stalk borers.

The mentioned pests were verily causing significant damage to the staple food crops especially that no control measures were taken. According to the respondents, they lacked agricultural extension guidance in the knowledge to control the pests. The other thing that was noted in the area is that there was a build of pests due to mono-cropping and use of local varieties that were susceptible to the pests hence compromising with food availability in the area. The situation in the basin area could be related to other parts in Africa like in Kenya where the country faced serious challenges in its food production by small scale farmers that were not practicing crop protection measures to their cereal crops especially maize due to dwindling extension services (Ministry of Agriculture Kenya, 2009). The report also highlighted that over the past few years the country had failed to produce above the consumption rate hence affecting the country's food security.

- **Rainfall pattern**

The area receives below average rainfall annually. But according to 90% of the respondents interviewed noted that the amount of rainfall received annually was not an issue but its distribution within a season. The respondents indicated that the rain season in the area was becoming short as rains starts late and stops early and its distribution was not evenly hence affecting most crop production activities in the area. Table 4.1 below show the rainfall figures in the area for two seasons.

Table 4.1: Rain Statistics for 2009/2010 and 2010/2011 seasons

Month	Rain days 2009/2010 Season	Rainfall (mm) 2009/2010 Season	Rain days 2010/2011 Season	Rainfall (mm) 2010/2011 Season
October	3	11.3	0	0
November	11	78.0	2	48.5
December	13	41.2	11	278.5
January	11	240.8	12	130.9
February	12	163.0	9	311.2
March	5	76.7	10	171.5
April	5	32.6	4	22.1
May	3	20.3	0	0
Total	63	663.9	48	962.7

Source: Meteorological Station – Fisheries Department

Lake Tanganyika basin area falls in Northern Province of Zambia which is a higher rainfall region. The region's normal annual rainfall is 1000mm and above (FSRP, 2011). But with reference to table 4.1 on the area annual rainfall statistics for two seasons: 2009/2010 and 2010/2011 clearly show that the area received below average rainfall annually of 663.9mm and 962.7mm respectively. This negative rainfall trend was also supported by 90% of the respondents interviewed as they complained of receiving less annual rainfall in the area and its distribution which was not evenly had severely affected normal crop production.

The major reason to changes in rainfall pattern as observed by the local agricultural expert in the area was attributed to climate change. The expert therefore noted that it was important for farming households in the area to start adapting with the climate by planting early, use of drought tolerant crop varieties as well as conserving the natural resource base. Conservation of the local natural resource is very significant as can be attested by the previous literature experience in Himalaya, India: that during the recent past, the natural resource base had been steadily depleted, leading to significant disruption of ecosystem services, particularly water, biomass and soil-nutrients with a consequent decline in food productivity (Tiware, 2000). Moreover, global climate changes have already stressed the Himalayan agro-ecosystem through higher mean annual temperatures, altered precipitation patterns and more frequent and extreme weather events. These have adversely affected food and

livelihood security in the region (ICIMOD, 2007). And changing monsoon patterns were reducing the number of rainy days and amount of rainfall (IPCC, 2007). These changing climatic conditions caused a 30% decrease in agricultural productivity in India, including the Himalayas (Cline, 2008).

- **Soil suitability**

100% of the respondents indicated that the soil was not fertile especially with maize production. They revealed that without the use of fertilizer no meaningful crop yield could be realized more especially maize. One female headed household from Lolesha village mentioned, ***“I cannot afford to procure fertilizer because I am poor hence I just grow maize without application of fertilizers and always have low yields”***.

The soil type found in Lake Tanganyika basin as initially stated in the report was Alluvial. Therefore, as expressed by the respondents during field study, the soils were not very fertile especially for maize which was a nutrient heavy feeder. No meaningful yield could indeed be obtained without the use of fertilizer in the area. One of the contributing factors to poor soils was the geographical location or formation of the basin area which is hilly and surrounded by escarpment hence most of the rich top soil had been eroded away mostly by water run-off.

It was also observed that farming households in the area were not taking advantage of practices such as crop rotation, intercropping and other conservation farming techniques to fix back nutrients into the soil hence continual nutrient depletion. In other regions of similar geographic terrain like in the Himalayas according to Tiwari (2008) noted that, the nature of the hilly terrain in Himalayas imposes severe limitations on the scale of productive activities as well as on the efficiency of infrastructural facilities. As a result, biomass based subsistence agriculture constitutes the main source of rural food supply and livelihoods for more than 70 % of the population, despite the limited availability of arable land.

