THE IMPACT OF ZIMBABWE'S DROUGHT POLICY ON SONTALA RURAL COMMUNITY IN MATABELELAND SOUTH PROVINCE

Carolina Dube

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Supervisor: PJ Eloff

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DECLARATION

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Date: 18 November 2008

ABSTRACT

The climate of southern Africa varies greatly spatially and temporally. Tyson's (1987) examination of long-term rainfall records has shown an 18-year cyclical pattern of wet spells alternating with dry spells. Recurrent droughts are thus a feature of southern Africa's climate. Although climate change resulting from global warming could intensify future droughts, current predictions of regional climate change are unreliable.

This study evaluates the nature, adequacy and effectiveness of Zimbabwe's drought policy in reducing the vulnerability of rural communities to the impact of drought. The objectives of the study are to explore the different meanings of the concept of drought; to explain the relevant concepts and frameworks of the hazard assessment and management discipline; to describe the current status of disaster management in general and drought in particular; to identify the mechanisms used by small-scale farmers in Sontala ward for coping with drought; and to evaluate the adequacy and effectiveness of Zimbabwe's drought policy in reducing the vulnerability of rural communities to drought impacts. A qualitative approach was used which involved analysis of government documents and academic literature. Semi-structured interviews were conducted with government officials at provincial level and small-scale farmers at ward level in Matabeleland South province. The data collection exercise was, however, constrained by the current political instability in the country.

The study established that the Civil Protection Act No 10:06 of 1989, complemented by relevant sections of other laws, provides a legal framework for disaster management. The Ministry of Local Government, Public Works and Urban Development has a coordinating role. Coordinating committees at national, provincial and district level formulate disaster-response plans to be activated when a disaster occurs. The Civil Protection System uses existing government, private and non-governmental organizations whose regular activities contain elements of disaster risk prevention and community development. The enactment of the Emergency Preparedness and Disaster Management Act will remove some of the shortcomings of the Civil Protection System.

There was no evidence to show awareness or implementation of the 1998 National Policy on Drought Management. During the 1980s and 1990s the government responded to drought-related disasters through massive grain distribution involving the Drought Relief

Programme, a smaller Child Supplementary Feeding Programme and a post-drought Agricultural Recovery Programme. During the most severe droughts a national taskforce on drought was set up to coordinate the acquisition and distribution of grain.

An analysis of the Provincial Disaster Response Plan showed that it is more suitable for responding to rapid-onset than slow-onset disasters such as drought. The study also revealed that government response to the 2006/07 drought was inadequate. The most vulnerable members of the community were not receiving food aid and the Cash-for-Work programme was underfunded. These findings supported those of Gandure (2005) who noted that government support to food insecure households had fallen in recent years. The households relied on their own coping mechanisms to address food insecurity. They were assisted by World Vision Zimbabwe, a non-governmental organization, through the Child Supplementary Feeding Programme at schools and nutrition garden projects.

Keywords

Coping mechanisms, disaster management, drought, drought policy, food insecurity, hazard assessment, Matabeleland South, rural communities, small-scale farmers, Sontala ward, vulnerability, Zimbabwe

OPSOMMING

Die klimaat van suider-Afrika varieer baie oor ruimte en tyd. Tyson (1987) se ontleding van langtermyn reënvalsyfers wys ‘n 18-jaar sikliese patroon van afwisselende droë tye. Herhalende droogtes is dus ‘n kenmerk van suider-Afrika se klimaat. Ofskoon klimaatsverandering as gevolg van aardverwarming toekomstige droogtes kan vererger, is huidige voorspellings van streeksklimaatverandering onbetroubaar.

Hierdie studie bepaal die aard, toereikendheid en doeltreffendheid van Zimbabwe se droogtebeleid om die kwesbaarheid van landelike gemeenskappe vir die effekte van droogte te verminder. Die studie se doelwitte is om die verskillende betekenisse van die droogtekonsep te ondersoek; die relvante konsepte en raamerke van die dissipline rampwaardering en -bestuur te verduidelik; die huidige status van rampbestuur in die algemeen en droogte in besonder te beskryf; die meganismes te identifiseer waarmee kleinskaalse boere in die Sontalawyk droogte die hoof bied; en om die geskiktheid en doelmatigheid van Zimbabwe se droogtebeleid om die kwesbaarheid van landelike gemeenskappe vir droogte-impakte te verminder. ‘n Kwalitatiewe benadering is gevolg deur staatsdokumente en akademiese literatuur te ontleed. Halfgestruktureerde onderhoude is met provinsiale regeringsamptenare en met kleinskaalse boere op wyksvlak in Matabelelandsuid-provinsie gevoer. Die data-insamelingsoefening was egter deur die heersende politieke onstabiliteit gestrem.

Die studie het vasgestel dat die Civil Protection-wet Nr 10:06 van 1989, aangevul deur dele van ander wette, ‘n regsraamwerk vir rampbestuur voorsien. Die ministerie van plaaslike ontwikkeling, openbare werke en stedelike ontwikkeling vervul ‘n koördinerende rol. Koödineringskomitees op nasionale-, provinsiale- en distriksvlak formuleer rampresponsplanne wat geaktiveer kan word sodra ‘n ramp plaasvind. Die Civil Protection System maak gebruik van bestaande regerings-, private en nie-regeringsorganisasies wat in hul normale aktiwiteite elemente van ramprisikovoorkoming en gemeenskapsontwikkeling inhou. Die uitvaardiging van die wet op Emergency Preparedness and Disaster Management sal party van die Civil Protection System se tekortkominge verwyder.

Geen bewyse van bewustheid of toepassing van die 1998 National Policy on Drought Management is gevind nie. In die 1980s en 1990s het die regering op droogteverwante rampe gereageer deur grootskaalse graanverspreiding deur die Drought Relief Programme, ‘n kleiner Child Supplementary Feeding Programme en ‘n na-droogte Agricultural Recovery Programme. Tydens die ergste droogtes is ‘n nasionale taakmag insake droogte saamgestel om die verkryging en verspreiding van graan te koördineer.

‘n Ontleding van die Provincial Disaster Response Plan het gewys dat dit meer geskik is om te reageer op rampe wat vinnig begin as dié wat stadig begin soos droogtes. Daar is ook bevind dat die regering se respons op die 2006/07-droogte ontoereikend was. Die kwesbaarste gemeenskapslede het nie voedselsteun ontvang nie en die kontant-vir-werkprogram was onderbefonds. Hierdie bevindings ondersteun dié van Gandure (2005) dat staatsteun aan huishoudings wat voedselonsekuriteit ervaar, in onlanse jare gedaal het. Sulke huishoudings moes op hulle eie hoofbiedmeganismes staatmaak om voedselonsekuriteit aan te spreek. Hulle is wel deur World Vision Zimbabwe, ‘n nie-regeringsorganisasie, se Child Supplementary Feeding Programme by skole en met voedingstuinprojekte bygestaan.

Trefwoorde

Droogte, droogtebeleid, hoofbiedmeganismes, kleinskaalse boere, kwesbaarheid, landelike gemeenskappe, Matabelelandsuid, rampbestuur, risikobepaling, Sontalawyk, voedselonsekuriteit, Zimbabwe

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ACRONYMS

AREX	Agricultural Research and Extension
CZI	Confederation of Zimbabwe Industries
EMA	Environmental Management Agency
ENSO	El Niño-Southern Oscillation
ESKOM	Electricity Supply Commission (South Africa)
FAO	Food and Agricultural Organization
FEWS NET	Famine Early Warning Systems Network
GDP	Gross Domestic Product
GIS	Geographic Information Systems
GMB	Grain Marketing Board
GOZ	Government of Zimbabwe
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immuno-Deficiency Syndrome
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IMF	International Monetary Fund
IRIN	Integrated Regional Information Networks
MDC	Movement for Democratic Change
MLGPW& UD	Ministry of Local Government, Public Works & Urban Development
NDMC	National Drought Mitigation Centre
NEPC	National Economic Planning Commission
NGO	Non-Governmental Organization
ORAP	Organization of Rural Associations for Progress
PRN	Precipitation needed for a return to normal
SAHIMS	Southern Africa Humanitarian Information Management Networks
TANGO	Technical Assistance to Non-Governmental Organizations
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention for Climate Change
UNISDR	United Nations International Strategy for Disaster Reduction
UNSO	United Nations Sudano-Sahelian Office

USAID-OFDA	United States Agency for International Development-Office of US Foreign Disaster Assistance
WFP	World Food Programme
ZANU-PF	Zimbabwe African National Union-Patriotic Front
ZINWA	Zimbabwe National Water Authority
ZRP	Zimbabwe Republic Police

CHAPTER 1: INTRODUCTION

In this chapter the background to this study is outlined, the problem statement formulated and the aims and objectives are stated. An outline of the thesis is provided at the end of the chapter. The next section covers the background to the study.

