SCHOOL OF GRADUATE STUDIES

RURAL HOUSEHOLD FOOD SECURITY SITUATION ANAYLSIS: THE CASE OF BORICHA WEREDA SIDAMA ZONE

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Addis Ababa
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A STUDY ON

RURAL HOUSEHOLD FOOD SECURITY SITUATION

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BY

BECHAYAE TESFAYE TESSEMA

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Advisor	Signature
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Examiner	Signature

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Dedication

To my beloved son Amanuel

This thesis is dedicated to you. Ii is a fitting tribute to the unbending love, understanding, tolerance, patience, genuine concern and respect you have shown me during my engagement in this study even while we had to miss each other due to circumstances. I assure you that you are the essence of my love. All along, you have been a personal source of encouragement and inspiration as well as a cause for my passionate commitment in bringing this work to a successful completion .It is my hope that the challenges I faced during my study and the resolve with which I managed to tide over these challenge will set a good example for you. Almighty God may help you to follow my foot print. I love you Pomey.

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LIST OFACRONOMYES

APLZ: Agro-Pastoralist Livelihood Zone

BoAD: Bureau of Agriculture Development

BoFED: Bureau of Finance and Economic Development

BVPA: Base line Vulnerability and Poverty Analysis

BWADB: Boricha Wereda Agriculture Development Bureau

CLZ: Coffee Livelihood Zone

DRMFSS: Disaster Risk Management and Food Security Sector

ECX: Ethiopia Commodity Exchange

EMA: Ethiopia Mapping Agency

ENCU: Emergency Nutrition Coordination Unit

ENHRI: Ethiopia Nutrition and Health Research Institute

FAO: Food and Agricultural Organization

FMoH: Federal Ministry of Health

FSAU: Food Security Analysis Unit

GIS Geographic Information System

HEA: Household Economy Analysis

HFS: Household Food Security

ILU: Integrated Livelihood Unit

IPC: Integrated Food Security Phase Classification

LIU: Livelihood Integration Unit

MLZ Maize Livelihood Zone

MoA: Ministry of Agriculture

NGOs: None Governmental Organizations

ODI: Oversea Development Unit

OFSP: Other Food Security Programs

PSNP: Productive Safety Net Program

SNNPR: Southern Nations and Nationalities Peoples Region

UNCCD: United Nations Convention to Combat Desertification

UNDP: United Nations Development Program

UNEP: United Nations Environment Program

WFP: World Food Program

ABSTRACT

In Ethiopia, food insecurity has long been a wide spread problem. Despite its long time prevalence and wide area coverage in the country, there has been lack of clarity and common definition for classifying various food security situations in terms of varying severity and implication for action. Majority of the researches that have been done so far on the issue related to food security in Ethiopia are very general, fail to apply the right measurement tool, give emphasis to aid rather than livelihood protection and promotion, and considers the problem from national level by ignoring the objective reality at individual or household level. Bearing this in mind the study was conducted with the main objective of assessing food security situation of rural households in Boricha Wereda of, Sidama Zone .The conceptual framework of the research tried to link four interrelated and connected concepts (resource, flow, outcome and measurement) that are emanated from the main topic of food security. The research attempts to analyze certain household economic situations that have significant importance and influence on household, and finally rest on identifying major coping and adaptive strategies mainly employed on the study area. Ninety rural households from three kebeles representing three livelihood zones are the target of this study. Besides doing this, thirty respondents in each kebles are categorized in to locally defined three wealth groups (poor, middle and better –off).To that effect, the necessary data were generated from both primary and secondary sources. Field observations, sample household survey, key informant interview and focus group discussions were the principal means of generating data from primary sources. Secondary data were also obtained from concerned organizations. A quantative technique like HEA, cartography and GIS supported IPC and Household Food Balance models are interchangeably employed. The findings of this study confirm that 15 kebles or 38.5 percent of the total Wereda having a population of 74,005, 3 kebeles or 7.5 percent of the Wereda with the population 17,996 and 21 kebles or 54 percent with the population of 167,068 found under the phases of generally food insecure, acute food and livelihood crisis and humanitarian emergence phases. The study also ascertains that having large family size, small and fragmented land holding, failure to access farm input, prevalence of malaria, concurrent conflict and dependency on rain fed agriculture found to be the main reason for the prevailing food insecurity .Based on the findings of the study, both short term and long term development intervention schemes, strategies and policy issues have been recommended..

CHAPTER ONE

1 INTRODUCTION

1.1 Background of the Study

It is believed that hunger is said to have occurred as far as the inhabitance of man on earth. Similarly, we live today in a world with plenty and hunger situation. The world attained the status of sufficiently producing enough food to feed every individual on this planet three decades ago. However, feeding all has never happened in reality, as has mainly been explained by the uneven distribution of resources, difference in opportunities and constraints around the world, and power imbalance (Degefa, 2005). Today nearly one seventh of the world populations go to bed with empty stomach (FAO, 2010). This state of affairs is undoubtedly very immoral on any account a midst the world of plenty, and inconsistent with the International Declaration of Human Rights (1948) that 'every individual has a right to get adequate food' (Maxwell & Smith, 1992). And also the political commitment agreed upon by the heads of world major states to eradicate hunger and malnutrition on the First World Food Conference in 1974 that 'one should not go to bed hungry' (Maxwell 1998). From the observed trends over recent years, it seems that the goal would still be a myth and there remains a big challenge ahead for the International Community.

According to Degefa (2005), the over- whelming majority of the food insecure and hungry people live in the developing regions: South Asia (36%), East and Southeast Asia (31%), sub-Saharan Africa (23%), and North Africa, Middle East and Latin America together (10%). Sub-Saharan Africa is the only region where the food insecure population has shown up-word spiral. The failure of Sub-Saharan African countries to feed their population has been attributed to climate shocks, mainly drought and the subsequent water scarcity, resource degradation, bad governance and inefficient policies, widespread epidemic, technological stagnation, and conflict (UNEP, 2002).

The Ethiopian economy is among the most vulnerable in Sub-Saharan Africa (Devereux et al, 2005; Pankhurst and Gebre, 2002). It is heavily dependent on the agricultural sector, which has suffered from recurrent droughts and extreme fluctuations of output. Agricultural production, for instance, grew by about 2.3% during 1980-2000 while population was growing on average at a rate of 2.9% per year, leading to a decline in per capita agricultural production by about 0.6% per year (Demeke et al; 2004). The number of food insecure households in Ethiopia has been increasing since the 1960s, as domestic food production has failed to meet the food requirements of the country. The annual food deficit increased from about 0.75 million ton in 1979/80 to 1.4 million tons in 2000 (Mesaye,2001). As a result the most important basic deprivation that plagues Ethiopian society is a lack of access to adequate food and nutrition. The country has been receiving on average 700 thousand tons of food aid per annum (Mesaye,2001) .The number of food insecure households has been increasing, whilst precipitate food has been decreasing. For instance, according to Woldeamlack (2009), the average per capita food availability was 128.908 kg for the period 1960-1974, and decline to 119.99 kg for the period 1975-1991. The large gap between food demand and food supply was filled by import and aid. The later is contributing the largest share.

In this regard, different researchers agree that the causes of the existing food insecurity problem in Ethiopia are numerous and interrelated. These includes rainfall variability, soil degradation, inappropriate storage facility, pre and post harvest crop loss, inability of the households to purchase food, small and fragmented land size, lack of off-farm income opportunity, the under development of livestock sub- sector, inadequate credit and extension services, and tenure insecurity (Mesfin,1984; Debebe,1995; Markose,1997; Kifle andYosefe,1999; Messaye,2001; Degefa,1996/2002; Bekure,2005; Desalgne;2009; Woldeamlack ;2009).

According to Dechassa ,(2002) ,Sidama Zone, situated approximately 275 km south of Addis Ababa, is one of the zones in SNNPR. It is one of the highly populated areas in Ethiopia, having a density of 347people /km^2. Sidama is characterized by three agro ecological zones: the dry midlands/lowland (20%), the middle land (48%) and the high lands (32%). Sidama is known for its diverse, intensive and well-established agro forestry sys-

tem in which a diversity of perennial and annual crops is grown together. This system of production largely contributed and helped to keep the environment conserved (Dechassa,2002). In the low land, however, soil erosion is an important production constraint due to intensive agricultural diversification. In Sidama Zone mixed agriculture (crop and livestock production) is practiced. Enset is the main stable crop both in high land and midland while maize is so in the low land. Despite its poor performance in the low land, still farmers grow enset more for cultural and traditional purpose than for food. In the 1999 drought, both enset and coffee were destroyed not only from the severity of the drought but also enset was the only crop to rely on and also use the leaves as feed to livestock to tackle feed shortage.

Food is more precarious in the low land areas due to moisture stress and water logging in some pocket areas hampering agricultural production and less diversification of food sources.

1.1. Statement of the Problem

Though it is endowed with varieties of natural resources suitable to produce a wide variety of crops (Sisay, 1995), Ethiopia has the highest number of food insecure population in sub-Saharan Africa region (Beyene, 1997). Even though food related crisis goes back to ancient times in Ethiopia (Webb. et al, 1995; Goyder. and Hugh.. 1998), there were no such times as serious shortage of food supply as the last quarter of the 20th century. During this period, "there was no single year where there is no ……food shortage……" (Markose, 1997).

Particularly, majority of the Ethiopia rural population has been chronically suffering from mass poverty more severely than the urban dwellers. As Teferi (1987) noted "Under nourishment and malnutrition are common in Ethiopia…..and more than 81 % of the peasant live under absolute poverty."Moreover landlessness, lack of means of production, and large family size are the major characteristics of Ethiopian peasant at present . Therefore, one can safely say that the Ethiopian rural community is the major contributor to the na-

tional economy as most poverty stricken group of people. In order to build on these "natural endowments", the varied nature and causes of food insecurity and general destitution across Ethiopian society have to be understood. In policy discourse, the imperative to move away from repeated "emergency" food aid distributions and to find ways of tackling the longer-term causes of food insecurity have been long and widely acknowledged (Sharp et al, 2003). Key widely known factors behind worsening vulnerability to food insecurity are population pressure, size of landholdings and land degradation, deforestation, soil erosion and erratic and inadequate rainfall pattern in addition to the less articulated issues around the adequacy of policy and institutional frameworks and design of intervention programmes. The existing suite of interventions in Ethiopia is essentially oriented towards addressing these factors.

According to ENCU ,(2005)Boricha Woreda is one of the most food and nutrition insecure among Woredas of Sidama Zone. Its nutrition situation is typical with 6.8 percent global acute malnutrition. Crude mortality and under five mortality are 0.04 and 0.1 which is much greater than the national and international average .Morbidity in children is 20 percent and malaria occurs throughout the year with a peak from May to November. Due to widespread water shortage money, time and labor spent on water fetching are so huge and, occurrences of diarroreal disease is so widespread .Recurrent conflict with the neighboring ethnic groups on the issue of farming and grazing land which cause death, robbery and making farmers passive of the agricultural practices are the most significant features of the Wereda under study. More ever, high population growth, declining land holding, deforestation, land degradation, declining soil fertility and poor rain fall are defining characteristics of the place under study. Food insecurity of Boricha Wereda is not the outcome of single most important factor, rather it is the function of both immediate hazard events and underlying causes, as well as the specific vulnerabilities of livelihood systems.

Taking all multifaceted nature of food security problems and issues, the subject matter becomes the concern of many political leaders, academicians, donor organization and civic society's. However, majority of the researches that have been done so far on the issue related to food security in Ethiopia are very general, fail to apply the right measure-

ment tool, give emphasis to aid rather than livelihood protection and promotion, and consider the problem from national level by ignoring the objective reality at individual and household level. Only very few case studies have been done on Wereda, keble and household level. But, as indicated by many scholars (Sisaye, 1994; Debebe, 1995), the food security /insecurity situation at national level can fail to be the best case at household or individual level. In order to have reliable and timely information, to create currency and common language among policy makers, donors, development practitioner and public at large needs the application of appropriate Household Food Security Measurements tools like IPC and HEA are so vital. Therefore, based on this and other discussion in the previous paragraphs, the primary focus of the research is on the rural household's food security situation of Boricha Werda in Sidama Zone.

1.2. Objective of the Study

The main objective of this study is to assess food security status of the rural households in Boricha Wereda using food security measurement tools (HEA &IPC).

Specific Objectives of the study are:

1. to assess the household position in production, consumption, cash income and expenditure.

2. to identify the major environmental, economic and social factors influencing agricultural productivity in the area.

3. to examine to what extent the household have access to enough food throughout the year and analyze the household per capital dietary calorie supply.

4. to recommend ideas for improved policy and program measures to tackle food security problems.

1.4 Research Questions

The purpose of this study is to answer the following questions:

1. What does the rural household food security (dietary caloric supply) status look like in the study area?

2. What are the main source of household food, consumption, income and expenditure in Boricha Wereda?

3. What are the factors affecting Boricha's Wereda agricultural productivity in particular and food security in general?

4. What are the main coping strategies employed?

1.5 Significance and Scope of the of the Study

HEA, when integrated with IPC will give clear information on issues like severity of the situation, geographic extent, number of people affected, immediate causes and the like. They will pave way for considerable intervention and mitigating the underlying and predisposing causes of food insecurity. In place like Boricha where seasonal and chronic food insecurity is the norm the study is expected to come up with situation analysis which is supported by map that can be used in addressing livelihoods and structural causes of food insecurity.

This research is considerably an indicative for the policy and decision makers and attempts to make further contribution to the previous studies and can be used as source material for further studies. The result of the study provides policy related information and technically feasible remedies that help to prioritize among the many possibilities overcoming the food insecurity problems which are prevailing in the area. More specifically, it helps develop common language that should be functional among policy makers, donor

organizations, Academics the media and development practitioners working in the field of food security.

1.6 Limitations of the Study

The scope of the study is confined to the analysis of the rural food security status in Boricha Wereda. The study considers the household production, consumption, expenditure, and means of incomes and basic factors that determine food security throughout the year. The study also aimed to map the food security situation of all kebeles by integrating food security measurement tools and methodologies. However, this study is not free from limitation owing to data collection and analysis problem.

Some of the limitations are:

- the research failed to address gender based dimensions of food security

- failure of HEA to measure food obtained from informal means's.

- Some data collected at livelihood basis, while other are collected at kebeles basis.

1.7 Organization of the Paper

This research paper is divided in to five chapters. The first chapter deals with the introduction part which comprises back- ground of the study, statement of the problem, objectives of the study, research questions, significance and limitation of the study.

The second chapter reviews the concept, definitions and pillars of food security by linking to regional, national, local, household aspects and dimensions.

The third chapter deals with the back ground of the study area. Both physical and socio economic characteristics of the area are briefly discussed in this chapter.

The chapter four, issues like livelihood zoning, wealth categorization, patterns and sources of household income, expenditure consumption are analyzed and interpreted by

HEA and finally transformed to IPC to map food security situation of the place under study .

Chapter five tries to look in to basic factors of food security in Boricha Wereda. Moreover, some of these factors are seen independently being categorized as physical and socio economic factors.

The summary of the overall parts and recommendations that are assumed to alleviate the problem are covered in chapter six.

CHAPTER TWO

2 Concepts and Dimensions of Food Security

2.1 Food Security: The Concept

The root concern with food security can be traced back to the world food crises of 1972-74: and, beyond that, at least to the Universal Declaration of Human Right in the 1948, which recognized the right to food as a core element of an adequate standard of living (Stephen, 2007 ;Maxwell and Smith,1992).

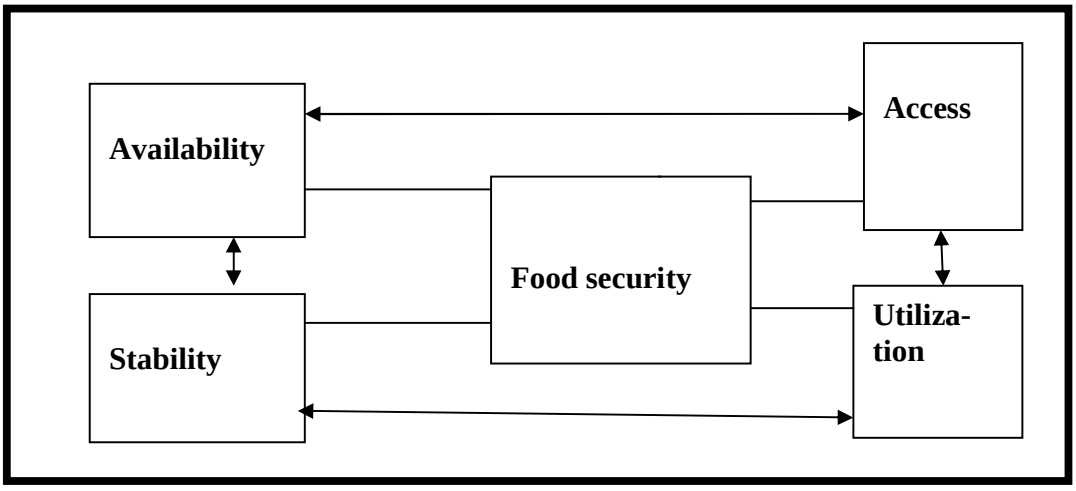
There are several different ways of defining food security. One set is similar to the World Bank and World Food summit definitions; another set focuses on the element of food security in a manner similar to the definition used by (FAO, 2002). Food security exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO,2007). Despite that food insecurity is a situation in which the individuals of a society have neither the physical nor the economic access to the nourishment they need. Also, it is defined as a limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways. Food security includes at a minimum: (1) the ready availability of nutritionally adequate and safe foods, and (2) an assured ability to acquire acceptable foods in socially acceptable ways (e.g., without resorting to emergency food supplies, scavenging, stealing, or other coping strategies). Household level food security is rather complex, transboundary and multifaceted including biophysical, socio-economic, political, demographic, gender and other dimensions. This understanding of food security encompasses not only current consumption, nutritional status and health, but also vulnerability to and coping with food insecurity (FAO,, 2002). In USAID terms the pillars of food security include availability of food (production and trade); access (purchasing power or capacity to produce) and utilization (the household ability to use the food they have, and the biological ability of human body to digest food). A report of (FAO, 2002) defines food insecurity in terms of the risk the households face: households become food insecure when

they are unable to mitigate negative impact on food availability, access, and/or utilization.