- **Accessibility to farm inputs**

It was difficult to access farm inputs by households in the area. Two percent of the respondents said had access to farm inputs while 98% had no access at all to government subsidized farm inputs. And those who had access, the inputs were always delivered late. It was also mentioned that there was a limitation of two packs/person of input acquisition (5kg seed, 50kg basal and top dressing fertilize made a pack). Apart from the government subsidized inputs, no other private dealers were involved. One respondent from Muzabwera village testified, ***“It is a secret to access government subsidized inputs and if you don’t belong to the ruling political party then forget”***.

It was also noted that the farm inputs were not available throughout the year. 60% of the respondents indicated that the government was only encouraging maize production at the expense of other potential crops.

The findings show that input acquisition by farming households was a thorny issue in the area as well as politically inclined. Therefore, it was retrogressive that the majority of farming households was finding it difficult to acquire and access farming inputs in the study area because inputs such as quality maize seeds, improved cassava planting materials, pesticides and fertilizers were a prerequisite to optimal crop production.

Research by Chibwana and Fisher (2010) on the impacts of agricultural input subsidies in Malawi has shown that farm input subsidy on maize (hybrid maize seeds and fertilizers) boosted maize production in the year 2008/2009. Denning et al. (2009) records that the production of maize in Malawi almost tripled from a deficit of 43% to 53% surplus within a period of two years due to input subsidy. Other research (Smale, Byerlee & Jayne, 2011) has shown that adequate availability of inputs for farmers leads to high yields of maize where

improved production enhances availability and thus improving the food security of the farming households.

- **Accessibility to extension agents**

The findings showed that the agricultural extension provision to the area was below average that was ranked at 30% by the respondents which was being implemented under the auspices of LTIRDP and UNDP. The main reason to poor extension service delivery by the Ministry of Agriculture and Livestock (MAL) was said to be due to poor road infrastructure to the area. The only means to reach the area was by water transport and the MAL lacked water transport. The extension service is one such a programme under the MAL in Zambia that is charged with the responsibility of transferring agricultural technologies to farmers in order to increase food production that is sufficient for domestic use and export (Dorosh et al., 2007). But from the findings, it was clear that the community in the study area lagged behind in receiving agricultural technologies for them to improve their food security. They relied on LTIRDP and UNDP whose programme was coming to an end in 2012.

- **Marketing support**

Zambia is still going through liberalized market economy since early 1990s though the government intervenes by provision of farm input subsidies and in crop marketing. The main role of government in a liberalized market environment was to put in place an enabling environment which would encourage the private sector to fully participate in agricultural marketing (PAC, 2011).

However, from the field study findings it was noted that the government through FRA was only providing market for a single crop that was maize. 50% of the households complained of the low market price of being low as one bag of 50kg maize was being sold at 65,000 Zambian Kwacha. The price was viewed critical as it was not off-setting the cost of production especially for farmers who were buying the inputs at commercial rate. The other concern observed was that government had set a limitation of 150 bags by 50kg to buy from farmers besides a ban on maize export. The government marketing policy was negatively impacting on the majority of the farming households in the area especially female headed households. The other challenge the farming households faced in marketing was late payments for their sold produce by the government hence some of them mentioned were now giving up in maize production. In Malawi, the marketing is similar to Zambia where the government through Agricultural Development and Marketing Corporation (ADMARC) is one of the many traders, but still remains a buyer of last resort. In the agricultural sector the reforms involved the following measures: liberalization of smallholder agricultural produce marketing coupled with the removal of subsidies on producer and consumer prices, especially of maize and fertilizers; deregulation of producer and consumer prices with the exception of maize where prices are supposed to swing within the government's maize price band (SCMP, 2006).

- **Accessibility to micro-credit**

Micro-finance has emerged as a powerful tool for accelerated rural development in several parts of the world in recent times that achieving food security would continue to be an illusion if the countries fails to offer the required financial and technical assistance needed by small scale farmers (Wilkinson, 2003). However, in the research area it was revealed that there were no micro-institutions that were providing micro-credit even at the district. Nonetheless, LTIRDP/UNDP had just introduced a loan facility to farmers in the area and only 5% of the community had access.

- **Accessibility to agricultural land**

Land is a main factor of production. Despite a relatively low population density, growth in the number of rural households contributes to increasing land fragmentation and shrinking land size holding in Zambia. While the mean land size holding in Zambia is 3.27 hectares, a quarter of the rural population controls on average barely one hectare of land (CFS, 2010).