1.1 BACKGROUND

Some climatologists have identified a cyclical pattern in the temporal distribution of rainfall in southern Africa in which wet periods alternate with dry periods. Major droughts are linked to ENSO[1] events: the development of the El Niño[2] phenomenon is associated with droughts over southern Africa. Droughts have many adverse impacts which include; famine resulting from severe food shortages, a drastic decline in the GDP and a decrease in the diversity of species in the environment.

1.1.1 Climate variability and change

Droughts are a recurrent feature of the climate of Africa (Hulme 1996; Nicholson 1989; Tyson 1987; Vogel 1989; 1994). According to Preston-Whyte & Tyson (1988: 259) the climate of southern Africa has a "high degree of both temporal and spatial variation." The inter-annual variation of rainfall in the region ranges between 25 and 35 per cent in the wetter areas to between 50 and 75 per cent in the drier zone (O'Hare, Sweeney & Wilby 2005). This means that in wetter areas the rainfall is more reliable and droughts are less frequent. On the other hand in drier areas the rainfall is erratic and droughts are more common. Questions as to whether southern Africa has become drier or is undergoing a cyclic rainfall variation have been the subject of much debate in the literature.

Early on Tyson (1987) proposed that the hypothesis that South Africa is becoming drier must be rejected and pointed out that Nicholson & Entekhabi (1986) came to a similar conclusion concerning Africa that it has not undergone progressive desiccation. However,

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[1] The El Niño-Southern Oscillation process arises due to an interaction of the equatorial sea temperature with the atmosphere and influences climate variation across much of the world (Ropelewski & Halpert 1989).

[2] This is a name given to a Pacific basin-wide increase in both sea surface temperatures in the central and/or eastern equatorial Pacific Ocean region and sea level atmospheric pressure (Glantz 2001: 19).

Hulme (1996) reports that the Sahel shows large multi-decadal variability with recent drying, east Africa is a relatively stable regime with some evidence of long-term wetting, while south east Africa is basically a stable regime, but with marked inter-decadal variability as noted by Tyson (1987). Nevertheless, UNFCCC (2006) has presented a gloomier picture of generally declining rainfall over much of Africa.

The rainfall pattern of southern Africa exhibits a random year to year variability as well as a non random component which accounts for 20 to 30 per cent of the rainfall variability (Preston-Whyte & Tyson 1988; Tyson 1987; Tyson & Preston-Whyte 2000). The non random component consists of a number of quasi-periodic rainfall oscillations, the most significant being one with an average of 18 years (Tyson 1987; Tyson & Preston-Whyte 2000). Each oscillation is composed of nine year spells of predominantly wet years with above normal rainfall and predominantly dry years with below normal rainfall. There have been eight approximately nine year spells in which wet periods have alternated with dry periods in a cyclical manner since the beginning of the 20th century (Preston-Whyte & Tyson 1988; Tyson 1987; Tyson & Preston-Whyte 2000). This cyclical variation has been stable for over 80 years and the wet or dry spells have affected most of southern Africa at different times and have not affected all regions equally (Tyson & Preston-Whyte 2000). During the 1971/72-1980/81 wet spell, the rainfall was significantly above normal on a sub-continental scale especially in central South Africa, southern Botswana, Namibia and Zimbabwe. A dry spell was experienced during the period 1962/63-1970/71 and 1981/82-1989/90 over most of southern Africa including Zimbabwe (Tyson & Preston-Whyte 2000). Climate change resulting form global warming could intensify the recurrent droughts over southern Africa in future.

According to some researchers, the number of extremely low rainfall events affecting the population has steadily increased in the last 20 years (Fauchereau, Trzaska, Rouault & Richard 2003; O'Hare, Sweeney & Wilby 2005; UNFCCC 2006). Climate change as a result of global warming, in southern Africa, is a widely researched field (Hulme 1996; Hulme et al 1996; Jury & Majodina 1997; Mason, Waylen, Mimmack; Rajaratnam & Harrison 1999; New et al 2006; Richard, Trzaska, Roucou & Rouault 2000; Rouault & Richard 2003). Some of the studies were based on simulation models to generate climate change scenarios using greenhouse gases such as carbon dioxide as forcing mechanisms. The aim was to predict future changes in the climate with respect to temperature levels and

rainfall variability. Some researchers, for example Menzhulin, Savvateyev, Cracknell & Boken (2005) maintain that regional climate change predictions are unreliable and this poses limitations to long term drought predictions.

Causes of droughts are not well understood by meteorologists (Van Heerden 1990). The next section reviews the literature on the causes of droughts in southern Africa.

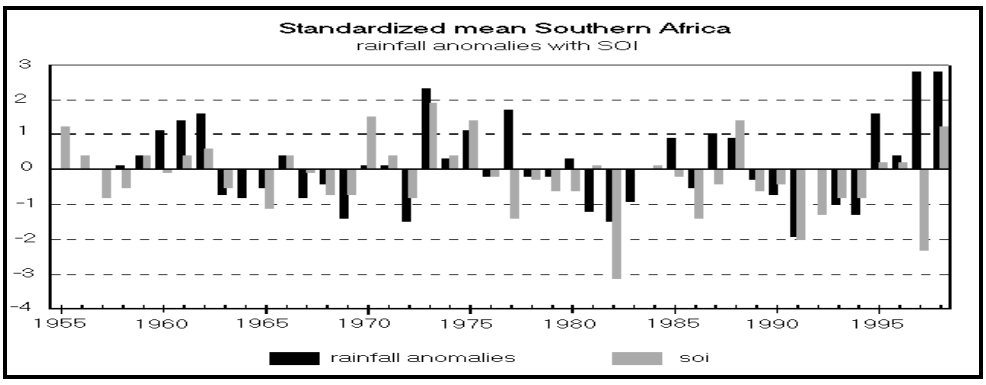
1.1.2 Causes of drought

Droughts are linked to large scale disruptions in the atmospheric circulation (Wilhite 2000). Dry weather is caused by the persistence of anticyclonic conditions over an area. An anticyclone or a high pressure system may remain over the land for a prolonged period during the rainy season causing subsidence and drought. During the 2001/02 season there was a prolonged dry spell from January to March 2002 over Botswana, Mozambique and Zimbabwe. These countries experienced seasonal rainfall deficits. The drought resulted from an abnormally strong subtropical anticyclone (Chipindu 2002). Temperatures may also increase as a result of adiabatic warming and absence of cloud cover associated with an anticyclone (Jackson & Tyson 1971; Tyson & Preston-Whyte 2000; Weather Bureau 2001).

Persistent anticyclones prevent the Intertropical Convergence Zone (ITCZ)[3] from moving far enough into the region thus reducing convergence of airmasses that bring rainfall. This phenomenon sometimes manifests itself as the Botswana Upper High in summer resulting in drought due to reduced convection over western Zimbabwe and Botswana (Unganai & Mason 2002). The establishment of upper level anticyclones over some parts of southern Africa in late summer may be caused by tropical cyclones near Madagascar or in the Mozambique Channel (Unganai & Bandason 2005; Weather Bureau 2001). Recent droughts have been linked to variations in ENSO events (Halpert & Ropelewski 1992). A significant correlation exists between the Southern Oscillation Index (SOI) and seasonal rainfall over southern Africa, as illustrated in Figure 1.1 (Garanganga 2003; Matarira 1990; Van Heerden, Terblanche & Schulze 1988). Drought occurs over southern Africa

[3] It is a low pressure zone of convergence, uplift, instability, cloud formation and rainfall (O'Hare, Sweeney & Wilby 2005).

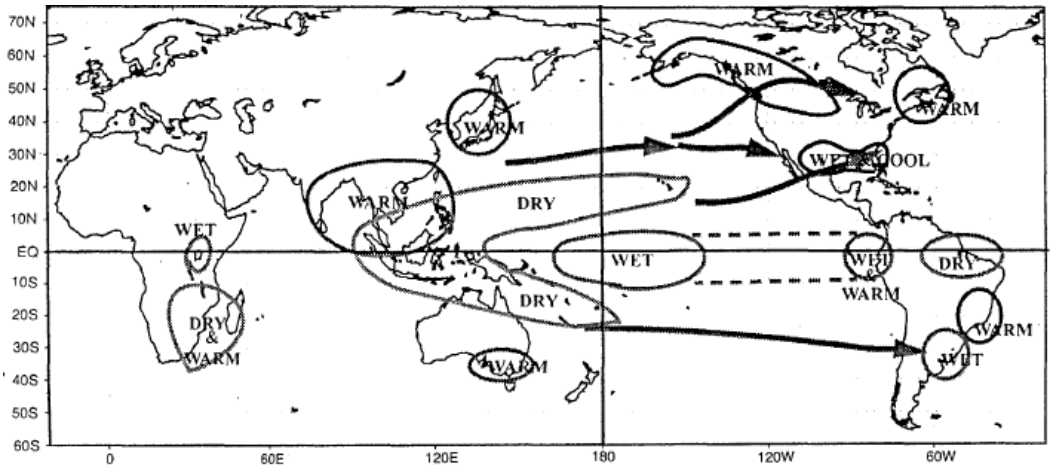
during an El Niño event as shown in Figure 1.1. On the other hand, rainfall tends to be above average during a La Niña[4] event (Matarira 1990).



