

**HOUSEHOLD FOOD SECURITY:
A CASE STUDY OF DAQUE UNIT – TETE PROVINCE,
MOZAMBIQUE**

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by

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ABSTRACT

Ensuring household food security is a critical step towards achieving the basic needs of poor groups or communities. Information regarding a community's access to food and supply in Mozambique is based on rough estimates, since hard data are, in general, not available.

The present research is the first attempt to evaluate the level of food security in Daque Unit, a rural area in Tete province, central Mozambique. Field work was conducted in two communities, Daque and Bungue, in which a number of household heads, local authorities, and key informants were interviewed. The interviews aimed at understanding the local people's views on problems, especially concerning natural resources management, agricultural production, consumption patterns, income generating activities, and health status with particular reference to children. A combination of quantitative and qualitative methods were used for data collection and analysis.

The results of this study indicate that there is poverty in the study area, which is exacerbated by high levels of unemployment, illiteracy, and poor living conditions. As far as food security and entitlement is concerned, both communities have the same problems that affect food production. Both communities depend mainly on subsistence agriculture, with limited financial resources, making them vulnerable to food insecurity.

The study has shown that the nature of the land available to people, gender, and income status are the critical variables that influence food security in the area. Thus, the study recommends that government should put in place policies that can enable people, families and communities to break the unfortunate cycle of poverty. It recommends community participation in the planning process and use of local natural resources. Skills related to employment and income generation improve capacity for achieving household food security.

PREFACE

The research project presented in this dissertation was carried out in the Centre of Environment and Development, University of Natal, Pietermaritzburg, under the supervision of Prof. Robert Fincham from the Centre of Environment and Development.

The study represents the original work by the author and has not been submitted in any form for any degree to any University. Where use has been made of the work of others it is duly acknowledged in the text.

Signed:



Joana Muneuassane Fumo Mahumane

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LIST OF ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immuno-Deficiency syndrome
GDP	Gross domestic product
GNP	Gross national product
HIV	Human Immuno-Deficiency virus
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
WHO	World Health Organisation
SADC	Southern African Development Community
DEA	Direccao de Economia Agraria (National Directorate of Agriculture)
MAP	Ministerio da Agricultura e Pescas (Ministry of Agriculture and Fisheries)
IAF	Inquerito dos Agregados familiares (Households survey)
INE	Instituto Nacional de Estatistica (Statistical National Institute)
NGO	Non Governmental Organisations
SPSS	Statistic Package for Social Science
PROAGRI	Agricultural Sector Investment Programme
FAO	Food and Agriculture Organisation of the United Nations
CBNRM	Community Based Natural Resources Management
HDR	Human Development Report
USDA	United States Department of Agriculture

CHAPTER 1

INTRODUCTION

1.1 Addressing Food Security in Mozambique

The people of Mozambique currently have one of the lowest standards of living in the world. Of the estimated total population of 16.5 million in 1998 (INE 1999) sixty nine percent of Mozambicans live in extreme poverty with four fifths of the poor to be found in rural areas. Poverty is so serious that the average income per person is below the official poverty line (UNDP 2000, p 125).

Food security enhancement, as an important part of absolute poverty reduction, needs to be placed squarely on the political and economic priority agendas of the government. The struggle for access to adequate food constitutes the most serious problem for many African households today and for most Mozambique ones.

Low agricultural productivity, rapid population growth, structural adjustment programmes, illiteracy, environmental degradation, wars, floods, droughts, poorly formulated food policies and political instability are among the factors held responsible for households' food insecurity and food inadequacy in Africa. In Mozambique, recovering from such disasters is difficult. The floods of 1999/2000 are a case in point. Their impact has placed an even larger number of individuals, households and communities at risk of hunger and malnutrition.

There is a need in Mozambique to design and implement effectively managed programmes that address both malnutrition and household food insecurity. In Daque Unit, a rural area, where most people struggle for survival, such programmes must form an integral part of any poverty alleviation strategy.

1.2 Food Security and the Changing Face of Southern Africa

The regional environment is characterised by human and environmental changes. The greater impacts are changes in political environment and major epidemics such as AIDS, tuberculosis and malaria. According to the Newsweek International Magazine (1999/2000), international organisations predict that southern Africa will have 70% of

the global HIV and AIDS sufferers by the year 2000, the higher proportion being women. As referred to by the UN Population Fund 2000, the unequal power relations between men and women limit female control over sexual activity and women's ability to protect themselves against HIV/AIDS. The Natal Witness (21 September 2000) mentioned that in Africa 10%, or two million, more women than men are HIV-positive.

Some examples of changes in Southern African countries are mentioned below:

- South Africa at present is facing changes in politics, resulting from a change from the Apartheid Regime to democracy. The process of change is not easy, and impacts on the economic development of the country.
- Zimbabwe, with the recent failure of the government referendum about the Constitution, is facing changes which are affecting its economic growth. Consequently, the changes will influence the region.
- In Angola, the war that started many years ago still continues and the country suffers from chronic food insecurity. The insecurity contributes to environmental degradation and poor economic development of the country. Consequently, Angolans are dying as a result of the armed conflict and also because of hunger.
- Mozambique's recent history is one characterised by human and environmental changes. These changes place great stress on the natural resources base. There is a need to acknowledge changes and a need to address their negative impacts.

1.3 Confronting the Challenge of Change

The challenge is to improve the life chances and health of peoples, particularly those who are food insecure. Firstly, it is important to determine who is food insecure, why and how they became vulnerable, and where they reside. A bottom-up approach should be used to establish the causes of food insecurity, because the usual top-down approach does not include a community's participation in identifying its problems. So, information on household food security conditions gathered from the community, can then help in general development planning.

Daque Unit is a rural area located in Tete province covering five communities in two districts, namely Cahora Bassa and Magoé. The Daque unit is subjected to poor living

conditions, lack of basic needs such as schools, water supply, sanitation and medical facilities. There is a Community Based Natural Resource Management (CBNRM) project in the Daque Unit, whose objective is to introduce sustainable rural development in the area. The reason for conducting this study in the area is to identify key problems that contribute to food insecurity. Thus, the findings of the study will be communicated to the project leaders in order to contribute to an integrated development strategy in the rural households in the Daque Unit. Then, Daque Unit, can be a model for how integrated development can occur in other rural areas.

1.4 Limitations of the Study

The limited time (six months) reserved to undertake the research, which included two visits to the study area at different times, was a limiting factor. Due to the long distance and cost constraints it was not possible to undertake further visits to corroborate data.

Study in the field was also limited due to lack of appropriate transport and the great distances that had to be covered to obtain the study data. In spite of these limitations, support from local communities, and the CBNRM project have made the successful completion of anticipated work possible.

1.5 Aims and Objectives

The aim of the study is to develop an overview of the current level of food security in Daque Unit. This overview is all the more important when one considers that no previous work has been done in the area.

The purpose of this research is to evaluate the current level of food security, to understand how people are coping with the present situation, and to make them aware of the environmental conditions that can be caused because of hunger. The findings from this study can be used as a model elsewhere.

In summary the purpose of this study is to evaluate food availability, food access and food utilisation in Daque Unit. The research will also look at the use of resources and their environmental aspects.

The research seeks to:

- Assess food availability, identifying household characteristics, which include gender, household size, age distribution within a household, household infrastructure, education, and land conditions, mainly access to land and size of land.
- Assess food access, identifying sources of income, working status within a household, and assets that the households have.
- Assess food utilisation, identifying the household diet, quality of water, and sanitation.
- Assess the natural and human resources available in the area.
- Provide baseline information to facilitate solutions.

1.6 Structure of the Dissertation

The thesis is organised into seven chapters. Chapter 2 discusses theoretical issues of food security and nutrition and their implications at the household level. Chapter 3 provides a brief overview of the biophysical environment and the socio-economic issues in the study area. The methodology used, which explains the sampling techniques applied to data collection, is presented in Chapter 4. The results from the semi-structured interviews of households are presented in Chapter 5. The analysis of the results and findings from the fieldwork are discussed in Chapter 6. The conclusion and recommendations of the study are presented in Chapter 7.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The achievement of sustainable food production is a critical step toward the reduction of food insecurity and malnutrition. The world has made some important progress toward reducing food insecurity. For example, according to the United Nations Food & Agriculture Organisation (FAO 1998), approximately 35 percent of people in developing countries were chronically malnourished in 1969-71, but only 20 percent by 1990-92.

Food security is the concept that helps to foster an integrated approach to food and nutrition interventions. Ideas about food and nutrition in developing countries have changed over the past two decades, and current approaches to food problems reflect these changes. At the center of this evolution of ideas, is the distinction between *food availability* (related to food crisis in Africa in the early 1970s), and *food entitlement* (related to the food crisis that again plagued Africa in the mid-1980s). These two concepts are critical to the debate about food security at the household level and are a key component of the literature review.

This chapter will deal with the theory and current knowledge about food security and nutrition. It will constitute the basis for raising questions that will guide fieldwork; so linking theory and practice. It has sections that assist in building a picture of aspects relating to the present study. Thus, it will focus on:

- An outline of the concepts of food availability and food entitlement
- A conceptual framework for food security
- An overview of food security and nutrition in Africa and the countries of Southern Africa Development Community (SADC)
- A description of agricultural conditions in Mozambique at present
- The implications of the above aspects at a household level.

2.2 Food Availability

The concept *food availability* refers to the supply of food available at international, national, or local levels. According to Davies et al. (1991), food crises in Africa in the early 1970s stimulated a major concern on the part of the international donors to supply short falls created by production failures which were due, in turn, to drought and desert encroachment. The idea that food availability tends to fall short of long-term food requirements, is an old one, and is often associated with the doctrine of Thomas Malthus (1766-1834) who noted that agricultural output tends to increase arithmetically, while population grows geometrically. These phenomena result in a tendency for the gap between food supply and food needs to widen over time, with famine ensuing and as the mechanism to close the gap.

In more recent times, the FAO World Conference in 1974 placed primary emphasis on the problems of food supply deficits and methods for overcoming them. This conference took place in a period of severe short-term shortages of food commodities in international trade and high world prices for staple grains. The conference helped to set the standard for international and national responses to food problems in developing countries during the following decade.

2.3 Food Entitlement

The concept of *food entitlement* refers to the command over food which households or individuals have. The concept of food entitlement originates in a celebrated series of writings on the causes of famine by Sen (1980-1981). Related ideas about the causes of malnutrition and starvation also appeared in other writings, for example Reutlinger (1977), United Nations (1994), and UNICEF (1998).

The essence of the entitlement approach is that people do not necessarily starve due to an insufficient supply of food, rather they starve because they possess insufficient command over, or access to, food. Borton and Shoham (1991) argue that food insecurity occurred in situations where food was available but not accessible because of an erosion of people's entitlement to food. Sen (1981) states that entitlement involves how much food households actually have access to from their own production, income, gathering of wild foods, assets, and migration. In other words, a

number of socio-economic variables have an influence on a household's access to food. Sen (1981) distinguishes four different types of entitlement that individuals or households in a market economy may possess or acquire:

- Trade-based entitlement: ownership of goods or resources obtained by trading something a person or household owns with another party;
- Production-based entitlement: ownership of production using personal or household resources;
- Own-labour entitlement: ownership of personal labour power, thus enabling a person or household to obtain trade or production based entitlement in exchange for their own labour; and
- Inheritance and transfer entitlement: ownership of goods or resources conferred or freely given to the person or household.

The concept of entitlement, therefore, encompasses both non-monetary and monetary command over food and other commodities. Non-monetary command over food occurs with respect to subsistence production, payments in kind, gifts and physical transfers within a community, and intra-household food distribution. Monetary command over food is described by the concept of exchange entitlement, which is a household or any individual's purchasing power over food, given prevailing market prices of food and other commodities.

Food entitlement of an individual or household has long and short term dimensions, and is susceptible to rapid changes of fortune for people living on the margin of poverty. According to Ellis (1992), the food security concept stresses the avoidance of under nutrition or starvation as the fundamental food policy goal. Davies et al. (1991) argue that households will have stable access to food if they have viable means for procuring food (produced or purchased) that do not lead to environmental degradation.

2.4 A Conceptual Framework for Food Security

The conceptual framework addressing issues around food security has undergone considerable evolution, reflecting the changes in perception that have occurred over time. The concept of "food security" was developed as early as the 1970s, while the

construct of "household food security" is more recent. According to Smith et al. (1993), the bulk of the literature dates from the 1980s and there are close to two hundred different definitions of the term. There was an increased concern about national food security stocks in the 1970s, then changing to a preoccupation with individual entitlements in the 1980s.

According to Johnson (1996), and UNICEF (1998) food security includes several dimensions but the three most important components at a household level are:

- Availability: this occurs when sufficient supplies of appropriate food are consistently available to all individuals. Such food can be supplied through household production, other domestic output, commercial imports or food assistance.
- Access: this is ensured when households and all individuals have adequate resources to obtain appropriate nutritious food. Access depends on income available to the household, on the distribution of income within the household and on the price of food.
- Utilisation: this refers to a proper biological use of food through adequate diet, potable water, adequate sanitation and health care. Effective food utilisation depends in large measure on knowledge within the household of food storage and processing techniques, basic principles of nutrition and proper child care and illness management.

2.4.1 Defining Food Security

There has been no single definition of food security in the literature over the years. However, the definition that is nowadays widely accepted as capturing the spirit of the concept is that advanced by the World Bank (1986a pg. 1):

Food security is ... access by all people at all time to enough food for an active, healthy life. Its essential elements are the availability of food and the ability to acquire it. Food insecurity, in turn, is the lack of access to enough food.

There are several variations on this definition, which tend to produce small differences in interpretation, but a general consensus on the basic principles of food

security seems to prevail. According to the World Bank (1986) definition, these principles may be listed as follows:

- a) The definition emphasises access to food rather than the supply of food. This is consistent with the concept of food entitlement, and the definition focuses on whether people have sufficient command over food, and thus on methods to supplement this entitlement where it is deficient or absent.
- b) The definition emphasises the access to food by all people, implying that an aggregate view is insufficient. The situation of individuals and social groups at risk is of critical importance.
- c) The definition refers to the availability of food and the ability to acquire food, corresponding to the food availability versus food entitlement concepts.

2.4.2 Food Insecurity

According to Green (1993), food insecurity applies to persons, households or countries that in normal years do have food availability and entitlement, but are at serious risk of losing these as a result of unemployment or restriction of access to land, or drought, or other calamities.

The World Bank definition of food security also makes an important distinction between *chronic food insecurity* and *transitory food insecurity* (World Bank 1986). *Chronic food insecurity* is defined as a continuously inadequate diet caused by the persistent inability to acquire enough food over a long period. Chronic food insecurity arises from conditions of poor production, limited resources, and poor health. *Transitory food insecurity* is a temporary decline in a household's access to food. It can result from instability in food production, food prices, household incomes, or health conditions.

Both these concepts are based on a food entitlement perspective on food policy and both focuses on the situation of a household or an individual rather than on macro-economic aggregates. The underlying causes of food insecurity, as mentioned by Stover et al. (1997) are the following:

- war and civil strife
- inappropriate national policies

- environmental degradation
- poverty
- gender inequality
- poor health
- population growth
- barriers to trade, and
- inadequate agriculture

2.4.3 Food Risk

The food security concept addresses peoples' risks of not having access to needed food. Such risks can be with respect to income and food production, for instance. According to Anderson & Scandizzo (1992), a complementary view of food insecurity is to view it in terms of the *risk* that certain social experiences pose when confronted by starvation. *Food risk* is measured as the probability that a given population, defined, for example, by geographical location, may experience inadequate access to food. This probability is in turn, the product of environmental risk (for example the probability of crop failure), on the one hand, and income risk (the probability of failing to earn enough), on the other hand.

According to Walker & Jodha (1986), sources of risk to the income of the poor and vulnerable can be categorised as follows:

- environmental risks (drought, floods, pests)
- market risks (price fluctuations, wage variability, unemployment)
- political risks (changes in subsidies or prices or income transfers from government, civil strife, war)
- social risks (reductions in community support or community entitlements)
- health risks (that prevent work).

The task of a food security policy is to reduce the probability of the occurrence of food risk, by stabilising supply and reducing the incidence of poverty.

2.4.4 Measuring Food Security

Staatz et al. (1990) mention that in the past, food security indicators have been measures of a regional or national food supply or its correlate (rainfall). Recently, many have questioned the validity of commonly used indicators of food security which are measured at the national level and have questioned these as reliable indicators of access to food at household level. For example, Frankenberg & Maxwell (1991) argue that indicators are needed to measure supply and food entitlement changes, but at local level. According to Haddad et al. (1991), there is still no consensus on acceptable indicators and methods of measurement. That is, a number of different indicators can be used for delineating household food security. The indicators can be divided into factors, which reflect food supply, and *food access*, and outcome indicators that serve as proxies for *food consumption*.

Food supply indicators are defined, as indicators that provide information on the likelihood of a shock or disaster event that will adversely affect household food security (Borton & Shoham 1991). The examples of these indicators are:

- agrometeorological data
- access to natural resources
- agricultural production data
- market infrastructure and institutional support
- regional conflict and its consequences

Staatz et al. (1990) mention that supply indicators that are valid for one region might not be valid for another. Thus, these indicators may be used only for a specific location.