The size of land is a constraint in Lake Tanganyika basin area as the field results shows that land is limited by the presence of the lake, hills and escarpment. The results further indicated that respondents rely on up to one hectare of land for crop production to feed an average household of six members. Due to scarce of land in the basin area about 55% of farming households acquires or rent land for cultivation on the plateau within the district which was proving to be expensive for the poor in the area. The respondents also revealed that 70% of land was accessed by men while 30% accounted for women in the area. There is no doubt that the farming households in the area will have to rely on yield crop improvement other than area expansion.

- **Labour demand for agricultural production**

Labour is an important human resource in agricultural production. The field results showed that 90% of the respondents expressed difficulties in meeting labour demand for production. They gave reasons to shortage of household labour due to: few family members, sickness of household members, labour being split during fishing season as men went for fishing while women worked at the farms. Labour was very critical in the study area as only 5% of the respondents could hire labour hence compromising food production.

4.2 Livelihood activities engaged by households

A livelihood comprises the assets (natural, physical, human, financial and capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household (Ellis, 2000, p.10). Table 4.2 illustrates various livelihood activities engaged by the households in Lake Tanganyika basin community.

Table 4.2: livelihood activities

Activity	% engaged by the community	Remarks
fishing	60%	Fishing and trading. Men are involved in fishing while women fish trading
farming	30%	Crop production
Local beer brewing	5%	Mostly involved by women
Tailoring	1%	Engaged by women
Thatching grass trading	2%	Done by women especially in rain season
Selling mangoes fruits	2%	Done by women during fruiting season

Source: Field

However, 95% of the respondents interviewed revealed that the major livelihood of the community in the basin area was fishing though complained of experiencing reduced fish catches from Lake Tanganyika. One male respondent from Kapembwa village revealed that, ***"I am yielding nothing from fishing even by the use of illegal methods and it is becoming unreliable. I cannot raise enough money from it than I used five years ago due to low fish catches"***.

The field findings shown on table 4.2, indicates that 60% of the community in the study area is engaged in fishing activities, 30% farming, 5% beer brewing especially women, 2% thatch-grass trading and 2% accounted for selling mangoes during fruiting season. Therefore, as testified by 95% of the respondents, it can be deduced that the major livelihood activity in the study area was fishing. It was also observed that there was over dependency on fishing by the household community in the area that had even contributed to fish depletion in Lake Tanganyika. The low trend in fish stock catches signifies fish depletion from the lake according DoF (2010) hence it is prudent for diversification of livelihood activities by the community if poverty and food security was to be achieved in the basin area.

Promotion of agricultural diversification represents a key strategy to combat food insecurity at household level. It is the basis for providing and enhancing a balanced nutritional supply among poor rural families, particularly in the context of subsistence agriculture and socio-economic marginalization. In addition, agricultural diversification can represent a mechanism to alleviate labour shortages, as it allows for diffusing labour loads through time (Bonaglia, 2008).

4.3 Household income levels

- **Sources of Income**

The main sources of household income according to 80% of households interviewed indicated that, fishing business was the major source of their income followed by sells from farm produce and other sources such as carpentry, beer brewing and tailoring. The respondents also mentioned that currently they were not generating enough money from fishing as the catches of fish stocks from the lake had severely declined. Table 4.3 shows the percentage of income sources.

Table 4.3: Income sources

Activity	% of generation per year	Remarks
Fishing	50%	Fish trading
Farm production	23%	Farm sales
Farming and fishing	20%	Fish and farm sales
Beer brewing	1%	Done by women
Carpentry	0.5%	Done by men
Tailoring	0.5%	Women mostly involved
Household income generation per year		
Class of household	Approximate amount of money generated per year in Zambian Kwacha (ZK)	Household %
Low income earner	ZK200,000.00 to ZK400,000.00	75%
Middle income earner	ZK600,000.00 to ZK100,000.00	15%
High income earner	ZK1,00,000.00 to ZK 2,500,000.00	10%

Source: Field

The respondents moreover, noted that the limiting factors to generation of more household income were as follows:

- Lack of employment;
- Fish depletion in the Lake Tanganyika;
- Labour shortage, sicknesses, low crop production;
- Lack of potential livelihood activities;
- Poor marketing out lets; and
- Pressing household needs such as school fees, high cost of food and drugs.

It was also revealed by respondents that men had much control to household resources than women as illustrated in table 4.4.

Table 4.4: Gender analytical frame work on resource

Resources	Male (man)	Female (woman)	Children
Land	Control/Access	Access	Access
Household Income	Control/Access	Access	Just benefit
Household Decision making	Control/Access	Control/Access	No access

Source: Field

The findings on table 4.3 shows that the main income sources for the households in the study area was from fishing with 50%, followed by farming 23% and a combination of fishing and farming rated at 20%. Other marginal sources accounted for 5%.