Source: Garanganga (2003: 2)

Figure 1.1: Rainfall anomalies over southern Africa overlain on ENSO

Figure 1.2 shows temperature and precipitation anomalies related to a warm ENSO episode. Heavy arrows represent the positions of strongest winds (jet streams) at high levels (30 000 to 35 000 feet) of the atmosphere (Halpert & Ropelewski 1992).



Source: Halpert & Ropelewski (1992: 182)

Figure 1.2: Temperature and precipitation anomalies related to a warm ENSO episode

According to Figure 1.2 the south eastern part of the southern Africa is experiencing warmer weather and drought. Cane, Eshel & Buckland (1994) cited by Glantz & Cullen

[4] It exists when extremely cold sea surface temperatures appear in the central and eastern equatorial Pacific for an extended period (Glantz 2001).

(2003) and Unganai & Bandason (2005), found a significant relationship between El Niño and maize production in Zimbabwe where 60 per cent of the variance in maize yield was explained by the NINO3 index of El Niño variability. This serves as proof of a teleconnection between the occurrence of drought in southern Africa and El Niño events. The worst affected countries during a warm ENSO episode are southern Tanzania, Malawi, Zimbabwe, Mozambique, Swaziland, and the eastern part of South Africa including Lesotho (Matarira 1990). The 1982/83 and 1991/92 droughts which occurred over southern Africa were linked to El Niño events (Rouault & Richard 2003).

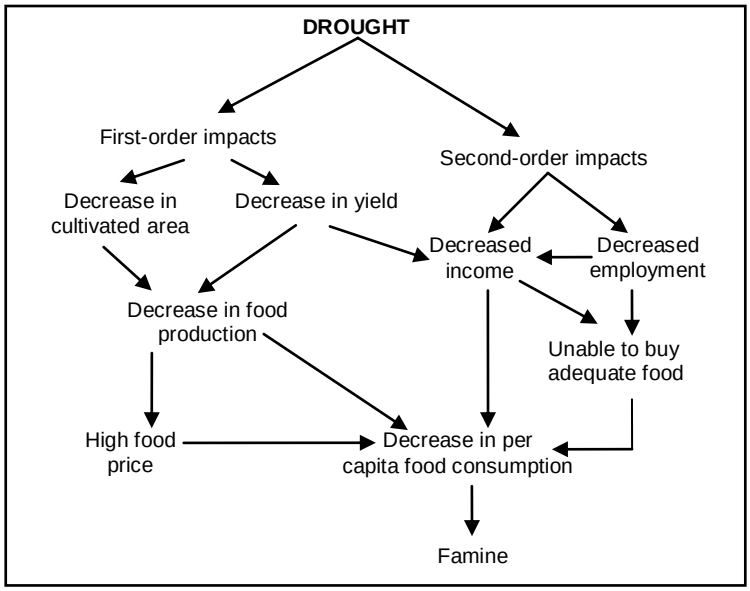
Dilley & Heyman (1995) have noted that there is a highly significant increase worldwide in the average number of drought disasters during the second year of ENSO warm events compared with other years and that the spatial distribution of the countries in which these disasters occur corresponds to that of the dry/warm ENSO teleconnections illustrated in Figure 1.2. The El Niño phenomenon was also experienced during the 2006/07 season and Lesotho, Swaziland and Zimbabwe, as well as southern Mozambique were most severely affected by that season's below-average rainfall (FEWS NET 2007b).

However, not all El Niño events are linked to droughts in southern Africa. One of the two strongest El Niño events in the twentieth century, namely the occurrence in 1997/98 was not linked to drought in the region (as shown in Figure 1.1) but above-normal rainfall occurred instead due to the warming of the Indian Ocean (Dilley 2000; Garanganga 2003; Glantz 2001). Some researchers and environmentalists suggest that El Niño events will increase in frequency and intensity as a result of global warming of the earth's atmosphere (Glantz 2001). This implies that droughts could correspondingly increase in frequency and intensity over southern Africa as already evidenced during the last 20 years where there have been serious rainfall deficits in the region (Fauchereau et al 2003; O'Hare, Sweeny & Wilby 2005).

An understanding of drought impacts is important in that it will enable government officials to implement the correct mitigation measures to reduce the impacts.

1.1.3 Drought impacts

The diverse impacts of drought can be broadly categorized as economic, social and environmental (Glantz, Betsill & Crandall 1997; Nagarajan 2003; Paul 1998). They are further referred to as direct or indirect and first order or second order to depict the sequence in which they occur (Paul 1998). Van der Linden, Dekkers & Hommes (1995) use the terms primary[5] and secondary[6] impacts. In a country where agriculture dominates the economy, one of the direct or first order impacts of drought is reduced food production (see Figure 1.3). This results from a decline in the size of the cultivated area and crop output (Paul 1998). Secondary effects occur because certain sectors of the economy have forward or backward linkages with agriculture or with those sectors that use large quantities of water in their production processes (Benson & Clay 1998; Van der Linden, Dekkers & Hommes 1995). Second order impacts include increased unemployment and lower incomes (see Figure 1.3).



Adapted from Paul (1998: 359)

Figure 1.3: Drought impacts resulting in famine

Increased unemployment is caused by reduced employment opportunities in the agricultural sector. Because of crop failure and animal losses, there will be a reduced

[5] Primary impacts occur when water is a major input into the production process (Van der Linden, Dekkers & Hommes 1995: 181).

[6] Secondary impacts arise when sectors are not influenced by drought themselves, but by the influence of drought on other sectors (Van der Linden, Dekkers & Hommes 1995: 181).

surplus produce for sale. The scarcity of food in the market causes food prices to rise (Paul 1998). Small-scale farmers are likely to experience transitory food insecurity[7] which prompts them to adapt various coping mechanisms in order to survive. These include reducing consumption to the minimum food required for survival. Malnutrition could become a serious problem. People may start eating wild plants that are not normally consumed. According to Devereux & Tapscott (1995), during the 1992/93 drought some communal farmers in Caprivi in Namibia responded in a survey that they supplemented their diet with foods gathered from the bush such as fruits, nuts, berries, water lilies and mopani worms. Other small-scale farmers in the Okavango region claimed to have consumed less palatable bush foods. Such actions give early warning of a looming famine (Devereux & Tapscott 1995).

In Namibia, frequent droughts have resulted in the loss of indigenous resources which include genetic and livestock capital resources. In the northern part of the country where communal farmers carry out mixed farming, local varieties of seed crops have been lost, for example pearl millet and groundnuts (Matanyaire 1995). However, a report from the Agronomic Board of Namibia did not find any correlation between annual maize production by commercial farmers and total annual rainfall during 1962-1970 (Matanyaire 1995). The farmers probably used irrigation during severe droughts to overcome the deficiencies in rainfall. However, in Zimbabwe a strong correlation between annual maize production and total annual rainfall has been identified by Rook (1994). Maize has largely been produced by communal farmers in Zimbabwe under dryland farming since independence in 1980.

Van der Linden, Dekkers & Hommes (1995) noted that the 1992/93 drought had a number of impacts on the Namibian economy. With regards to primary impacts, the price of electricity increased sharply because the country was forced to supplement power supply through imports from ESKOM in South Africa at 10 times the normal price. Some construction projects were delayed, for example there was an interruption in the building of a road in the Owambo region. Moreover, the construction of the trans-Caprivi highway was delayed because the government had to free financial resources to finance Drought

[7] Transitory food insecurity arises from temporary decline in access to adequate food supplies, often due to short-term variability in food production, incomes and prices (PTA 1994).

Relief Progammes. However, sectors such as mining and breweries did not experience the impact of drought because they practised successful coping mechanisms which include mining of underground water supplies and recycling of water (Van der Linden, Dekkers & Hommes 1995).