In livelihood terms, the element of provision (direct assistance), protection (mitigating the impact of shocks and protecting livelihood assets), and promotion (the building of livelihood assets and capabilities) describe different kind of interventions that address food security and livelihood more generally.

The food security definition comprises four key dimensions (Fig.2.1): availability, stability, access and utilization (FAO, 2007). The first dimension relates to the availability of sufficient food, i.e., to the overall ability of the agricultural system to meet food demand. Its sub dimensions include the agro-climatic fundamentals of crop and pasture production and the entire range of socio-economic and cultural factors that determine where and how farmers perform in response to markets. The second dimension, stability, relates to individuals who are at high risk of temporarily or permanently losing their access to the resources needed to consume adequate food, either because these individuals cannot ensure ex ante against income shocks or they lack enough, reserves to smooth consumption ex post or both. An important cause of unstable access is climate variability, e.g., landless agricultural laborers, who almost wholly depend on agricultural wages in a region of erratic rainfall and have few savings, would be at high-risk of losing their access to food.

Figure 2.1: The Intricate Determinant of Food Security



However, there can be individuals with unstable access to food even in agricultural communities where there is no climate variability, e.g., landless agricultural laborers who fall sick and cannot earn their daily wages would lack stable access to food. They cannot take out insurance against illness. The third dimension, access, covers access by individuals to adequate resources (entitlements) to acquire appropriate foods for a nutritious diet. Entitlements are defined as the set of all those commodity bundles over which a person can establish command given the legal, political, economic, and social arrangements of the community of which he or she is a member. Thus a key element is the purchasing power of consumers and the evolution of real incomes and food prices. However, these resources need not be exclusively monetary but may also include traditional rights, e.g., to a share of common resources (FAO, 2007). Food access depends largely on household purchasing power, which varies in relation to market integration, price policies and temporal market conditions (UNEP, 2002). Finally, utilization encompasses all food safety and quality aspects of nutrition; its sub dimensions are therefore related to health, including the sanitary conditions across the entire food chain (FAO, 2007).

Also food utilization is determined by food safety and quality, how much a person eats and how well a person converts food to energy, all of which affect proper biological use of food, nutritional status and growth. Adequate food utilization requires a diet providing sufficient energy and essential nutrients, potable water, adequate sanitation, access to health services and proper feeding practices and illness management (UNEP, 2002).

2.2 Food Security at National or Regional Level

Food security is also sometimes considered from collective or national view point, referring to “national food sufficiency”. Some would argue that individual food security and national food self sufficiency are two different and unrelated concepts. Indeed, national self sufficiency is neither necessary nor sufficient to guarantee food security at the individual level. India, for instance, is self sufficient but a large part of its population is not

food secured. On the other hand, Hong Kong and Singapore are not self sufficient, but their population are food secure due to the countries capacity to import food. Food security therefore brought about by a combination of individual, household, community, national and even international factors. In particular, efficient trickle-down and redistribution mechanism, and transfer based entitlements (Sen., 1981) (i.e. individual access to those mechanisms) area required in order that national self sufficiency ensure individual food security (FAO, 2007).

In general, the recent concept of food security has given more attention to household and individual than its availability at international, national, regional, wereda or kebels levels. This is because, as already indicated, increasing food production, supply and sufficiency at broader levels does not necessarily ensure that each and every individual is food secure, this is why ,as reported by the(WFP , 2009).

2.3 Household Food Security

Household Food Security (HFS) is emerging as an organizing for development thinking and objective of development initiatives. To reduce and monitor food insecurity we must determine who are food insecure?, why and how they became vulnerable ?, and where they reside? (Maxwell and Smith, 1992). Government policy makers, donors agency, and Non- Governmental Organizations (NGOs) have all attempted to opertionalize this concept by deriving a series of indicators .Typical indicators of food consumption, for example, household calorie adequacy from recall, or more complex indicators such as income level and food expenditure, have proven to be difficult and too expensive to incorporate in to ongoing monitoring and evaluation systems (Maxwell and Smith,1992). Alternative indicators have been sought which are less expensive, timely and reliable in locating the food insecure. Consensus still has not reached on acceptable indicators and methods of measurement (Maxwell and Smith,1992). Recently, however, many have begun to question the validity of the commonly used indicators of food security measurement at national level as representative of indicator of access to food at household level. The notion of food entitlement (Sen., 1981) has played a critical role in this respect.

2.4 Indicators of Household Food Security

As Dewal (1989) noted, “One of the earliest examples of household food security monitoring came from India; because famine was a recurrent phenomenon in India, the British administration drafted the India code in 1980”. The aim of these code developed in provisional basis was to ensure the maintenance of efficient channel of information by means which the approach of scarcity or famine may be detected in time and to provide for a state of preparedness in respect to measure of relief when the emergency arises. Implementing these indicators within the Indian context or other countries is found to be difficult and hard for both academia and development practitioners.

As Debebe (1995) noted “Assessment of food insecurity is a difficult issue as there is no universally established indicators which serve as measuring tool.”However, several researchers agree that numerous interrelated socio economic, environmental and political factors determine food security situation of a given society (Debebe, 1995; Markose, 1977).

Several food insecurity indicators have come in to use along with the development of the concept of food security. The utilization of these indicators depends on the procedure, purpose and depth of the research. Three most important indicators have been developed which enable a researcher asses, analyze and monitor food security situation of the people under consideration. These are supply, food access and outcome indicator. These can be itemized in to two major categories based on their use. Supply and access indicators are considered as process indicators and they could measure food insecurity in the region under study. On the other hand, outcome indicators measure the level of food intake (Debebe, 1995).The details of three major indicators given in the table 2.1.

Table 2.1: Indicators of Household Food Security

Supply Indicators	Food Access Indicators	Outcome Indicators
-Metrological data -Natural resource data -Agricultural production data -Market information -Information on pest damage and stock disease -Regional conflict -Agro-ecological models	-Land use practice -Dietary change -Livestock sales -Sales of assets -Access to loans/credit -Seasonal migration -Diversification of income sources	-Household budget and expenditure -Food consumption frequency -Subsistence potential -National status -Storage estimate -Household perception of food insecurity

Source: Debebe (1995) as summarized from Frankenberger (1995)

As Debebe (1995) pointed out supply indicators are not appropriate to analyze food security situation at household level. Rather they provide a general picture of the food security status at broader levels such as national, regional or societal level. But access and outcome indicators serve better to measure household food situation.

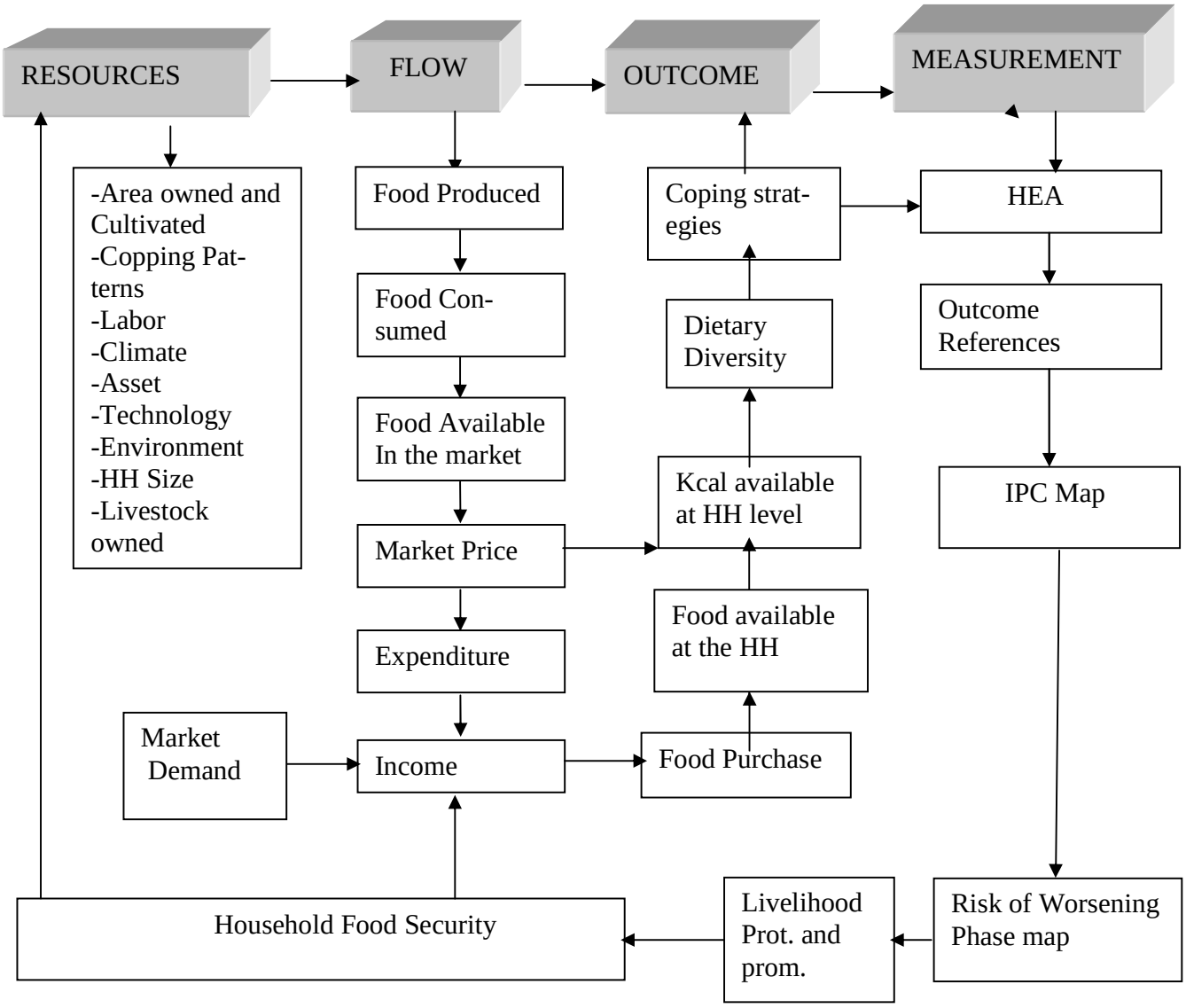
2.5 Conceptual Framework

The conceptual framework of this research tries to show link and integration of four important grand concepts of food security through the lenses of Sustainable Livelihood Framework.

It attempts to look the interaction of resource and assets (financial, physical, social, environmental and human) and their flow and the resultant outcome. The outcome in the sense of this research is measured by food security tool HEA and finalized by drawing cartography and GIS supported IPC and Risk worsening map of the study area. It is ap-

parent that the finding will create common currency among the food security communities.

Figure: 2.2 Relations of flow of variables to food availability in the household: Hypothesis model for the study, modified from Mason et al. (1984).



CHAPTER THREE

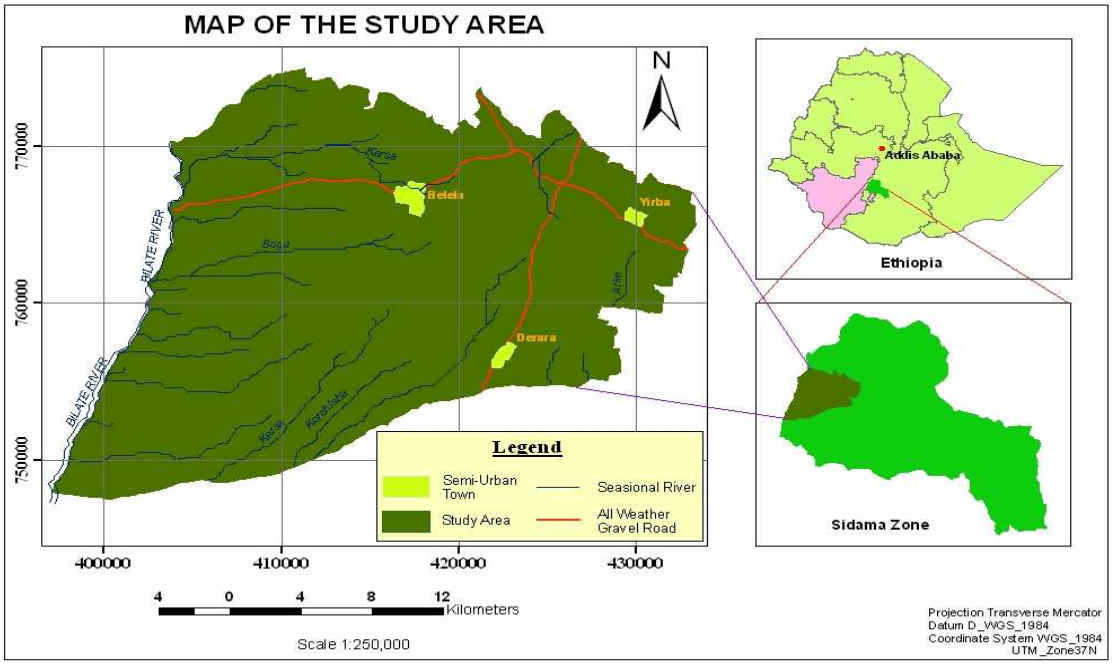
3 Methodology and Description of the Study Area

3.1 Description of the Study Area

3.1.1 Location

The study area is found in Sidama Zone, in Southern Nations Nationalities and Peoples Regions (SNNPR), which is located at 311km south of Addis Ababa. Its geographical location extends from 6º 46'N and 38º04'E to 7º01'N and 38 º24'E. Boricha has an estimated area of 588.05sq km. Administratively the Wereda comprises 39 Kebeles of which 3 Kebeles are semi-urban kebles and the others are rural (figure 3.1).The wereda is labled as malaria prune since the altitude falls below m.a.s.l (FMoH, 2008).

Fig 3.1 Location of the Study Area



Source: Ethiopia Mapping Agency

The drainage pattern of the study area is found in a poorly drained catchment. In some places the rain water stays for several days lying on the ground. All the rivers in this Wereda are seasonal rivers and are tributary's of Bilate River. These tributary rivers are running from east to west in the Wereda. In addition, there are swampy areas and many ponds in the study area. Most of the ponds were quarried by the dwellers in order to fight scarcity of water during the dry seasons. The dwellers use this water for drinking, household purpose and for their cattle throughout the year. The swamp area dries out within a few weeks after the end of major rainy season.

3.1.2 Topography

Most of the study area is characterized by flat lying topography. As far as the altitudinal variation of the region is concerned, it extends from the lowest point at south west of the mouth of tributary of Bilate river 1320m.a.s.l to north east 2080m.a.s.l with some scattered ridge in between such as Boricha Ridge 2040 m.a.s.l and Siso Ridge 2020 m.a.s.l.

3.1.3 Soil

According to FAO soil classification, the study area has four types of soil, namely; chromic luvisols, lithic leptosols, eutric vertisols, humic nitosols . The Wereda is mostly covered by the chromic luvisols and eutric vertisols.

3.1.4 Size and Population

Based on the information from BoFED of SNNPR, Boricha Wereda has an estimated total population of 255,514 of these 130,757 are men and 124,757 women. About 95.6 percent of the populations are estimated to be rural inhabitants.

3.1.5 Land Use/ Land Cover

The main land use of the Wereda is dominated by rain fed agriculture which is owned by small holder farmers. The major crops in the Wereda according to their area coverage are maize, haricot bean, coffee, horticultural crops and teff. Limited hectare of land is used to produce certain cash crops like chat, spice and eucalyptus trees. The towns in this Wereda are rural towns thus the settlement area is insignificant but, the farm land covered a considerable large area than others land use land cover types (table3.1). Especially the areas to the lower altitude are severely degraded. Riverine trees are grown following the pattern of the rivers. The other dominant land use land cover type is the scattered trees. They are found be mixed with farm land and those planted by the dwellers. The scattered trees on the ridge are planted by the community in collaboration with NGOs.