So then, as the respondents mentioned, fishing was the largest employer as regards to income generation despite the low catches being experience from the lake. This meant that even the income they realized from fish was not to the expectation as compared to what they used to generate previous. In terms of the actual amount of income generated by the households as illustrated on table 4.3, it is not encouraging as it is low for a household survival. The income distribution was worrying in the area in the sense that the low income earner percentage was high with 75%, middle earner at 15% while 10% accounted for high income earner. This shows that the majority of the poor were surviving on approximate ZK5000 per day which is equivalent to one US dollar. The reasons given by the respondents to low levels of household income which was genuine were as follow: lack of employment, low fish catch, labour shortage, low production, lack of productive assets, lack of potential livelihood activities and high cost of living.

In as regards to control of the resources as depicted on table 4.4, 80% of the respondents conceded that men had both control and access to household income while women had little control but full access. It was also noted that men had about 70% in household decision making power while women had 30% with children being mere beneficiaries.

4.4 Food prices

Generally 80% of the respondents indicated that the prices for food commodities in the district were expensive. They also noted that most of the food stuffs come from outside the district hence contributing to high prices due to transport cost involved. 90% of the households interviewed complained that Lake Tanganyika basin community was far from Mpulungu main market where most food commodities are found and access to the market was a challenge due to poor road infrastructure. The only means of transport was by water which was expensive for the poor in the community. One female respondent from Chituta Village noted, ***“Water transport is very risk and prone to water accidents when there are storms on the lake especially during rain and winter seasons. This lake has consumed a lot of people due to capsizing of the boats sometimes wiping the entire family at once”.***

95% of the respondents mentioned that generally the food price trends are that during the harvest period food prices are low because foods were plenty but during rainy season most foods were scarce and prices went high. It was also observed that the purchasing power of the households was low as 40% could afford while 60% of the households could not have the purchasing power and that were struggling more especially women. Table 4.5 shows seasonal price trends for major food commodities in the area.

Table 4.5: major seasonal food prices

Commodity	QTY (kg)	Price in Zambian Kwacha per month					
		Jan	Feb	Mar	Apr	May	Jun
Breakfast maize meal	25kg	60,000	60,000	60,000	55,000	55,000	50,000
Roller meal	25kg	46,000	47,000	48,000	45,000	45,000	40,000
Maize grain	5kg	7,000	7,000	6,000	5,000	5,000	4,500
Millet	5kg	7,000	7,500	7,500	4,500	4,500	5,000
Beans	5kg	20,000	18,000	18,000	20,000	20,000	20,000
Cassava chips	5kg	5,000	6,000	6,000	5,500	5,000	5,000
Beef	1kg	15,000	15,000	15,000	15,500	15,500	16,000
Pork	1kg	15,000	15,000	15,500	15,000	15,500	16,000
Chicken	2kg	28,000	30,000	30,000	30,000	30,000	30,000
Kapenta-fish	5kg	45,000	45,000	40,000	40,000	40,000	30,000
Commodity	QTY (kg)	Jul	Aug	Sept	Oct	Nov	Dec
Breakfast maize meal	25kg	50,000	50,000	50,000	50,000	50,000	50,000
Roller meal	25kg	40,000	40,000	40,000	40,000	40,000	40,000
Maize grain	5kg	5,000	5,000	5,000	6,000	7,000	7,000
Millet	5kg	5,000	4,500	4,875	5,000	6,000	7,000
Beans	5kg	18,000	18,000	18,000	18,000	20,000	22,000
Cassava chips	5kg	4,500	4,625	5,000	5,000	5,500	5,500
Beef	1kg	16,000	16,000	16,000	16,000	18,000	18,000
Pork	1kg	16,250	15,250	15,000	14,000	15,000	15,000
Chicken	2kg	30,000	30,000	30,000	35,000	35,000	40,000
Kapenta-fish	5kg	30,000	46,250	45,000	40,000	50,000	50,000

Source: Department of Agri-business and Marketing, 2011.

The findings from the field study shows that 80% of the respondents interviewed pointed out that generally prices for food commodities in the district were high. The increase in food prices according to Heady et al. (2010) indicated that the high price variability on record and the food crises they caused were not a secret. The impacts of these on undernourishment and hunger have been significant and dramatic especially in terms of household purchasing power and welfare losses. This is so because poor households in Africa spend between 50 to 75 per cent of their income on food and they have little capacity to adapt to frequent or any significant food price hikes, in addition to untimely adjusted wages (Benton et al, 2008).