There are limited linkages between industries in the Namibian economy so that drought impacts are unlikely to be as pervasive as in an economy which has strong backward and forward linkages (Van der Linden, Dekkers & Hommes 1995). Surprisingly, drought can have a positive impact on the milling industry. During the 1992/93 drought in Namibia, demand for services from the milling industry rose by between 10 and 15 per cent because the government, non-governmental organizations, and foreign countries donated cereals which were processed locally (Van der Linden, Dekkers & Hommes 1995). Employment opportunities increased in this sector. Drought had no effect on the meat processing industry because it partly relies on imports from South Africa. Moreover, there was an increase in raw materials from local farmers because they had to dispose of a large number of animals within a short space of time as a drought mitigation measure. Dairy producers, however, experienced price increases of inputs which they passed on to the consumers and the price of milk rose by 10 per cent (Van der Linden, Dekkers & Hommes 1995).

The financing of drought relief assistance can result in a budget deficit. In Namibia the drought relief assistance for the 1992/93 drought was budgeted at R133 million. It rose from R9 million and R2 million in 1990/91 and 1991/92 respectively (Van der Linden, Dekkers & Hommes 1995). At this level, drought-relief assistance financed through local financial resources is not sustainable. There are a number of ways in which drought can influence government revenue (Van der Linden, Dekkers & Hommes 1995). Drought can result in a drop in corporate income tax revenue from industries experiencing adverse primary or secondary effects from drought because some of the industries are likely to close down as a result of the shortage of agricultural inputs and those which continue to operate may do so at a loss. A decline in general sales tax revenue may be caused by a reduction in the purchasing power of households with drought correlated incomes. However, drought may also have positive effects on government revenue. A rise in corporate income tax revenue may occur in industries experiencing positive secondary effects from drought (e.g. milling companies). The increase in prices of agricultural goods, such as fruits and vegetables, as a result of their scarcity can result in a general increase in

sales tax revenue (Van der Linden, Dekkers & Hommes 1995). Generally, drought has a negative influence on government revenue because it causes a loss of income from taxes and increased expenditure on drought relief.

In Zimbabwe the 1991/92 drought affected the manufacturing industry in a number of ways (Benson & Clay 1998). Severe water shortages were experienced throughout the country. As a result most municipalities, especially in urban centres such as Bulawayo, Chegutu and Mutare, imposed water rationing. Electricity shortages were experienced due to reduced hydroelectric power production[8]. Low inflow into the Zambezi river caused a drop in the level of lake Kariba to 5.5 per cent at the end of 1992 (Ministry of Information, Posts and Telecommunications 1993). Load shedding was used to manage the electricity crisis. Shortages of agricultural inputs to manufacturing industries resulted in reduced production of some agro-industries. However, larger food processing industries such as grain millers increased production because more imports of grain were allocated to them for processing by the government. Meat processing industries increased production as a result of a greater supply of animals for slaughter (Benson & Clay 1998). Farmers were forced to sell a lot of their cattle so as to reduce the herd size as a drought mitigation measure. The demand for manufactured products was greatly reduced due to the "contractionary effects of the drought" (Benson & Clay 1998: 23). Increased government borrowing from the domestic market partly to finance drought-related expenditure caused higher rates of inflation and higher interest rates resulted in an unfavourable financial environment for businesses to operate in (Benson & Clay 1998).

Nagarajan (2003) has reported a number of negative social impacts of drought in some parts of India. Family solidarity was reduced, tensions and conflicts over the use of scarce resources such as water, grass and fodder, increased. Crime escalated and people in isolated settlements lived in fear of thefts. The economic, environmental and social impacts are summarized in Table 1.1. The environment is likely to be harmed in that species diversity may decrease due to large scale deaths of flora and fauna caused by the shortage of food and water (Vogel 1994). The physical environment that sustains the flora and fauna could become degraded by increased wind erosion.

[8] Most of the country's electricity is generated at Kariba dam on the Zambezi River.

Table 1.1: The impact of drought on economic, environmental and social sectors

ECONOMIC	ENVIRONMENTAL	SOCIAL
Loss from crop production Annual and perennial crop loss Damage to crop quality Reduced cropland productivity Insect infestation Plant diseases	Damage to animal species Reduction and degradation of fish/wildlife Lack of feed and drinking water Disease Increased vulnerability to predation Migration and concentration Increased stress Damage to plant species	Food shortage Malnutrition, reduced nutrition level Loss of human life Public safety Mental and physical stress Health related low-flow problems Increased respiratory ailments Increased conflicts
Loss from dairy and livestock production Reduced productivity of rangeland Closure/limitation of grazing land Non-availability of water for livestock High livestock mortality rates Breeding delays Increased predation	Increased number and severity of fires Loss of wetlands Estuarine impacts (change of salinity)	Disruption of cultural belief systems Re-evaluation of social values (priorities, needs, right) Reduction or modification of recreation activities Public dissatisfaction with government response Inequity of distribution of drought relief
Range fires Loss from timber production Wildland fires Tree disease Insect infestation Impaired productivity of forest land	Increased groundwater depletion Land subsidence Loss of biodiversity Wind erosion	Inequity in drought impacts based on socio-economic group, ethnicity, age, gender, seniority Loss of aesthetic values
Loss of fish/poultry production Income loss and bankruptcy Unemployment Increased energy demand and power shortage Decline in food production/supply Disruption of water supply Strain on financial institutions Cost of water transfer/transport Decreased land price Depletion of groundwater	Depletion of reservoir, lake levels Reduced flow from springs and rivers Water quality effects Air quality effects Visual and landscape quality	Reduced quality of life, change of lifestyle Rural areas, urban areas, increased poverty Population migration, rural to urban areas, migrants to other regions Increased data/information needs, coordination of dissemination activities

Source: Nagarajan (2003: 25-26)

Quoting Benson & Clay (1994), Glantz, Betsill & Crandall (1997: 21) define drought in economic terms as "an exogenous supply-side shock which usually causes sharp declines in agricultural output, employment, export earnings, and income levels. Such impacts spread throughout the entire economy by way of sectoral linkages and multiplier effects." Drought can lead to an economic downturn. In the year following the 1984 drought in sub-

Saharan Africa, the GDP of Mali, Niger and Ethiopia plummeted by 9 per cent, 18 per cent and 7 per cent respectively. Zimbabwe's GDP dropped by 3 per cent as a result of the 1983 drought (Benson & Clay 1994). According to USAID-OFDA (1998) the drought of 1990/91 resulted in a 45 per cent drop in agricultural production, a 62 per cent decline in the value of the stock market, a 9 per cent drop in manufacturing output and an 11 per cent drop in the GDP in Zimbabwe. Because the economies of sub-Saharan countries are dominated by agriculture, meteorological droughts have direct and large impacts. As a result of the 1982/83 drought, Zimbabwe suffered US$360 million in direct agricultural losses and spent US$120 million on drought relief (Ogallo 1987).

The economic impacts of drought differ according to the level of economic development of a country (Benson & Clay 1994). In simple economies dominated by rain-fed agriculture and pastoralism, such as Burkina Faso and Somalia, drought impacts can be very severe resulting in a large reduction of the GDP. The non-agricultural sector is small and intersectoral linkages are negligible. When the drought ends, economic recovery is fast (Benson & Clay 1994). Economic recovery is, however, slower in countries that have intermediate economies such as Zimbabwe, Zambia and Senegal because the drought impacts are more far reaching. There are stronger backward and forward linkages in their economies. Agro-industries which rely on agricultural raw materials are well established. The service sector has strong links with agriculture as well. The revenue base of the government will decline and yet it has the responsibility of not only providing drought relief but also providing funds to stimulate economic recovery after the drought. Complex economies, such as that of South Africa, are more resilient to drought shocks because the country's economy is more diversified. Agriculture contributes a smaller percentage of the country's income (Benson & Clay 1994).

Some countries, such as Botswana and Namibia, mainly rely on extractive industries. The former relies on mining only, whereas the latter mainly depends on both mining and fishing. These countries have dualistic economies with few linkages. The impacts of drought are restricted to the agricultural sector but the mining and fishing sectors are not harmed (Benson & Clay 1994). On the basis of these findings, the researchers recommended that financial assistance to alleviate drought impacts should be streamlined according to the level of economic development of the country and that donors should give countries with simple economies more food aid whereas those with intermediate

economies could be assisted with finance to help them to resuscitate their ailing economies (Benson & Clay 1994).

Drought impacts are greatest in countries whose economies are dominated by agriculture. On the other hand, in countries where agriculture makes a small contribution to the GDP, the impact of drought is much lower. Countries with intermediate economies, such as Zimbabwe, experience drought impacts that are far more pervasive in the economy because of the strong linkages between different sectors of the economy and agriculture. The following sections deal with the problem statement, aims and objectives.