Table 3.1: Land Use Pattern of the Study Area

Land Use Type	Area (ha)	Percent of the Total Area
1.Annual Crops	20,638.00	52.4
2.Perenial Crops	11,577.00	29.4
3.Grazing Land	3,232.00	8.2
4.Forest	484.00	1.2
5.Settlments	2,400.00	6
6.Barren Land	1,074.00	2.71
Total	39,405.00	100

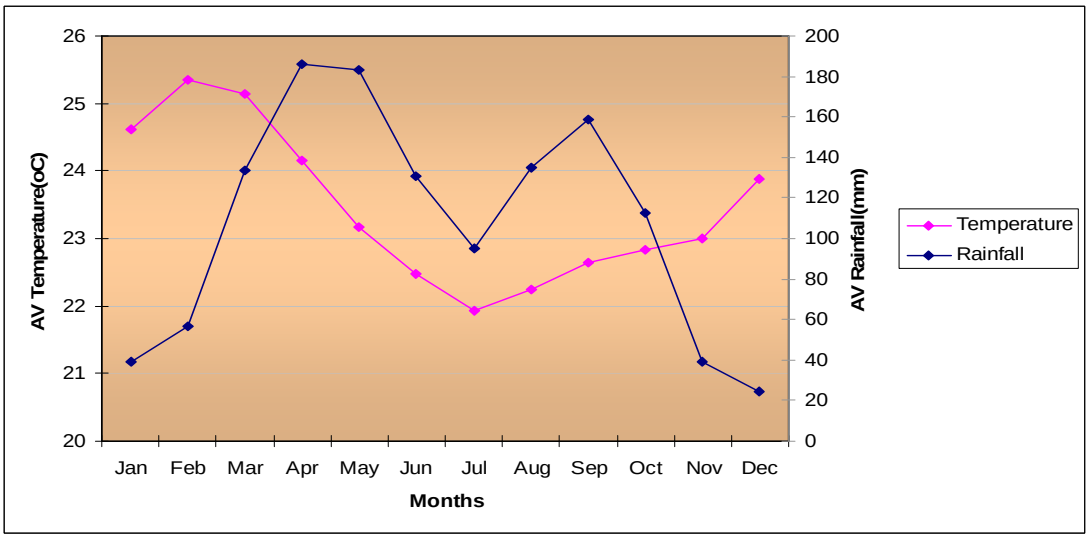
Source: BWADB.2011

3.1.6 Climate

3.1.6.1 Rainfall

Rainfall is an appropriate indicator when acute food shortage result from drought, however, caution should be taken in the way the data are used. For example, total rainfall may not correlate with yield unless distribution is taken in to account (Mesfin, 1984). In addition, the start of the rainy season may vary by as much as a month in the studied area, which adversely affects the yield. Similar to most part of the country, rainfall in this area is characterized by fluctuation in amount and periodicity from year to year. This fluctuating of rainfall both in amount and periodicity, no doubt, adversely affects the agricultural practice and the availability of food items in the area.

Fig. 3.2 Trends of Rainfall and Temperature in the Study Area (2000-2010).



Source: National Metrological Agency

3.1.6.2 Temperature

Concerning the monthly average temperature of the study area, it varies between 21.93ºC in July and 25.36ºC in February. And the rainfall pattern of the study area, according to

table 3.2 varies from 27.8 2mm mean minimum rainfall in December to the mean maximum rainfall 128.58 mm in October.

3.1.6 Livelihood

The usefulness of livelihood based approaches to development has been recognizes since late 1980s when the concept was popularized by international agencies such as; World Commission on Environment and Development (WCED, 1987). The growing popularity of livelihoods as analytical construct led shifts in development thinking towards participatory, people centered and holistic approach to development intervention. Livelihoods approaches reflect the diverse and complex realities faced by poor people in specific context. Livelihood analysis can identify causal factors behind vulnerability and food insecurity (Devereux .et al, 2005). Chamber and Conway (1992:57) defined livelihood as it is sustainable when it can cope with and recover from stress and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base. The most widely used concept of rural livelihood is the capabilities, assets (including both material and social resource) and activities required for means of living.

According to MOA, DRMFS Directorate Boricha wereda has three prominent livelihood zones identified by ILU of the Directorate. Bilatea Agro-pastoralist, Sidama Coffee and Sidama Maize belt are the main livelihood zones in the study area. Brief description of each livelihood will be given hereunder.

3.1.7.1 Agro- Pastoralist Livelihood Zone (APLZ)

Household have large livestock holdings compared to neighboring agricultural livelihood zones, in addition to both rain fed and irrigated agriculture . Rainfall however is irregular and serious livestock diseases are endemic. This small livelihood covers western part of Boricha and its southern part boarders the Oromiya region. The topography of the zone is mainly flat, with a gentle decline from east to west, where the large perennial Bilate River provides the boundary. The altitude range is from 560-1700 meters above sea level.

The zone is agro pastoral, but the pastoralist way of life is dominate. Households live together and share resources in common. The main stable food crops in the zone are maize, haricot bean, Kocho, and sweet potato all are produced in relatively small amount.

3.1.7.2 Maize Livelihood Zone (MLZ)

Although described by many officials as lowland or kola, it technically falls into the border line area between the kola and woina dega agro ecological zones, with altitude in the range of 1400-1700 meters above sea level. Average annual rain fall is in the range of 700-1200 mm per year and falls during two rainy seasons. As recently as one generation ago, the area was covered by acacia forest, but these days it becomes increasingly bare. Very few rivers cross this livelihood zone. So the population largely depends on hand dug ponds and shallow wells for water for both human and livestock. The landscape varies between undulating hills and plain. The main cash crops vary from one part of the livelihood zone to another, but include coffee, chat and chilly pepper. Land preparation methods include both hand cultivation and, for some better off households, plowing with oxen. Livestock are important and cattle, goats and donkeys are the main livestock types reared in the Sidama Maize belt. Cattle and goats are often kept in the lower and more remote areas of the livelihood zone, where pasture and browse are more readily available.

3.1.7.3 Coffee Livelihood Zone (CLZ)

Sidama coffee Livelihood Zone is a reality productive midland area that attracts migrant laborers from nearby highland areas during the busy coffee picking season. Altitudes range from 1700-2300 meters above sea level. The landscape is characterized by undulating hills and, due to the high population density; most of the land is cultivated. This is a visibly green part of SNNPR, with eucalyptus, fruit and coffee trees prominent throughout the zone and enset stems growing around every house. However, there is no natural forest and very limited communal grazing land. Rainfall in this livelihood zone is more reliable than in the neighboring maize belt, and falls during two rainy seasons, the belg

and kiremt rains. Coffee is the main cash crop and enset is the main food crop, and these are supplemented by small quantities of other rain fed food crops (including maize, sorghum, haricot beans, yams, taro, and sweet potatoes) and fruits (including avocado and pineapple).

3.2 Methodology

3.2.1 Type and Sources of Data

It is important to recognize that both quantitative and qualitative techniques play useful and complementary role in improving our understanding of household food security situation in a given area. Qualitative methods are useful for improving the depth of our understanding of the local circumstance that households operate in, while quantitative tool help us to determine the breadth to which observed behavioral practice, resources ,or problems are distributed within a population (Ellis,2000) . As a result of these both qualitative and quantitative data types are employed in this study.

3.2.2 Sampling Procedure and Sampling Size

It obvious that, decision on sample size are influenced as much by cost and time consideration as by the required precession in estimators (Ellis, 1991). Other factors to take in to account are the size of the population to which one wants to recognize, the heterogeneity of the population and how accurate one wants to sample statistics (Bernard, 1988). There is always a grater trade–off between accuracy and greater economy in sample. Although the degree of accuracy may be reduced, smaller, more cost effective samples will still provide researchers some notion of trend that are occurring in area (Ekuland 1991). Bearing these in mind a two stage sampling technique was employed to draw sample households. Three kebles were selected from three livelihood zone(one from each LZ) and 30 respondents from each kebele selected based on locally defined wealth categorization (poor, middle and better-off). The result obtained from each sampled kebele is

sought as representative to the whole livelihood zone and used to draw the IPC map of the place studied.

Table 3.2: Sampling Size

Wereda	Total Rural Kebeles	Total Household	Sampled Kebeles	Total Household In Sampled Keble	No. of Sampled Household
Boricha	39	49025	Fulasa Aldada	1410	30
			Shelo Aborea	1384	30
			Alwa Orkie	1655	30
			Total	4449	90

Source: BWADO, 2011

3.2.3 Method of Data Collection

In the view of the complexity of the problem of food insecurity and methods and tools to be applied, the nature of information needed on various aspects of the research, a single method of data collection could not satisfy the data requirement. Therefore, combinations of formal and informal techniques of data collection were employed to generate adequate and reliable data.

Household Survey: to generate information at household level, formal survey was undertaken using structured interview. Before embarking to on the formal survey (i.e. interview) pre- testing of the interview schedule was carried out and accordingly revision was made and finalized. Three enumerators were recruited based on their proficiency in communicating using local language, educational background and prior exposure to similar work. Training was given to enumerators on the content of the schedule and procedure while conducting the interview.

Focus Group Discussion: total of three focus group discussions were undertaken, with a group composed of 7-10 male and female headed households, kebele officials, development agents, health extension agents, religious leaders, NGO staffs and other concerned bodies in the kebele. The nature of data includes wealth group information, market infrastructure, imminent crises, crop calendar and perception toward migration, drought and famine, water shortage, land resource change, malaria and health service, food aid, diminishing land size, failure of crop and livestock productivity, peace and stability and extension service.

Secondary Data: The secondary sources of information have been collected from published and unpublished works and websites.

CHAPTER FOUR

4 Discussion and Analysis

4.1 Characteristics of Sampled Households

4.1.1 Household Size

Based on the study undertaken the average family size in the studied three kebles Sheloabore, Alawaorkie and Fulass Aldada representing each livelihood are six, seven and eight respectively. The total and average household sizes including male female ratios are clearly indicated in Table 4.1.

Table 4.1 Average Household Size of Sampled Kebeles

Kebles	Livelihood Zone	Female	Male	Total
Sheloabore	Maize	3	3	6
Alwaorkie	Coffee	4	3	7
Fulassa Al-dada	Agro-pastoral	3	5	8
Average		3.3	3.66	7

Source: Writers own Survey

4.1.2 Sex of Sampled Household Heads

The Study tried to analyze food security situation of 90 households residing in three different kebles. From the Table 4.2 we can be aware that 93 percent of the respondents are male headed household and the remaining 3.3 are female headed household. The other 3.3 percent of the respondent recorded as those who fail to give response for questions forwarded.

Table 4.2 Sex of the Respondents

Sex	No. Respondents	Percent
Male	84	96.55
Female	3	3.45
Total	87	100

Source: Own Survey

4.1.3 Age of Respondents

For the better result of the study the researcher tried to categorize the age group in to seven categories (Table 4.3). Based on this and the finding reached, significant numbers of respondents were in the age ranges of 31-50 years.

Table 4.3 Age of the Respondents

Age Category	Frequency	Percent
20-30	1	1.15
31-40	38	43.7
41-50	29	33
51-60	8	9.2
61-70	4	4.6
Above 71	7	8.15
Total	87	100.0

Source: Writers own Survey

4.1.4 Ethnic Background of Sampled Household

The place studied is a home for different ethnic groups. As shown in Table 4.4 as a result of this the majority of the respondents (66.7 %) have found to be Sidama, and the rest, Wolayettas, Oromos and Amharas accounts for 20,10 and 3.3 percent of the respondents respectively.

Table 4.4 Ethnic Back ground of the Respondents

Ethnicity	Frequency	Percent
Sidama	60	66.7
Amhara	3	3.3
Oromo	9	10.0
Wolayeta	18	20.0
Total	90	100.0

Source: Own Survey

4.1.5 Educational Background of the Respondents

The educational status of the respondents depicted in Table 4.5 clearly indicates that 65 percent of them are able to read and write and 24.4 percent of the respondents are found to be illiterate. The rest 7.8 percent attended church and Koran schools respectively.

Table 4.5 Educational Status of the Respondents

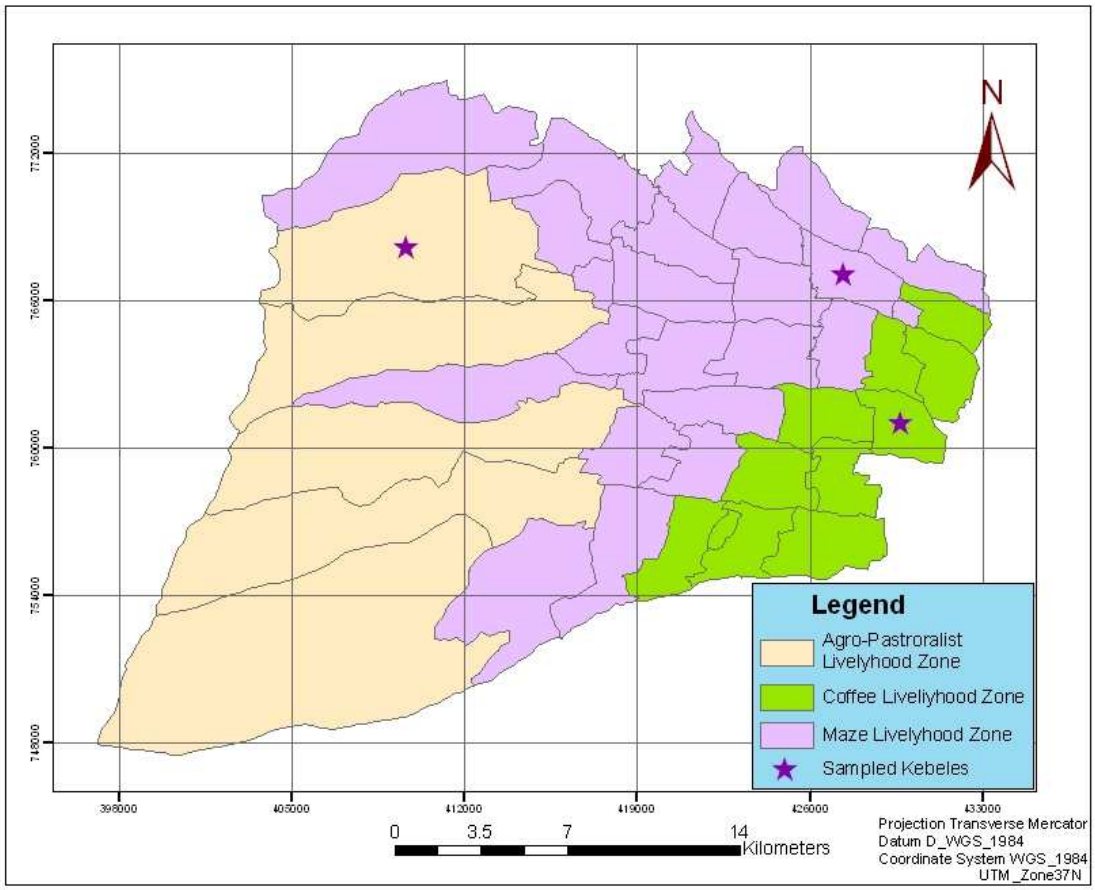
Educational Status	Frequency	Percent
Illiterate	22	24.4
read and write	59	65.6
church school	2	2.2
Koran or church(informal learning) school	7	7.8
Total	90	100.0

Source: Own Survey

4.2 Livelihood Zoning

Boricha wereda with a total of 39 rural and 3 quasi urban kebeles has three livelihood zones. As it was tried to elaborate in the previous chapters these livelihood were Agro-Pastoralist Livelihood Zone (APLZ), Coffee Livelihood Zone (CLZ) and Maize Livelihood Zone (MLZ). Of the total 39 kebles, 5 kebles or 12. Categorized under APLZ, 10 kebles under CLZ and the remaining 24 kebles under CLZ. The spatial location and distribution of livelihood zone are clearly depicted in the Fig 4.1.

Fig 4.1: Livelihood Zones of Boricha Wereda



Source: DRMFSS

4.3 Wealth Group Categorization of Sampled Household

Based on local criteria of wealth ranking (amount of land and livestock), the HEA identified three socio-economic categories or wealth groups (poor, middle, and better-off). In CLZ the three wealth groups poor, middle and better-off accounts for13.3 percent, 36.7 percent, and 50 percent of the respondent respectively. Wealth group categorization is made based on focus group discussion and key informant interview held at each livelihood zone.

Table 4.6: Wealth Group Categorization of the Respondents in CLZ

			Criteria for Wealth Group Categorization				
Wealth Group	Frequency	HH Size	Land (Cultivated)in ha	Livestock Owned (num.)			
				Cattle	Shoat	Donkeys	Poultry
Poor (Butecho)	4	5-7	-0.25	0-2	0-1	0-1	1-3
Middl(Meirema)	11	5-7	0.25-0.5	2-4	0-3	0-1	3-5
Better-off(Duressa)	15	8-10	0.5-1.5	4-8	3	1	5+

Source: *own Survey*

Wealth in CLZ primarily determined by the size of land that the household owns. Other characteristics (such as the number of sheep or goats or the type of housing inhabited) tend to result from these more basic characteristics.

Better-off household have larger household size than other wealth groups because they attract additional dependent (usually children of poorer relatives who work as domestic laborers) and because they tend to be older, more mature household. In contrast to this,

poor household are often younger families that started off with small land holdings when their parent land is sub -divided.