However, in the study area, it was evident that most of the food stuffs come from outside the district hence this attracted high prices due to transportation costs involved.

In addition, the households revelation showed that lake Tanganyika basin area was far from Mpulungu main food market hence due to poor road infrastructure in the area it was a challenge for the poor households to access foods from the market.

According to seasonal food price trends on table 4.5, it demonstrates that most food prices in the area are low from June to October and high from December to April. The explanation to this as expressed by 95% of the respondents was that during the harvest period food prices are generally low because foods were plenty but during rainy season most foods were scarce and prices went high. The illustration of food seasonal price trend in the area is a correlation of what is depicted on the seasonal food calendar in figure 4.3.

The purchasing power of the households as initially stated in the area was low, and that 40% of the respondents had the buying power while 60% were struggling symbolizing low income base by most households. This also meant that the average percentage of household income that is spent on food was rising, indicating that Zambia households were finding it increasingly difficult to feed themselves (UNDP, 2000).

4.5 Coping mechanisms by households to food insecurity

- **Household food stock levels**

From interviews conducted with respondents including observations made at homestead of households, it was discovered that 99% of the households did not have storage bins for storage of their farm produce. But the respondents said they store their farm produce in polythene sacks or bags then keep their produce inside their houses. The reasons given for this form of storage were that: it was for security purpose from thieves, it was simple and labour cost effective. Only one percent of the households were using locally made storage bins called ferrumb. Figure 4.2 depicts the distribution of food security status in the Lake Tanganyika basin community.