Food access indicators are defined as factors that provide information on the capacity of a population affected by a shock or disaster event to withstand its effects (Borton & Shoham 1991). Examples of these indicators are:

- land use practices
- diversification of livestock
- diversification of income sources
- access to loan/credit
- sale of production assets

- distress migration

Outcome indicators are defined as proxies for adequate food consumption. Depending on the situation, food consumption can be defined as food availability, food purchases or expenditures, food eaten or nutritional status (O'Brien-Place & Frankenberg 1988). These indicators can be grouped into direct or indirect indicators. The former most closely approximate actual food consumption, such as:

- household budget and consumption surveys
- household perception of food insecurity
- food frequency of consumption assessments

Indirect indicators of food consumption most closely approximate marketing channel information and medical status. Examples of these indicators are:

- storage estimates
- subsistence potential ratio
- household food security card
- nutritional status assessments

The criteria used for selection of indicators include resource availability, relevance, accuracy and timeliness. It is important to mention that the selection of indicators to be used will be determined by specific data needs. For the specific case of Daque Unit, socio-economic data and nutritional status will be used to assess the current level of food security and nutrition in the area. As an example Haddad et al. (1991) suggest that the household level of food security and nutrition indicators must include:

- demographic variables such as household size/composition, migration, age and gender of the individuals.
- resource indicators such as availability of land for cultivation and the actual area under cultivation, and the availability of labour.
- food availability indicators such as net food availability, time when food stock is depleted, number of meals eaten in a day.
- income indicators such as cash crop income, income from livestock sales, income from remittances, availability of employment, level of wages.

- market and price variables such as food market availability, and levels of prices of food.
- entitlement indicators such as ownership of livestock and other liquid assets.
- nutritional indicators such as height for age, weight for age, weight for height.

2.4.5 Poverty and Food Security

Poverty is a primary obstacle to satisfactory food security. FAO (1996) mentioned that worldwide, 1.3 billion people, or nearly one-quarter of the world's population, live on less than 1 dollar a day. Their low income makes them especially vulnerable when prices for basic commodities increase rapidly and sharply. According to the World Bank (1989), poverty in Africa is still largely a rural phenomenon. Thus, policies for rural economic development, particularly food and agriculture policies have a direct effect on poverty. Absolute poverty in the African subsistence farming sector is characterised by:

- a low income combined with a low cash income
- insufficient food consumption combined with high seasonal fluctuations in consumption
- inadequate access to services, such as health (or the ability to acquire them), resulting in high morbidity, infant and child mortality, and low life expectancy.

Poor households spend the bulk of their cash income on food, especially for ingredients to complement the staples. Hazel et al. (1983) mentioned the example of Rwanda, where the inhabitants spend 74% of their income on food and Nigeria where they spend 79%. So, this means that with only slight changes in circumstances, people are not able to cope with the situation. Mellor & Lore (1990) argue that improved infrastructure are also important factors to consider for poverty alleviation in rural Africa. For example, with good roads, market facilities contribute to the improvement of food security.

As stated in chapter 1, other important factors associated with poverty and affecting food security include weather, civil strife and war, widespread unemployment or underemployment, inadequate returns for the food producers, unsustainable use of natural resources, diseases (HIV/AIDS), overvalued exchange rates and distorted

international markets. That is, the web of unsatisfactory factors that define poverty also affect food security.

According to Green (1993), absolute poverty in Sub-Saharan Africa ranges from 20% (excluding Seychelles, Mauritius and Botswana) to over 60% (Angola, Mozambique, Somalia, Ethiopia, Eritrea and Sudan). So, poverty places a heavy burden on sub-Saharan Africa's efforts to improve its food security situation, since income is more likely to be needed for current consumption at the expense of savings that could help finance investments in economic development.

2.4.6 Food security: a contemporary perspective

Maxwell (1996) identified three main shifts in thinking about food security since the World Food Conference of 1974. These shifts were:

- from the global and national to the household and individual, a shift in perspective that took place largely in the period of 1975 – 1985.
- from a “food first” perspective to a “livelihood” perspective, which took place mainly after 1985, stimulated by the observation of the African famine of 1984/85.
- from objective indicators to subjective perception. In the poverty literature, there is a distinction between “the conditions of deprivation” referring to objective analysis and “feelings of deprivation”, related to the subjective perceptions (of the rural poor).

According to Maxwell & Smith (1992), food security must be treated as a multi-objective phenomenon, where the identification and weighting of objectives can only be decided by the food insecure themselves. Flexibility, adaptability, diversification and resilience are the key words to addressing food insecurity.

Achieving food security, from the contemporary perspective, necessitates work at community level as well as the more traditional, national and regional levels. That is, there is a need to understand particular situations and not to rely only on aggregate situations on which to base policy formulation. This is important because it reflects the views of those people affected by food security policy as well as those who make

decisions (policy makers). This leads to substantiating the value of the case study approach. It recognises the uniqueness of place, from which one begins to build a greater "world view".

2.5 Food Security and Nutrition in Africa

In terms of food security and regions of the world, Africa faces the most difficulties. Van Braun & Paulino (1990) mentioned that Africa neither produces the food it needs nor does it acquire sufficient food through trade and food aid to meet the nutritional needs of poor. According to FAO (1998), and UNICEF (1998), Africa currently accounts for about 200 million or about 25 percent of chronically malnourished people in developing countries. Furthermore, if no action is taken to reverse the present trend, by the year 2010, this figure could exceed 300 million of the chronically malnourished. Sub-Saharan Africa is the only region where chronic malnutrition is expected to increase between now and 2010. According to United Nations (1994), over half the underweight children in the world are in South Asia. Currently, over two-thirds of the world's malnourished children live in Asia (especially South Asia), followed by Africa and Latin America.

In the view of FAO (1998), Africa's agricultural production and trade have been affected by a variety of factors from the period following independence to the present, including:

- the effects of cold war on agricultural and rural development policies,
- the chronic civil and social strife and displacement of people,
- the mismanagement of national resources, including environmental resources,
- the failure to build capacity in critical areas such as policy analysis and entrepreneurship,
- periodic droughts and the entry of the former Soviet Union into world markets.

United Nations (1994) state that approximately 18.5 million people were refugees or displaced in Sub-Saharan Africa. In 1996, FAO designated 14 of 48 sub-Saharan countries, involving 22 million people, as facing exceptional food emergencies. See below, Table 2-1, showing the countries and the reasons cited by FAO for the emergencies.

Table 2-1: Food Emergencies in Sub-Saharan Africa

Country	Reasons for emergency
Angola	Population displacement
Burundi	Civil strife, displacement of rural population
Eritrea	Reduced harvest, largest number of vulnerable people
Ethiopia	largest number of vulnerable people, localised drought
Lesotho	Drought-reduced harvest
Liberia	Civil disturbances, population displacement, shortage of farm inputs
Malawi	Drought-reduced harvest, Mozambican refugees
Mozambique	Displacement of rural population
Rwanda	Population displacement, reduced planting
Sierra Leone	Population displacement
Somalia	Civil strife, poor harvest
Sudan	Displaced persons, localised food deficits, civil strife
Zaire	Rwandan refugees, civil disturbances affecting food distribution
Zambia	Drought-reduced harvest

Source: Food Supply System and Crop Prospectus in Sub-Saharan Africa. Table 1 pg.5 (Rome: FAO, 1996).

FAO described the food security situation for Sub-Saharan Africa as precarious, as global cereal supplies tighten and food availability shrinks. Sharp increases in cereal prices on the world market and the consequent higher cost of cereal imports, coupled with balance of payments' difficulties in food-deficit countries, will mean that a large proportion of food imports will need to be covered by food aid.

Van Braun & Paulino (1990) mentioned that food security in sub-Saharan Africa is threatened by continuing and rapid population growth. It is the only region in the world where the growth rate, currently at about 3.2 %, has not started to decline FAO (1998). Population growth has important consequences for food security, since Africa's food consumption currently exceeds its food production. Presently, 30 percent of sub-Saharan Africa's cereal output is in areas of low and unreliable rainfall. Fifty percent of cultivable land is in arid and semi-arid regions. Unless food

production expands at a rapid rate, imports will have to increase dramatically to improve Africa's food security. However, a number of African countries face a bleak economic outlook. Continuing balance of payments difficulties are seriously limiting their capacity for increasing commercial exports as well as imports. According to Marter & Gordon (1996), exports of primary commodities, the main source of revenue for sub-Saharan Africa, show a 20-year history of declining trade. In terms of income, Marter & Gordon (1996) also indicated that many Africans are worse off today than they were a decade ago, and real per capita income is projected to grow at only 0.3 percent during the 1990s. By the year 2000, 30 percent of the world's poor are expected to be in sub-Saharan Africa, compared to 16 percent in the mid-1980.

Food security is also affected by HIV/AIDS. According to the Human Development Report (HDR) (1998), HIV/AIDS is one of the most significant global epidemics, taking nearly 12 million lives since it started 18 years ago. The devastating aspect of this epidemic is that it affects people in their most productive years. HIV/AIDS is having a significant impact on economies, creating shortages of skilled labour, and affecting the sustainability of households and the socio-economic prospects of communities. UNAIDS (1998) indicated that 83% of AIDS deaths have been in Africa. HDR (1998), mentioned that in 1997 nearly 31 million people were living with HIV, up from 22.3 million the year before. At the year 2000, it is estimated that 40 million people will be living with HIV. UNAIDS gave an estimation of 16000 new infections a day, from which 90% are in developing countries (40% are women and 50% are between 15 and 24 years old). According to UNAIDS and WHO (1998), approximately 7 out of 10 people newly infected with HIV in Sub-Saharan Africa are among children under five. According to UNICEF (1998), it is thought that between 4 and 5 million children will be infected with HIV, during this millennium. The majority, mostly in Sub-Saharan Africa, will acquire the infections directly from their mothers.

Poverty worsens the epidemic, and the epidemic intensifies poverty. So, there is a need to pay special attention to the epidemic as it impacts directly on food production by hindering the work force's ability to produce. It also consumes money or assets that could be used to purchase food or health care.

2.6 Women and Food Security

According to UNICEF (1998), studies have shown that women play a crucial role in many aspects of crop production in sub-Saharan Africa, especially in maintaining household food security. While men are often responsible for land clearing, burning and plugging, women specialise in weeding, transplanting, post-harvest work and in some areas, land preparation. Both take part in seeding and harvesting. The above statement reflects the crucial role of women in Daque Unit. UNICEF (1998) argues that for household food security to be translated into good nutrition, the overwhelming responsibility must be redistributed or reduced, so that other needs like caring for children, also related to nutrition, can be met. This should be one of the steps that decision makers have to consider when discussing the strategic plan of a rural development. According to Green (1993), children comprise the majority of the food insecure and deprived. This is because of lack of entitlements linked to overall poverty (inadequate access to water, decent housing, clothing and education). Thus, the improvement of infrastructures and basic conditions will help to improve women's and children's food security.

According to Moser (1993) and FAO (1997), women produce between 60 and 80 percent of food in most developing countries and are responsible for half of the world's food production. However, their key role as food producers and providers, is only recently becoming recognised, as is their critical contribution to household food security.

FAO studies confirm that while women are the mainstays of small-scale agriculture, the farm labour force and day-to-day family subsistence, they have more difficulties than men do in gaining access to resources, such as land, credit and services. In almost all developing countries, women's access to resources is limited due to cultural, traditional and sociological factors. Daque Unit is not an exception, and women still experience difficulty in gaining access to credit and the means of production to exploit the resources available in the area. Accurate information about men's and women's access to, and control over, resources, is critical in the development of food strategies. Research in Africa, Asia and Latin America, has found that improvements in household food security and nutrition are associated with women's access to income and their role in household decisions on expenditure.

Women tend to spend a significantly higher proportion of their income than men do on food for the family. This is an example of what happens in Daque Unit; while women go to fetch water or firewood, men exchange some of the stock food with traditional drinks.

International initiatives and efforts developed especially since the 1975 World Women's Conference in Mexico have contributed to a greater recognition of the importance of women's participation in rural and other domains of development. According to The World Guide (1997/1998), the 4th World Conference on Women, held in Beijing in 1995, helped to generate many governmental ideas to improve women's life conditions, although few funds are available for achieving this goal.

According to FAO (1998), in many African countries women:

- provide 33 percent of the working force
- comprise 70 percent of the agriculture workers
- provide 60-80 percent of the household labour for food production and sale
- undertake 100 percent of the processing of basic food stuffs
- undertake 90 percent of household water and fuelwood collection
- undertake 90 percent of hoeing and weeding work
- undertake 60 percent of harvesting and marketing activities.

The number of female-headed households is increasing significantly in rural areas in many developing countries as rural men migrate due to the lack of employment and other income-generating opportunities. Rosenhouse (1989) mentioned that female-headed households tend to be poorer, own less land and labour and government services, including credit. Frankenberger & Goldstein (1990) also mentioned that poorer households, mainly women headed households, are more vulnerable to stress than are wealthier households, and begin to suffer earlier when food shortages hit. According to Watts (1988), the poor resort early to sale of livestock, pledge forms, incur debt, sell labour, and borrow grain at higher interest. Thus, during food crisis, a cycle of accumulation of debt and decapitalisation can occur, depending on the depth of any current crisis. FAO (1998) indicated that in sub-Saharan Africa, 31 percent of rural households are headed by women, while in Latin America and the Caribbean and Asia, women head 17 and 14 percent respectively. This emphasises that the role

of women in the African economy is critical.

According to Stock (1995), in almost all countries female-headed households are concentrated among the poorer strata of society and often have lower incomes than male-headed households. The hardships that confront the majority of African women will continue to grow, because governments become less able to respond to urgent needs.

2.7 Food Security in SADC Countries

The Southern Africa Development Community (SADC) was originally established through the Lusaka Declaration of 1 April 1980. SADC, formerly Southern Africa Development Coordination Conference (SADCC), became a formal treaty organisation in 1992, with the signature of the SADC Treaty and Declaration in Windhoek. In 1994, South Africa joined the organisation, followed by Mauritius in 1995, and more recently, the Democratic Republic of Congo and the Seychelles were admitted at the meeting of Heads of States and Governments of SADC in Blantyre, in 1997.

The SADC now comprises 14 countries: Angola, Botswana, The Democratic Republic of Congo, The Seychelles, Lesotho, Swaziland, Malawi, Mauritius, Mozambique, Namibia, South Africa, Tanzania, Zambia and Zimbabwe. Although geographically contiguous, the SADC countries are quite dissimilar in many respects, for example area, size of population, endowment of natural resources, in infrastructure, and size of the national economy.

A major SADC objective is the cooperation between member states in pursuing food security. Zimbabwe was given the responsibility for regional cooperation in food security. In fulfilment of this obligation, Zimbabwe set up a coordinating unit and developed a regional food security program, with the following objectives:

- to ensure that adequate supplies of food are always available;
- to ensure that households have the capacity to acquire food by means of their own production or through cash purchases;
- to ensure the natural resource base is conserved; and

- to work towards improvements in nutrition.

In order to achieve the objectives, the member countries developed the strategy framework, which comprises a set of programs for the region. The programs will be adaptable to changes in economic and political circumstances and will aim to promote overall development to a greater degree than before. The programs comprise a number of national and regional projects aimed at encouraging improved output and productivity, as well as promoting measures designed to lead to increased incomes, especially in rural communities. The programs also stress the need to promote sustainable use and long term conservation of the region's natural resource base. It will also encompass issues of general economic development, trade, investment, and poverty in the region. The strategic objectives of the program are the following:

- a) Improved availability of food in the SADC region, which means there is a need to:
 - improve smallholders' competitiveness;
 - increase efficiency of use of natural resources; and
 - increase agricultural and intra-regional trade.
- b) Improved access to food in the SADC region, which means there is a need to:
 - generate employment and focus on small-scale agriculture that has comparative advantage;
 - improve income stability while maintaining economic efficiency; and
 - develop safety nets for vulnerable groups.
- c) Improved food utilisation and nutrition in the SADC region, which means there should be:
 - better levels of food quality and nutrition for all members of SADC society.

According to Nichola (1998) the achievements and the challenges of the SADC countries with respect to food security are diverse. These differences make policy coordination to address food security difficult. Table 2-2 shows some basic indicators of the SADC countries:

Table 2-2: Basic indicators of SADC countries

Countries	Area (‘000 Sq. Km)	Population (mill 1994)	GDP (mill US\$ 1994)	GNP per Capita (US\$)	Share of Agriculture in GDP (%)	Total External Debt (mill US\$)
Angola	1247	10.4	-	-	-	-
Botswana	582	1.4	4011	2800	5	691
Democratic Congo	2345	42.5	-	-	-	-
Lesotho	30	1.9	886	720	14	600
Malawi	118	9.5	1302	170	37	2015
Mozambique	802	15.5	1467	90	33	5491
Namibia	824	1.5	2884	1970	14	-
South Africa	1221	40.5	121888	3040	5	-
Swaziland	17.4	0.906	-	1100	-	-
Tanzania	945	28.8	3378	140	57	7441
Zambia	753	9.2	3481	350	31	6573
Zimbabwe	391	10.8	5432	500	15	4368

Source: World Bank, World Development Report, 1996.