1.2 PROBLEM STATEMENT

One of the coping mechanisms for reducing the impacts of droughts outlined above is the formulation and implementation of proactive[9] drought policies characterized by risk management. A study by UNSO (1999) established that most Southern African Development Community (SADC) member countries including Zimbabwe, responded to droughts through crisis management. The purpose of this study is to determine the nature of Zimbabwe's drought policy and to evaluate its impact on rural communities in Sontala ward in Matabeleland South province.

1.3 AIM AND OBJECTIVES

This research aims to determine the nature and impact of Zimbabwe's drought policy on rural communities. The aim will be achieved through a number of objectives. The study will:

- explore the different meanings of the concept of drought;
- explain the relevant concepts and frameworks of the hazard assessment and management discipline;
- describe the current status of disaster management in general and drought in particular in Zimbabwe;

[9] Proactive approaches are all measures conceived or prepared by conscious and systematic actions that may help in the alleviation of consequences (Yevjevich 1980) cited by Hazelton et al (1994). The approach is planning.

- identify the mechanisms used by small-scale farmers to cope with drought in Sontala ward during the 2006/07 season; and
- evaluate the adequacy and effectiveness of Zimbabwe's drought policy in reducing the vulnerability of the rural communities to drought impacts in Sontala ward.

An outline of the structure of the thesis is provided in the next section.

1.4 OUTLINE OF THESIS

The thesis report consists of seven chapters. Chapter 1 introduces the study by providing the background, problem statement, aim and objectives as well as the thesis outline. Chapter 2 deals with the theoretical background and it provides an explanation of pertinent concepts. The geographical setting and the socio-political situation of Zimbabwe, the country in which the research was carried out, are explained in Chapter 3 so as to contextualize the study. The methodology is covered in Chapter 4 together with data presentation and analysis. In Chapters 5 and 6 the findings of the research are discussed and the report ends with the summary, conclusions and recommendations in Chapter 7.

1.5 SUMMARY

Droughts are a recurrent feature of the climate of southern Africa. Climatologists attribute droughts to disturbances in the global atmospheric circulation and to teleconnections with ENSO events. Droughts may increase as a result of global warming but the predictions of climate change scenarios are still uncertain at this stage. Droughts have adverse economic, social, and environmental impacts which include a decline in a country's GDP, food shortages and depletion of water supplies. The next chapter deals with the definition of drought and examines drought indices for determining the inception, severity, duration and cessation of a drought episode. Disaster management concepts and frameworks are then explained and the chapter ends with an illustration of how selected countries have grappled with the development of drought policies.

CHAPTER 2: CONCEPTUAL FRAMEWORK

The previous chapter explained the cyclical nature of southern Africa's rainfall pattern, the causes of drought and its impacts. An outline of the problem statement, aim and objectives was also presented. This chapter deals with the definition of drought and highlights the fact that there is no universally accepted definition of the concept. A variety of drought indices are then examined. These offer a solution to the problem of defining drought. Other concepts discussed relate to disaster management. The chapter concludes with an exploration of the development of drought policies in selected countries.

2.1 DEFINING DROUGHT

Drought differs from other natural hazards in many ways. It is a slow onset hazard whereas other hazards are typically rapid-onset. It is difficult to quantify the onset, duration, severity, and potential impacts of drought. Drought definitions vary with the climatological context of a place, time scale and economic sector. There is no agreement on how drought should be defined. Operational definitions in the form of indices are more useful than conceptual definitions in that they can help to determine the beginning, duration, severity and end of a drought period. This enables administrators to respond quickly to a looming drought-related disaster.

2.1.1 Differences between drought and rapid onset disasters

Drought differs from other natural hazards in many respects (UNISDR 2003). Most other natural hazards such as cyclones, floods, earthquakes, volcanic eruptions, and tsunamis are sudden events which are often associated with the destruction of infrastructure. Because the impacts of drought are non structural, they are difficult to quantify (Wilhite 1997; 2001). The occurrence of other natural hazards is more localized and their impacts are thus limited to a smaller surface area as well as to specific geographic regions. On the other hand, droughts can occur in every climatic region – in high- and low-rainfall areas (Wilhite 2000). Drought is an insidious or "creeping" hazard that sets in slowly so that it is difficult to determine the inception and termination of the event (Smith 2004; UNISDR 2003; Usman, Archer, Johnston & Tadross 2005; Wilhite 2001). It may be prolonged for

many months or years unlike other hazards which are of a shorter duration. Prolonged droughts result in cumulative impacts (Smith 2004). Moreover, it is difficult to assess the severity of drought and provide adequate response to drought stricken areas because the spatial extent is usually much greater and the impacts affect larger geographical areas (Wilhite 1997; 2001). A combination of a number of indices has to be used in order to adequately quantify the onset, duration, severity and potential impacts of drought.

2.1.2 Importance of defining drought

There are different perspectives on drought and this gives rise to a large number of varied definitions of the concept (Giambelluca, Nullet & Nullet 1988; Hazelton, Pearson & Kariuki 1994; Jackson 2001; Pelser 2001; Swearingen 1992; UNISDR 2003; Wilhite & Glantz 1985). More than 150 definitions of the term were identified by Wilhite & Glantz (1985). These varied perspectives and definitions create confusion as to whether a drought exists and if it exists, how severe it is, when it started and ended. Because of this uncertainty, administrators in the public and private sectors, non-governmental organizations and international organizations will fail to formulate timely policies (UNISDR 2003). Their indecision may result in huge material losses and human suffering. To address this problem, UNISDR (2003) has suggested the establishment of a comprehensive early warning system that uses multiple physical and social indicators and indices to enable coping or mitigation actions as well as response programs to be taken timeously. Olszewski & Moorsom (1995: 39) have pointed out that the concept drought is usually "complicated by its overlapping meanings" and that "the usage of the term is influenced by the climatological context, the time scale and the impacts experienced." The many definitions of drought arise because the characteristics of drought differ between regions. The impacts also differ because of variations in social, economic and environmental characteristics at local, regional and national scale (UNISDR 2003). UNISDR (2003: 4) recommends that "drought definitions should be impact or application specific and region specific." According to Usman et al (2005) drought definitions vary from sector to sector and they should be sector specific.

Wilhite & Glantz (1987) distinguish between conceptual and operational definitions of drought. Conceptual definitions are stated in general terms and assist the public to comprehend the concept of drought (NDMC 2006) but they are not useful when dealing

with the reality of drought impacts (Wilhite & Glantz 1987). In addition, they are vague and do not quantify the start, duration, extent, severity and end of a drought period (Smakhtin & Hughes 2004). Operational definitions can help to identify the beginning, severity, duration and cessation of a drought. They use a variety of indices to quantify the intensity of the drought, its extent and potential impacts (Wilhite & Glantz 1987). They are region-specific and are based on scientific reasoning which analyses meteorological and hydrological information. Operational definitions are useful in developing drought policies, monitoring systems, mitigation strategies and preparedness plans (Smakhtin & Hughes 2004). Most attempts to define drought refer to deficiencies in precipitation as all droughts result from a deficiency in precipitation (Whitmore 2000). There are four main components of drought in the literature: meteorological, agricultural, hydrological and socio-economic (Wilhite & Glantz 1985). Each is discussed in the following paragraphs.

Meteorological drought is mainly defined by "deficiency of precipitation from expected or 'normal' amount over an extended period of time" (UNISDR 2003: 4). It is concerned with the physical aspect of drought relating to the departure of the precipitation from the 'normal' for a certain period. According to Unganai & Bandason (2005) no objective, operational definition has been developed in Zimbabwe but drought exists when rainfall is less than 75 per cent of the long term average for a prolonged period during the rainy season. A drought is declared according to the results of an assessment of the state of agricultural production and water supplies. If these have been adversely affected to the extent that small-scale farmers cannot cope without state assistance, a drought is declared (Unganai & Bandason 2005). An operational definition of drought applied in South Africa broadly defines drought as "occurring at 70 per cent of normal rainfall. It becomes a *disaster* or *severe* drought when two consecutive seasons experience 70 per cent or less rainfall. A 'normal' drought … refers to temporary periods of moisture deficits of less than one year duration" (Bruwer 1990: 201). This definition tries to define the onset, duration and end of the drought event and can be used as a basis for an early warning system. Meteorological drought for Nevis, an island in the Caribbean Sea, is declared when about 85 per cent or less of average annual rainfall has occurred (Jackson 2001). The latter example clearly shows that the definition of drought differs according to the climatological context of a place as noted by Olszewski & Moorsom (1995).