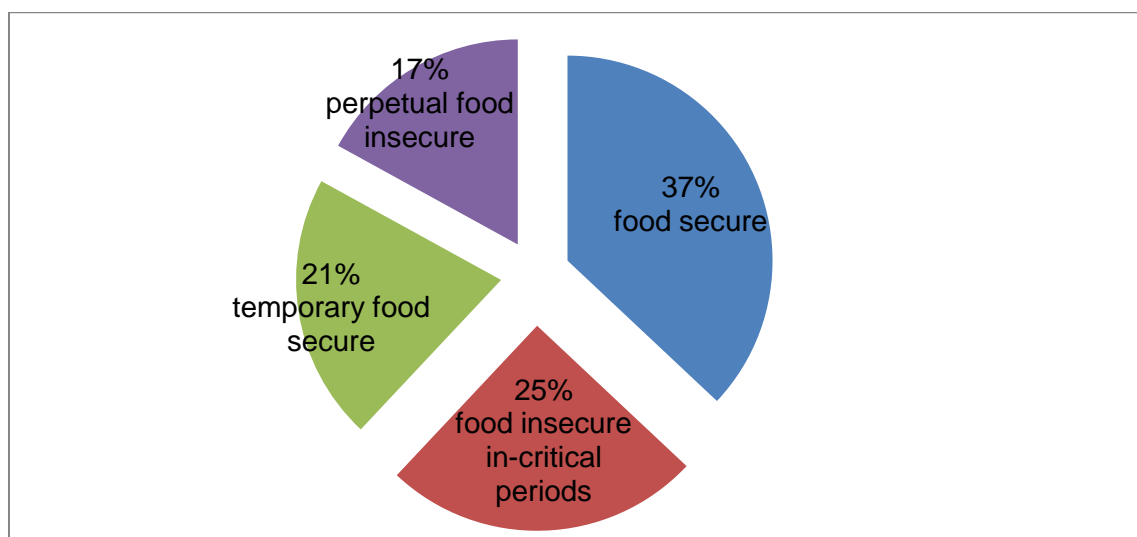


Figure 4.2: Household food security status

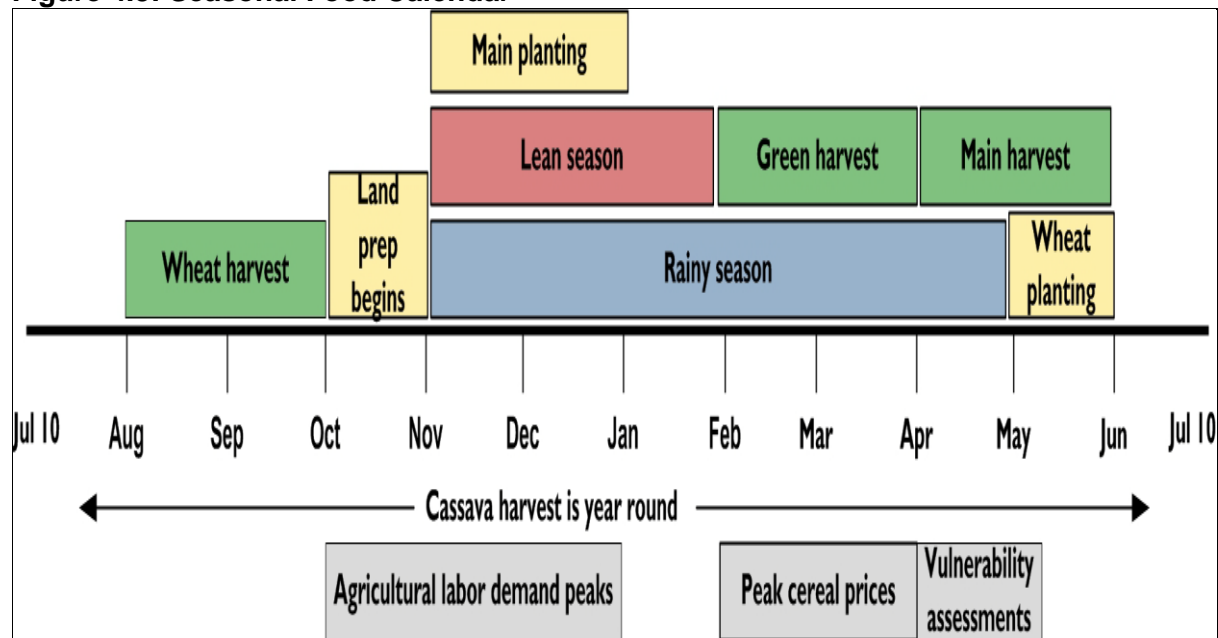
According to the field findings in figure 4.2, it is evident that food insecurity in Lake Tanganyika basin area was a source of concern. The field data shows that 37% of the household in the area were food secure throughout the year through their own production, 21% were temporary food secure and their production were not sufficient to last them to the next harvest. 25% of the household became food insecure in critical periods from October to May while 17% were perpetually insecure meaning chronically food insecure year in year out. It was however noted that the critical food insecure periods were between January and March when 31% of the households were out of food supply.

Looking at the illustration from the seasonal food calendar in figure 4.3, it can be deduced that the food insecurity periods in the area coincides with the peak agricultural labour demands meaning that most food insecure households could not provide the labour needed for farming activities hence perpetuating the household food insecurity cycle.

However, the limiting factors to how well the households utilize their food in the area can be cited as follows: low food production, rushing to sell their farm produce just after harvest due

to household pressure needs, misuse through barter system in exchange of fish with food and lacking training knowledge in planning and budgeting, food preparation, preservation and storage. Figure 4.3 below illustrates the seasonal food calendar in the research area which also represents the country scenario.

Figure 4.3: Seasonal Food Calendar



Source: FSRP, 2011.

- **Coping strategies to household food insecurity**

Even though the farming households interviewed in the study area produced for domestic consumption, their food reserves were low. As indicated above as regards to food security analysis, these farming households were either not able to produce enough to last throughout the year or were unable to store enough produce for consumption throughout the year or were unable to store enough produce for home consumption throughout the year. The critical question is, “how are they able to survive”? During food insecure periods, these households use a wide range of mechanisms and communal support networks to cope with the situation. These coping strategies include the following: reduction of the food intake, the frequency of meals is reduced to once a day, also the quantity of food per meal is also reduced and priority is given to young ones with a hope that things will be better in the next season; there is over dependency on the lake for fishing; they work for food to households that have food; selling of productive assets; eating mangoes, wild fruits, mushrooms and insects locally called *inswa*; and other households resort to illicit and illegal means to gather food such as prostitution, theft and charcoal burning.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Household food insecurity is prominent and a threat to Lake Tanganyika basin community in northern Zambia. It was established that 17% of the households were chronically food insecure, 21% temporary food secure, 27% food insecure in critical periods and only 37% were food secure throughout the season.

The major crops grown in the area which are cassava, maize and beans yielded low production due to several factors such as: limited land space, poor soils, crop damage due to pests like maize stalk borer and cassava mealy bugs, low rainfall and poor distribution, lack of extension service and poor accessibility to farm inputs.

It was also found that there was no any micro-financial institution in the area to offer micro-credit to the community for them to venture into activities that could improve their livelihoods. However, there was only LTIRDP/UNDP that had just introduced soft loans to farmers with only 5% beneficiary coverage. This was as a result after noticing the vast potential in the area and how the community was suffering during the survey carried by LTIRDP in 2010.