The entire region is characterised by rapid population growth. About half of the countries have an average annual growth rate in excess of 3.0 percent. For all the SADC countries, with the exception of Tanzania and The Democratic Republic of Congo, the growth rate of cereal production is lower than the population growth rate. Such observations are indicative of a declining capability to meet food demand from domestic production.

Most SADC countries are consistently dependent on imports to meet food demands, with the exception of South Africa and Zimbabwe, which have been surplus producers for the most years (1981 – 1994). Mozambique and Angola required food aid for most 1980’s to supplement their imports. The vulnerability of the region was dramatically highlighted by the dependence on imports of the two major exporters, South Africa and Zimbabwe, during the drought of 1982 (Nicola, 1998).

Nicola (1998) says that with the exception of Botswana, the other countries that are heavily dependent on imports are also indebted. For instance the total debt ratio in

1994 to GDP ratio for Mozambique was close to 400 percent whereas Botswana was only 17 percent. He also mentions that the situation in the SADC countries in respect of transitory food insecurity is not encouraging. Cereal prices in almost of the SADC countries have been growing in double digits and also show significant variability, suggesting that the region has been experiencing widespread transitory food insecurity.

2.8 Agricultural Conditions in Mozambique

Agriculture is the basis of Mozambique's economy. According to DEA (1998) the agricultural sector accounts for 40-50% of Gross Domestic Product (GDP), employs more than 80% of the labour force, and provides more than 80% of foreign exchange earnings.

According to the World Bank (1996) and Tesfai (1991), during the colonial period investments in Mozambique were aimed at increasing the supply of agricultural raw materials such as cashew, copra, cotton and tea to Portugal. The agricultural sector had three components: large plantations, medium-sized settler farms and small African family farms. An estimated 100000 adult rural males migrated to South Africa annually to work in the mine.

Mozambique's independence from foreign rule occurred in 1975, and the new socialist government took over the abandoned Portuguese properties and established large centralised state farms. Tesfai (1991) mentioned that during this time, parastatal monopolies were also established to take over marketing and trade functions. According to the World Bank (1996) private traders were also allowed to operate and were granted monopoly rights, but the government retained a monopoly at the wholesale level and regulated marketing margins.

The period of war (from late 70s to early 90s), the drought of 1982-83 and poor development policies resulted in near collapse of the Mozambique economy. For example, between 1981 and 1986 GDP and food production fell by an estimated 30%, marketed production of maize and rice declined by half, and exports declined by 75% (World Bank 1996). During this period, the country grew dependent, mainly on food aid. Because of war there was a huge displacement of the population towards cities.

The war also destroyed much of the economic infrastructure. According to the World Bank (1996), the number of private traders fell from 6000 in 1975 to 2000 by 1990. The rehabilitation period (since 1987) Mozambique has made substantial progress in improving its macro-economic policies; by liberalising the exchange rate, reducing budget deficits and inflation. According to Howard et al. (1998) by 1994, 263 small and medium public enterprises had been restructured and either privatised, converted to joint venture companies (JVC's), or leased. Most commodity prices are now market determined. According to DEA (1998), during this period, the country made a rapid recovery from decades of poor development policies and war. For example, an estimated 4.7 million hectares were cultivated in 1996, a 60 % increase over that achieved in 1992.

2.8.1 Food Security in Mozambique

Mozambique is rich in natural resources, and agriculture constitutes the main economic activity. Despite its rich potential in agricultural production, many households suffer food insecurity. Their food insecurity is due to low levels of income, weak physical, social, and economic infrastructure, making people vulnerable to natural disasters such as drought and floods. According to IAF (1998), approximately 69 % of the Mozambican population live below poverty line. This is critical in rural areas (71 %) and in urban areas (60 %).

In Mozambique food security research has been conducted in the northern part of the country, but for other areas is almost non-existent. The Department of Nutrition, Ministry of Health and some non-governmental organisations, mostly carry out nutrition extension services. So, linkages between agricultural research, food research and nutrition extensions services are in their early stage. Although there is an understanding by the government, researchers, and the donor community of the causes of national food insecurity, low nutrition status and poverty, there is a need to design practical interventions adapted to local socio-economic conditions.

2.8.2 Food Security and National Policy in Mozambique

Access to an adequate supply of food is the most basic of human needs and rights, and ensuring that people have enough to eat is not only the moral duty of governments,

but is also in their economic and political interest. The development of any country is possible only with well-nourished and healthy populations.

According to the 1998 report of “Estratégia de Segurança Alimentar e Nutricional”, the objective of the National Agricultural Policy is to support the government to achieve food security, and employment creation in order to improve the balance of payments. The same report notes that the Mozambican Government prepared the Agricultural Sector Investment Program (PROAGRI) for five years, 1999-2003, as an instrument to implement its policy. The principal strategy of PROAGRI is the development of agricultural activity based on the family sector.

The national Food Security and Nutrition Strategy was approved by the Council of Ministers in December 1998. The document was prepared by an inter-sectorial working group, in which the process included the development of a conceptual framework, to analyse food security through the components of food availability, access, and utilisation. Nutritional aspects are taken into consideration in all three components, but in particular, in utilisation of food. The conceptual framework also presents an approach through which the role of the state is considered in providing public goods and an enabling environment to facilitate the contribution of the private sector and NGO's.

The National Strategy for Food Security and Nutrition provides a broad orientation for the contribution of agricultural research to the improvement of food availability by targeting problems of the family sector and small private producers. The research priorities would contribute to the improvement of food and nutritional security and would prioritise the improvement of access to land, particularly by women, labour productivity, and the reduction of the impact of climatic variations and crop disease and pests. This could be achieved through the introduction of crops resistant to drought and pests, as well as new sustainable technologies incorporating the improvement of soil fertility, particularly in areas with land shortages. From the point of view of the national strategy for food security and nutrition, a case study of Daque Unit will then contribute to the improvement of food security and nutrition, considering aspects referred in the national strategy. Particular attention will be paid to women and children as the most disadvantaged group.

2.9 Implications of the Literature Review for the Present Study

This literature review has shown that food security is a broad and complex subject. One can see that causes of food insecurity are diverse, varying from place to place. Therefore, there is a need to clarify the causes of food insecurity in a specific location, and thus suggest possible remedies to adopt to overcome the problem. The achieving of food security for all is an enormous task, which should be carefully analysed.

Household food security is linked to socio-economic and environmental factors. Similarly, the role of gender relations in determining intra-household resource allocation has influenced food security studies, shaping their focus on food access for the individual.

According to Singer (1997), the discussion of food security is often divided into macro and micro aspects. The macro aspects are related to general economic forces, which may generate poverty and food insecurity, and to measures to be taken at general macro-economic level. The micro aspects are related to the way in which household's cope with food insecurity and the way in which food is distributed within and between households. The present study will deal with food security at a micro level.

In conclusion, it can be briefly stated that the chapter has tried to show that food security and nutrition was firstly seen as an international and national problem, but lately it is seen as the individual's and household's problem. At the centre of the evolution of ideas about food security and nutrition there was a concern with food availability and food entitlement. Thus, the individual and household food security incorporates factors of availability, access and utilisation of food. It has been shown further more that there are a number of factors that affect food security and malnutrition in different countries. Thus, the literature review, provides a conceptual framework for the present study.

CHAPTER 3

THE STUDY AREA

3.1 Introduction

This chapter aims to give a brief overview of the study area. It comprises two broad sections, namely a description of the study area's natural resources and of its socio-economic issues. The aspects considered in this chapter contribute to an understanding of the current situation of food security and the agricultural production system in the study area.

3.2 Effects of War and Floods on Food Production

With drought in the early 1980s and an intensifying war, agricultural production in Daque Unit declined dramatically. According to the key informants, during the war between the Frelimo government and Renamo (from the late 1970s until 1992), Daque Unit was exclusively under the Frelimo government control. The so-called traditional authorities (former Régulos and their sub-chiefs, whom Frelimo deposed at national independence in 1975) had little room in which to maneuver. There was no dialogue between the administrative and traditional authorities. The key informants mentioned also that the deposed traditional leaders, after independence had negative impacts on the rural community's livelihoods, which were aggravated by adverse conditions such as lack of rains and successive droughts.

Recent floods affected the Tete Province as a whole. Both districts belonging to the study area were also affected. Cahora Bassa dam, and the flooding of rivers in the neighbouring countries exacerbated the situation and caused inundation along the rivers in the study area. Consequently, the situation affected the food production as the households lost their farms, cattle, goats, and their food stock. Although floods and drought are regular phenomena in both districts, this year was particularly different and disastrous. According to the report "Avaliação e Mapeamento de Vulnerabilidade"(2000), it is estimated that the recent floods affected 4000 people in Magoé district, and 2000 in Cahora Bassa.

During the period of floods, the two districts (Magoé and Cahora Bassa) were unable to communicate with each other due to inundation of Daqué River, which separates the two districts. This caused great hardship: for example people from Bungue (one of the communities of the Cahora Bassa district) were not able to cross the Daqué river for medical assistance at the Daqué health center. If the objective is to secure food for rural communities it is time to look at other options or integrate the already known problems in strategic plans for development of a better life in rural communities.

3.3 Biophysical Environment

3.3.1 Geographical Location

The study area is located in the Tete Province in the central part of Mozambique. It is one of the hottest parts of the country and lies on a plateau 500m above sea level (Figure 3-1). The area is characterised by two distinct agro-ecological zones, that north of Zambezi river with good soil fertility and that south of the Zambeze river, with a dry climate and low soil fertility which results in low agricultural production. The study area covers the districts of Cahora Bassa and Magoé, separated by the Daqué River (Figure 3-2).

In the study area there is a Community Based Natural Resource Management project (CBNRM) called Tchuma Tchato. The project objective is to introduce rural development, promoting natural resource conservation. According to Tiago (Per comm. 1999), the head of the project who was interviewed in the study area, the project started in 1997, covers an area of 6,500 sq. km, and involves five community councils and nine community scouts. The major activities that are taking place at the moment are wildlife patrols and resource inventory making, licensing of traditional fisherman, community conservation education, training of community game scouts, constructing main camps for tourism purposes, procurement of materials and equipment and making contacts with private investors to establish partnerships with local stakeholders.

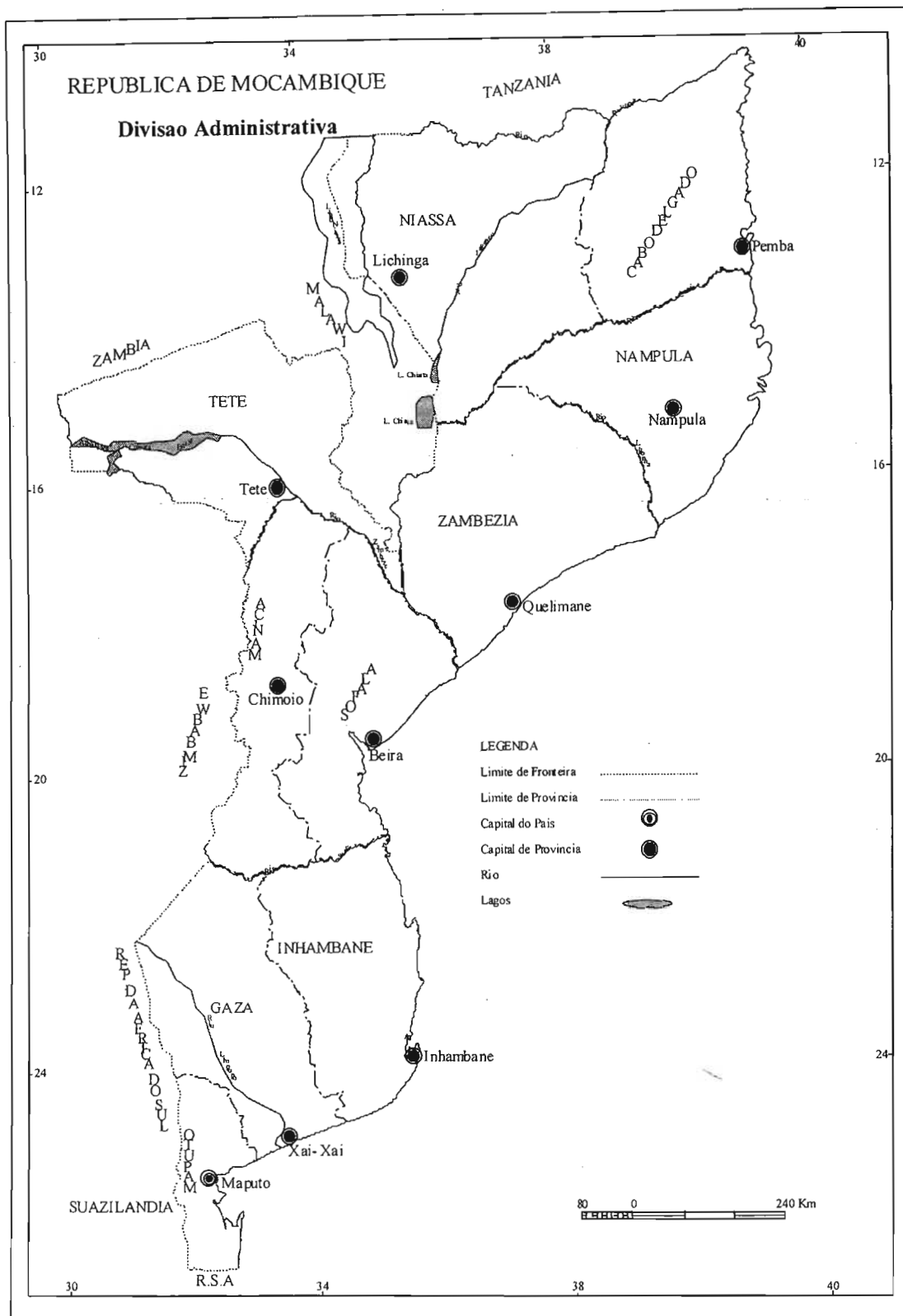


Figure 3-1: Map of Mozambique

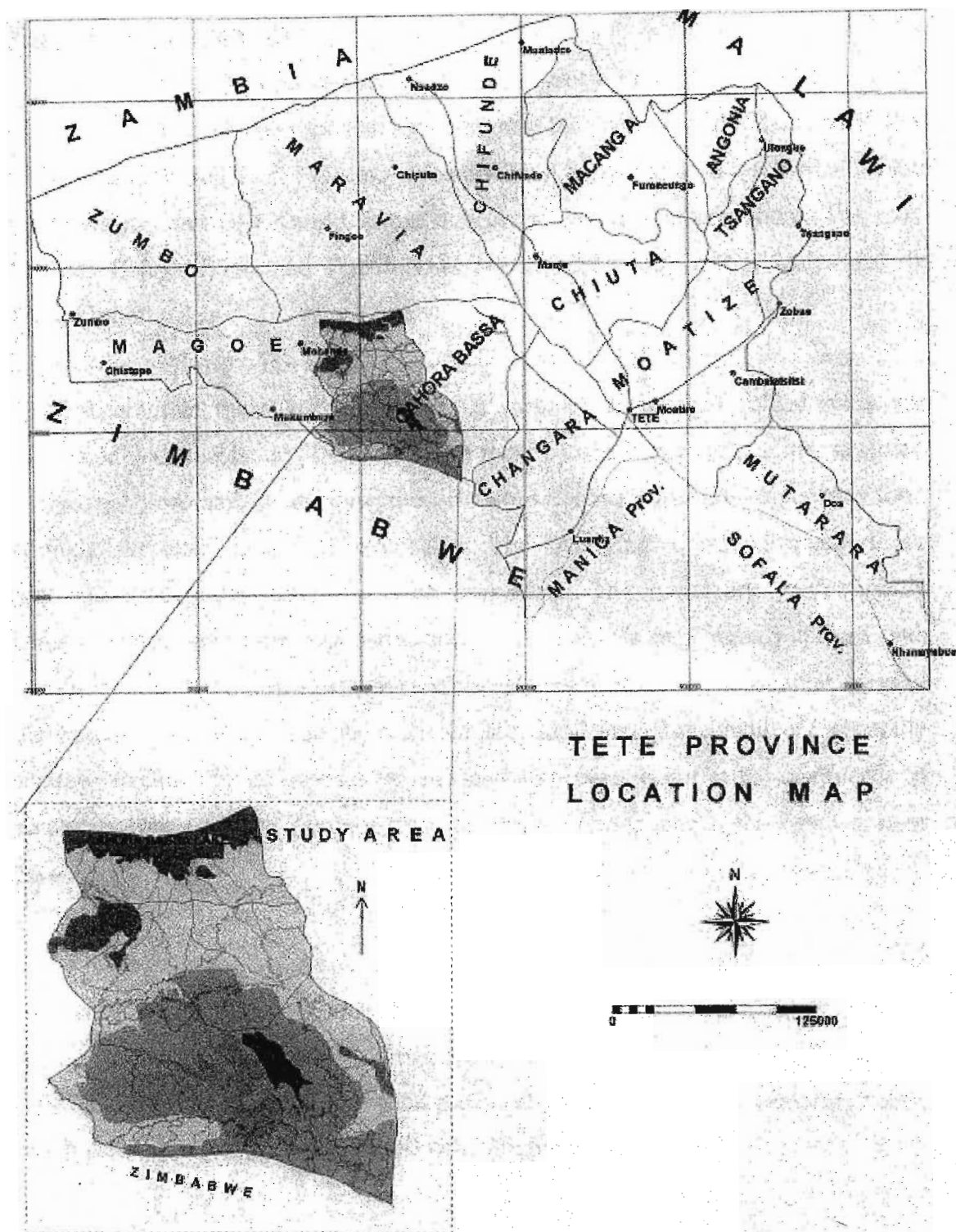


Figure 3-2: Location of the study area

Please see clarification of key at the end of the reference section.