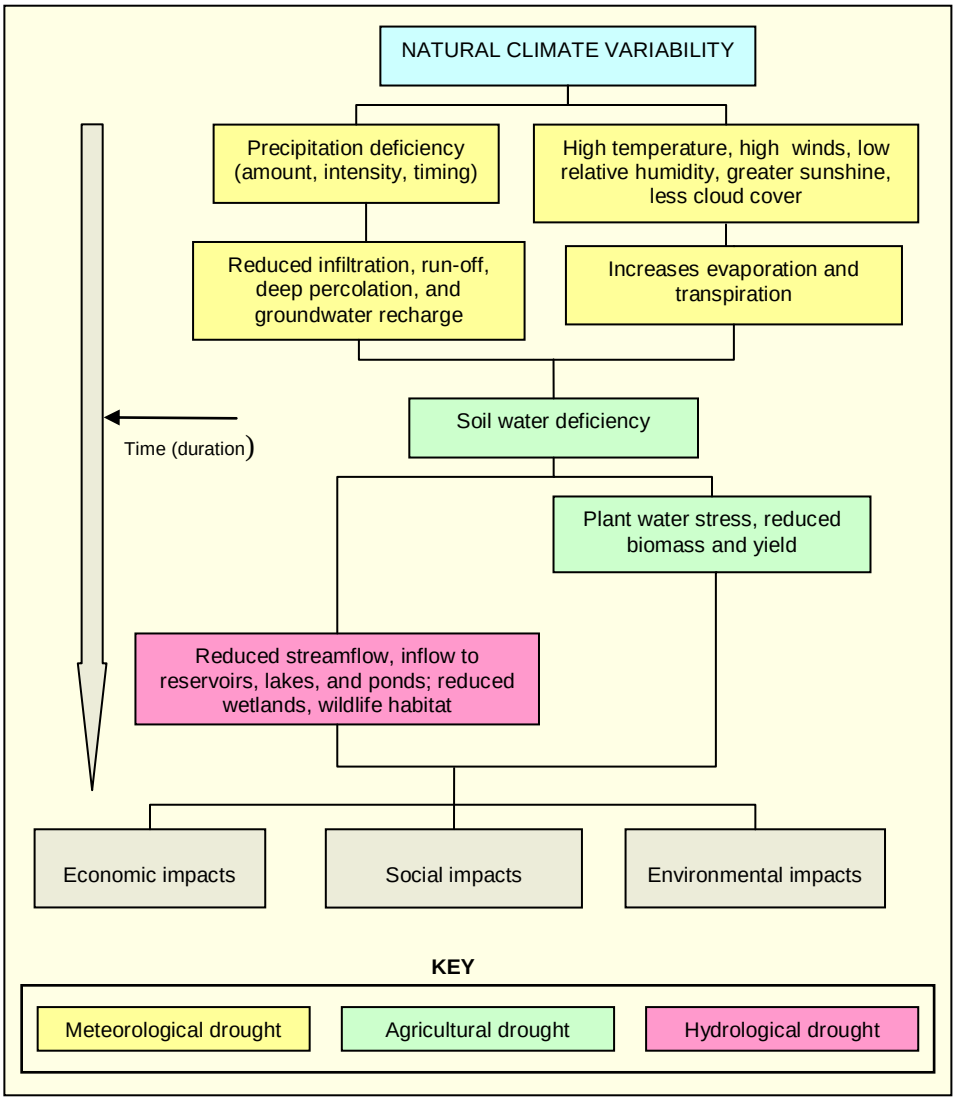
The concept of meteorological drought has several shortcomings (Whitmore 2000). First, the long term average of the rainfall (the 'normal') varies with the length of the rainfall record and may be affected by anomalies in the weather within the recorded period. Second, it is hard to define when a drought starts because the reserve moisture in the soil may conceal the onset of drought. It is also difficult to assess whether drought has ended or not. Third, the compliance of the total rainfall of a place with a numerical definition of meteorological drought may not be associated with agricultural drought because the spatial and temporal distribution of the rainfall may have been such that the water needs of the crops were met during critical water sensitive periods.

Agricultural drought occurs when an insufficiency of soil moisture causes crop failure (UNISDR 2003; Wilhite 1997; Wilhite & Glantz 1985). This type of drought occurs when plant water demands cannot be met due to inadequate soil moisture resulting from dryness brought on by meteorological or hydrological drought. In such cases plant water stress is shown by reduced biomass and plant yield (Jackson 2001). FAO (1983) is mainly concerned with agricultural drought in its definition of a drought hazard as being the percentage of years when crops fail due to inadequate moisture. The occurrence of agricultural drought is affected by the magnitude, timing, duration and frequency of the rainfall deficits and also by the varying responses of soils, plants and animals to water stress (Whitmore 2000).

Hydrological drought refers to a rainfall deficit capable of seriously reducing run-off, streamflow, inflow into storage reservoirs and recharge of groundwater (Whitmore 2000). This in turn affects the base flow of rivers, spring flow and yield of boreholes. It manifests itself in significant reduction of water in surface reservoirs and the drying of dams and wetlands (Jackson 2001; Smith 2004). The definition used is based on concern for water supplies for irrigation or urban needs (Swearingen 1992). As noted above about meteorological drought, it is difficult to define the start, duration and severity of hydrological drought. Moreover, run-off and streamflow are affected by factors other than the amount of rainfall. The mode of occurrence of rainfall may vary in that soft showers will result in lower run-off than a single torrential downpour. Dense vegetation cover reduces run-off and streamflow because of increased infiltration. Phantom drought can occur as a result of increased population and intensified land uses that deplete surface and underground water supply in a catchment area. In such cases the demand for water

exceeds supply. The depletion of water will not have been caused by meteorological drought but by excessive abstraction of water (Whitmore 2000).

The three types of drought are related as shown in Figure 2.1 and there are leads and lags in their onset and departure (UNISDR 2003). During the onset of a drought, meteorological drought occurs first followed by agricultural drought and then hydrological drought (Wilhite 1997). The hydrological system recovers last after an extended drought. The relationship of agricultural and hydrological drought to meteorological drought may not be apparent in some cases.



Adapted from NDMC (2006)

Figure 2.1: Relationships between types of drought

Swearingen (1992) gives an example of the Gharb in Morocco which might experience meteorological drought in terms of very low rainfall which does not result in agricultural or hydrological drought. Soil moisture and streamflow may be higher than expected as a result of the occurrence of above-normal rainfall the previous year. Low precipitation levels over a number of years may result in hydrological drought which will still occur when the precipitation returns to normal. In this case hydrological drought is out of phase with meteorological and agricultural drought. Precipitation which is unevenly distributed temporally during the growing season can result in agricultural drought even though there was no meteorological drought (Swearingen 1992).

Socio-economic drought occurs as a result of the inability of the affected people to cope with drought and "it associates the supply and demand of some economic good with elements of meteorological, agricultural, and hydrological drought" (Heim Jr 2002: 1149). Takeuchi (1974) and Usman et al (2005) regard droughts as manifestations of the occurrence of deficits in water requirements associated with human activities, mainly agriculture and water resources. Humans usually worsen the impact of drought (NDMC 2006).

Drought indices complement conceptual definitions and are useful for the quantification of drought inception, duration, severity, termination and impacts. The next section deals with different types of droughts indices.

2.1.3 Drought Indices

Drought indices are applied to produce more useful operational definitions of drought that enable the onset, duration, severity and potential impact of drought to be quantified and determined so that appropriate action can be taken as early as possible. Early warning systems consist of indicators developed using meteorological variables such as precipitation and temperature. In addition, hydrological variables such as streamflow, groundwater levels, reservoir and lake levels, snowpack, and soil moisture may be used (UNISDR 2003). In Africa drought early warning systems are usually combined with those developed for early warning of famine and food shortages. In such cases indicators of stress on lives and livelihoods are also monitored (UNISDR 2003).

According to Friedman (1957) cited by (Heim Jr 2002) any drought index should meet four basic criteria: "1) The timescale should be appropriate to the problem at hand; 2) the index should be a quantitative measure of large-scale, long-continuing drought conditions; 3) the index should be applicable to the problem being studied; and 4) a long accurate past record of the index should be available or computable. A fifth criterion should be added for indices used in operational drought monitoring: 5) the index should be able to be computed on a near-real-time basis" (Heim Jr 2002: 1150).