Table 4.7 Wealth Group Categorization of the Respondents in APLZ

Wealth Group Information								
Wealth Category	frequency	Percent	HH Size	Land area Cultivated (ha)	Livestock Owned (num)			
					Cattle	Goat	Donkeys	Poultry
Poor (Butecho)	9	30	5-7	0.5-1	1-5	3-7	1	1-4
Middle(Merirama)	14	46.7	7-9	0.75-1.24	10-30	10-20	1-3	4-7
Better-off (Duressa)	7	23.3	9-11	1.5-2	30-70	30-40	2-4	7+

Source: Own Survey

As shown in Table 4.7 Wealth in APLZ is determined primarily by livestock holding, particularly cattle holding .The size of land that a household owns and cultivates found to be secondary in this zone.

Wealth status of the respondents in MLZ is largely determined by land size owned and cultivated t (Table 4.8). Other characteristics (such as the number of goats, or donkeys owned or the type of housing inhabited) tend to result from the previously mentioned grand assets and characteristics.

Table 4.8 Wealth Group Categorization of the Respondents in MLZ

Wealth Group Information								
Wealth Group	Fre-quency	Percent	HH Size	Land area Cultivated (ha)	Livestock			
					Cattle	Goat	Donkeys	Poultry
Poor(Butecho)	12	40	5-7	0.25	0	0-2	0	3-7
Mid-dle(Merirema)	12	40	5-7	0.25-0.5	1-2	2-6	0-1	7-11
Better-off(Duressa)	6	20	8-12	1.5-2	10-20	5-15	1-2	11+

Source: *Own Survey*

In this zone the majority owned small size of land it is uncommon for household to rent in or share crop land. Poor household own and cultivate limited areas and have limited access to improved seeds and fertilizers. In this study some household were found to own no livestock at all.

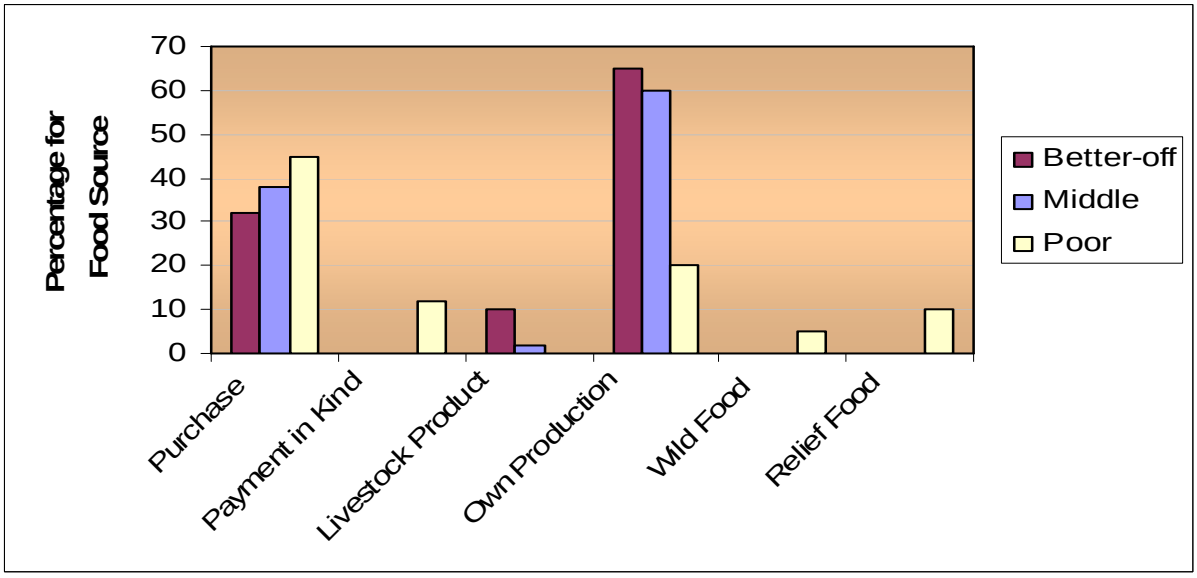
As indicated in the two zones better-off household tends to be larger than other types household for the reasons. First, they can support more people and therefore tend to attract relatives from poorer household. It is quite common for very poor or poor households to send a child to live with, and work for, their better-off relatives. In this way, better-off household are able to send their own children to school and still have enough labor around the house for cultivation, enset processing (which is very labor intensive), fetching fire wood and water, Second, better-off household tend to more mature, which means that the household tend to be older, has made more time to accumulate large number of children.

4.4 Households Food Sources

The percentage of consumption requirement coming from each source of food was calculated using estimates of yearly quantities. During survey time different food sources are identified, own production, gift, PSNP hand out, purchase, payment in kind, and wild foods are among others. Basically, these sources have different connotation for different wealth groups.

CLZ is entirely dependent on coffee production. The size of agricultural land is positively correlated with the wealth status of that particular household.

Fig 4.2 Sources of Food of the Respondents in CLZ



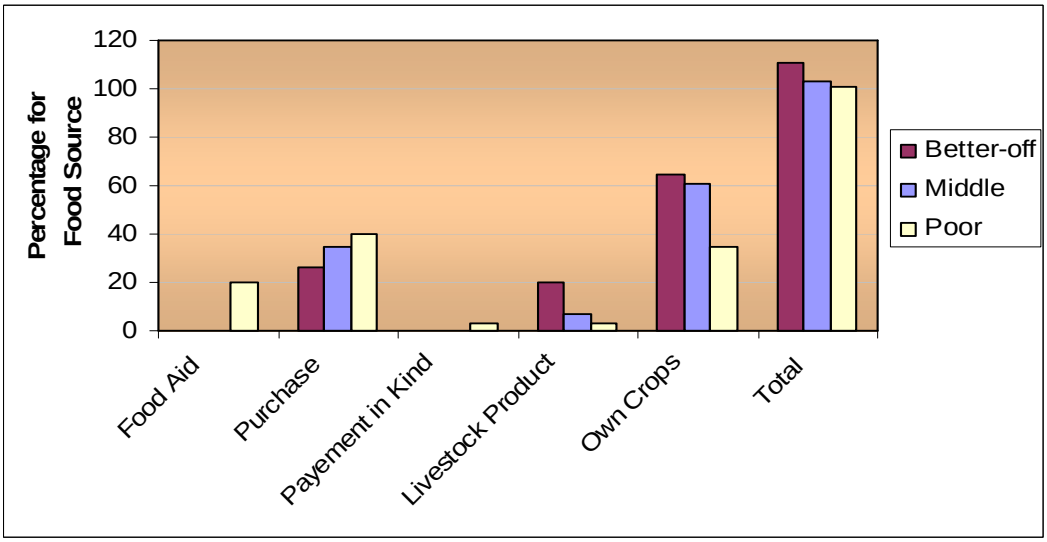
Source: *Own Survey*

Figure 4.2 shows that the contribution of own production generally increased with wealth, although something of a mixed picture was obtained for better-off household. Some better-off households produce large quantities of food and are able to eat from their

production for most of the year. Other better-off household concentrate on coffee production and only produce enough food for part of the year. Better-off household did produce more food crops than middle households, they also had much larger household size, while resulted in the contribution from own production being quite similar .The contribution of livestock product (primarily milk) increase with wealth. Maize is the cheapest source of calorie made up of the bulk of purchase for poor and middle household, supplemented by small quantities of kocho (processed enset) and haricot bean. The study has shown that poor wealth group of this livelihood zone are unable to fully cover 100% of their minimum requirement.

On other hand APLZ is well known in its mixed agriculture, where livestock production plays zone. Besides this, crop production is practiced largely on rain fed basis and minimally in the form of irrigation. After taking the survey in this area the following results have been obtained regarding the pattern and sources of consumption is concerned (Fig 4.3)

Fig 4.3 Sources of Food of the Respondents in APLZ

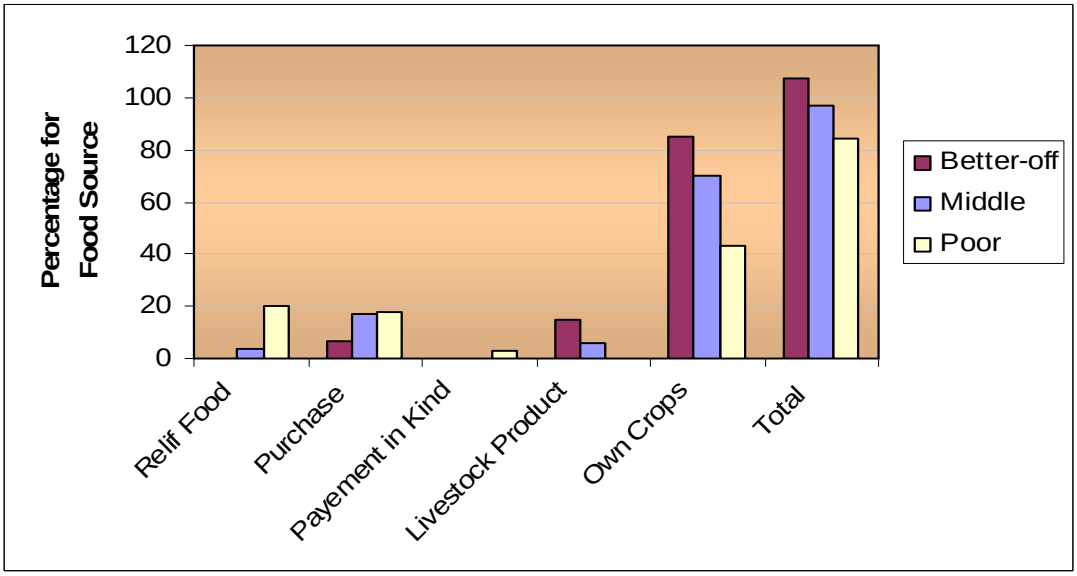


Source: *Own Survey*

As it was mentioned in the earlier paragraphs, the contribution of own production increase with wealth, but not markedly, so this is partly because household size increase with wealth and partly because the better-off spend more time tending their livestock than their crops. The main rain fed crops are maize, haricot bean, enset and teff. The study reveals that the main irrigated crops in the zone are maize, haricot bean and sweet potato. The contribution of livestock product (milk, butter and meat) increases with wealth and is large compared to neighboring livelihood zones, as one could expect when comparing an agro-pastoral zone with mixed farming system. The percentage of food purchase is fairly similar across wealth groups, primarily because poor household received food aid in time of study, thus reducing their need to purchase food. The main foods purchased are maize, kocho, haricot bean and meat.

According to the study the contribution of own production increased with wealth. Poor household obtained 35-45 % of their food needs from their own production, where as better-off household obtained 85-95 % in time of study (Figure 4.3). The contribution of livestock product also increased with wealth.

Fig 4.4 Source of Food of the Respondents in MLZ



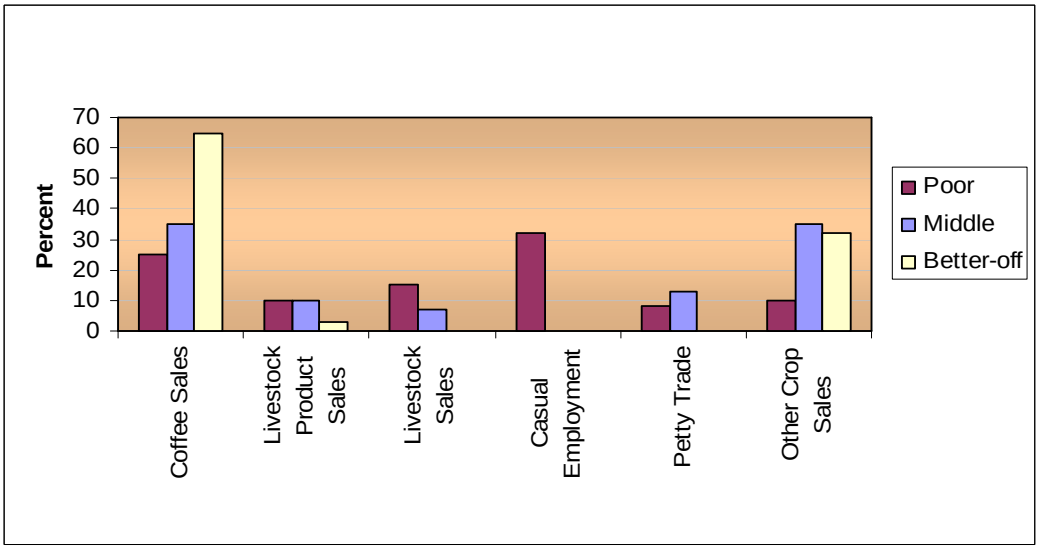
Source: *own survey*

In contrast, the contribution of relief food decreased with wealth, which suggests that targeting is working to a certain extent. Household made up any gap in food through a combination of purchase and labor exchange (which means working directly for food). Maize finds to be the cheapest sources of purchased calorie and made up the bulk purchase for poor and middle household, supplemented by small quantities of kocho.

4.5 Pattern and Sources of Household Cash Income

Sources of income are representative of twelve months period situation derived from interview and focus group discussion under- taken in the study area. It is apparent that the diversification of economic activities appears to be linked to the income level of the household. Despite a strong dependency on agricultural labor, poor household are inclined that have more varied, but nonetheless, volatile (dependent on seasonality and labor need) sources of income.

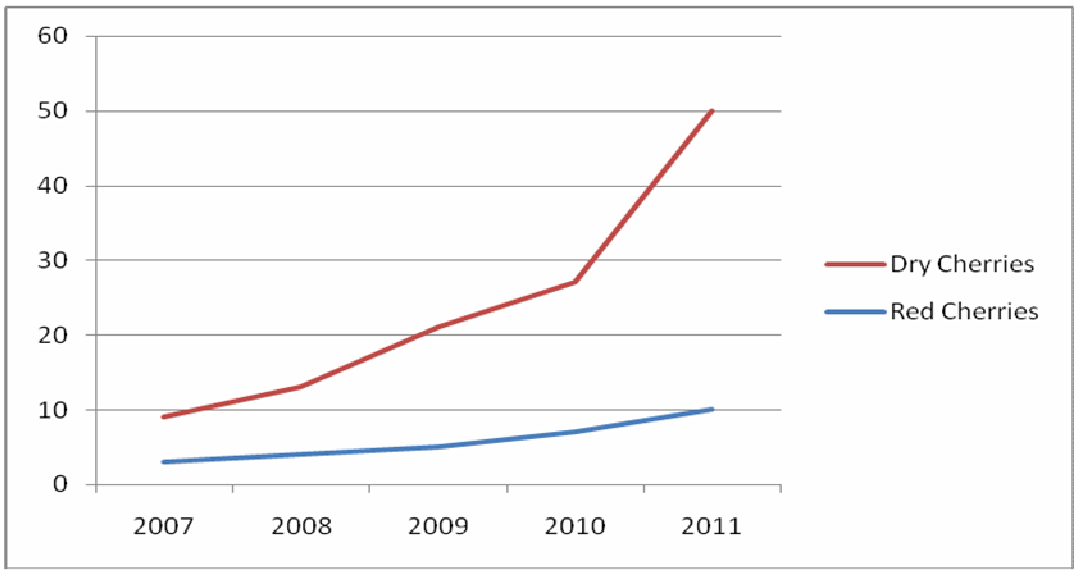
Fig 4.5 Sources of income of the Respondents in CLZ



Source: own survey

Figure 4.5 presents source of cash for households with in different wealth categories for CLZ. The year 2010 is a year of good production as well as the price of coffee has shown vital increment in international market. Besides, the establishment of a new market firm (ECX) has contributed a lot in this regard. In the study area farmers sell their coffee in two forms: wet red cherries and dry cherries Wet coffee is sold during the harvest time (September to December) for unions who have pulping machines. The coffee at pulping stations passes through processes like pulping, fermenting, washing, drying, sorting and packing. According to coffee development experts of Boricha Wereda Agriculture Office, 70-80% of the coffee in this livelihood zone is sold in its wet form, which result in pre-paring export quality coffee. The remaining coffee is dried by farmers and sold from January onwards, also to unions, cooperatives and private traders. During the survey time the coffee price has shown sky rocketing trends which makes the coffee growers in the livelihood zone so beneficiary.