3.3.2 Geology and Soils

The study area is influenced and affected by its geology. Precambrian rocks/basement complex and post-Karoo rock outcrops dominate the geology of the Zambezi Valley between Zumbo and Tete. Precambrian and Karroo rocks occur on the northern shore while Karroo and post-Karoo formations occur on the southern shore. The river between Cahora Bassa and Tete follows NW-SE fault lines and is underlined by Precambrian rocks.

The Precambrian rocks are mainly highly metamorphosed and folded sediments associated with ancient eruptive rocks. The rocks consist largely of granites, gneisses, schists, gabbros, marbles and quartzites. Between Cahora Bassa and Magoé they form strongly dissected hills and mountains. The overlying Karroo formations are sedimentary deposits associated with volcanism. The rocks are predominately conglomerates, sandstone, and carbonaceous. Drainage is only weakly incised with rare, minor river terraces. Quaternary colluvial sediments cover substantial areas of the basement complex. The deposits are silt, sand and gravel and are generally shallow. Recent alluvial deposits of silt, sand and gravel occur at the confluence of secondary rivers and the Zambezi river, and on the floodplains of the Zambezi river between Boroma and Tete.

The soils occurring in the area have some limitations for agricultural production. According to the Mozambique National Soil Map (1995), the study area is characterised by four major land forms, namely Recent Alluvial Deposits, Quaternary Deposits, Volcanic Rock Deposits and Sediments of Karroo, and Precambrian Socle, which are represented by different soil units (Figure 3-3):

SOIL MAP OF THE STUDY AREA

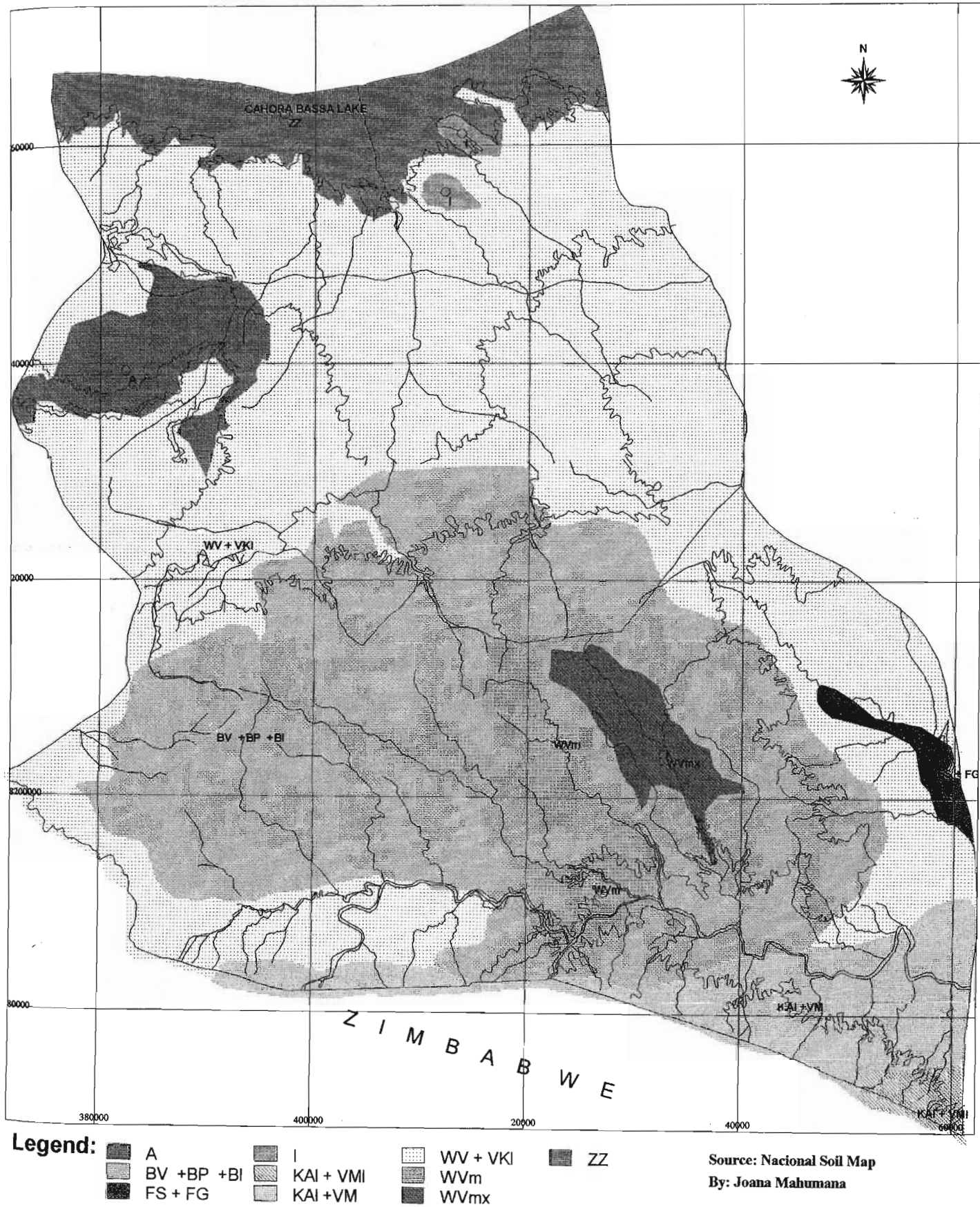


Figure 3-3: Soil units in the study area
Please see clarification of key at the end of the reference section.
Source: INIA (1995)

A) Recent Alluvial Deposits

- FS + FG- Coarse and Medium alluvial soils, originated from alluvial deposits of the Holocene, are classified as mollic and eutric fluvisols by FAO (1988). These soils are > 100cm depth, with imperfectly, to moderately good, to poor drainage. The main agriculture limitation is drainage. According to USDA land capability classification, the land use of these soils varies from very suitable to moderately suitable, with drainage and soil texture as major limitations.

B) Quaternary Deposits

- A- non-specified sandy soils derived from sandy cover, aeolic sands of Pleistocene. They are classified as Arenosols by FAO (1988). Generally the soil depth are > than 180 cm, and they are well to excessively drained. The main limitation for agriculture is the poor water retention capacity and the fertility. These soils are classified as marginal suitable for rainfed crop production according to the USDA land capability classification.
- WV, WVm, and WVMx- Red Clayey soils, derived from outcrops of sedimentary rocks of Karroo, and they are classified as haplic lixisols by FAO (1988). These soils are well drained and the soil depth varies from 50 to 100cm. The limitations for agriculture are soil depth and topography. These soils are classified as moderately suitable for rainfed crop production by USDA.

C) Volcanic Rock Deposits and Sediments of Karroo

- BV + BP + BI - Lithic, Black and Red Basaltic soils, originated from Basaltic mantle along the Pre-Cambrian Socle, and classified as ferric lixisols, calcic vertisols, and eutric leptosols by FAO (1988). The soil depths vary from < 50 to 150 cm, and they are well to moderately well drained. These soils are classified as natural reserves and forests, and according to USDA, are classified as moderately suitable for agricultural production limited by soil depth, and soil texture.

D) Pre-Cambrian Socle

- KAI + VM (1)- Brown - grey to red sand soils, originated from acid rocks, granite, gneiss, and classified as ferric lixisols by FAO (1988). The soil depths vary from 100 to 120cm and the drainage varies from well drained to somewhat excessively well drained. USDA classified these soils as moderately to marginally suitable for agricultural production, with topography, soil texture and fertility limitations.
- I- Lithic soils, derived from acid rocks, granite, gneiss, and classified as eutric leptosols by FAO (1988). The soil depths vary from 0 to 30cm, and they are excessively drained. These are classified as natural reserves and forests by USDA, and have limitations of topography.

According to INIA (1995), the study area is characterised by poor drainage, and low soil depth (most have < 100cm). The soil characteristics have some limitations for agricultural production, which varies according to different soil units. From the map, it can be seen that there are two dominant soil units; the BV, BP, BI or basaltic soils; and the WV, WVm, WVMx or sand soils. The first soil unit (basaltic soils) occupying a large proportion of the study area is classified as being occupied by forest and natural reserve and it is where there exists conflict between local communities and the animals. Although the land is moderately suitable for agriculture it has some limitations as mentioned above. The second soil unit (sand soils), also occupies a large proportion of the study area, and it is also moderately suitable for agricultural production but also has some limitations, these being soil depth and topography. It is important to mention that the USDA land capability classification is qualitative, and does not consider economic, political or social aspects. So, in depth research of soils and their suitability considering the socio-economic status of the rural communities is needed in order to contribute to achieving sustainable agriculture. This is possible through soil surveys at local level, improved seeds, technology transfer and extension services. In summary, this means that improving agricultural production, would be a step toward achieving food security.

3.3.3 Climate

The climate of the region is an important environmental variable, as it contributes to marginal agricultural potential in the study area. Such factors make sustainable agriculture difficult to achieve, and thus offers limited earning potential. The study area is located in the Zambezi Valley, which is climatically hot and dry. The climatic data from Chicoo Station (the nearest meteorological service station) is presented in Table 3-1. The reason for choosing the Chicoo station is because there is an absence of reliable data for Daque Unit, and because there is no significant climatic variation between Daque Unit and Chicoo, since both belong to the same agro-ecological zone. According to Kassam et al. (1984), data from 25 years at the Chicoo station shows that the average annual precipitation in the area is 635 mm, and the average dry period is said to be from April to November. This is a dry, hot climatic area.

Table 3-1: Climatic Data for Daque Unit

	P (mm)	T-mean (°C)	T-max (°C)	T-min (°C)	Ed (mbar)	U (m/s)	n/N (%)	Rg (cal/ cm/day)	PET (mm)
January	189.7	27.2	34.3	20.0	30.3	0.9	49.0	467.4	133.6
February	152.4	27.0	34.9	20.1	26.1	0.8	50.0	459.0	121.0
March	69.2	27.1	34.5	19.7	25.1	0.8	64.0	485.0	136.6
April	11.6	26.5	34.4	18.6	22.5	0.9	73.0	462.7	122.5
May	1.2	24.4	32.5	16.3	18.9	0.8	81.0	429.1	102.9
June	2.0	22.0	30.7	13.3	16.1	0.9	80.0	393.3	84.2
July	0.5	21.8	30.1	13.4	15.7	1.1	79.0	404.7	95.0
August	0.1	23.4	32.1	14.7	16.7	1.3	85.0	472.1	121.3
September	0.0	26.2	35.2	17.2	18.0	1.6	86.0	539.8	158.2
October	5.6	30.0	38.5	21.5	20.8	1.7	83.0	581.2	203.0
November	58.3	29.6	37.7	21.5	23.2	1.5	59.0	505.8	177.9
December	144.6	28.1	35.7	20.5	24.7	1.0	70.0	558.4	166.6

Legend: P (mm) = Precipitation expressed in millimetres; T-mean (°C) = mean daily Temperature degree Celsius; T-max = maximum Temperature; T-min = minimum Temperature; Ed (mbar) = mean water vapour pressure; U (m/sec) = mean wind speed in meter per second; Rg (cal/cm/day) = solar radiation; PET (mm) = Potential Evapotranspiration in millimeter; n/N (%) = hours of bright sunshine as a percentage of maximum possible sunshine hours in percentage.

Source: Agroclimatological Data for Mozambique, FAO of the United Nations (1984)

Kassam et al. (1982) states that the average start of the first growing period (GP1) after the general dry period is on November 27. The indication of the variation of the GP1 is from November 6 to December 27. Table 3-2 summarises the length of growing periods.

Table 3-2: Length of Growing Periods

No. of Growing Periods	Percent of occurrence	Length Growing Period (Days)		Length Dry Period (Days)		Length Humid Period (Days)	
	% of Yr	Avg	Std	Avg	STD	AVG	STD
1 Growing Periods	93	110	24	250	24	57	25
2 Growing Periods	7						
- length 1		96		222		75	
- length 2		15		27		0	
3 Growing Periods	0						
- length 1							
- length 2							
- length 2							

Legend: % of Yr = Percentage within a year; avg = Average; std = Standard deviation.

Source: Kassam et al. (1982) – Climatic data bank length of growing period analysis.

According to Kassam et al. (1982), one can say that in 93 out of a 100 years it is possible to have a growing period of 110 days (6 November – 27 December). Only in rare cases is the growing period extended beyond that (7/100 occurrence). Table 3-3 indicates the general crop growing periods.

Table 3-3: Indication of Crop Growing Period

Crop	Length of Crop Growing Period (days)	Length of Crop Growing Period (Experimental Data Mozambique)				
		Elevation Classes:				Max. Elevation
		0-200m	200-600m	600-1000m	> 1000m	
Beans	60-120	80-100	80-100	80-100	80-100	1500m
Cabbage	100-150					
Cassava	180-330					
Cowpea	100-130	100-130				200m
Cotton	150-180	138-152	152-180			600m
Groundnut	90-140	120-123	123-129	129-131		700m
Maize	90-140	120-124	124-132	132-140	140-150	1500m
Millet	90-120					
Potato	100-150					
Sorghum	90-140					
Soya	90-140					
Sunflower	90-145					
Tobacco	90-200					
Tomato	90-140					
White melon	80-110					
Wheat	100-135	122-124	124-128	128-132	132-137	1500m

Source: Kassam et al. (1982); experimental data: P.Geurtjes (1995)

3.3.3.1 Climatic Requirements for Crops in the Daque Unit

To evaluate the suitability of soils for rainfed agriculture it is important to consider limitations due to climatic conditions as well as the other requirements of crops. Table 3-4 shows some of the types of crops (maize, millet, and sorghum) that can be grown at Daque climatic conditions.

Table 3-4: Example of Suitability of Crops

	S1	S2	S3	N1	N2
Maize					
Length of growing period (days)	150 – 270 130 - 150	270 – 325 110 - 130	325-345 90-110	-	> 345 < 90
Annual precipitation (mm)	850 – 1650	1600-1800	> 180	-	< 500
Mean temperature of the growing period (°C)	22 – 26 26 - 32	16 – 18 > 32	14 – 16	-	< 14
Millet					
Length of growing period (days)	120-180 180-230	70-90 230-250	60-70 250-200	-	< 60 > 260
Annual precipitation (mm)	750-900 900-1000	70-90 230-250	60-70 250-260	-	< 60 > 260
Mean temperature of the growing period (°C)	22-26 26-32	18-20 28-30	16-18 30-32	-	< 16 > 32
Sorghum					
Length of growing period (days)	150-210 210-240	90-120 240-270	75-90 270-300		< 75 > 300
Annual precipitation (mm)	800-1000 1000-1200	400-600 1200-1400	350-400 1400-1500		< 15
Mean temperature of the growing period (°C)	21-26 26-32	18-21 > 32	15-18		< 500

Legend: S1 = Suitable; S2 = moderately suitable; S3 = marginally suitable; N1 = conditionally not suitable; N2 = not recommended.

Source: Land evaluation manual, Frank Bernaart (1990).

In table 3-4, it can be seen the range of length of growing period, annual precipitation, and mean temperature of the growing period for some crops. Table 3-2 shows the length of growing period in the study area. The conjunction of these tables clearly contributes towards decisions of which crops to grow in the area.

3.3.4 Vegetation

In general the study area is characterised by dense forest or open bushland, bush savannah and shrubby grassland (Wild & Fernandes 1976). Mopane woodland, one of the most distinctive vegetation types found in the southern part of Africa, characterises the area. There are also some species such as *Azelia quanzensis* (Chanfuta), *Adansonia digitata* (Embondeiro), *Ziziphufs mauritian* (Maçaniqueira) and others. It is important to mention that *Adansonia digitata* and *Ziziphufs mauritian* produce fresh fruits that are consumed by the local population. The *Ziziphufs mauritian* fruit is also consumed dry, and is used to produce a traditional drink in the area, and this constitutes a source of income mainly for female-headed household. Figure 3-4 refers to *Adansonia digitata* (Embondeiro), a typical tree in the study area and very important for local people for its multiple uses. Figure 3-5 refers to the general overview of the Mopane woodland, considerably reduced as a result of rural settlement.

The Mopane woodland consists of medium to large trees from 4 to 18m in height. This type of vegetation tolerates, in general, alkaline and poorly drained soils. Its leaves provide important fodder for many animals, particularly for goats, where it constitutes an important browsing resource. Caterpillars known by their large brownish-grey mouth, commonly known as "Mopane worms" also feed on its leaves. Mopane wood is dark reddish-brown to almost black in colour, very durable, hard and heavy. It is a good source of wood for producing furniture although it can be difficult to work. It constitutes a potential resource for human use in both Daque and Bungue communities, and has been extensively used for producing poles and railway sleepers.