The *Palmer Drought Severity Index* (PDSI), developed by Palmer (1965), is a site-specific index with a low level of precision derived from weighted differences between actual precipitation and evapotranspiration (Dagel 1997). The PDSI is well known and is extensively used for different purposes in the United States of America (USA). It is more suitable for measuring impacts that are sensitive to soil moisture conditions, such as agriculture (Heim Jr 2002; Willeke, Hosking, Wallis & Guttman 1994). It has also been useful as a drought monitoring tool and has been used to start actions associated with drought contingency plans (Willeke et al 1994). According to Alley (1984) the PDSI is popular for a number of reasons. First, decision makers can determine how abnormal the recent weather for a region has been. Second, it provides an opportunity to place current conditions in historical perspective. Third, historical droughts can be spatially represented. Several states in the USA, such as Colorado, Idaho, New York and Utah use the PDSI as one of their drought-monitoring systems.

The PDSI, however, has a number of limitations. It is only used in the USA as tests in other countries, for example in South Africa, have found it to be a poor indicator of short term changes in moisture status affecting crops (Bruwer 1990; Du Pisani 1990). According to Smakhtin & Hughes (2004), PDSI values may lag behind emerging droughts by several months. It is therefore not suitable for use in areas with frequent climate extremes (Hayes 2006; Smakhtin & Hughes 2004). Furthermore, its calculation is complex as it requires a large amount of meteorological data (Smakhtin & Hughes 2004).

An index developed by Palmer (1968) to complement the PDSI is the *Crop Mixture Index*. It measures the extent to which crop moisture requirements are met. Unlike the PDSI, it responds faster to short-term changes in moisture conditions (Smakhtin & Hughes 2004). It is most effective in measuring agricultural drought during the warm growing season

(Heim Jr 2002). However, its shortcoming is that it is a poor tool for monitoring long-term droughts (Hayes 2006).

The *Standardized Precipitation Index* (SPI) was developed in Colorado in the USA by McKee, Doesken & Kleist (1993). Smakhtin & Hughes (2004) report that the index is based only on precipitation and thus requires less input data and calculation effort than the PDSI. According to Edwards & McKee (1997) cited by Smakhtin & Hughes (2004: 3), "a long-term precipitation record at the desired station is fitted to a probability distribution which is then transformed into a normal distribution so that the mean SPI is zero." It can be calculated in different time steps, for example, 1 month, 3 months, and 48 months and can identify emerging droughts sooner than the PDSI (Smakhtin & Hughes 2004; Wilhite, Svoboda & Hayes 2005). It is more readily applicable than other drought indices because the data required is limited. In addition the calculations are flexible and simple (Heim Jr 2002; Smakhtin & Hughes 2004; Wilhite, Svoboda & Hayes 2005).

The *Effective Drought Index* (EDI) is a function of precipitation needed to return to normal conditions. PRN is precipitation which is necessary for recovery from accumulated deficit since the beginning of the dry period (Byun & Wilhite 1999; Smakhtin & Hughes 2004). The index is also a daily effective precipitation and its deviation from the mean for each day. EDIs are standardized and allow drought severity in various places to be compared even if their climates differ. The Effective Drought Index is applicable for drought monitoring over large regions (Byun & Wilhite 1999; Smakhtin & Hughes 2004). The main problem is that in its original form it is based on daily precipitation data which are much less readily available (Smakhtin & Hughes 2004). It was developed by Byun & Wilhite (1999) and in its original form the index is calculated with a daily time step.

The *Surface Water Supply Index* (SWSI) is calculated from reservoir storage, streamflow and two precipitation types (snow and rain) at high elevations to produce a single index number (Smakhtin & Hughes 2004). In winter months the SWSI is calculated using snowpack, precipitation and reservoir storage but in summer flow precipitation and reservoir storage data are used. Smakhtin & Hughes (2004) note the strengths of the index which are that it is fairly easy to calculate and that it gives a representative measure of water availability across the river basin. According to Heim Jr (2002), however, the index has a number of shortcomings. There is no consensus on the definition of surface water

supply. Factor weights vary from place to place and in some cases from month to month resulting in indices with different statistical properties. The hydro-climatic differences that characterize river basins in western USA result in indices that do not have the same meaning and significance in all areas and at all times. This makes it difficult to compare drought severity in different basins using the index as a basis for comparison (Hayes 2006). SWSI was developed in Colorado by Shafer & Dezman (1982) and it is currently used in a number of American states where snow forms a large component of the water balance.

Frere & Popov (1979) developed the *Water Requirement Satisfaction Index* (WRSI). It was used by Vossen (1990) in Botswana and is widely used in southern Africa. The index is an indicator of crop performance based on the availability of water to the crop during the growing season and is used to monitor crop moisture stress. The WRSI ranges from 0 to 100. An index below 50 indicates crop failure and a value of 97-100 shows good crop condition (Unganai & Bandason 2005). Regional implementation of the index has been carried out in a geographic information system environment. It has been applied spatially across South Africa using WindDisp and ArcView software (Monnik 2000). One of the weaknesses of the WRSI is that to facilitate calculation, assumptions are made concerning a specific crop, replanting, evaporation, and soil water holding capacity (Monnik 2000). Other weaknesses pointed out by Du Pisani (1990: 6) are that: "WRSI does not consider crop- or stage-specific sensitivity to drought stress; it only takes account of cumulative moisture deficits, not consecutive deficits; it can only partly accommodate actual evapotranspiration; and, the model assumes equal soil moisture availability over the entire range between field capacity and wilting point."

Deciles are widely used in Australia and they were suggested by Gibbs & Maher (1967). Smakhtin & Hughes (2004) explain that monthly precipitation totals from long term records (30-50 years) are first ranked from highest to lowest in a cumulative frequency distribution. They are then split into tenths of distribution or deciles. Any precipitation value can be measured against the deciles. The indices are easy to calculate. The only input is precipitation data and fewer assumptions have to be made as in the more complex indices such as PDSI and SWSI (Hayes 2006; Smakhtin & Hughes 2004). Decile rainfall analysis is valuable because it is standardized over time and therefore regions with

different climates, such as in South Africa, can be compared. The main shortcoming of the index, however, is that it is not sensitive to the distribution of rainfall within the period considered (Monnik 2000).

The most widely used index in southern Africa is the *per cent normal rainfall index* (Unganai & Bandason 2005). According to Smakhtin & Hughes (2004) the normal may be set to a long term mean or median precipitation value. It can be calculated for a day, month, season or year and considered to be 100 per cent. Similar percentage of normal values may have different specific impacts at different locations and it is a simplistic measure of precipitation deficit (Smakhtin & Hughes 2004). Application problems experienced in southern Africa relate to the difficulty and cost of monitoring parameters such as soil moisture and the lack of data on potential evapotranspiration. A rainfall departure of 25 per cent from the normal for several successive weeks during the rainy season is usually classified as drought in much of southern Africa (Unganai & Bandason 2005).

Byun & Wilhite (1999) have cited additional shortcomings of indices in general. They suggest that drought indices should be calculated with the concept of consecutive occurrences of water deficiency. They also note that most indices do not use daily units. This is important because the water amount of the affected drought region can return to normal conditions with a day's rainfall. In addition a time dependent reduction function is required to estimate the current water deficiency. Most current drought indices use simple summation of precipitation. Byun & Wilhite (1999) have questioned the accuracy of the data used at times. The estimation of parameters such as run-off, soil moisture, and evapo-transpiration in the calculation of indices results in simplification. They concluded that no satisfactory solutions had been found for problems relating to predicting the beginning and end of drought.

Some of the indices outlined above are of limited use in southern Africa as noted by Bruwer (1990) and Du Pisani (1990). The following indices can be used in southern Africa: the Standardized Precipitation Index, deciles, per cent normal and Water Requirement Satisfaction Index. They are easy to calculate and the only input required in the calculation of most of them is rainfall, unlike the PDSI and SWSI whose calculation is more complicated because a greater input of parameters is required. Furthermore,

researchers have established that some of the indices, such as PDSI and SWSI, are site- and region-specific. They are therefore applicable only in places where they were developed, for example, in certain parts of the USA (Smakhtin & Hughes 2004).

Drought and aridity appear to be synonymous, but they are different as set out briefly in the next section. The next section deals with the differences between drought and aridity.

2.1.4 Drought and aridity

Drought is a temporary anomaly and a common, recurring feature of climate. It should be regarded as inevitable and not as a rare event that occurs by chance. It occurs, as mentioned above, in almost all climatic zones, but its features differ among regions. Aridity on the other hand is limited to low rainfall regions and is a permanent feature of a climate (Landsberg 1975; NDMC 2006). Drought and aridity are, however, similar in that both are characterized by a shortage of water (Landsberg 1975). Arid areas are characterized by low annual rainfall, less than 250mm, with extreme inter-annual variability (Gibbs 1975). Aridity is one of the main characteristics of desert climate. Drought is more frequent in transitional, semi-arid regions that lie between arid regions and moister regions, for example, the south-western part of southern Africa and the Sahel region, a belt extending from west to east across Africa along the southern fringes of the Sahara desert (Glantz 1994).