Fig 4.6 Coffee Price (2007 – 2011)

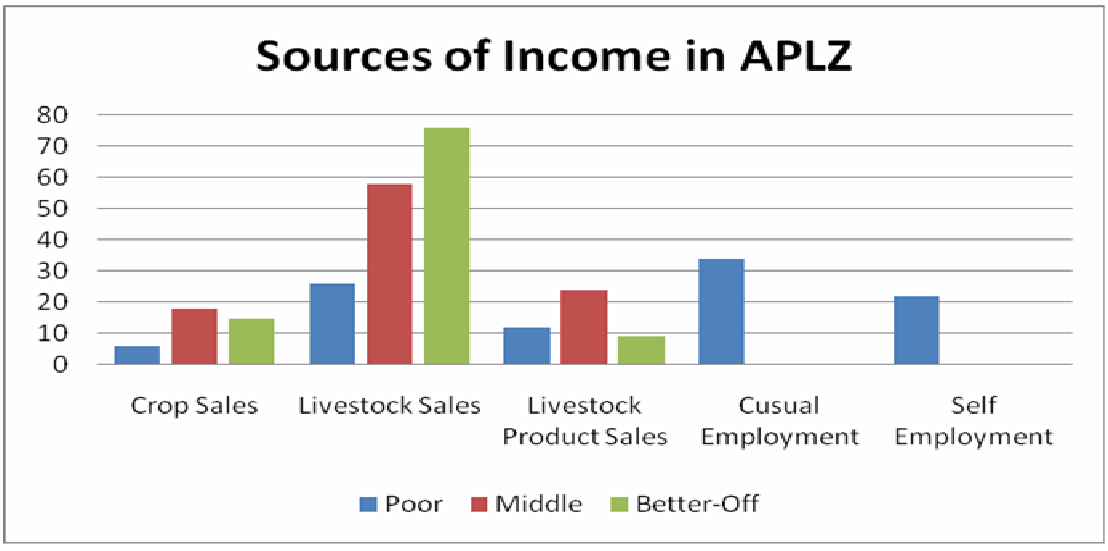


Source: SNNPR Marketing and Cooperative Bureau (2011)

The price of coffee received by the inhabitant in the livelihood has shown a tremendous increment starting the year 2007 (Figure 4.6). For instance the average price for red cherries was three birr in the year 2007; this price has reached almost ten birr in the survey year. Besides this dry cherries has reached birr forty in 2011, which was six birr in the year 2007. This implies that, despite some financial irregularities the farmer in the studied livelihood zone has strong financial status compared to the neighboring livelihood zones.

In APLZ major income is obtained from sales of livestock and livestock products. This was supplemented with income from the sale of small amount of maize, haricot beans and teff. Poor households also obtained income from these sources, but in smaller amount and the total contribution to household income was less than 50%. Other income sources for the poor household include casual agricultural labor and fire wood sales (self employment). Figure 4.7 shows the source of cash income of wealth groups in CLZ

Fig 4.7 Sources of Income of the Respondents in APLZ

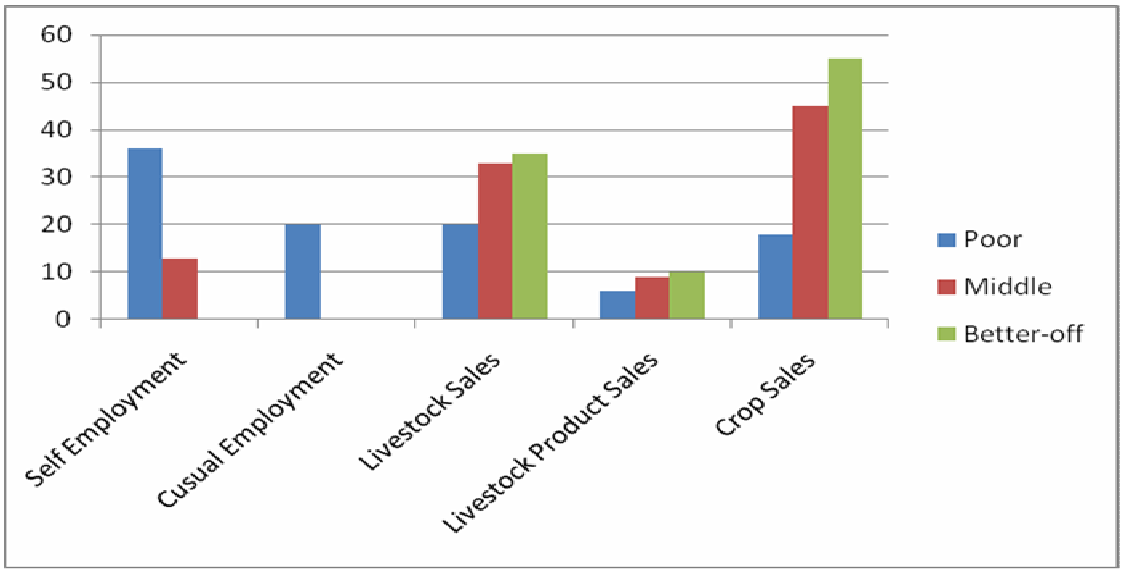


Source own survey

From the Figure 4.7 it is possible to infer that poor wealth groups have more number of income sources as compared to middle and better-off groups. This can be substantiated that, the later wealth group depends only three means's of incomes (crop sales, livestock sales and livestock product sales), while the previous group depend on sources used by the previous group plus two additional sources (employment and self employment).

As can be seen in Fig 4.8 in MLZ, the contribution of income from crops and livestock increased with wealth. This can be easily correlated to better position in terms of farm land and labor owned by the wealth groups mentioned. Although better-off and middle households had very similar pattern of income, levels varied quite significantly with middle households earning less than half that of better-off households. Contrary to this, poor households obtained the bulk of their income from casual labor and fire wood sales.

Fig 4.8 Source of Income of the Respondents in MLZ



Sources: Own Survey

Casual labor was obtained locally from better-off households and includes agricultural labor, enset processing (mainly performed by females), fire wood and water collection. Fire wood sales were a separate income source, where the wood obtained from distant location and transported manually or on a borrowed or rented donkey. However, some house holds in each wealth group engage in petty trading.

4.6 Household Expenditure Patterns

Since 2010 was a year of good coffee production, incomes were relatively high in this year and expenditure was therefore stretched to a certain extent. The pattern of expenditure for different wealth groups in CLZ livelihood is clearly indicated in the Figure 4.9.

From the Table 4.9 we can infer that the difference among the wealth group in the zone is the percentage of expenditure on staple food, agricultural inputs and non-staple food. According to this study one average poor wealth group spent 57% of their expenditure, where as forms of expenditure remains insignificant and minimal. The poor in this group spent only 8% of their expenditure for agricultural inputs which could in turn have negative effect on future production, income and expenditure, whereas, better-off household spent a considerable amount of money for agricultural input and agricultural labor.

Table 4.9 Expenditure Patterns of the Respondents in CLZ

Wealth Category	Staple Food	None-Staple Food	HH- Items	Water	Inputs	social Service
Poor	56	13	7	6	10	8
Middle	32	23	9	5	19	12
Better-Off	25	16	13	7	25	14

Sources: Own Survey

The category household items include salt, soap and kerosene. Other includes tax, social obligations, ceremonies and savings. Expenditure on most items (except staple food) increase with wealth. The category social service includes spending on education and health. From the study, it is possible to conclude that better-off household spent a large amount of money on schooling, and were the only wealth group that could afford to send their children to school in the livelihood zone. As it works for consumption and income, the pattern of expenditure has sought affected by seasonal situations prevailing in the livelihood.

Table 4.10 shows that expenditure on stable food and non-stable food household items in the APLZ, declined as a proportion of income as increased. However, expenditure on inputs (including livestock drug, seeds and fertilizer) greatly increased with wealth. The livelihood is far from the main regional markets and road connections are poor, resulting in difficult market access.

Table 4.10 Expenditure Patterns of Respondents in APLZ

Wealth Catagory	Staple Food	None-Staple Food	HH-Items	Water	Inputs	social Service	Clothes	Others	Total
Poor	52	10	4	6	10	6	4	8	100
Middle	34	12	8	7	15	7	6	11	100
Better-Off	25	15	7	7	19	8	7	12	100

Source: Own Survey

The category household items put for the purpose of this livelihood include salt, soap, grinding and kerosene. Other includes tax, social obligations, ceremonies, investment in livestock and savings. The category social service includes spending on education and health. Better-off household spend large proportion of their income on schooling, and are the wealth group that can afford to send children to school outside the livelihood zone.

Although primary schools are reasonably accessible within the livelihood zone, high schools are only available in the main Weredas towns and this requires spending on accommodation and food in addition to the expected fees and stationary. Most household cannot afford this. Indeed, even primary school is beyond the means of most households, who tend to only send one or two of their children to school.

Table 4.11 Expenditure Patterns in Respondents in MLZ

Livelihood Zone	Staple Food	None-Staple Food	HH-Items	Wa-ter	Inputs	Social Ser-vice	Clothes	Others	Total
Poor	26	8	18	5	8	15	18	12	100
Middle	12	10	16	7	15	10	14		100
Better-off	4	8	12	7	20	15	16	18	100

Table 4.11 shows that expenditure on agricultural inputs varies significantly by wealth group. Better-off household can afford improved seeds, fertilizer (DAP and urea), and livestock drugs. They may cultivate using plow oxen and can afford to employ labor during the peak agricultural seasons. This may not true for poor household who use inferior seeds and can not afford adequate quantities of fertilizer.

4.7 Main Hazards and Response Strategies

It is apparent that hazard could include both natural and technological processes or events which may threaten human life, property, activity and environment. Hazard results from extreme natural processes, technological developments, and various forms of social exclusion .Hazards are potentially dangerous and damaging events such as drought, flood, windstorm ,or volcanic eruption in natural or humane-made environment that negatively affect lives ,property or activities.

Boricha is well known for the occurrence of multifaceted hazards. After conducting intensive interviews and focus group discussion the following hazards, their effects and prominent strategies identified and formulated in table 4.12.

Table 4.12 Hazards and Response Strategies in Three Livelihood Zones

Livelihood Zone	Hazards	Effect	Responses Strategies
CLZ	-Shortage of rain and Drought	-Affect crop livestock production	-Reduction of non-essential Expenditure -Livestock sales -Migration -More local casual work -Petty trade -Increased consumption of inset
	-Hail and Frost	-Have devastating effect on coffee production	
	-Disease and Pest	-Coffee berry and coffee welt disease significantly affect coffee production	
	-Fluctuating coffee production	-Affects cash Income	
	-Fluctuating International Coffee Price	-Affects cash Income	
	-Increased stable food price	-Affects Consumption	
APLZ	-Drought	-Crop failure and increased stable food price	-Increased livestock Sales -Increased Consumption of enset -More casual labor work -Reducing non-essential expenditure -Consumption of wild food
	-Livestock Disease	-Diminishing size of livestock due to trypanosomiasis	
	-Malaria	-Affect health and labor availability	
	-Flooding	-Damage crop production	
MLZ	-Drought	-Crop failure and increased stable food price	-Migration -Wild food consumption -Livestock sales -Reduction on none essential expenditure -Relief Food
	-Malaria	-Affect health and Agricultural labor	
	-Livestock Disease	-Reduce stock	

Source: own survey

In some parts of Boricha Wereda the researcher observed people collecting and consuming wild foods such as Xunaye and Rafo (in Sidama language) (Figure 4.9). Collection and consumption of wild food is an indicator of for food shortage either among a certain segment of the population, usually the poorest or if the consumption becomes wide spread and people start to consume food that are uncommon the community categorized as food and nutritionally insecure.

Fig .4.9 Some wild Foods Rafu (left) and Xunaye (right)

Source: Photo by the researcher

4.8 Linking HEA with IPC

The integrated Food Security and Humanitarian Phase Classification (IPC) is a system for defining the severity of the situation (from generally food secure to famine /humanitarian catastrophe), based upon a wide range of indicators of the impact of a hazard event on human health and welfare (mortality rate, nutritional status, etc). There are obvious links between outcome as measured by Household Economy Analysis and phase, since HEA takes in account the many and varied economic operation of individual households, the deficit calculated using HEA relate not just to food, but also a number of other key reference outcomes included in the IPC (e.g. coping strategies, dietary diversity, destitution

/displacement). All the key reference outcomes used to define phase and current, i.e. they relate to the situation now. Given the usually long lead times between defining a problem and mounting a response this is a significant problem in terms of making the IPC an effective tool for linking information to action. The question is not just what is the phase now? , but what is it likely to be in 6-12 months time. HEA provides a formal, quantitative method for predicting what phase might be reached within next 12 months. HEA is method of assessing needs (where as IPC is a classification). HEA can compliment the IPC estimating number of people in need, types of assistance required, amount of assistance required, timing and assistance required etc. Bearing this in mind the researcher tried to undertake by applying data from two sources. After undertaking HEA analysis household food security situations like dietary diversity, coping strategies, available kcal at household level, displacement, and coping stages are identified at livelihood zone level. Beside this, indicators like water access, civil security, disease and hazard probability are substantiated from secondary origin data collected from different parastatal bureaus of Boricha Wereda (police, health, water and food security offices are among others)

4.8.1 Data Derived from HEA

4.8.1.1 Dietary Diversity

Swindle and Bilinsky (2005) identify twelve main food groups used to calculate a dietary diversity are: cereals, root and tubers, vegetables, fruit, meat /poultry/ offal, eggs, fish and seafood, pulses /legumes/ nuts, milk and milk product, oils /fats, sugar/ honey, and miscellaneous. Research conducted at FSAU found that three or less food groups indicates a critical situation (FSAU 2005).Based on this assumption the dietary diversity of Boricha Wereda was studied using the research tools, interview, focus group discussion and key informants. Despite the prevalence of some differences that arise from wealth and livelihood situation the common food diversity of the study place are cereals, root and tuber, vegetable, meat, legumes, enset and milk and milk product.

Table 4.13 Stages of Dietary Diversity

Livelihood Zone	Stage of Dietary Diversity	Value Assigned
CLZ	Consistent	1*
MLZ	Chronic deficit in dietary diversity	2*
APLZ	Consistent	1*

Source**: Own Survey* ****See annex vi

The table 4.13 clearly illustrates that the dietary diversity situation of the three livelihood zones. According to the study the zones (CLZ and APLZ) are categorized as consistent dietary diversity zones and MLZ as chronic deficit. It is good to bear in mind that, dietary diversity typically does not include quantities consumed, rather it focus on different type food consumed by the household.

4.8.1.2 Coping Stages

Coping strategies are the resulting behaviors of individual ,households, or communities in the face of stress .The ability to cope with a shock is directly related to the capacity of an individual, household, or community to resist the effect of a hazard or shock. Coping levels are both an observable indicator of severity and an out come in their own right, as some types of coping involves loss of individual assets. The following coping stages identified in the study area.

Table 4.14 Stages of Coping

Livelihood Zone	Stages of Coping	Main features of the Stage	Value Assigned
CLZ	Insurance	Reversible stage, preserving productive asset, reduced food intake	1*
MLZ	Insurance	"	1
APLZ	Insurance	"	1

Source Own Survey ***See annex vi***

Table 4.14 above indicates that under current situation all the three livelihood zones are applying the same type of coping strategy, insurance. It possible to judge that as the problem of food security prevails in a given place the capacity of a community to cope with hazard will gradually became diversified and strong.

4.8.1.3 Total Dietary Energy Available

The most important, but not the only one, indicator of food adequacy in the household is the per capita dietary energy supply measured in calorie (also called kcal).This is a measure of the average daily food available to each person in the household (FAO ,1998). It is usually good to bear in mind that, the average value which is taken in to consideration though the amount calories a person needs. Having putting this in to consideration the average kcal/capita/day is calculated based on the information obtained from the respondent households. In making this study, the food sources of the household are given due consideration.

Table 4.15 Total Dietary Energy Equivalent Available

Livelihood Zone	Average/kcal available/hh	Average number of hh	Kcal/capita/day	Value Assigned
CLZ	4997580	6	2282	1*
MLZ	4189425	7	1640	4*
APLZ	5126712	8	1755	3*

Sources: Own Survey ****- see annex VI and viii***

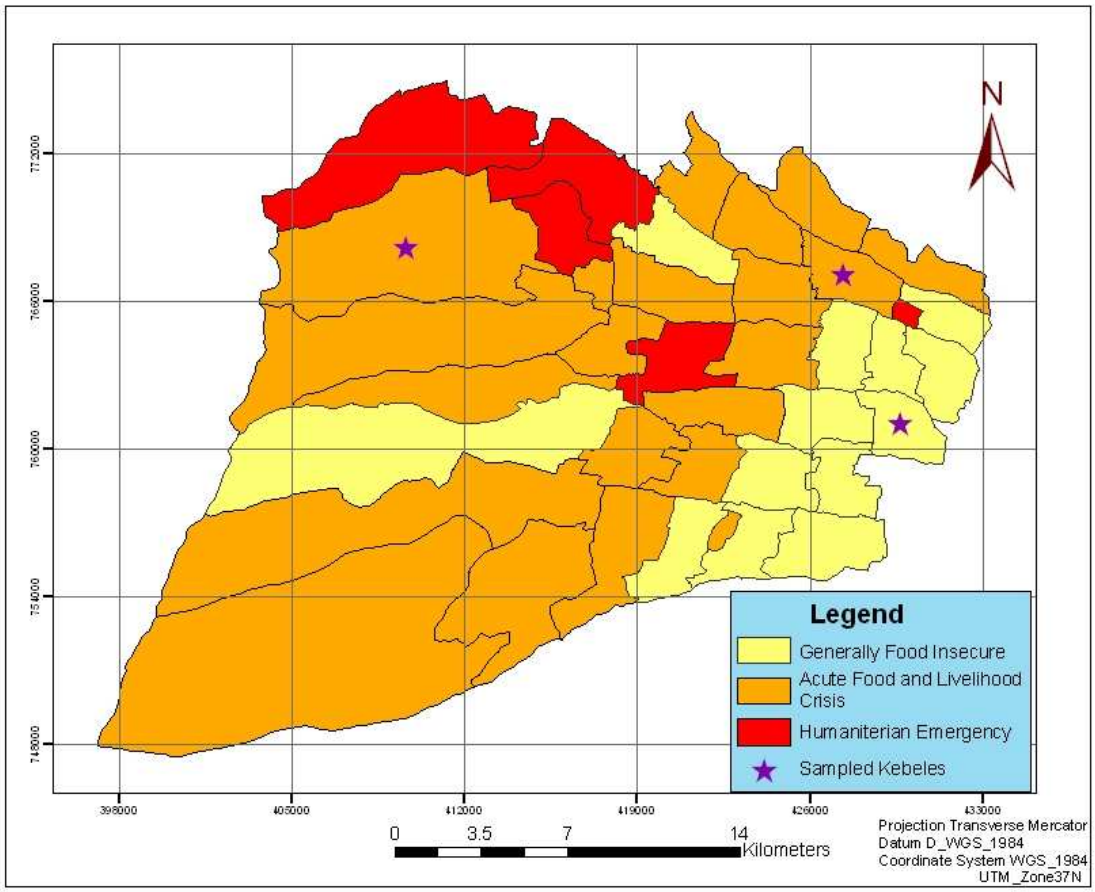
In the process of calculating the available kcal/capita/day the sources of like own production, purchasing, livestock product ,food aid, payment in kind ,gifts and PSNP and OFSP handout are critically investigated. After the total food obtained, an attempt was made to convert the average quantity of grain production into dietary calories equivalent using EHNRI food composition table (see annex viii)To this effect, the average calorie value of per 100 gram of each type of food grain was computed based kind of food the community consumes utmost. The main types of food consumed in the study area are enset, maize, wheat, haricot bean, meat and milk and milk products.