Figure 3-4: *Adansonia digitata*, a typical tree in the study area

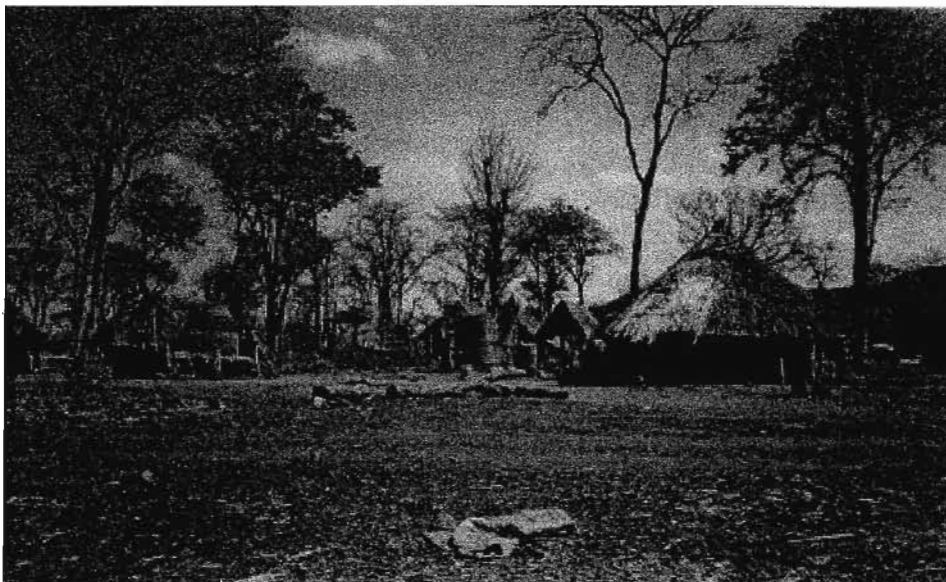


Figure 3-5: General overview of the Mopane woodland, considerably reduced as a result of rural settlement.

3.3.5 Wildlife

The utilisation of wildlife forms the foundation of the Tchuma Tchato CBNRM project. According to Tiago (Pers. Comm. 1999), the major activities that are being conducted in the study area, include wildlife patrol and resource inventory making. These activities aim to determine the number and variety of animal species. Animals such as lions, elephants, leopards, impala, zebras, monkeys, hippopotamuses, crocodiles as well as other species like buffalos, and wild dogs have been identified. The Daque River and Cahora Bassa Lake contain a variety of fish species. There are also several bird species in the area.

According to Tiago (Pers. Comm. 1999), the elephant and hippopotami herds are a major problem to agricultural production since they destroy most of the local efforts at farming, particularly along the Daque River. The farmers interviewed for this study mentioned that the number of elephants is increasing in the area. Furthermore, according to the Tchuma Tchato technicians there are few customs inspectors to patrol the area. Local communities use traditional methods such as fire, noise produced from drums to repel elephants. However, according to most of the interviewees many elephants in the area continue to destroy large areas set aside for crop production. The absence of inspectors and lack of financial resources exacerbates the problem. According to the report of the Tchuma Tchato project, the inspectors killed three elephants in 1999, the same number of hippopotami, and one leopard to protect the community and their production. So, fencing will be the best option to resolve the conflict between animals and communities. The animal problem has been regarded as very crucial for both the communities and their crop production.

3.4 Socio-Economic Issues

The questionnaire was administered in two communities: the Daque community, which belongs to the Magoe District and the Bungue community, which belongs to the Cahora Bassa District. It is important to mention that the Bungue community is composed of resettled people, occupying the area only recently. People resettled in this community come from other places in the Magoe and Cahora Bassa districts and were victims of the floods. Even so, they are still vulnerable to natural disasters, as the Bungue community is located close to Cahora Bassa Lake.

3.4.1 General Characteristics of the Two Districts

Table 3-5: Summary of general characteristics of the two districts

	Cahora Bassa	Magoé
Area (Km ²)	9035	8505
Total Population	68000	37000
Population/Km ²	6.42	4.25
Male (%)	42.6	48.6
Female (%)	57.4	51.4
No. of health centers	6	7

Source: Perfil distrital de segurança alimentar e nutrição e Instituto Nacional de Estatística (II recenseamento Geral da População e Habitação de 1997).

3.4.1.1 Cahora Bassa District

The district occupies an area of 9035 km² and a population density of 6.42 km². It has six health centers, which serve 11000 people each. The maximum distance to a health centre is 115 km. Diarrhoea, malaria, and sexually transmitted diseases are the most common diseases found in this district. According to people interviewed in the area, due to the great difficulty in getting to a health centre, communities use traditional medicine found in the forest. In general, women use traditional methods for family planning, namely breastfeeding the child until it has reached two years, and refraining from sex. According to "Perfil distrital de segurança alimentar e nutrição 1998" the modern method of contraception (family planning) is known to a few women, but they do use these methods because of taboos (for example it is thought to cause sterility or haemorrhage). Some women do not use contraception because their husbands do not allow them to, thinking that their wives will practise prostitution. As a result, the population is increasing which will impact on the environment in the future. Subsistence crops are: maize, sorghum, millet, groundnuts and beans, while the cash crops are: cotton and vegetables.

3.4.1.2 Magoé District

The district has an area of 8505 km² and a population density of 4.25 km². It has seven health centers with 3000 people served by each health center. The maximum distance to the health centre is 60 Km. The common diseases found in this district are the same as in the Cahora Bassa District. According to "Perfil distrital de segurança

alimentar e nutricao 1998” in general, women use traditional methods for family planning, consisting of breastfeeding the child until eighteen months or two years, and abstaining from sex. There are food taboos such as pregnant women are not allowed to eat food rich in energy (banana and sugar cane) and food rich in protein (egg, meat, fish), and it is argued that this kind of diet can cause problems at delivery of the child or to the new born.

3.4.2 Population Demographics

According to the 1997 population census, the estimated population of Cahora-Bassa and Magoe Districts was 68000 and 37000 respectively. In the Cahora Bassa District, 42.6% are male, while 57.4 are female. In the Magoe District, 48.6 are male and 51.4 are female. One can see from these data that there are more females than males. This is an important aspect to consider as far as agricultural production is concerned, as women are the keys to assuring household food production. According to INE (1997), in Mozambique 90 % of women practise agriculture, representing 60% of the work force. Even though 41 % of female headed household have a farm with less than 1 ha.

3.4.3 Infrastructure

In all communities that were visited there is a lack of basic infrastructure. Daque Location is characterised by poor living conditions, by lack of resources and by basic needs such as schools, a water supply, sanitation and clinics. It is mentioned in the literature review that infrastructures are important for the improvement of food security. This means that there is an urgency to develop basic infrastructures, including transport and communications in order for people to satisfy the basic needs.

A) Education

Another major constraint facing the people in the study area is the absence of schools. According to the key informants interviewed in the study area, there is only one primary school (EP1) in Daque (one of five communities in the study area). The one school has no equipment (no chairs, no tables, and no blackboard). Most children, particularly from other communities do not attend the school since the only primary school is located far away from their homes. Even those who attended the primary school do not attend secondary school (EP2) after finishing primary school, since it is located even further away from their communities. In general their parents do not

have sufficient income to pay for secondary school. Consequently, most of their children from 15 to 18 years old cross the border to Zambia or Zimbabwe to look for jobs. Considering the dependency of these communities on agricultural production, and the important role that rural women play, it is crucial to invest in education as it affects food productivity.

B) Health

The key informants mentioned that there is only one medical facility located in the Daque Community. This health centre is poorly equipped, with no qualified doctor, nor medicine supplies. In the health center there is only one nurse and one midwife. Most people in the five communities living in the area have to travel long distances (30 –50km) to find an appropriate medical facility. Costs of travelling and medicines are very high. Therefore, most of those people use traditional medicines made from plants commonly found in the forest located in the area, when they need treatment. Some people that were interviewed said that many people die, particularly children because of malaria, water borne diseases, diarrhoea, fever, swelling and AIDS related diseases. AIDS is becoming an issue in the area mainly because of the number of people that are crossing the border back and forth to Zambia and Zimbabwe as well as through people coming from those countries and other parts of the country to the area.

C) Roads

Despite Tete Province benefiting from a main road in reasonable condition, the access to the interior of districts and localities is bad. According to the key informants, the access became worse during the rainy season; for example to reach Daque Camp from Daque location is extremely difficult even using a 4 wheel drive car. Another example is that the Daque river which separates the two districts, and when it overflows its banks isolates the two districts, which means that people from Cahora Bassa communities who benefit from Daque health centre in Magoe have no access to that facility. There is a great need to upgrade the roads, and to construct some dams, because the two districts have many rivers and during the rainy season their banks are severely eroded.

D) Water

All communities consume water from the Daque River. This river is also used by local people to wash their clothes and to bath. Livestock such as goats, and pigs drink the same river water. To find potable water supplies is one of the major constraints facing those communities. This problem encourages some farmers to make their farms close to the Daque River, which is unfortunately vulnerable to natural disasters (floods) and erosion.

E) Sanitation

In all communities visited there are no sanitation facilities. Only a few households in some communities constructed a small place to bath, using local materials. This lack of sanitation contributes to spread of diseases as the environment becomes polluted, mainly in the rainy season.

3.4.4 Energy

In the study area, all people rely on wood for cooking and heating. They use Mopane wood, which makes very good firewood (giving off a sweet smell and an intense heat). Its burning power is so strong that most people use it for producing charcoal.

3.5 Conclusion

This chapter has described the biophysical environment and socio-economic issues. These are fundamental factors against which the current level of food security and the causes of malnutrition in the study area must be studied. From the biophysical and socio-economic conditions in Daque Unit, it can be seen that the area is harsh, remote, and with limited means to exploit the local resources.

CHAPTER 4

METHODS

4.1 Introduction

This chapter aims to describe the how the collection of data on the current status of food security and nutrition in the Daque Unit, Tete Province, was undertaken. The data were collected in two phases. The first or pilot phase (reconnaissance), was carried out in August 1999, and it took approximately seven days, with the objective of getting the first inside information about the study area, in particular that which would relate to the socio-economic characteristic of the population, to logistic concerns and to gaining other necessary information (availability of the probable interviewers). This initial overview helped to develop the second phase in particular the area selection, and conceptualisation of the field work, and in particular, the development of the questionnaire and identification of the different sources and key informants for data collection. The second phase covered the period October to November 1999, and consisted of the interview of households. Due to time constraints and absence of resources at local level, only two communities were selected; Daque and Bungue, each to represent Magoe district and Cahora Bassa, respectively. The areas were selected based on the information provided by key informants relating to the current situation of food security and nutrition, internal variability and similarities that provided a general overview of the districts as whole. It is important to mention that the two communities have some similarities in terms of housing infrastructure, compared to the rest of the communities in the two districts, which form part of the study area.

The area was also selected because it is a very important for the Tchuma-Tchato project, one of the best examples of community based natural resource management in the Southern Africa. As a result of this project, there is a need to understand the food security and nutrition status of the rural population since the area is rich in natural resources (fauna and woodlands), fish and water, which have been used by outsiders with few benefits for local communities. So, the study will provide an initial step to understanding the current situation of availability, access, and utilisation of these resources within the households and their impact on their nutritional status.

4.2 Methods

The initial contacts were made at provincial level in the field with officials from the Ford Foundation to explain the objectives of the present research. The interview with the Provincial Director of Agriculture and Rural Development gave some insights into the type of agriculture, natural resources management and community management projects in the area. The nature of government agricultural policies and the farmers' response to these policies were also discussed. Finally, directors of agriculture in each district were interviewed. While in the field the project officers and some key informants, such as academics and village and community leaders were interviewed. The interviews aimed at understanding the local people's views on problems, especially those concerning natural resources management, agricultural production, consumption patterns, income generating activities, and health status (in particular that of children).

From these interviews it was able to design the second phase, in particular the questionnaire aimed at generating qualitative and quantitative information. Secondary sources (see reference list) were also used for preparing the second phase. This phase produced data obtained through a field visit, contact with key informants in the area and local observations. The data gathered were very important because they helped to identify the communities and households, which would be suitable for more in depth work. They also helped to identify factors that influence the availability, access and utilisation of food at a household level.

As mentioned in chapter 3, Daque Unit is characterised by poor living conditions, lack of resources and lack of basic needs such as a school, water supply, sanitation and clinics. As the aim of the present study is to assess the current level of food security in Daque Unit, the analysis of socio-economic indicators of people living in Daque Unit will contribute to the aim of the study. It was used two places (Daque and Bungue communities), with generally acceptable sample sizes (30 for each community) for the case study approach. This approach cannot generalise out from these figures, but nevertheless it can give sound insight into the particular area, in this case the Daque Unit. Hammersley (1993) says that where the question of the generalizability of

findings is concerned, one suggestion is that qualitative researchers talk in terms of transferability of the results.

Defining strata within communities:

Table 4-1 shows the summary of the general socio-economic characteristics classification of households in both districts (Magoé and Cahora Bassa).

Table 4-1: Socio-economic characteristics of the households

Ultra Poor (≤ 85 % of population)	Poor (≤ 15 % of population)
<ul style="list-style-type: none"> • Small portion of land (0.5 to 1 ha) • Without food stock • Rudimentary means of production • Low income (food for work) • Small houses with poor building • Without sanitation facilities • One or no household member economically active • Low level of education (EP1) 	<ul style="list-style-type: none"> • Medium portion of land (2 – 3 ha) • Food stock for a year • Improved means of production • Medium income (small business) • Small houses made with improved building • Sanitation facilities satisfactory • Members of the household having primary level of education (EP2)

Source: adapted from "Perfil distrital de Segurança Alimentar e Nutrição (1998)".

The prior information gathered in the pilot phase, helped in identifying the different kinds of households. After careful consideration these were designated as ultra poor, and poor families. These categories were applied only in the Daque community. In Bungue the difference between families in terms of availability and access to food was minimal, making a single category, of ultra poor applicable here.

Hammersley (1993) states that methods should be selected according to purposes. A combination of quantitative and qualitative methods was used for data collection and analysis. The qualitative research methodology combined key informant interviews and focus group discussions. A questionnaire (Appendix 1) was used to gather both quantitative and qualitative data and was divided into six parts:

- Household characteristics (gender of members, household size, age distribution within the household, education, household infrastructure).
- Land conditions (access to land, size of land)
- Sources of income (working status, assets)
- Diet
- Water and sanitation
- Natural resources and other environmental concerns

4.2.1 Qualitative Data

Qualitative methods were used in the pilot phase, which helped in understanding the current situation of the households (for example, their main problems and what they think about the future of the community). These methods helped also to gather information related to the roles of the government, NGO's, and the community structures, through meetings with the key informants.

Key informant interviews.

The key informants that were interviewed were selected from both communities, Daque and Bungue. The key informants were community leaders, Tchuma Tchato members, referred to in chapter 3 (subsection 3.2.1), and influential people from the community who were able to provide relevant information regarding their community.

The key informants in the Daque community included:

- Community leaders (for example, secretary of the community, first, second and third secretaries of the Bairro¹),
- Tchuma Tchato president and his deputy for the Daque community and
- Selected old and young men and women.

The key informants in the Bungue community included:

- One community leader, because this community consists of one Bairro belonging to the locality of the Cahora Bassa District,
- Tchuma Tchato president and his deputy for the Bungue community, and

¹ Bairro (Daque community is divided into 3 bairros, which means that each bairro is composed of a certain number of households with their own leader).

- A selected group of males and females.

Focus group discussions

Participants in the focus group discussions were women and men. In each community there are female and male groups selected to represent the community on issues related to community management of natural resources.

4.2.2 Quantitative Data

The method used for gathering quantitative data was a semi-structured questionnaire. The purpose of this approach was to gather information about socio-economic conditions of the community, for example household characteristics, level of income, level of education. A further objective was to evaluate nutrition status by evaluating children under 5 years old for their nutrition status (weight, height and age). It is important to mention that there were limited cases of children under 5 years of age who had correct dates of births (day, month and year). There were no Road-To-Health clinic cards (charts that provide a continuous record of a child weight gain or loss over the first five years of his/her life), and no trained nurse to do the accurate measurement of weight and height of the children. My supervisor was not able to accompany me into the field. As a result, the nutrition assessment of the children was exploratory and is not included in the results. My work with the children suggests, however, that they are often hungry and therefore likely to be under weight-for-age. In terms of height-for-age, they are shorter than expected suggesting that long term under-nutrition has been the lot of these communities. One is therefore looking at present hunger and the long term stunted growth of children (and the community, by association).

a) The Daque community

The questionnaire was administered to 30 households, selected in the 3 bairros, which means that there were 10 households in each bairro. The 3 bairros are similar in terms of key characteristics, for example, same access to land, housing and housing infrastructure, and so on. Through data gathered from the qualitative research with the key informants, in each bairro households representing ultra poor and poor families were selected. As the objective was to represent both ultra poor and poor families, the selection was, first to identify the poor families in each bairro, and randomly survey

the ultra poor families. Before starting with the interviews a list of poor families in each bairro was obtained, and it was easy to locate the families, because each leader of the bairro accompanied the researcher or delegated somebody to show the location of the households. The questionnaire was administered face to face with the head of the household or a permanent mature adult respondent who was familiar with all aspects of the household.

b) The Bungue community

The questionnaire was administered to 30 households, selected randomly, because of their relative homogeneity and which were classified as ultra poor families. Bungue is composed of resettled people, having occupied the area recently, who have the same housing and housing infrastructure, and lacking basic infrastructures. In this community the questionnaire was also administered face-to-face with a head of the household.