The study also established that fishing was rated as being a major livelihood activity in the area albeit the depletion of fisheries resource in Lake Tanganyika due to many factors including overfishing. This signaled as an alarm to the community for resilience and start considering taking up agriculture in its diversification as a path way to remove the local poor households from the trap of poverty and food insecurity. It was sought that without agriculture, meant that the community's food insecurity fight looks to be a lost battle.

It can also be said as regards to the study results that the geographical formation in the basin area posed a challenge in agriculture production and perpetuation of household livelihoods as the area is surrounded by hills, escarpment and the lake. Hence conservation of the natural resource base and conservative farming practices was inevitable for enhancing household food security by the community in the study area in the era of climate change.

Enhanced agricultural productivity for the long term food security of the majority of world's hungry has been deemed crucial, due to the links to jobs, income generation and nutrition well-being of the people in developing countries. In this study area, the community alone cannot overcome the food insecurity but it needs concerted effort through multi-sectoral approach with various stakeholders and the government inclusively. The commitment and sacrifice from the community households will be cardinal and they should be in the forefront otherwise if not, then achieving household food security would remain a pipe dream in the Lake Tanganyika basin community.

5.2 Recommendations

Based on the findings of this research the following recommendations are made:

At household and community level

1. The households need to be actively responsible for conservation and sustainable use of their local natural resource base: such as adoption of conservation farming practices, protection of fish breeding sites and afforestation because they are the direct beneficiaries of the lake resources and its ecosystem.
2. Involve in off-farm and other income generating ventures, diversify their economies from fishing into agriculture in view of improving household food security in the community.
3. Start saving groups to enable households manage their incomes and invest in alternative sources of income to reduce the overdependence on the lake. Proper management of household income will help them come out of the poverty trap faster.
4. Promote household and community gardens to enhance food security among its members.

At Local Government level

5. Facilitate construction or rehabilitation of appropriate infrastructure in the area such as feeder roads, markets and storage sheds thus promoting economic growth in the area.
6. Support the extension services in order to reach more rural people in the area.
7. Training local people in leadership, gender, promotion of people participation, empower women through education and improving the access of farming households to farm inputs, micro-credit and markets.
8. Promotion of small-scale irrigation schemes by taking advantage of the abundance of water from the lake thus enhancing food security in the area.

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ANNEXES

Annex 1: Semi-structured interview checklist

1. Factors limiting major food crop production <ul style="list-style-type: none"> - What major food crops grown? - How are the crop yields? - Which crops are adapts well to the local conditions? - How is the Prevalence and impact of crop pests and diseases? - How does rainfall pattern affect major food crop production? -How is the prevention and control of crop pests and disease? - How is accessibility to farm inputs? - How is the access to extension agents? - How is the marketing support? - How is the accessibility to micro-credit or micro-finance by households? - How is the accessibility of agricultural land? - How is the suitability of land/soil for farming or agricultural production? - How is household labour demand for agricultural production? 	5. Food prices <ul style="list-style-type: none"> - How are the prices for major foods consumed by households? - How is the food price trend throughout the year? - How affordable are prices of food by households?
2. Livelihood activities <ul style="list-style-type: none"> - What are the alternative livelihood activities engaged by households to obtain food? [off-farm, on-farm & non-farm] - How do the households copy with seasonal food insecurity? <p>Or What are the alternative livelihood activities that can help copy with household food insecurity?</p>	6. Purchasing power <ul style="list-style-type: none"> - How is the purchasing power of household to produce and gather food?
3. Food aid <ul style="list-style-type: none"> - How is accessibility to food aid? - How is the existence and non-existence of food aid affects household food availability throughout the year? 	7. Household income <ul style="list-style-type: none"> - How do households obtain their income? - How much income do they earn per month or per year? - How much money do you spend for food or fees in a month? - How is access & control of income by gender within the household? - What are the factors limiting to obtain income by the household?
4. Household food stock levels <ul style="list-style-type: none"> - How do household store their food? - How is prevalence of food storage pests or loses? - How is the household food stock level throughout the year? - What are the factors that limit how well household use their food throughout the year? 	8. Transport & market infrastructure <ul style="list-style-type: none"> - How is the accessibility to markets by households? - How is the accessibility to transport and road?