The finding from this respect reveals that CLZ livelihood zone attained 2282 kcal /capita/day, which is 109 percent of the national average. As opposed to the previous livelihood zone, the study has shown the remaining livelihoods zones APLZ and MLZ have 1640 and 1755 kcal/capita/day which is 78 and 84 percent of the national average. As a result of this the value assigned to each of kcal achievement is clearly indicated on table 4.15.

4.9 IPC Map of Boricha Wereda

Based on the data obtained from primary and secondary sources and the tools and methodology applied the following IPC map of the study area is drawn. One most important thing to bear in mind is that this map only reflect food security situation at the time of survey (March, 2011).

Fig 4.10 IPC Map of Boricha Wereda



Source: Own Survey

The study revealed that 15 PAs or 38.5 percent of the total Wereda having a population of 74,005, 3 PAs or 7.5 percent of the Wereda with the population 17,996 and 21 PAs or 54 percent of with the population of 167,068 found to be generally food insecure, acute food and livelihood crisis and humanitarian emergence phases of IPC (see annex. Vi). Beside this, the two extremes of food security generally food secures and famine /humanitarian catastrophe phases become non defining factors of the study area. The study ascertains the importance of IPC that it has given due emphasis and draw food security analysis through a livelihood approach, but recognizes that it is impossible to sepa-

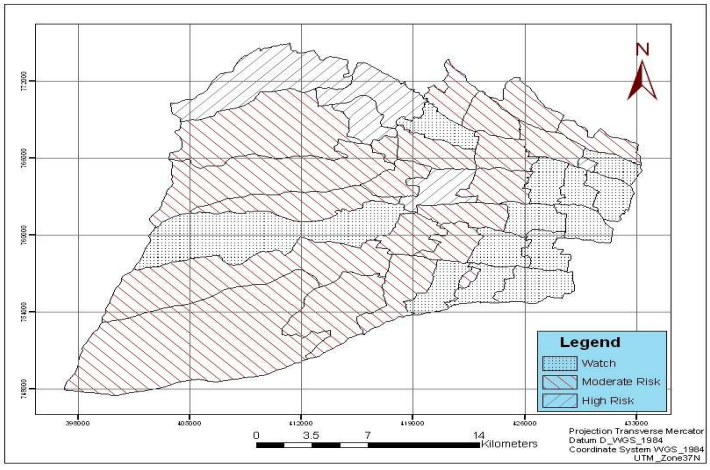
rate food insecurity from associated structural crises in the field of health, protection, sanitation and others.

From already established IPC map it is possible to infer severity of the situation, geographic extent, magnitude (number of people affected), immediate cause, underlying causes, identification of general needs and criteria for social targeting.

4.10 Risk of Worsening Phase

The need of drawing risk of worsening phase map is if certain key immediate causes like drought, malaria and water shortage and other key underlying causes fail to be given due emphasis by the concerned bodies the problem of insecurity will be widen both in magnitude and area coverage. In this respect the phases already identified categorized in to three risk of worsening phases: watch ,moderate risk and high risk .These three phase are the defining characteristics of phase 3.4 and five, and executives, donors and development practitioner are advised to take appropriate measure accordingly. The most important variables that contribute for further worsening of food insecurity according to the study are: dependency on third generation seeds .risk of malaria and environmental factors. Based on the previously said issues the risk of worsening phase for the place studied was depicted in the following map (see annex vii).

Fig 4. 11 Map of Risk of Worsening Phase



Source Own Survey

CHAPTER FIVE

5. Determinant of Food Security in Boricha Wereda

5.1 Overview

As it is true for most part of Ethiopia, traditional way of farming remain the dominate source of employment and income in Boricha Wereda. Agriculture makes a living for the vast majority of the population in the Wereda. Even a great proportion of the urban resident those living in towns of (Yerba, Beleala and Derrara) generate much of their income from crop production and livestock rearing. Hence, agriculture is the mainstay of for almost all rural inhabitants and for significant proportion of urban resident in the Boricha Wereda.

However, as it is true for the country as a whole .both crops and livestock production practices in the area have remained backward and traditional. According the data from the Weredas office, no peasant uses any form of modern farming tool and storage facilities. Only few proportions of the peasants are currently applying improved seed, fertilizer and herbicide.

Coupled with some other factors like land degradation and adverse climatic and metrological condition, the prevailing backward production processes have undoubted affected the food security status of the community in the study area. The serious problems related to agriculture in the area the diminishing size of farmlands, landlessness fueled by rapid population growth. According to the opinions gained from peasant (substantiated by the experts of agriculture of the Wereda office), the current peasant land holding size can not support the population under current production and technologies. More ever, the soil getting infertile and the natural vegetation have been devastated at a very alarming rate.

5.2 Physical Factors

5.2.1 Climate

As tried to discuses in the previous chapters, the total rainfall situation in the study area is quite below the average of the whole country, the area is characterized by high coefficient of variation from one year to the next. There is also great variation in the time of starting and stopping rains. This high varying magnitude, no doubt, increase the food insecurity risks of the peasants in one way another.

The problem of variable rainfall conditions has been substantiated by the survey respondents. A great proportion of peasants say that the varying condition of the rain both in time and amount has been severely affecting agricultural activities over the past several years. It is not un common, as the peasant reported, that they plant at wrong time to make use of the rain and not having sufficient seed stock at hand to replant, as a result of they lose the possible grain produced.

5.2.2 Hazard of Malaria

Aster (2010) pointed out Boricha Wereda is one of most prominent malaria prone area in the SNNPR. The study under taken by her reveals that, 14.5 percent, 74.3 percent, 12.2 percent of the total area is subject to moderate, high and very high level of malaria hazard. In general most of the kebles in the study area are subject to moderate, high and very high malaria risk .Among them Konsore Cheffa is almost fully in high malaria risk. Most part of Hanja Cheffa and Elawo Orfe and some parts of Etawo Dawale, Alawo Siso. Dilla Arfe, Hanja Goro and Belela are subject to very high malaria risk. In Conclusion, more than 85 percent of the total area is highly exposed to malaria hazard and over 51 percent of the total area is categorizer as high and very high risk of malaria. Data obtained from the Wereda health bureau also ascertains that most part of the study area categorized as malarias. If the situations continue the way it is now the food security attainment could be affected by malaria problem. Because malaria leads to loss of agricultural labor due to the illness and death, wastage of family members time,money and energy in carrying for ma-

laria peciant and grieving for people killed by malaria. Malaria also results in to loss of agricultural knowledge and skills if it kills an experienced farmer.

Additionally, household may spend their saving, sell their productive asset like land and livestock to pay medical bills for malaria patient or meet funeral expense for people killed by malaria. All these direct effect from malaria in turn result in to reduction in land cultivated by the household for crop production which ultimately affect production negatively. On the other hand when the household sell their productive asset to take of malaria patient and meet funeral expense their capacity to invest on agriculture (e.g., buying better seed, implements and fertilizer) that can improve production severely compromised.

Accordingly a key informant discussion taken on sampled Kebeles ascertains about the devastating nature of malaria hazard.

One of my key informants Semberi Walola from Alwaorkie kebele with the age of forty five told me about the details of malaria. According to her, malaria mostly occurs starting from May to December. She added on the issue that during malaria infestation there is a chance of family member to be diseased. During times where harvesting season and malaria infestation intermingle, it is difficult for that particular household to collect readily available harvest and as the result of this the post and pre harvest lose will be enormous. She added some family members who were patient malaria and get rid of the disease they will not simultaneously start working (rather it will take them several days to engage on routine agricultural activities). My key informant added even if the government gives us bed net due to our poverty we will sale it and use the money for our felt need manly food. According to her during these days the death toll of malaria increased and time and money spent for caring of malaria patient, covering medical fee, funeral cost cause additional burden on household income and expenditure. Finally my key informant conclude that during all courses of the disease the existing meager resource of the household will be shifted to over come the effect consequence of the disease. She added unless and otherwise something is taken by the government malaria will remain hazard to our community.

5.2.3 Environmental Degradation

Mengistu (1987) pointed out that soil erosion is the single most important factor of land degradation and man has reached a point when soil erosion has become a great problem affecting agricultural productivity at present. Similarly, several research documents indicate that soil erosion by water and wind are major forms of land degradation in Ethiopia (Sutcliffee, 1995; MEDaC, 1995; Kifle, 1999; Tesfaye, 1999). According to some of the document, the average annual rate of soil loss is estimated at12tons/ha and it is cited as a major factor exacerbating reduction in the crop production in the country. Likewise, experts in the Boricha Wereda agriculture office and the experienced peasants agree that soil fertility has been considerably decreasing over year in the area. Particularly the bare sloppy areas are severely eroded to the extent that only extensive rocks are found exposed to the surface (Fig.5.1).

The causes of land degradation are complex and have diverse nature and dimensions depending on the bio-physical environment and human interventions. The major causes of land degradation in the the study area are largely anthropogenic including large population growth ,bad farming practices, deforestation, high fuel wood consumption and unbalanced crop livestock production

Fig 5.1 Land Degradation in the Study Area

Photo by the researcher (March, 2011)

According to Sidama Zone BoAD report (2007),due to land degradation and the resultant loss of fertility and shrinkage of farming land ,erratic rainfall and population increase in 2006 some 41,855 were registered as food in secured and have been under the support of PSNP and OFSP programs.

It is believed that environmental degradation worsens the livelihood of local communities and the sustainability of the natural ecosystem. Thus, there is a need to reverse the land degradation problems and appropriate water shade development schemes.

5.3 Socio Economic Factors

5.3.1 Access to Improved Farm Inputs

With the adoption of improved agricultural extension packages, farmers managed to produce good yields and harvests in previous years and intensified the use of improved farm inputs. With adoption of improved agriculture extension packages, farmers undermined their local seeds, i.e., their composite seeds that have broad base genetic make up to give reasonable but lower yield but only with fertilizer applied and with intensive management.

Table 5.1 Distribution of Farm inputs in Boricha Wereda (2004-2010)

Improved inputs used (qt)	**Year**						
	2004	2005	2006	2007	2008	2009	2010
Chemical Fertilizer	27399	7342	3119	5974	2477	8353	3836
Seeds (mainly maize and haricot bean)	5190	307.8	136	1491	1900	732	3836

Source: Boricha BoAD

From the table 5.1 it is possible to conclude that, the use of improved seeds significantly dropped in Boricha Wereda. According to Wereda agriculture office subject matter experts, this drop out could be attributed to the poor re-payment from farmers and other loan takers. Most farmers totally ignore purchasing of farm inputs knowing that they area indebted to previous loan and cannot effect their due. Taking this in to account many farmers purchased maize seeds on local market that are of doubtful origin and certainty of low quality. Some of the farmers reported that these seed could very well be third generation degenerated hybrid maize that are useless for production. Thus, due to adverse problems encountered to input supply side the food security situation will remain in dangerous status.

5.3.1 Average Size of Land Holding

Most of incomes in Wereda understudy come from the activity which needs land as the main production factor. Based on this, Agricultural land holding is the important aspect in each livelihood zone, because it affects level of income. The role of land is too important in community live, landholding size is often considered with social status of the household. In areas where agricultural land is rare, such as Sidama coffee zone of Boricha Wereda, the price /value of land more is expensive compared to the neighboring Agro-Pastoralist zone. As the data obtained from the survey illustrate 93.3 percent of the land in the study area obtained through inheritance. On top that 82 percent of the respondent say that the size of farming land diminishing as a result of rapid population growth resulting in scrambling of land in many units through inheritance.

Table 5.2 Average Size of Landholding

Livelihood Zone	Average Land Size (ha)			
	Poor	Middle	Better-Off	Average
CLZ	0.25	0.75	1.75	0.9
MLZ	0.25	0.375	1.75	0.79
APLZ	0.75	1.0	1.75	1.16
Woreda Average				0.95

Source: Own Survey

Table 5.2 shows the average land size in the study area. According to this table the average land holding in each livelihood zone is 0.9, 0.79 and 1.16 for CLZ, MLZ and APLZ. According to the study the average land size at Boricha level is found to be 0.95 ha /household .The little exaggerated figure in the study could be attributed to the presence of huge land ownership in APLZ where the land is mainly used for animal grazing.

As opposed to the finding in this paper, the Wereda agriculture experts assume that the average land holding is less than 0.5 ha. One thing we should bear in mind is that, lands holding especially in two livelihood zones (CLZ and MLZ) are diminishing to the extent that couldn't support the human and livestock population in the area. Generally speaking access to land in the region household been reduced by several factors like ,high population growth ,poor redistribution of land and loss of farming land due to environmental degradation are to mention a few. Under current production technology, as justified by different researchers, this holding size is too small to produce adequate grain for a household in the country in general and studied area in particular. Provided that present the present population growth continues unabated, the scarcity of farm lands will be undoubtedly affected.

5.3.2 Land Tenure

There has been widespread agreement that the issue of tenure security is a crucial aspect of sustainable agricultural development and food security .Several researchers conclude that insecure land right have adverse impact on natural resource and agricultural production. Maler,K.(1998:262), for instance ,notes “in Southern and Eastern Africa……..the lack of well-defined property right is the main force driving to over-grazing soil degradation and over-fishing.” However, as true for the country as a whole the property right of a land and other natural resource have been vested on the state on the study area. Thus, no, doubt, has adversely affected the peasant long term concern to the wellbeing of the soil, vegetation and other environmental resources on the land which they occupied but not possessed.

This might be why, as learned from respondents, natural vegetation is being severely cut down, covered with eucalyptus trees, and being degraded in Boricha Wereda Presumably, this might have contributed to the previously discussed food security problem in the Wereda.

The PSNP is currently is the largest operating social protection program in the Sub-Saharan Africa countries out side of South Africa. It differs from previous food-for-work programs, in that it focuses continuously on selected households overall several years and in that explicit objective is that it will be eventually phase out. The PSNP is one of several components of the Ethiopian government’s food security program. The other components are subsidies for volulenterly resettlement and package of programs

5.3.4 Productive Safety Net and Other Food Security Programs jointly called Other Food Security programs (OFSP).

Like other parts of Ethiopia, the PSNP in Boricha Wereda has two components: public works and direct Support. Public works are used to mitigate the impacts of environmental degradation and food insecurity risks on chronically food insecure farmers by providing employment to "able -bodied" laborers. Direct support is a minor component and delivers

assistance to members of the community who cannot participate in public works but need help.

Despite some irregularities and short falls observed during survey time with respect of targeting, implementation and graduation the overall performances of PSNP activity of Boricha Wereda in table 5.3.

Table 5.3 PSNP Performance of Boricha Wereda (2008-2011)

Year	PSNP Beneficiaries'	Graduated	Percent of graduates
2008	41855	263	0.62
2009	39021	246	0.64
2010	38166	105	0.27
2011	34021	492	1.44

Source: BWADB

From the table above it is possible to infer that there is big difference between the persons who participated in the program and those who have been graduated. The percent of the graduate varies from 0.27 in 2010 to 1.44 in 2011. This could be linked to poor performances of the executing bodies, absence of clear policy directions and underplaying problem of dependency syndrome among the beneficiaries.

Fig.: 5.2 Beneficiaries with their children gathered to receive PSNP cash and food handout

Photo: By the researcher

Many people gathered in one of my sampled Kebele PSNP cash and food handout. Majority of the beneficiary gathered on the spot are women. I dare to ask to one female beneficiary with respect to PSNP. According to Shemsia from Alwaorkie keble who is 27, PSNP is vital in acquiring food and cash from government sources and she believe that most of people in the vicinity have been benefited from the scale. Suddenly I asked how she entered the program? She replied it is the X-Chairman of the Kebele who has assisted her to enter to the program paying him 10 percent of the initial payment. My third question raised to Shemsia was how long she stayed in the program? She firmly replied that she stayed three years in the program because she didn't like to boycott the program because fearing that the regular cash and food handout will be terminated. The issue of asset she has built after the program raise to Shemsia but she refuse to answer.