4.2.3 Analysis of Data

The Quattro Pro computer package and Statistic Package for Social Science (SPSS) were used to analyse the quantitative data that were collected from the interviews. The results obtained from analysis of data are expressed in percentages; this enables one to understand the information collected, and is useful for making a comparative analysis of both communities, in terms of availability, access and utilisation of food.

4.3 Conclusion

This chapter has described the procedures used to conduct the present study. It has also given reasons why the two communities were chosen. It also indicated the measuring approaches used including the quantitative and qualitative data, interview procedures and lastly the computer package used to analyse the data.

CHAPTER 5

RESULTS

5.1 Introduction

The literature review has shown that indicators are needed to measure food security and nutrition status. According to Maxwell (1990), the use of indicators is location specific. The results presented in this chapter used indicators suggested by Haddad et al. (1991) referred to in chapter 4. The results from the semi-structured interviews of households, from key informants and personal observations will be presented in seven broad sections, based on household characteristics, land conditions, sources of income, education, diet, water and sanitation, and natural resources and other environmental concerns. Comparisons between the two communities, namely Daque and Bungue, are made in the presentation of results.

5.2 Household Characteristics

5.2.1 Gender

In both communities, most of the respondents were male and they were household heads. In Bungue 60% were male respondents and 40% female, while in Daque the difference in gender is much bigger, that is 87% are male and only 13% are female. From these results, one can see that the male gender was dominant in both communities. According to the key informants and local observations, there are not great differences between households, but compared to Daque, Bungue has more female-headed households.

5.2.2 Household Size

The number of members of the household determines the size category of the household. It is assumed that if the household has between 1 and 5 persons, it is small, between 6 and 10, it is medium and more than 11 (inclusive), it is large. Comparing the two communities, the results show that Bungue has more small households (50%) than Daque, which has 23.3%. In Daque, there are more medium sized households (60%) and large household (16.7%). Bungue has 40% medium households, and 10% large households.

Table 5-1: Characterisation of households, gender and sizes of the households interviewed

Communities	NH	Gender		Household size (%)	
		% of M HHH	% of F HHH		
Daque	30	87	13	Small	50
				Medium	40
				Large	10
Bungue	30	60	40	Small	23
				Medium	60
				Large	17

NH = number of the households, M = male, F = female, HHH = head of household

Source: Field work questionnaire case study data.

5.2.3 Age distribution within a household

The classification reflects the real situation in Mozambique rural areas. The results showed that both male and female aged from 11 to 55 are considered economically active. From age 11 children drop out of school for several reasons, including the fact that they have to help their parents in finding food for the household, and some, because their parents can not afford to pay school fees.

Table 5-2: Age Distribution within households

Age Distribution within a household (numbers)						
Ages (years)	Daque community			Bungue Community		
	M	F	Total	M	F	Total
< 5	10	17	27	21	17	38
6-10	16	19	35	17	12	29
11-55	63	73	136	35	54	89
> 55	2	4	6	2	3	5
Total	91	113	204	75	86	161

Source: Field work questionnaire case study data.

5.2.4 Level of Education

The results indicate that more than half (>50%) of people living in both communities have no education and the rest have attended only primary school. There are 60% and 66.7% respondents with no education in Daque and Bungue communities, respectively. Those with primary school education, there are 40% in Daque, and 33.3% in Bungue community (Figure 5-1).

The interviewers mentioned that the main reasons for the low level of education in both communities include low-income levels and absence of schools. Most of the time children drop out of school at an early age to help their parents in agricultural production and they also produce children early.

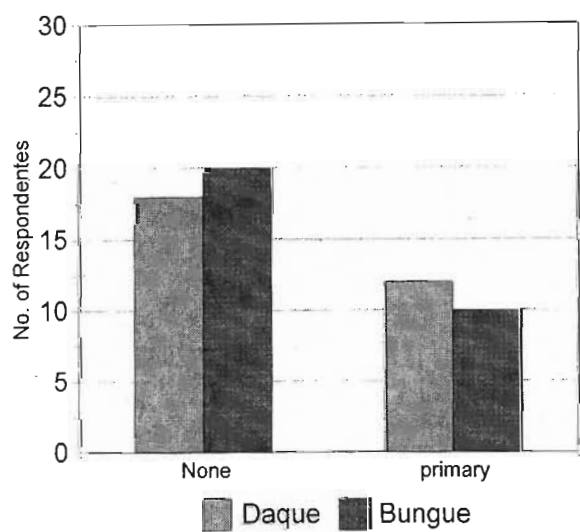


Figure 5-1: Level of education

5.2.5 Household Infrastructure

In both communities and the whole study area in general, the houses and housing infrastructure are similar. The houses are made out of local material, which is basically wattle and daub and they are thatched (refer to Figure 5-2). Those who have livestock have kraals surrounding the house, for security reasons (wild animals). In each community, the houses are located close to one another. In both communities, there is no fencing between the areas where the wild animals are normally found and

where the people live. This lack of fencing results in the destruction of crops by wild animals, resulting in loss of production.

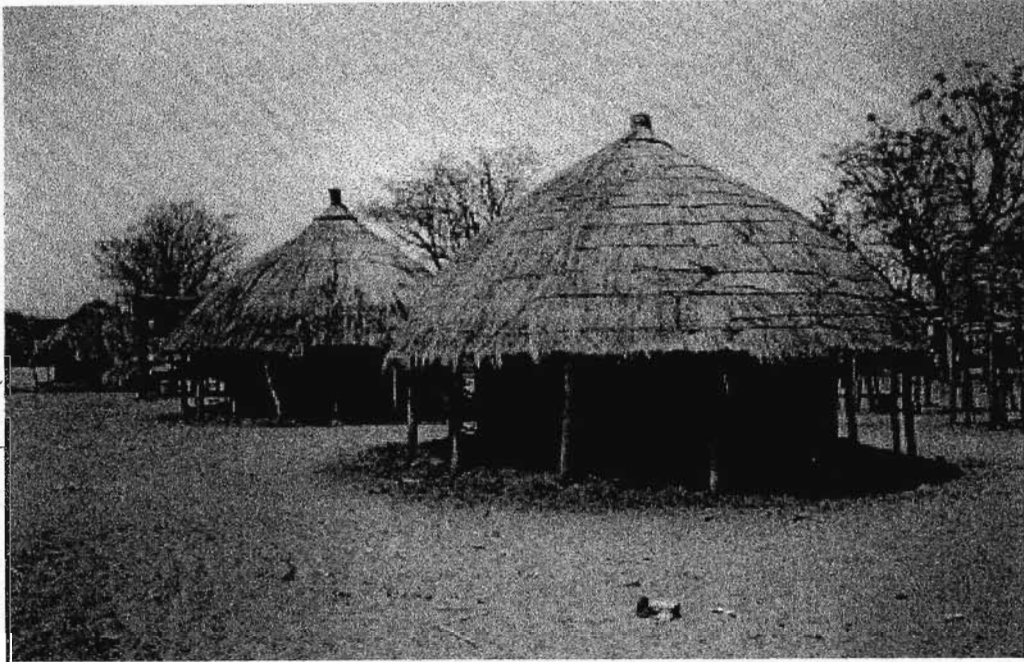


Figure 5-1: The type of houses in the study area

5.3 Land Conditions

5.3.1 Access to Land

In both communities, all households mentioned that the availability of land for cultivation is sufficient, despite the fact that they mentioned that some of the lands that they clear are not good for agriculture. They also mentioned that access to land is free (meaning that it is a government property), as long as one has enough resources to exploit it. All of the households in both communities clear only the land needed for cultivation.

5.3.2 Size of Land Holdings

All households that were interviewed have agricultural land, but the size of each farm varies. Only households headed by males have more than one piece of agricultural land. The reason is due to the need for hard physical work in clearing the land. Female-headed households do not have sufficient labour to clear the land so they have

no extra agricultural land. The choice and size of the agricultural land are limited by the following:

- no soil information and a random process is used in securing sites.
- problems with animals which destroy their crops
- insecurity due to floods and drought
- very hard work is needed in clearing the land, due to vegetation type in the area, this is a big problem mainly for households headed by women

5.3.3 Food Production and Production Capacity

The main crops produced in both communities are maize, sorghum, and millet. The productivity of the cultivated land is dependent of several factors, such as type of soil (with natural fertility), climate as referred to in chapter 3 sub-section 3.3.3, resistance of crops to pests and animals. As a result of these limitations to agriculture, the food produced is in general not enough to meet the consumption requirements of many households. Figure 5-3 refers to storage facilities, empty, as they are so often. Figure 5-4 shows the storage facilities in poor condition. The storage facilities are made by local material and are not often used.

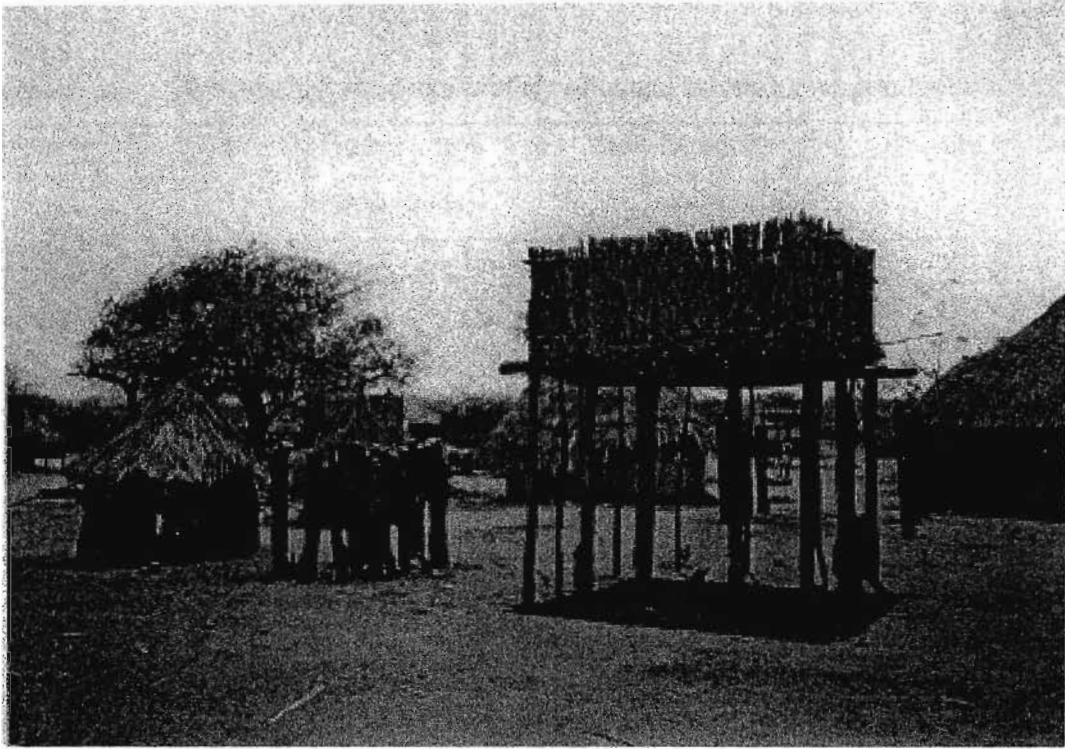


Figure 5-3: Storage facilities (empty, when I was there, as they are so often).

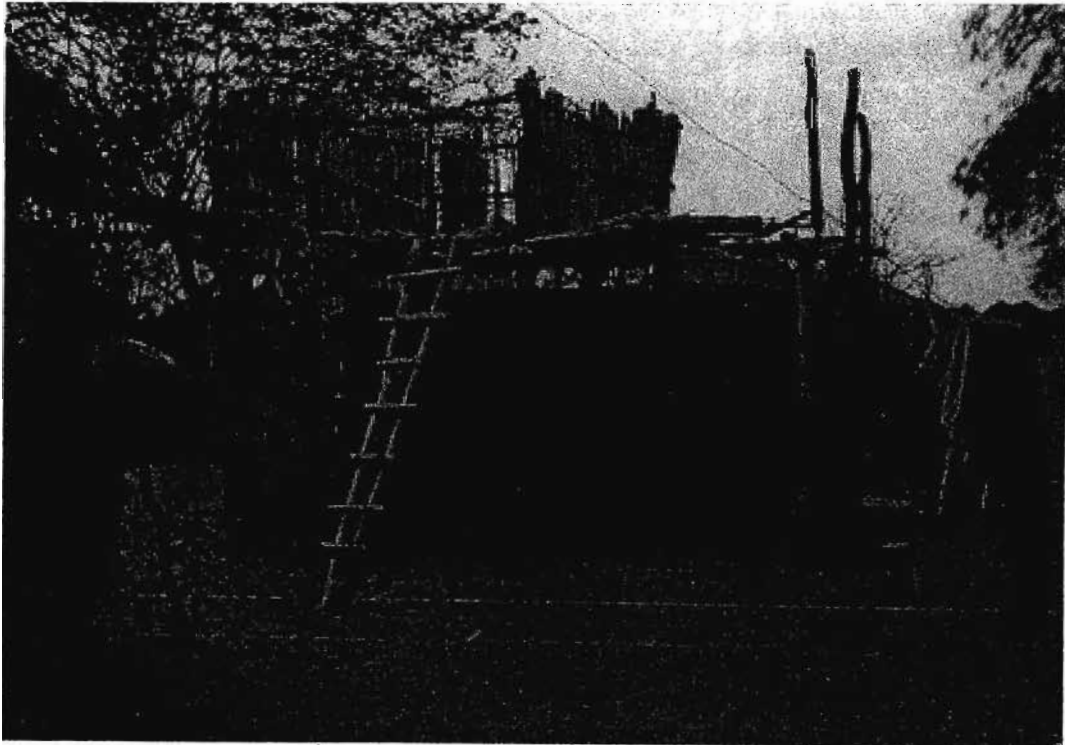


Figure 5-4: Storage facilities in poor condition.

Table 5-3: Households' food availability obtained through own production

	Daque (% of the households)	Bungue (% of the households)
Food for all year	17	-
Food for at most 9 months	50	10
Food for less than half year	33	90

Source: Field work questionnaire case study data.

The results showed that Bungue has 27 (90%) of households, which have food for less than half year and only 3 (10%) with food for at most 9 months. Daque is represented by 5 (16%) with food for all year, 15 (50%) with food for less than half year, and 10 (33%) with food for at most 9 months. In both communities, households whose food is not enough for all the year, obtain it through working for those who have enough food in the same area. Those who have money, buy in small quantities from those who have small businesses in the area. It is important to mention that people who have small businesses in the study area get their products in Tete and sell them in the area in small quantities; since there is no local capacity to buy large quantities. The prices are high and variable. According to some interviewees transport costs are high and they also spend money to overnight in Tete. Thus, continued rehabilitation of the road network, especially rural feeder roads, is necessary to reduce the costs of marketing food and other products. For example one litre of vegetable oil is sold in small plastic containers. Soap is divided into small pieces. The same is done for other food and non-food products. The reason is that only in this way can people afford to buy the goods.

The Table below shows the comparative costs of food products in Maputo (Mozambique capital) and Tete.

Table 5-4: Costs of items in Maputo and Tete

Item	Maputo			Tete		
	Last month's price	This month's price	Change (%)	Last month's price	This month's price	Change (%)
Grain of white Maize	2577	3226	25.2	1408	1645	16.8
Maize meal	4446	4467	0.5	6220	6546	5.2
Cowpea	2784	3437	23.4	3639	5435	49.3
Common beans	10906	11080	1.6	10563	10956	3.7
Rice	4908	4830	-1.6	8197	8318	1.5
Vegetable oil	15000	15000	0.0	20000	19500	-2.5
Groundnut	11052	10948	-0.9	8850	10863	22.8
Sugar	5949	6218	4.5	6875	7292	6.1

Source: Boletim mensal do sistema de informacao de mercados agricolas (SIMA), Dezembro 1999 edicao 103.

The prices are in Mts/kg, Mts/l.

1 USD = 15000,00 Mts

According to the interviewees, in both communities, the government never provides free food, agricultural implements, seeds, or other forms of relief. Only in Bungue, all interviewed households (resettled population) mentioned that, they received free food once in 1992 and once in 1994, from World Vision (an NGO, who was working in the district of Cahora Bassa). As a result of poverty and lack of resources to explore their natural resources, people from both communities experience food insecurity. In Daque community, 28 households (93%) have food insecurity periodically, while 2 (6.7%) have constantly. In Bungue community, 19 households (63%), experience food insecurity periodically, while 11 (36.7%) are constantly food insecure.