Annex 2: List of interviewees

No.	Name	Householdhead	Village	Date
1	Samuel Sipabwe	Male	Kamuswilo	24/07/2012
2	Benjamin Mfula	Male	Kakula	24/07/2012
3	Evely Lusambo	Female	Chituta	24/07/2012
4	Edward Ngalala	Male	Muzabwera	26/07/2012
5	Trizah Mulenga	Female	Muzabwera	26/07/2012
6	Mulira Katentu	Male	Muzabwera	26/07/2012
7	Mwansa Chungu	Female	Muzabwera	26/07/2012
8	Joyce Nakapende	Female	Lolesha	27/07/2012
9	Pelian Chifunda	Female	Lolesha	27/07/2012
10	Davies Sikazwe	Male	Kaizya	27/07/2012
11	Justice Sikazwe	Male	Lolesha	27/07/2012
12	James K. Mwimanzi	Male	Chituta	28/07/2012
13	Barason Mwambazi	Male	Onzye	30/07/2012
14	Syden Kasumbalesa	Male	Chituta	31/07/2012
15	Chomba C. Sikazwe	Male	Isoko	01/08/2012
16	Samson Simuzosha	Male	Mwanangwa	02/08/2012
17	Kalonga J. Chifunda	Male	Kapoko	02/08/2012
18	Chansa Douglas	Male	Kapembwa	02/08/2012
19	Rose Nandazi	Female	Kaizya	03/08/2012
20	Helen Nayame	Female	Kaizya	03/08/2012
21	Nancy Nambeye	Female	Kaizya	03/08/2012
Supportive interviewees				
1	Chashawa women club	Focus group	Mpulungu	25/07/2012
2	Abraham Chishimba	Informant (Block Extension Officer)	Mpulungu Central	26/07/2012
3	Patric Katongo	Expert (Agricultural Officer)	Mpulungu	02/08/2012

2.1 Female head household: Joyce Nakapende of Lolesha village



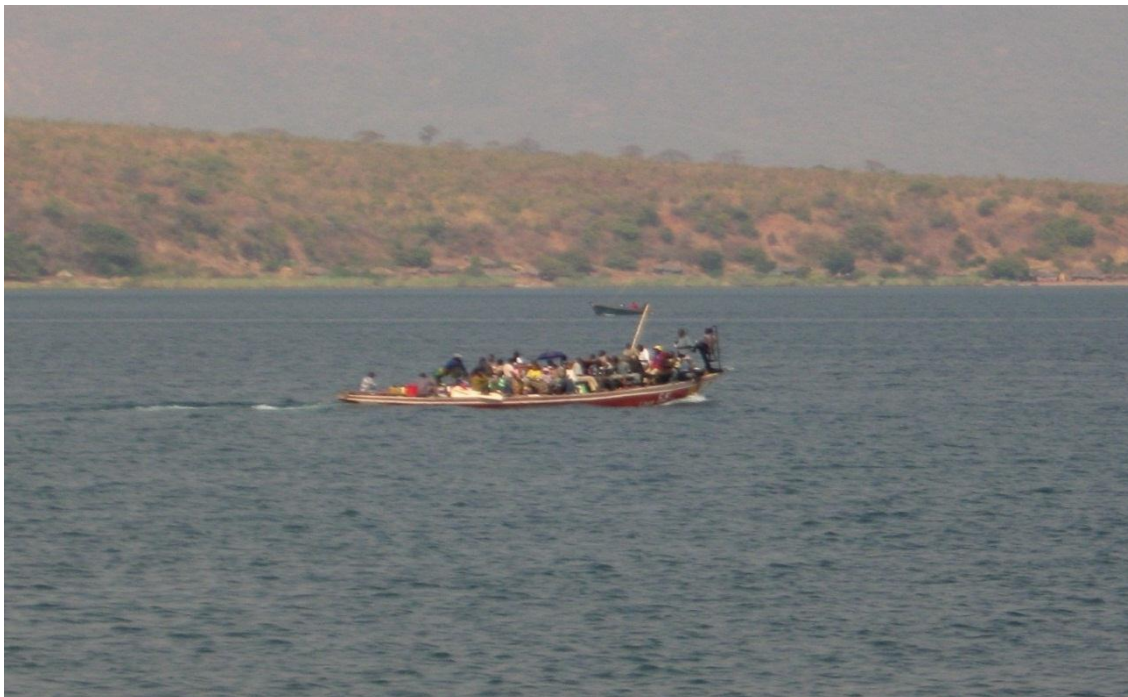
2.2 Female headed household: Pelian Chifunda of Lolesha Village



2.3 Male headed household: Davies Sikazwe of kaizya village



2.4 Water transport being the reliable means for Tanganyika basin community



2.5 At LTIRDP Offices



2.6 Part of Lake Tanganyika basin village