CHAPTER SIX

6. CONCLUSION AND RECOMMENDATIONS

The study has sought to answer four questions. First, what does the rural household food security (dietary caloric supply) status look like? Second, what are the main sources of household food, consumption, income and expenditure patterns looks like? Third, what are factors that are affecting Boricha's Wereda agricultural productivity in particular and food security in general? And fourth, what are the main recurrent hazards and response strategies mainly employed by the community?

The focus of the study was to investigate rural household food security situation in Boricha Wereda. This could be taken as cause study and the results are believed to reflect conditions in the most of rural households in Ethiopia. Data used for the analysis include detail focus group discussion, various document and academic literature.

According to the finding of this study, Boricha Wereda agricultural productivity in particular and food security situation in general are affected by many and interrelated factors and circumstances.

In seeking answers to the questions, the researcher used different conceptual perspectives and analytical tools to have fair understanding of rural household food security situations.

6.1 Conclusion

An examination of kcal available in the sampled household ascertains that, only the coffee livelihood zone has shown best performance in this regard .The sampled livelihood zone has 2282 kcal /person /day, which is 109 percent of the national average .As opposed coffee zone the two livelihoods have shown poor performance 78 and 84 percent of the national average, which is 2100kcal/person /day. It is possible to substantiate that sky rocketing coffee price that has boosted the income of coffee farmers has played signifi-

cant role in higher kcal attainment of the zone. As opposed to this, the poor performance related to the remaining livelihood zones are attributed to small land holding, high population pressure, land degradation and the resultant yield decline.

With regard to sources of food, main sources like own production, gift, PSNP hand out, purchase and payment in kind, and wild food are among others. Despite some differences in livelihood basis three important things are identified. First, the contribution own production as source food is positively correlated with wealth status. Better–off household consumed 65 percent of their production, while the rest consumed 30 0r less percent of their production. Second ,the number food sources negatively correlated with wealth status ,thus the poor's have about six sources of food where as the better-off are limiting themselves to only purchase and livestock product this clearly reveals that the poor's have long sustained survival and copying strategies as compared to middle groups and better-offs. Third, the use of livestock product as a source of food positively related with wealth group, this is to mean that better-off households have shown the trend of eating more livestock products because of the income they generated from the economy.

In the income issue, there is source of income differences based on agro ecological situation. For instance major of income in agro pastoralist zone is derived from livestock sales, coffee zone from the sales of coffee bean and maize zone from coffee sales. Besides this, eventhough it is small and periodic, poor households have number of cash sources compared to the rest wealth groups.

With regard to expenditure the research finding reveals that, nearly 60 percent poor households income is spent for the purchase of food, contrary to this middle and better-off household spend nearly 30 or less percent .In addition to this expenditure on farm inputs positively correlated with wealthy status, meaning that better-off household spent 19 percent of their income where as poor households have shown a trend spending 8 or lees percent their income. From this finding we can conclude that, poor utilization of farm input by poor household will be their manifestation and presence in the vicious circle of poverty which is the breeding ground of food insecurity. The major impediments of food security in Boricha Wereda are the predominance of subsistence agriculture, adverse cli-

matic change and variability, recurrent conflict among with the neighboring ethnic groups ,malaria risk , shortage of water, dependency on rain feed agriculture , high population growth ,small land holding, in secured land tenure environmental degradation ,poor access to farm inputs, diminishing land holding, absence of well defined tenure security and inappropriate PSNP.

Based on the investigation made, like other parts of the country the study area has its own recurrent hazards with their effects on the likelihoods of the people and there are certain response strategies mainly employed by hazard prune people living in the area. One thing to bear in mind is that, the nature and magnitude of the hazard have some resemblance with agro-ecological situation of the particular place. In coffee livelihood zone hazards like shortage of rain ,hail and frost ,disease and pest and fluctuating coffee production and price are investigated ,besides to these hazards commonly employed response strategies like reduction of non essential expenditures, livestock sales ,migration casual work and petty trade are among others. Contrary to the previous zone, commonly occurring hazards in pastoralist zone are drought, livestock disease, malaria and flooding. Increased livestock sales, consumption of wild food, cusual labor and reducing non essential expenditure are main response strategies in this livelihood zone. Lastly, maize belt has hazards like drought, malaria and livestock disease with response strategies of migration, wild food consumption, livestock sales, relief food and reduction of non essential expenditure.

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6.2 Recommendations

It has already been indicated that the scope of this research is limited to three kebles in Boricha wereda. However, the finding of the study could be used to suggest a number of policy measures that can be used to alleviate the food security problems and brings sustainable household economy .Therefore, the writer suggest the following points based on the findings of the research

-Generally, food insecurity and malnourishment that are prevailing in the study area are the direct result of the existing abject poverty .In order to achieve food security it is advisable to uplift the real income of rural household through providing yield augmenting inputs on reasonable price on timely basis.

-The most important factor that made the area prune to food insecurity is the prevalence of malaria risk. In places like Boricha malaria has negative impact on the productivity of the labor force, with adverse effect on total economic growth and it also diminish the working capacity of those who have recovered from the disease. Bearing this in mind to reduce the risk of the disease, establishment of health institution ,creation of robust and efficient malaria early warning system ,distribution of bed nets and anti-malaria drugs and creation of community based intervention should be given due emphasis.

-From the research it is possible to infer that, the area under study is repeatedly exposed to several and complex natural and manmade hazards. In this regard it is good to have community based preparedness which is organized starting from Keble to Wereda level. By doing this the local community will be aware of the prevailing issue and expand its level of participation to the extent needed. The process of empowering communities to prepare for emergencies is a more holistic programming approach that integrates development emergency within a comm. unity livelihood frame work.

-The study revealed that, significant variability in expenditure, income and consumption have been investigated during pick harvesting season and lean seasons. Household expenditure and consumption have increased progressively in pick harvest time and seen declining in other remote months. It is advisable to link farmers to nearby saving and credit organization to attain sustainable and efficient utilization of resources which can be extended to needs of bad times.

-Dependency syndrome towards food aid is common among the household appeared for interview, this is obviously true for the remaining household. In this regard it is advisable to link aid intervention to development activities like soil and water conservation and rural road construction via food for work and cash for work schemes. Despite, some inappropriate measures taken so far PSNP and OFSP should be brought to already established development objectives rather than to which is politicized and tend to benefit specific groups. The researcher also insist for the establishment and promotion of safety net program that give due emphasis to orphans, female headed household and people with HIV aids.

- The production system has precarious in the study area on account of rain fall variability on which the peasant have no control .Thus ,attempts should be made to utilize the available water sources as much as possible and develop small scale irrigation schemes so that peasant produce better quantity of yield.

-A family size of most household found to be very large, family size will have negative effect on household daily per capital energy available. More ever the area is highly characterized by the habit of monogamy which in turn leads to high population growth and to the prevailing severe environmental degradation. Thus, concerned Wereda offices must work in integration to bring reduced number household size of that is geared towards the " carrying capacity of the household" and the environment through appropriate family planning measures.

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Annex 1

I. Basic Information Regarding Household

1	Household Identification Number			
2	Date of Interview			
3	Interviewer			
	Livelihood zone	APLZ	CLZ	MLZ
4	Keble Name			
5	Household wealth group	Poor	middle	Better-off
6	Name of household head			
7	Sex of household head	1/ Male 2/ Female		
8	Religion	1/ Christian 2/ Muslim 3/ Other, specify ---		
9	Age			
10	Ethnicity	1/ Sidama 2/ Amhara 3/ Oromigna 4/ Wolayeta 5/ other, specify----------		
11	Marital status	1/ Single 2/ married 3/ divorced 4/ separated 5/ polygamy		
12	Educational Status	1/ literate 2/ read and write 3/ church school 4/ kuran informal learning5/ other specify ---------		
13	Number of permanent household at time of survey	Male		
		Female		
		Total		

II. Access to Natural Capital, Land Tenure Situations and Resource management

1. Do you have access to land for agricultural use? 1/ Yes 2/ No

2. If yes, how do you get access to it? If yes

1/ Through land distribution 2/shared with relatives

3/ Inherited from parents 4/ Purchased

5/ Other Specify……..

3. What is your main source of water?

1/river 2/spring 3/pipe water 4/pump well 5/pond 6/other, specify

4. How long does it take to collect water?

5. 1hr 2/2hr 3/3nr 4/Half day5/Full day

6. Who collect water?

1/mother 2/children 3/father 4/older son 5/other, specify----------

7. Wealth Group Information

Wealth Group Information						
	HH size	**Land area Cultivated**	**Livestock**			
Poor			Cattle	Shoat	Donkeys	Poultry
Middle						
Better-off						

8. Sources of Food

Sources of Food	Amount in kg	Proportion in %	Remark
Own production			
Purchase			
Livestock Product			
Food Aid			
Payment in Kind			
Gift /relief			
Fish and wild foods			
PSNP handout			
Other			
Total			

9. Sources of Cash

Sources of Cash	Amount in Birr	Proportion in %	Remark
Crop Sales			
Self Employment			
Credit			
Own product sales(e.g. firewood ,charcoal.& Resins)			
PSNP Cash transfer			
Livestock Product Sales			
Livestock Sales			
Fish and wild food sales			
Gift and others			
Total			

10. What happened to the size of Land holding over the last five years

1/ increased 2/ Decreased 3/ no change.

11. What are the reasons for decrease or increase?

Increased number of household

Decline of land productivity

Expansion of grazing land

Other, Specify----------

12. What do you think are main reasons for being food insecure?

Reason for food insecurity	1/ Yes 2/ No
Inability to produce sufficient grains and raise livestock	
Meager income from non-farm activities	
Instability due to frequent change in rural policies	
Failure to properly utilize own production and other earnings	

13. Constraint for crop production

Constrained 1/ Yes 2/ No	The most Important bottlenecks
1/ Drought 2/ Frost 3/ water loggings 4/ pest and disease 5/ Erratic Rain Fall 6/ Weeds 7/ Shortage of farm oxen 8/ Poor Storage 9/ Poor soil fertility	1/
	2/
	3/
10/ Depending on rain feed farming 11/shortage of farm land 12/poor access to market	

14. Constraint to livestock raising

No	Constraint	1.Yes 2.No	Three most Important bottle-necks
1	Lack of sufficient pasture land and fodder		1/
2	Stock disease		2/
3	Poor stock management		3/
4	Traditional attitude towards large number of livestock		

15. Produced commodity

Crop Type	Production (kg)	consumed (kg)	Sold (kg)	Gift (kg)	Seed Reserve (Kg)	For labor (kg)	store (kg)	Post harvest loss
Maize								
H/Bean								
Enset								
Coffee								
Potato								
S/Potato								
Chat								
Total								

16. Purchased commodity

Purchase commodity	Amount purchased	Price/time of year	Total kgs	Total cost	
Table Salt					
Meat					
Sugar					
Kerosene					
Maize					
Other					
Total					

III. Hunger Scale

17. Who in the family is served first when meals are served?

1/ Father/ men in the family 2/ All eat at the same time

3/ Mother/women in the family 4/ Children 5/Lives and eats alone

18. Does your house hold run out of money to buy food?

1/Yes 2/No

19. Do you ever relay on limited number of food to feed your children?

1/ Yes 2/No

20. Do you ever cut the size of meals or skip any because there is not enough money to buy food?

1/Yes 2/No

21. Do you ever eat less than you should because there it not enough money for food?

1/ Yes 2/No

22. Do your children ever eat lens than you feel they should because there is not enough money for food?

1. Yes 2.No

23. Do your children ever say they are hungry because there is not enough food in the house?

1. Yes 2.Yes

24. Do any of your children ever go to bed hungry because there is not enough money to buy food?

1. Yee 2.No

25. Has the family ever experienced periods of food shortage?

1/Yes 2/No

26. If yes, how did the family coup during this period?

1. Found additional sources 2. Asked family /relatives/neigh ours for

3. Family members went to live elsewhere 4.Sold asset

5. Worked for payment in kin 6.Depend on charity/welfare

7. Borrowed money/food 8.Increased production of food

9. Could not do anything 10. Other, specify

27. Dietary diversity

1/one 2/two 3/three 4/four 5/ five and above

28. What are the most important hazards recurring in the area?

Drought	Rank order
Malaria	1/
Flooding	2/
Conflict	3/
Hail and frost	4/
Crop disease	5/
Fluctuating coffee production	6/
Fluctuating international coffee price	7/
Increased stable food price	8/
Animal disease	9/
Water shortage	10/

29. Coping Strategies

1/What are the main coping strategies?

		Yes/NO
Low cost Examples	Reducing expenditure on essential items	
	More casual local work	
	Harvesting reserve crop	
	Increased consumption of enset	
Medium cost	Increased sale/slaughter of livestock	
	Intensification of local labor activities	
	Short term seasonal migration	
	Intensification of self employment activities	

30. Coping Stages

		Chose among 1.2 3and 4	Remark
1.Normal			
2..Insurance	-Crop and livestock adjustment		
	-Diet change		
	-Famine food use		
	-Grain loan from kin		
	-Labor sales/migration		
3/Crisis			
	-Small animal sales		
	-Cash/Cereal loan from merchants		
	-Productive asset sales		
4/Distress			
	-Farm land pledging		
	- Farm land sales		
	-Out migration		

Annex II

CHECK LIST QUESTIONS FOR FOCUS GROUP DISCUSSION TH BE HELD AT THE THREE LIVLIHOOD ZOONES OF BORECHA WOREDA-MARCH-2011

Survey Kebele ---------- ----------Cluster number:----------
----Survey date:----------Team number:----------

General questions

1. How many household are there in the keble? ----------
-

2. How long does it take to walk from the center of this keble to a major market? ----------

3. How long does it take to walk from the center of this kebele to a small market?------

4. What is the main altitude zone of this kebele ?----------
--

(1=dega,2=woina dega,3=kola,4=extreme kola)

5. Which rain are you dependent on? Priorities importance----------

(1=belge, 2=meher,3=both)

Wealth break down

6).Wealth Group Information

Wealth Group Information								
Wealth group	Sidamiffa equivalent	As% of Total keble	HH size	Land area owned	Land area Cultivated With coffee	Livestock		
Poor						Cattle	Shoat	Donkeys
Middle								
Better-off								

Annex III

Check List for Key informants and Focus Group Discussions

1. General Feature of the area

- Demography: age, household composition, etc.
- Migration: birth place, stay at other place, and stay at current site.
- History of the area: landscape, settlement density and pattern.
- Drought and famine history.
- Land resources change: vegetation, soils water use and distribution.
- Perception towards water shortage
- Perception towards malaria and health service.
- Perception towards food aid
- Perception towards climate change.
- Perception towards diminishing land size.
- Perception towards failure of crop and livestock productivity.
- Perception towards extension service
- Perception toward peace and stability

2. Assessment on the major livelihood assets

2.1 Access to natural capital

- Land holding size
- Change in holding size over the last few years
- Present status of farmland in terms of suitability for farming and soil fertility Main problems of farm land.
- Access to natural vegetation

- Problems in relation to the exploitation of natural vegetation
- Interest in managing in water points
- Interest in planting trees
- Perception towards the recurrent drought and erratic rain fall distribution

2.2 Financial Capital

- Main annual crops grown and size of harvest during the last five years
- Trend in Production (increase/decrease/no change-why)

  -Perennial crops grown (size and income from their sale per year)

  -Livestock animal (types and size)

  -Constraint to livestock rising

  -Income from non-farm activities and purpose for which the money is used

  -Reserve money at hand or bank

2.3 Social Capital

-Participation in community organization

-Draft power assistance

-Grain and loan during deficit period

-Cash loan in times of need

-Benefits from safety-net schemes

-Any sort of remittance received from abroad or domestic sources

2.4 Physical capital (availability and access to rural infrastructure)

- Health service
- School

- Potable water source
- Credit
- Irrigation
- Agricultural extension
- Veterinary service

2.5 Food Security

- Main stable food crops of the household
- Average number months you able to feed your household from own productivity
- What are the main bottlenecks of to produce crop and raise live-stock that enables you to be suet - suffered in food?

Annex: IV

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Part III. Secondary data from Woreda Government Offices

1/ Physical environment

- Area of the woreda in ha. or km2
- Agro Climate (type, distribution & proportion)
- Relief pattern (distribution of various types)
- Land Vs. land cover (type & distribution)
- Vegetation cover (type & distribution)
- Soil types, distribution
- Rainfall: (amount and availability
- Number of rural kebles urban kebles

2/ People and Culture

- Population size
- Ethnic Composition
- Religion
- Main staple food
- Migration pattern

3/ Economy and Livelihood

- Main occupations
- Livestock raising: type, population
- Constraints to the production - risk of failure
- Off-farm and non-farm incomes

4/ Food Security

- Food availability/sufficiency: surplus on descript woreda?
- If there has been deficit, why? Since when? ----over time: increase or decrease
- Which areas wereda are most vulnerable to food insecurity?
- Which areas of Wereda are highly degraded? What are mitigating methods taken so far?