5.4 Sources of Income

5.4.1 Income

Income for both communities was divided into four categories, namely “unstable and less than 100.000 Mts ”, “101.000 – 200.000 Mts”, “201.000 – 600.000 Mts”, and “601.000 – 1000.000 Mts”. Most of the households in both communities have unstable incomes that are 87% in Bungue and 53% in Daque. The term “unstable” refers to households with irregular incomes, which they obtain from different sources as part of their survival strategy. The instability reflects the uncertainty to which most households are subject. It is important to mention that these incomes refer to income per month of the households obtained from all household members within a month.

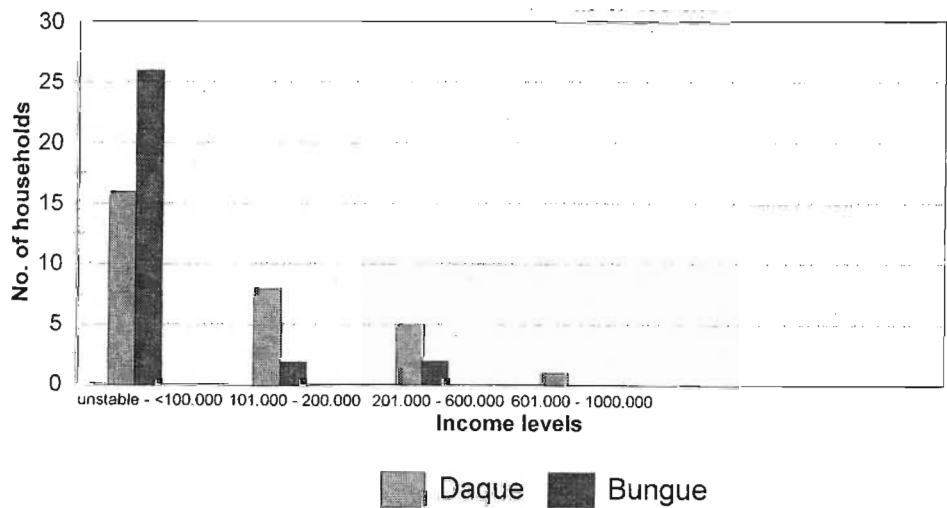


Figure 5-5: Monthly income range of the households interviewed
Source: Field work questionnaire case study data.

5.4.2 Working Status

Working status as a source of income was grouped into three categories, namely employed, unemployed and self-employed. Employed refers to people who are working and earn a salary. Unemployed refers to people who are dependent only on subsistence agriculture. Self-employed refers to people who have small businesses, normally they go to town and buy in small quantities, products like salt, rice, soap and so on and sell to local people, some others sell fish acquired in the area. There is only one person (3.3%) employed in the Daque community, 27 unemployed, which means

90% in both communities. There are 2 people self-employed in Daque, that is 6.7%, and 3 in Bungue, which means 10%. From these data, one can see that the level of unemployment is very high. Most of the people living in both communities are easily vulnerable to food insecurity, as they rely mainly on their own agricultural production and this depends in turn on rain and many other factors previously mentioned, such as poor soils, animals damage, hot and dry climates and so on.

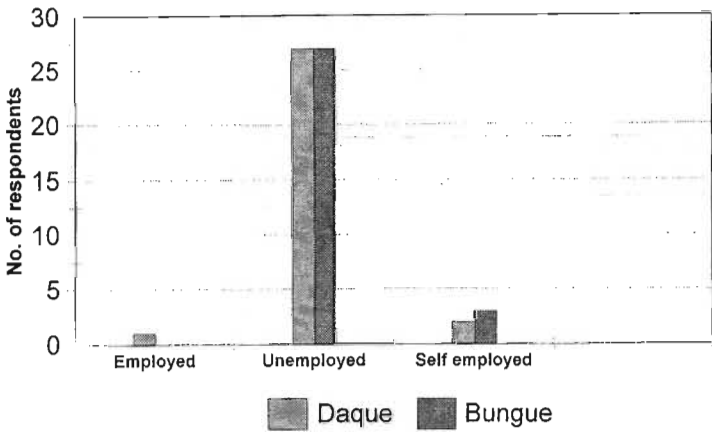


Figure 5-6: Working status and number of the households interviewed

Source: Field work questionnaire case study data.

5.4.3 Assets

The results showed that crops are the only assets that all households have in common. In Daque, there are 20 households having livestock, while in Bungue, there are 17 households having livestock. Livestock consists mainly of goats, chickens, and pigs. Radios, bicycles, and furniture are irregularly distributed within communities, and there are very few households who have these items.

5.5 Diet

In both communities, members of the households indicated that their staple food is maize with sweet potatoes and pumpkin leaves. A few households mentioned that sometimes they eat fish, or meat, which they get through exchange of maize. This

exchange happens only in times when they still have food, mainly in the first two or three months when the food is available. The number of meals per day that members of the household consume varies. For the ultra poor household, it varies from 1 to 2 per day, and it is basically maize. The poor families have normally 3 meals per day, and also these are based on maize. Both ultra poor and poor families tend to reduce the number of meals, when there is a shortage of food. The number and kind of meals per household is the same for both adults and children (even those less than 5 years old). In the Daque community, 15 households (50%) have meals twice a day, while the rest (50%) have meals three times a day. In Bungue 2 households (7%) have meals once per day, 67% twice, and 26% three times.

The food that most of the households consume on a daily basis is maize, sorghum and some sweet potatoes and pumpkin leaves. The source of protein is basically fish, meat, chicken, and goat. Meat is consumed only irregularly by very few households in both communities.

In both communities, supplementary food is given to babies, between 3 and 6 months, and is basically light porridge, made with maize and no oil is added.

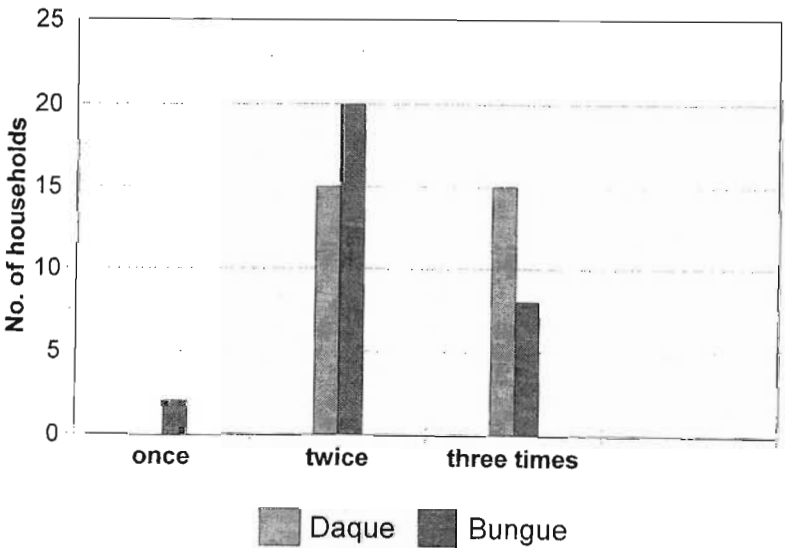


Figure 5-7: Household meals per day

Source: Field work questionnaire case study data.

5.6 Water and Sanitation

The Daque community obtains drinking water from the Daque River, while the Bungue community obtains it from the Cahora Bassa Lake. For both communities, the water that they consume is not suitable (the same water is used for human consumption, washing, etc). The same source for drinking water for the people is the same one for the animals. See Figures 5-8 and 5-9. Both communities wash their clothes in the source of their drinking water. This contributes to the spread of diseases, because the water becomes polluted. Thus, there is a need to find alternative sources of water, or to find better means to control its varied use.

Both communities lack sanitation facilities. The main illnesses mentioned in both communities are diahorrea, malaria, and cholera. They also mentioned others like stomach and head aches, infectious diseases such as tuberculosis, AIDS and related diseases.



Figure 5-8: Animal drinking water in Daque river during the dry season



Figure 5-9: People fetching water in the same river during the dry season

5.7 Natural Resources and other Environmental Concerns

Both communities have access to natural resources, but they do not have control over them. Access to natural resources means that if the resources are available and families belong to the area where the resources are, they have access to them. The controls that are exercised at present are through the Tchuma Tchato project (chapter 3 section 3.3), which aims at the sustainable use of the resources.

According to the head of Tchuma Tchato project in Daque (Tiago, per. Comm. 1999), the project is trying to compile an inventory of the animals existing in the area and at the same time it is looking for possible investors for the area. As the project is about community based natural resource management, it aims to help local communities exploit appropriately their natural resources in order to benefit the community.

The project has educated the local communities in matters relating to natural resource conservation. Conservation is an important issue due to the conflict existing between local communities and the animals. The project is aiming to conserve the fauna, but from the community's point of view, the animals are only destroying their crops. Some members of the community interviewed argued that it is not easy to understand why they should have to help in preserving the animals, when they destroy their crops. Apart from this issue on wildlife, ecological education in general is important, because some household members are destroying the forest, as they need land for agriculture. They first burn and then clear the land and they also build small houses with local material like wood to live within the forest, see Figure 5-10. In the long run, this will have a negative impact on the environment. The head of Tchuma Tchato Project in Daque argues that the project does not have sufficient resources (human and financial) to control the situation.



Figure 5-10: Destruction of the forest by local people

Fish is another natural resource in the area, and is being exploited by people from outside the area, without any benefit to the local communities. These outsiders are fishing without control, which also will have a negative impact on the marine resources in the area.

For both communities there are sufficient resources that they can exploit to meet their household needs, but the problem is an absence of the means to exploit them. At the moment, they are not applying any conservation practices to the use of resources, because they argue that they only exploit for instance firewood for household consumption.

5.8 Conclusion

The results on household characteristics showed that there is poverty in both communities, which is exacerbated by high levels of unemployment, illiteracy and poor living conditions. Poverty in the Bungue community is more visible due to the lack of infrastructure such as schools and the health center, and is aggravated by the fact that there are more households headed by females than in the Daque area. As households in both communities depend mainly on subsistence agriculture, without financial resources, both communities are vulnerable to food insecurity.

As far as food security and entitlement, both communities have the same problems that affect their food production. Due to problems like long distances to the farms, and

hard work to clear the land, most of the households have small farms which impact on food production. In both communities most households have sufficient food for less than half a year. As a result, most households experience hunger and food insecurity periodically.

One may conclude that most people will be suffering from malnutrition due to their limited daily food intake. Therefore, the deficiency in food results in non-resistance to most of the diseases existing in the area.

Finally, in terms of access to natural resources, both communities have access to the resources, but not control over them. Most of the households have some knowledge about their natural resources, but they do not have the means to exploit them due to financial constraints and lack of markets. As an example, when I visited the area I noticed that there is a lot of *Juncus krausii* (refer to Figure 5-11), which can be used to make handicrafts, but this is not being done (because of lack of skills and markets). In both communities there are serious problems related to water supply and sanitation facilities, which contribute to diseases.

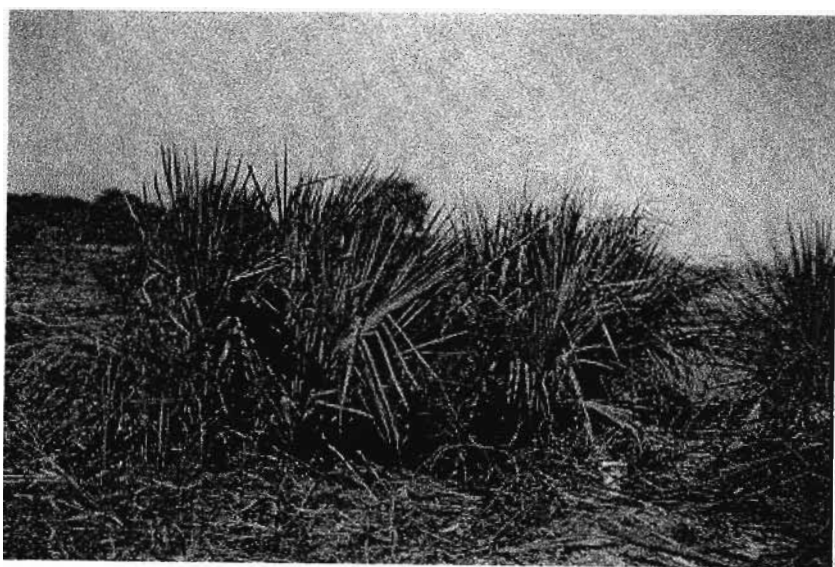


Figure 5-11: *Juncus krausii*

CHAPTER 6

ANALYSIS OF RESULTS

6.1 Introduction

The analysis of results will be considered against the objectives of the present study, linking with findings that come up from the fieldwork and presented in the previous chapter. As mentioned in the research objectives, the study will look at the current level of food security and the causes of malnutrition, and will examine food security and entitlement, and finally will evaluate the access to natural resources and will examine other environmental concerns. The analysis of results will also cover aspects that were found as relevant in the study area, such as poverty, and gender issues.

6.2 Current Level of Household Food Security

The current level of household food security is determined by socio-economic factors, or in other words is assessed using information on food availability, access, and utilization.

6.2.1 Food Availability

The purpose of a food availability analysis is to determine whether the total amount of food physically available in the area over the given consumption period is adequate to meet the consumption needs of the household. Total food includes that from direct sources (household stocks, own production) as well as indirect sources (markets, business, and transfers).

From the results previously presented, one can see that in both communities, local food availability is a problem. Most people in both communities do not have food stocks, which means that they produce enough merely for subsistence, and food is only available for less than half year.

Factors affecting food availability as mentioned in chapter 5, are the following:

- land conditions
- household size
- gender

- **Land Conditions**

Land conditions are important issues that can determine the level of household food security and nutritional status. If land is productive, then most likely the production will meet some of household needs. Land productivity is a problem in both communities and in the study area in general, due to the fact that rainfall is low, and the climate is hot and dry.

- **Household Size**

Another factor affecting food availability is household size. The number of household members determines the amount of food required by a household. Comparing the two communities, the Daque one has more large families than the Bungue. Both communities are affected by food availability, mainly those with large families but also those with medium families.

- **Gender**

It is clear from the literature review that those households headed by females are more susceptible to poverty, and hence to food availability. According to chapter 2, section 2.6, women have more difficulties than men do in gaining access to resources. And this is due to cultural, traditional and sociological factors. From the results it can be seen that the data shows certain characteristics that leads to show that the household head determines the economic status of the household in the population within the sample size used, but more rigorous research is necessary to say with a meaningful level of confidence.

In Bungue and in Daque, households headed by females, even with small families are the most affected by lack of food availability. As an example, in Bungue it was interviewed a woman with 3 children, one of whom she was breastfeeding. She is one, like many women in the area, who sees her husband once per year, because he is living with another woman in another province. The interview was in the afternoon, when almost all members of the other households were back from their farms, and she was preparing food (pumpkin leaves and sadza = hard porridge). When it was asked her about how many meals her family (she and her children) have per day, she answered that the one that she was preparing was the only one that they would have,

and everyday was like that “we eat once per day”. When asked about the following day, the answer was the same, everyday it is the same food. She and other households prepare pumpkin leaves adding only water and salt and once boiled, it is ready to be eaten. It can be seen that the kind of food prepared affects the health of people, and as a result they are susceptible to diseases. Poor nutrition is a cause of concern in both communities.

6.2.2 Food Access

The objective of a food access analysis is to measure the ability of households to acquire the available food to meet their consumption requirements. The main factors that affect food access include:

- income
- assets
- working status
- education

Income

Income is a sensitive issue with households; thus the questionnaire when asking about income, used a range in income rather than requiring them to nominate an exact amount. It is an important indicator that needs to be considered to understand social structures in households. Income levels in this study ranged from “unstable” (not consistent) or less than 100.000,00 Mts to 1000.000, 00 Mts (Mts is Mozambican currency, 1 USD = 15.000,00 Mts). In both communities the level of income is low. Some households possess sources which can generate it, but these sources of income are insecure. There are more households with unstable incomes than stable incomes in both communities. As an example, there are 16 (53%) households in Daque, and 26 (87%) in Bungue with unstable incomes, and 1 (3.33%) in Daque with an income between 601.000 and 1000.000,00 Mts per month, and none in this category in Bungue. It can be argued that since both communities have low incomes, there is little opportunity for the alleviation of the existing poverty. Both communities are producing food for subsistence, and they do not have other means to buy food. Some of the strategies adopted for the communities in order to acquire food include exchanging work for food, the production of traditional and alcoholic drinks, selling

fish, and some times selling part of their assets. According to people interviewed in both communities, this problem of low income is the result of the following factors:

- Migration

Young people in young ages, mainly male, go abroad usually to neighboring countries, namely Zimbabwe, Zambia, Malawi, and South Africa to seek employment, and they come back to their home without remittances. The households interviewed argued that the reason of coming back with non-remittances is the lack of employment in the mentioned neighboring countries and involvement with female partners abroad.

- Diseases

As a consequence of migration, there is an increase in the number of AIDS and related diseases, which impact on food production, as there is a reduction of household labour availability.

- Entrenchment of poverty

Some people are not able to work because they are unfit. Even those who have some source of income will spend it in trying to help to resolve the problems of poverty (spending money for medicines). Women and children are the most affected, because they do not have other means to cope with poverty.