Annex V

Kebeles in Boricha Wereda

Keble	Male	Female	Total	Land area(ha)	Altitude	Livelihood zone
Boro Shebela	2702	2626	5328	880	1770	APLZ
Dila Anole	3866	3883	7749	858	1790	APLZ
Gasra Kuwe	1767	1614	3381	938	1700	APLZ
Shelo Abore*	3526	3393	6919	934	1710	APLZ
Shelo Elancho	2361	2768	5128	880	1830	APLZ
Derara Shae	3068	2844	5912	1069	1800	CLZ
Konsore Arki	3430	3111	6541	943	1860	CLZ
Olka Danshe	3706	4100	7806	984	1900	CLZ
Alawo Orke*	4145	4130	8275	1085	1820	CLZ
Alawo Siso	4350	2697	7053	901	1890	CLZ
Derara Gorbe	3884	3600	7484	1012	1800	CLZ
Dila Arfe	2989	3192	6181	1138	1900	CLZ
Dila Olka	3920	3602	7522	1074	1990	CLZ
Sadama Dikcha	3706	3503	7209	1221	1930	CLZ
Yerba Diwancho	2450	2972	5422	1148	1850	CLZ
Alawa Arfe	3052	3229	6281	1017	1820	MLZ

Aldada Dila	2700	2642	5342	883	1800	MLZ
Boneya Chere	2741	2764	5505	1104	1750	MLZ
Chireko Wacho	2756	2684	5440	985	1750	MLZ
Chiquale Bore	2930	3112	6042	940	1830	MLZ
Fulassa Aldada*	3481	3570	7051	1094	1800	MLZ
Gonowa Bulano	3272	3274	6546	787	1810	MLZ
Hanja Cheffa	2478	4064	6542	977	1820	MLZ
Hanja Gorro	4185	3422	7607	1130	1870	MLZ
Hariro Bedicha	3199	6804	5003	950	1890	MLZ
Honogo Bonkicha	33084	3280	5370	876	1830	MLZ
Ketawo Danbea	1809	3842	5651	1023	1880	MLZ
Konsore Cheffa	4305	4074	8379	1058	1800	MLZ
Konsore Fulasa	3776	3582	7358	1043	1810	MLZ
Konsore Haranja	3059	2427	5486	1043	1860	MLZ
Koran Gogi	3510	2482	8992	863	1820	MLZ
Medo Mechanica	4545	4492	9037	961	1800	MLZ
Sadama Chala	3346	4047	7393	930	1900	MLZ
Shamena Godo	2175	2128	4303	806	1990	MLZ
Shelo Belela	3499	3439	6938	1242	1810	MLZ

Shendlo Leo	4201	3147	7348	1010	1900	MLZ
Werancho Wacho	2409	2468	4877	1143	1850	MLZ
Yerba Gangeso	2472	2705	5177	934	1800	MLZ
Belila 01	1185	1138	2323	240	1830	-
Derara town	1197	1020	2217	120	1860	-
Yerba 01	1697	1711	3008	240	1960	-

*Sampled Kebles

Annex VI

Phase Classification		Key Reference Outcomes *Current or imminent outcomes on lives and livelihoods. Based on convergence of direct and indirect evidence rather than absolute thresholds. Not all indicators must be present for classification..*	Strategic Response Framework *Objectives: (1) mitigate immediate outcomes, (2) support livelihoods, and (3) address underlying causes*
1A	Generally Food Secure	***Crude Mortality Rate*** < 0.5 / 10,000 / day ***Acute Malnutrition*** <3 % (w/h <-2 z-scores) ***Stunting*** <20% (h/age <-2 z-scores) ***Food Access / Availability*** usually adequate (> 2,100 kcal ppp day), stable ***Dietary Diversity*** consistent quality and quantity of diversity ***Water Access / Avail.*** usually adequate (> 15 litres ppp day), stable ***Hazards*** moderate to low probability and vulnerability ***Civil Security*** prevailing and structural peace ***Livelihood Assets*** generally sustainable utilization (of 6 capitals)	Strategic assistance to pockets of food insecure groups Investment in food and economic production systems Enable development of livelihood systems based on principles of sustainability, justice, and equity Prevent emergence of structural hindrances to food security Advocacy
1B	Generally Food Secur		
2	Moderately / Borderline Food Insecure	***Crude Mortality Rate*** <0.5 / 10,000 / day; U5MR<1 / 10,000 / day ***Acute Malnutrition*** >3% but <10 % (w/h <-2 z-score), usual range, stable ***Stunting*** >20% (h/age <-2 z-scores) ***Food Access / Availability*** borderline adequate (2,100 kcal ppp day); unstable ***Dietary Diversity*** chronic dietary diversity deficit ***Water Access / Avail.*** borderline adequate (15 litres ppp day); unstable ***Hazards*** recurrent, with high livelihood vulnerability ***Civil Security*** Unstable; disruptive tension ***Coping*** "insurance strategies" ***Livelihood Assets*** stressed and unsustainable utilization (of 6 capitals) **Structural** Pronounced underlying hindrances to food security	Design & implement strategies to increase stability, resistance and resilience of livelihood systems, thus reducing risk Provision of "safety nets" to high risk groups Interventions for optimal and sustainable use of livelihood assets Create contingency plan Redress structural hindrances to food security Close monitoring of relevant outcome and process indicators Advocacy
		Crude Mortality Rate 0.5-1 / 10,000 / day, U5MR 1-2 / 10,000 / dy **Acute Malnutrition** 10-15 % (w/h <-2 z-score), > than usual, increasing ***Disease*** epidemic; increasing	Support livelihoods and protect vulnerable groups Strategic and complimentary interventions to immediately food access / availability AND support livelihoods
3	Acute Food and Livelihood Crisis	***Food Access / Availability*** lack of entitlement; 2,100 kcal ppp day via asset stripping ***Dietary Diversity*** acute dietary diversity deficit ***Water Access / Avail.*** 7.5-15 litres ppp day, accessed via asset stripping ***Destitution / Displacement*** emerging; diffuse ***Civil Security*** limited spread, low intensity conflict ***Coping*** "crisis strategies"; CSI > than reference; increasing ***Livelihood Assets*** accelerated and critical depletion or loss of access	Selected provision of complimentary sectoral support (e.g., water, shelter, sanitation, health, etc.) Strategic interventions at community to national levels to create, stabilize, rehabilitate, or protect priority livelihood assets Create or implement contingency plan Close monitoring of relevant outcome and process indicators Use "crisis as opportunity" to redress underlying structural causes Advocacy
4	Humanitarian Emergency	***Crude Mortality Rate*** 1-2 / 10,000 / day, >2x reference rate, increasing; U5MR > 2 / 10,000 / day **Acute Malnutrition** >15 % (w/h <-2 z-score), > than usual, increasing ***Disease*** Pandemic ***Food Access / Availability*** severe entitlement gap; unable to meet 2,100 kcal ppp day ***Dietary Diversity*** Regularly 3 or fewer main food groups consumed ***Water Access / Avail.*** < 7.5 litres ppp day (human usage only) ***Destitution / Displacement*** concentrated; increasing ***Civil Security*** widespread, high intensity conflict ***Coping*** "distress strategies"; CSI significantly > than reference ***Livelihood Assets*** near complete & irreversible depletion or loss of access	Urgent protection of vulnerable groups Urgently food access through complimentary interventions Selected provision of complimentary sectoral support (e.g., water, shelter, sanitation, health, etc.) Protection against complete livelihood asset loss and / or advocacy for access Close monitoring of relevant outcome and process indicators Use "crisis as opportunity" to redress underlying structural causes Advocacy
5	Famine / Humanitarian Catastrophe	***Crude Mortality Rate*** > 2 / 10,000 / day (example: 6,000 / 1,000,000 / 30 days) **Acute Malnutrition** > 30 % (w/h <-2 z-score) ***Disease*** Pandemic ***Food Access / Availability*** extreme entitlement gap; much below 2,100 kcal ppp day ***Water Access / Avail.*** < 4 litres ppp day (human usage only) ***Destitution / Displacement*** large scale, concentrated ***Civil Security*** widespread, high intensity conflict ***Livelihood Assets*** effectively complete loss; collapse	Critically urgent protection of human lives and vulnerable groups Comprehensive assistance with basic needs (e.g. food, water, shelter, sanitation, health, etc.) Immediate policy / legal revisions where necessary Negotiations with varied political-economic interests Use "crisis as opportunity" to redress underlying structural causes Advocacy

Annex VII

Risk of Worsening Phase

Risk of Worsening Phase	Probability / Likelihood	Severity	Reference Process Indicators	Implications for Action
Watch	As yet unclear	Not applicable	Occurrence of, or predicted *Hazard* event stressing livelihoods; with low or uncertain *Vulnerability* ***Process Indicators:*** small negative changes	Close monitoring and analysis Review current Phase interventions
Moderate Risk	Elevated probability / likelihood	Specified by predicted Phase, and indicated by color of diagonal lines on map.	Occurrence of, or predicted *Hazard* event stressing livelihoods; with moderate *Vulnerability* ***Process Indicators:*** large negative changes	Close monitoring and analysis Contingency planning Step-up current Phase interventions Preventative interventions with increased urgency for High Risk populations Advocacy
High Risk	High probability; "more likely than not"		Occurrence of, or strongly predicted major *Hazard* event stressing livelihoods; with high *Vulnerability* and low *Capacity* ***Process Indicators:*** large and compounding negative changes	

Annex VIII

Kcal Equivalent

	Kcal/100 g
CEREALS	
1. Barley, whole, dehusked	339
2. Barley, pearled	351
3. Buckwheat flour, 90% extraction	348
4. Buckwheat flour, 60% extraction	349
5. Maize, whole	363
6. Maize meal, about 96% extraction	362
7. Maize meal, refined, 60% extraction	354
8. Maize starch (commercial), corn-flour	352
9. Millet, bulrush, whole grains	363
10. Millet, bulrush, meal	365
11. Millet, finger, whole grain	336
12. Millet, finger, meal	332
13. Millet, haraka, dehusked	353
14. Millet, jajeo, dehusked	355
15. Millet, various, dehusked	355
16. Quinoa	345

	Kcal/100 g
16. Oats, dehusked	388
17. Rice, lightly milled and parboiled	354
18. Rice, highly milled, polished	352
19. Rye, 85–90% extraction	350
20. Sorghum, whole grain	355
21. Sorghum flour	353
22. Teff, whole grains	345
23. Wheat, whole and parboiled	344
24. Wheat flour, 85% extraction	346
25. Wheat flour, 70% extraction	350
STARCHY ROOTS, TUBERS AND FRUITS	
26. Arrowroot flour	340
27. Breadfruit pulp	113
28. Cassava, fresh	153
29. Cassava flour	342
30. Ensete	190

	Kcal/100 g
31. Plantain	128
32. Potato, Irish	75
33. Potato, sweet	114
34. Sago flour	352
35. Taro	113
36. Yam, fresh	104
37. Yam flour	317
38. Yam bean tuber	41
OIL SEEDS AND NUTS	
39. Almond	657
40. Brazil nut	688
41. Cashew nut	590
42. Coconut, kernel, mature, fresh	375
43. Coconut, kernel, immature	125
44. Coconut milk, ripe nut	14
45. Dika nut, kernel dried	697
46. Karkashi	615
47. Nigar	513
48. Oil bean, whole seed	544
49. Pistachio nut	626
50. Pumpkin seeds, seed coat removed	610
51. Sesame seeds	592
52. Sunflower seeds, seed coat removed	524
53. Walnut	697
GRAIN LEGUMES AND PRODUCTS	
54. Bambara groundnut	367
55. Bonavist bean	351
56. Chickpea	368
57. Cowpea	340
58. Fenugreek	335
59. Goa bean	404
60. Groundnut, dry	579

	Kcal/100 g
61. Groundnut, fresh	332
62. Horse bean	342
63. Horse gram	338
64. Kidney bean	339
65. Lathyrus pea	293
66. Lentil	339
67. Lima bean	326
68. Locust bean	380
69. Mung Bean (black)	329
70. Manga Bean (green)	324
71. Pea	337
72. Pigeon pea	328
73. Scarlet runner bean	326
74. Soya bean seed	382
75. Soya bean "milk"	32
76. Soya bean curd	76
77. Soya bean	363
78. Tepary bean	331
79. Velvet bean	351
VEGETABLES	
80. Beans, eaten green in pod	34
81. Beans and peas, fresh, shelled	104
82. Bean sprouts	28
83. Beetroot	45
84. Carrots	33
85. Cucumber	12
86. Eggplant	22
87. Gourd	28
88. Leaves, high carotene, dark green, eg, spinach, pigweed, sweet potato tops, kale, bledo, etc	48
89. Leaves, medium carotene, eg, chard, New Zealand spinach, purslane, cassava leaves, watercress, cress, squash, pumpkin, colza, etc	28

	Kcal/100 g
90. Leaves, low carotene, pale green, eg. cabbage, kohlrabi, Chinese cabbage, etc	23
91. Leek	52
92. Maize, immature on cob	123
93. Okra	33
94. Onion and shallot	48
95. Palm cabbage shoot	34
96. Peppers, sweet, green and red, seeds removed	37
97. Pumpkin, squash and vegetable marrow	36
98. Radish	18
99. Tomato with skin	20
100. Turnip and swede	34
FRUITS	
101. Avocado pear	165
102. Banana	116
103. Cape gooseberry	48
104. Cashew apple	56
105. Citrus, grapefruit, pommelo, etc	37
106. Citrus, lemon and lime	36
107. Citrus, orange and tangerine	53
108. Custard apple, soursop, sugar apple	93
109. Dates, dried	303
110. Fig, fresh	49
111. Fig, dried	269
112. Grape	76
113. Grenadilla, flesh and seeds	92
114. Guava, flesh and seeds	58
115. Hog plum, spanish plum	95
116. Kanapy, flesh	74
117. Mammy apple excluding seeds	49
118. Mango	63

	Kcal/100 g
119. Melon, sweet	26
120. Melon, water	23
121. Palm fruits, Peach palm, Pejibay	209
122. Papaya	39
123. Pineapple	57
124. Plum	45
125. Pomegranate pulp	77
126. Prickly pear, pulp and small seeds	56
127. Star apple	82
FATS AND OILS	
128. Butter	745
129. Fish liver oils	900
130. Ghee	828
131. Lard and other animal fats	891
132. Margarine	765
133. Red palm oil	900
134. Vegetable oils	900
INSECTS AND LARVAE	
135. Lake fly	289
136. Larvae, dried caterpillars	372
137. Locusts, mature	134
138. Termites, mature	148
BEVERAGES	
Beer, sorghum	35
Beer, European	35
Palm wine (1/2–1 day fermentation)	17
FISH AND FISH PRODUCTS (INCLUDING MOLLUSCS AND CRUSTACEA)	
Fish, freshwater, fillet	95
Fish, sea, lean fillet	73
Fish, sea, fat fillet	166

	Kcal/100 g
Cod, salt	125
Fish, dried	309
Crustaceans (lobster, crab, prawns, etc)	94
Molluscs (oysters, mussels, clams, etc)	70
Sardines, canned in oil	309
Salmon, canned	170
Snail, river, pond	82
Turtle	79
SYRUPS, SUGARS AND PRESERVES	
Honey	286
Jam	260
Molasses (cane, medium)	276
Sugar, crude brown	389
Sugar cane juice	73
Sugar, white	400
CONDIMENTS, SPICES, FUNGI, MISCELLANEOUS	
Colanut	350
Maize and sorghum stems	58
Sugar cane stem	60
Fungi, mixed, fresh	11
Fungi, mixed, dried	99
Mushrooms, fresh	13
Chillies, hot, dried	291
Garlic	139
Tamarind	304
Mustard seed	544
MEAT, MEAT PRODUCTS AND EGGS	
Bacon, fat, whole side	589
Bacon, lean, whole side	362
Beef, moderately fat, whole carcass	262
Beef, lean, whole carcass	202

	Kcal/100 g
Beef, canned, corn	227
Eggs, hens and ducks	158
Goat, carcass	145
Mutton, fat, whole carcass	412
Mutton, moderately fat, whole carcass	249
Mutton, lean whole carcass	149
Offal, heart	129
Offal, kidney	127
Offal, liver	136
Pork, fat, whole carcass	535
Pork, lean, whole carcass	371
Pork, salt, fat	781
Poultry: chicken, duck, turkey, etc	139
Rabbit	134
Veal, moderately fat	184
MILK AND MILK PRODUCTS	
Cheese from whole cow's milk, hard	384
Cheese from skimmed cow's milk, soft	87
Milk, cow, whole	64
Milk, human	75
Milk, buffalo	102
Milk, goat	71
Milk, sheep	108
Milk, cow, skimmed	34
Milk, cow whole, condensed	140
Milk, cow, whole, condensed, sweetened	317
Milk, cow, whole powder (unmodified)	500
Milk, cow, skimmed, condensed, sweetened	276
Milk, cow, skimmed powder	357

Declaration

I, the undersigned, declare that the thesis is my original work, has not been presented for a degree in any university and that all sources of material used for the thesis have been dully acknowledged.

Bechaye Tesfaye Tessema

Date:-June 23, 2011

Signature----------