- Social disorganization

In some households, while women go out to fetch firewood or water, men take maize from their stocks, and exchange it for traditional alcoholic drinks. They easily become drunk, because they drink alcohol without having food at the same time. Women have little control over this kind of occurrence. So, as a consequence the family as a unit is under threat, there is a great burden on women, there is no entrenchment of a work ethic, there is much alcoholism and feelings of powerlessness.

Assets

According to the results presented, all households in both communities have land as an asset to produce subsistence crops. In Daque likewise in Bungue, households also have livestock, 20 households in Daque and 17 in Bungue. Very few households in both communities have access to sources of generating income. The importance of assets to a household is that they can be used to gain access to food, in times of shortages.

In both communities, households still have a problem to gain access to food due to:

- Land quality

According to people interviewed the soil conditions are poor. They also mentioned the fact that animals destroy their crops.

- No Extension Services
- No support from National Agricultural Directorate

The agricultural district and provincial Directorate, neither supplies seeds of crops that can cope with the kind of soils in the area and never gives them agricultural equipment to help people to produce food. This problem associated with low income makes both communities vulnerable to food insecurity, since they do not have other means to help themselves to gain access to food in times of crisis.

- Livestock

Both communities mentioned that crop food is not enough. Even those who have livestock, sometimes experience food crises, because most of them preserve the animals as a symbol of wealth and prestige.

- Rainfall reliability

When the interviews were conducted, people were very concerned about the lack of rain, but nevertheless they were preparing the land to cultivate. Most of them commented on the floods that they had in the same year, where they lost all of their production. This happened because they sowed their crops close to the rivers or lakes, in order to exploit the better water supply.

From the findings, one can see how these communities are vulnerable to food insecurity. This is based on the fact that they do not have assets that will help them in times of crises. As an example, the 1999 floods left people from both communities with no food. The same lack of food occurred when there was a drought. People's strategies for survival are aggravated by their use of marginal lands.

Working Status

Another factor affecting food access is the high level of unemployment in both communities, which prohibits people buying food. Employment is crucial to the improvement of household food security. As shown in the results presented, the level of unemployment is high (90%) in both communities, which means that they are

vulnerable to food insecurity. From a sample of 30, there is only 1 household head employed in Daque, and none in Bungue. Of the remaining households, 2 in Daque and 3 in Bungue have members who are self-employed.

Both communities are characterized by subsistence food production, which has been already mentioned as not viable, and the situation is aggravated by high levels of unemployment, and low incomes. From these findings, one can see that both communities experience food insecurity. In other words, it can be argued that insufficient food availability, results in consumption requirements only being partially met, and as a consequence there will be poverty or outmigration on one hand, and disposal of productive assets on the other hand.

Education

- Lack of education and entrenchment of poverty

Education is an important factor to be considered in the eradication of poverty and hence household food security. Education is viewed worldwide as a tool by means of which the poor and impoverished can raise their social status and improve their standard of living. Education is a means by which people can free themselves from poverty. Both communities are characterized by low levels of education. It is argued that poorly educated households have higher rates of poverty. There is also a strong positive relationship between education level and income, but again more in deep research is needed to say so with meaningful levels of confidence. That is low income (poor households) have lower standard of education. Education is important for employment opportunities. This means that jobs are limited for uneducated people, and even if they go abroad to seek work, they end up earning low salaries, which will contribute very little to food access. The results showed that about 60% of the household heads in Daque, and 66.7% in Bungue have no education. 40% of the household heads in Daque, and 33.3% in Bungue were found to have attended only primary school. There is only one primary school in the Daque community, and none in Bungue. The Daque school is made from local materials, with pupils attending classes on the floor. What I have noticed during the fieldwork is that, female children drop out of school sooner than the male children; they start helping their mothers in their daily work, mainly in procuring food, and they also take care of the other

children. Another reason that children drop out of school is because it is distant from their homes.

What is happening presently in Daque where the school is located, is that children coming from Bungue have to stay there for a week, in a small house made of local material, bringing with them some maize which they have to cook by themselves. They normally stay in a group of 5 to 7 in the same house. On the weekend they walk again long distances back home to fetch some more maize. Because there is a river close to the school, they fish the very small fish to eat, and they drink water from the river. When their parents experience a shortage of food they have to drop out of school, and go back home. Some of those who can finish primary school, cannot continue with further education, because their parents do not have any source of income which can pay for continuing studies far from their homes. If this situation remains as it is at present, in both communities, households' access to food will become more difficult.

6.2.3 Food Utilization

This analysis identifies factors like diseases and certain practices that diminish their ability to meet dietary needs from the available and accessible food. In other words the use of food through adequate diet, water and sanitation, will be discussed.

Adequate Diet

Adequate diet is an important factor which can determine food utilization. According to the results, both communities have inadequate diets, since their basic food consists of maize (hard porridge) and some few leafy vegetables (pumpkin and sweet potatoes leaves). The number of meals taken per day is different, but the food eaten is basically the same. This means that the nutritional status of individuals is low and likely learning and health problems in long term. Many factors such as low income, high level of unemployment, low level of education, lack of assets, lack of resources, and so on influence the food availability, and food access, and all the factors together result in inadequate diet.

Water and Sanitation

Water is also another factor of extreme importance which can affect food utilization. In the Bungue community, water is not a problem in the dry or the wet seasons, while in Daque it becomes a problem in the dry season, because the Daque River dries up. However, the water that they access is not suitable for drinking. As mentioned before, water from the Daque river (consumed by Daque community), and from Cahora Bassa Lake (consumed by Bungue community) is the same used for washing cloths and for the animals to drink. The water from these sources is not boiled in either communities, which means that the water is a source of transmission of diseases. As a result, in both communities, the main diseases are diahorrea, cholera and malaria. This fact diminishes the ability to meet dietary needs, from the available and accessible food. Inadequate diet and diseases are two conditions of immediate malnutrition. Availability and access to food will also be affected, and thus food utilization, also becomes a problem. So, there is a need for health education

In both communities there is no access to sanitation facilities. This lack is also a source of diseases, mainly in the wet season. Members of household of the both communities use the forest in which to defecate, which is close by, and when there is rain, the waste is transported to their main sources of water. Consequently, the water becomes polluted, making people susceptible to infectious diseases. This is a case of environmental concern, which in turn affects food utilization.

6.3 Poverty, Food Insecurity and Hunger

The Daque and the Bungue communities experience hunger and food insecurity, which is due mainly to poverty. Based on data obtained from a survey in the households of both communities, one can see that it is urgent to promote policies, which can improve the lives and development capacities of low-income families. This is possible once the potential for growth and development exist in both communities. Low incomes, high levels of unemployment, low levels of education, low productivity of soils, the climate, animals, pests and diseases are the main factors, which affect food security in the study area and cause vulnerability to households.

The concept of food insecurity advances our understanding of hunger by recognizing that hunger takes place within a larger context, and by specifying a set of stages

through which households move from merely food insecurity to hunger. Before households reach the stage of hunger, they first experience anxiety about the adequacy of their food supplies, and are forced to alter their food purchases and dietary intakes, a condition termed "food insecurity". This process is what is happening at present for most of the households in both communities. If measures are not taken soon, this stage will be followed by hunger among first the adults, as they will try to spare their children from food deprivation. Finally the result will be that, as food insecurity deepens, children also will begin to experience hunger, as food intake reductions by adults become more severe.

6.4 Women and Food Security

Linking what was mentioned in the chapter on the literature review, with the findings from the field, it becomes clear that women play a crucial role in agricultural production (providing food for a family), yet changes in attitudes toward a recognition of women's activities still needs to be seen.

In both communities, men control social systems, while women are subordinate and actually suffer together with their children. Due to their overburden with their productive and reproductive roles, their low education status, and the absence of social and health infrastructures and services, women are not able to take adequate care of their children's health and nutrition. In both communities, malnutrition and other aspects of poverty make women vulnerable to many illnesses, including sexually transmitted diseases. According to "The State of the World's Children, 1998", good nutrition is the key to the healthy development of individuals, families and societies.

Another aspect affecting food production is population growth. Women in both communities lack family planning, and as a result child spacing is almost absent, contributing to low health of the mother and the child.

Despite women's status and productivity being recognised more these days, policy-makers continue to consider only men as heads of households, which means leaving a majority of women without technology, credit, and extension services they would need as major food producers. In both communities, women still use rudimentary

tools of production, and they have not been given adequate assistance from the government, banks, or others.

In order to improve their lives and the lives of their families, and communities, there is a need to empower women, through knowledge and skills, such as access to labour saving technologies, especially those needed in farming. Once they have access to these, these technologies will alleviate the need for a considerable amount of child labour.

6.5 Conclusion

This chapter has presented the analysis of results from the previous chapter, which was combined with the relevant aspects found in the study area. From the analysis, one can conclude that poverty is the major cause of food insecurity in both communities. Both communities have problems with food availability, food access, and utilization. Those problems include lack of basic infrastructures, such as schools, clinics, roads, and transport, as well as a high level of unemployment, low incomes, and low land productivity. This has an impact on household food security.

CHAPTER 7

CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

Food security is a broad and complex subject. The literature review has shown that causes of food insecurity are diverse, varying from place to place. Therefore, there is a need to clarify the causes of food insecurity, and the possible remedies to adopt to overcome the problem. The study has shown that land, gender and income are the most important variables that influence food security in the area.

- Land

The present study has shown that land is the only asset that both communities possess. However, the absence of detailed soil information in the study area is a limiting factor for food production. This is exacerbated by lack of means of production, improved seeds, and new technologies and extension services.

- Gender

The study refers to the importance of gender of household head and its influence on household food production. The results showed that male-headed households have more labour available, consequently they can afford to have more than one farm. The reason is that they have sufficient labour to clear the land and so they can have extra farms compared to the female-headed households. Consequently, female-headed households are more susceptible to food insecurity. It is important to mention that rural families, and especially rural women, are the most affected by all aspects of poverty. So, a policy to promote and improve women's status is an important strategic aspect in local development initiatives.

- Income

It is also an important indicator used to assess food security. The results showed that both communities face serious income shortages, due to absence of income generating activities and this leads to critical food insecurity.

- There are other factors also influencing the current status of food security in the Daque Unit such as, lack of employment, absence of schools and medical facilities, inadequate water supply, and sanitation. Natural disasters such as floods and droughts also cause vulnerability to food security in the study area.

7.2 Recommendations

This chapter will recommend some activities that may lead to increase the food security in the study area. It is important to mention that government should put in place policies that can enable people, families and communities to break the unfortunate cycle of poverty. A bottom-up method is also important in project design in order to give local communities a chance to participate in the planning process to use their resources. Community participation is essential for maintaining sustainable use of natural resources. Skills related to employment, income and education opportunities improve the capacity for achieving household food security as well as nutrition status. It is important to refer that nutrition status constitutes an important component to assess food security. So, it is recommended that further research linking food security and nutrition assessment should be done in the area.

From the presented findings, the study recommends the following:

- Land suitability

After years of war and neglect, the status of agricultural research in Mozambique is exceptionally weak. It is therefore of extreme importance that a land evaluation should be done in the area. The result gathered from the survey will help in identifying the crops most suitable to the area. In the medium and long runs, food security will increasingly depend on improvement in agricultural productivity. This will require substantial investments in its research and extension services and in private sector input.

- Seed supply and agricultural instruments

According to people interviewed in the area, the limited crops in the area are due to lack of seeds. Thus it is recommended that the government supply improved seeds, as well as suggest improved agricultural practices. So, programs aimed at better agricultural production are important for the improvement of the quality of life. It is recommended that women should have access to new technologies, especially those needed in farming, so as to alleviate the need for a considerable amount of child labour. It is important to mention that there is a need to create small credit facilities in order to help the rural communities to develop small economic activities.

Another possible intervention strategy sustainable in long term is to increase consumption of food rich in micronutrients, through dietary diversification, and therefore the role of agricultural research and extension is critical.

- Extension services

Both communities did not receive any visits from agricultural extension officers. No household received any extension support. There is a need for these services in order to improve the quantity and quality of food produced.

- Potable water/ sanitation/ schools/medical facilities

Lack of potable water, and sanitation, as well as poor education and health contribute to food insecurity and malnutrition. The focus groups interviewed in both communities considered that potable water, sanitation, schools and medical facilities are the four major priorities for development of the area. Thus, the study recommends that through the Tchuma Tchato project mechanisms that could contribute to the development of infrastructures be identified urgently. In the case of there being an investor in the area, the priorities listed by the local communities must be respected. Local people's needs must be considered in management of natural resources.

- Fencing

The biggest agriculturally related problems in both communities are crop losses due to animal destruction. Thus, fencing reserve lands is an urgent priority.

- Job creation

There are some alternatives that can help to diversify sources of income, in order to improve food security and general economic development. Some alternatives are:

Fishing, handicrafts, and Eco-tourism. Community participation in tourist ventures (for example, bird watching, safari, and mountain climbing).

There is a need to design and implement projects, so as to treat women equally with men in their productive capacities, responsibilities and benefits. A significantly higher proportion of women's income is used to buy food for their family as well as inputs for food production. Thus, to improve food production for the household, greater priority has to be given to increasing women's participation in market production as well as other income generating ventures.

- Monitoring

Periodic monitoring of household food security could be useful in providing information to project designers and policy makers.

APPENDIX ONE

QUESTIONNAIRE

The aim of this study is to evaluate the current level of food security in Daque Unit – Tete Province, Mozambique. The research will also develop a better understanding of how people are coping with the present situation. Semi-structured interviews to household members will be used in order to achieve the aim.

A. Characteristics of households

1. Respondent's by gender and status

Gender		Head of household ?	
Male		Y	N
Female			

2. Household Composition

2.1 Head of household

Name	Age	Sex	Working status	Level of education

2.2 Household members

Name	Sex	Relationship to respondent	Working status	Level of education

3. Income

3.1. Could you please give an estimation of incomes in the household?

Respondent's income		Other household members income	
Unstable - <100.000 Mts			
101,000 – 200,000 Mts			
201,000 – 600,000 Mts			
601,000 – 1000,000 Mts			
Other, please specify			

1 USD = 15.000,00 Mts

3.2. How do you earn a living?

The respondent		Other household members	
Depend on remittances			
Trading			
Pension			
Other, please specify			

4. House and Housing Infrastructure (for my assessment)

House/housing	Excelent	Good	Satisfactory	Poor	Unacceptable
Condition of building					
Building materials					
Hygienic conditions					

5. Could you please indicate household possessions

Type of assets	Amount / number / hectares
Crops	
Livestock	
Land	
Savings	
Other, please specify	

B. Food Security and Entitlement

B.1. History of food production / production capacity

- 1. Do you have a farm?
- 2. What is the size of your farm?
- 3. How far is it from your homestead?
- 4. How productive is your cultivated land?
- 5. and the community land?
- 6. What are the major problems of your land?
- 7. What crops / vegetables do you plant?
- 8. Do you produce enough food for your household consumption / needs?

All year	
Most (9 months)	
Less than half	
Other, specify	

- 9. Do you usually produce surplus food?

B.2. Food Practices

- 1. How many meals do you have per day?

Adults	
children	

2. What is your staple food?
3. Do you have another type of food basket?

B.3. Access to food

1. Where do you normally get your food?
2. how much do you spend on it?
3. Do you receive free food or other relief?
4. Did your household experience hunger / food insecurity?

Constantly	
Periodically	
when	

5. How did your household solve it?
6. What means of transport your household use to get food?
7. How much your household spend on it?

B.4. Access to Land

1. What is the availabilty of land for cultivation?
2. What is the actual area of land that you cultivated?
3. What is the ratio of land cultivated to land available to your household?

C. Nutritional status

1. In which periods of the year do you have food deficit?
2. What are the main illnesses in the area?

	adults	children
Household		
community		

3. What are the source of energy your household consume in a daily basis?

Maize	
Sorghum	
Vegetables	
Fruits	

4. What are the source of protein your household consume in a daily basis?

Meat	
Fish	
Chicken	
Goat	
other	

5. What types of food intake do your household have in a daily basis?

adults	
children	

D. Natural Resources

1. Do you have any access to and control of resources?
2. How is the resource allocation and distribution within your household?
3. Are there natural resources that you use to meet household needs? If yes / no, please specify which one.

Energy	
Water	
Woodland	
Other resources	

4. Do you think that there is enough natural resources for your household Why?
5. and the whole community?
6. What other energy resources do you use?
7. What are the present practices do you use for resources?
8. Which do you think are the best practices?

E. Other Environmental Concerns

1. Where do your household get drinking water?
2. What is the distance from the water source to your homestead?
3. Do you have any sanitation facilities?
4. How is the security of water source in

Dry season	
Wet season	

• For the key informants

- a) What are the role of the government?
- b) NGO's?
- c) Community structures?
- d) What are the main problems in the area?

e) What do you think for the future, will things get better/worse?

f) Why?

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Figure 3.3 Soil units in study area

Key:

A- Non specified sand soils.

FS + FG- Coarse and medium alluvial soils.

WV, WVm, WVmx- Red clayey soils.

BV + BP + BI- Lithic, black and red basaltic soils.

KAI + VM- Brown – grey to red sand soils.

I- Lithic soils.



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