The next section deals with concepts and frameworks which are relevant in disaster management. It is important to understand concepts such as vulnerability, resilience and adaptation in managing disasters. The disaster management cycle can be used as a theoretical basis for a proactive drought policy.

2.2 HAZARD ASSESSMENT AND MANAGEMENT

2.2.1 Drought hazard definition

A hazard is a “potential threat to humans and their welfare” whereas risk may be defined as “the probability of a hazard occurring and creating a loss” (Smith 2004: 6). A disaster may be regarded as the “realization of a hazard” (Smith 2004: 7). Another definition,

provided by the Asian Development Bank (ADB 1991: 3) is that a disaster is an "event, natural or man-made, sudden or progressive, which impacts with such severity that the affected community has to respond with exceptional measures." This definition refers to different types of hazards including droughts. A drought-related hazard is an event in which a "significant reduction of water is experienced enough to bring about severe economic, social, and environmental hardships to the population" (Jackson 2001: 6). Changes in people's perceptions of disaster revolutionized their approaches to disaster management.

2.2.2 Evolution of approaches to disaster management

The literature outlines the development of different approaches to disaster management. These evolved as a result of how people perceived disasters. Initially disasters were perceived as natural (an act of God) and man was left impotent against them. This gave rise to a technocratic approach in which science and technology were seen as the only means by which people could cope with natural hazards (Fara 2001). This perception affects the management of disasters in that it gives rise to crisis management and reactive policies that concentrate on preparedness, response and relief aid (Holloway 2003). However, recently the importance of interaction between humans, technological and environmental systems has been recognized in the creation of disasters (Fara 2001). The structural approach recognizes social, political and economic factors as the main causes of disasters because they can either increase or reduce the vulnerability of the population at risk. This approach emphasizes the relationship between poverty and human vulnerability to hazards. Another school of thought, found in anthropological research, focuses on local communities and the threshold points beyond which they can no longer survive (Torry 1979). The sociological approach, on the other hand, focuses on how people respond to a disaster event and on the effects that disasters are likely to have on community functions and organization (Quarantelli 1978). Researchers are increasingly realizing that material wealth can affect vulnerability to disaster losses because of its influence on adaptive capacity (Mileti 1999). This has given rise to the vulnerability approach in which scholars try to establish what makes people vulnerable to hazards. This realization has implications on disaster management policy formulation in that it should address the factors that increase the population's vulnerability to hazards so as to improve its adaptive capacity and thus reduce losses.

Advanced countries such as the USA and Australia have changed to hazard mitigation which is a proactive approach to hazard management that complements preparedness and response. The formulation of the new policies has been assisted by developments in disaster science coupled with research (Fara 2001). Literature on the African context reveals large-scale disaster interventions by advanced countries in the form of food aid to drought ravaged countries (Holloway 2003). No effort is made to address disaster prevention, mitigation and vulnerability reduction (Alexander 1997; Holloway 2003). Moreover, food aid creates a dependency syndrome and destroys local capacity to cope with droughts. Holloway (2003) criticizes the absence of initiative on the part of governments to develop home-grown disaster management strategies. Part of the problem noted is the dependence on foreign researchers whose accumulated body of knowledge may be irrelevant to the African situation (Fara 2001; Holloway 2003).

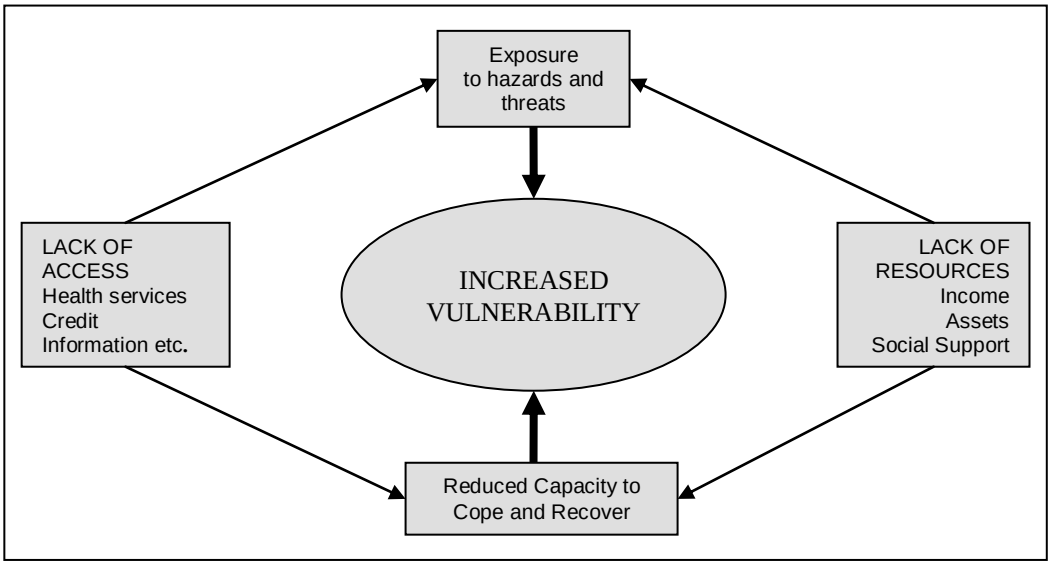
The next section deals with disaster management concepts. Hazard reducing activities include mitigation, protection and adaptation, and the level of vulnerability affects the population's ability to adapt to hazards.

2.2.3 Disaster management concepts

According to Smith (2004), hazard-reducing impacts fall into three groups. The first is mitigation. This modifies the loss burden. The financial burden is spread as widely as possible through disaster aid and insurance programmes. Protection is the second group and is characterized by the event being modified. Ways are found to reduce the hazard. The third group involves adaptation in which human vulnerability is modified. Adaptation programmes promote changes in human behaviour towards hazards and covers community preparedness programmes, forecasting and warning schemes and land use planning. Whether a drought hazard that is realized becomes a disaster in a certain area depends on the vulnerability and adaptive capacity of the population. According to Blaikie, Cannon, Davis & Wisner (1994) the impact of a drought-related disaster is directly related to the vulnerability of the population.

Vulnerability is "the state of susceptibility to harm from exposure to stresses associated with environmental and social change and from the absence of capacity to adapt" (Adger 2006: 268). According to Blaikie et al (1994: 9), "it involves a combination of factors that

determine the degree to which someone's life and livelihood is put at risk by a discrete and identifiable event in nature or in society." The factors mentioned above include "lack of access to resources; limited access to political power and representation; social capital including social network and connections; beliefs and customs; building stock and age; frail and physically limited individuals; and type and density of infrastructure and lifelines" (Cutter, Boruff & Shirley 2003). These factors contribute to social vulnerability. The factors influencing vulnerability are summarized by Wisner (1993) in Figure 2.2. The diagram also illustrates that vulnerability increases as result of exposure to hazards and that the reduced capacity to cope and recover directly affects vulnerability (Wisner 1993). The Intergovernmental Panel on Climate Change (2001: 982) defines adaptive capacity as "the ability of a system to adjust to climate change (including climate variability and extremes), to moderate potential damages, to take advantage of opportunities, or to cope with the consequences."



Source: Wisner (1993: 128)

Figure 2.2: Interrelationships between exposure, capacity, lack of resources and access in enhancing vulnerability

Cardona (2004) links vulnerability to resilience. Lack of resilience results from failure to obtain resources to enhance a community's means of livelihood. According to Blaikie et al (1994), resilience is a measure of the capacity to absorb and recover from the impact of a hazardous event. Other factors that increase vulnerability are level of exposure to hazards and socio-economic fragility (Cardona 2004). The formula used to describe drought in the

early 1990s was $Disaster = Hazard * Vu\ln erability$ (Blaikie et al 1994). This means that the realization of a drought hazard where the population is highly vulnerable can result in a major disaster, for example, the famine that occurred in the Sahel zone in the mid 1980s. A prolonged drought started in 1965 and lasted for 25 years until 1990. The rainfall declined by 20-40 per cent from the long term average (Hulme & Kelly 1993; Kassas 1999). This resulted in huge losses in terms of human lives as well as crop and animal failure. The formula, however, has been expanded to add adaptive capacity to the equation, $Disaster = \frac{Hazard * Vu\ln erability}{Capacity}$. According to Blaikie et al (1994) capacity is a key element in reducing disaster risk. The impact of the disaster is reduced if the adaptive capacity of the population is greater (Blaikie et al 1994).

Research on vulnerability has been conducted from different perspectives: social, economic, physical and environmental. Adger (2006) maintains that research traditions have struggled to find suitable metrics for vulnerability and that for research findings to be compared, it is important to provide "consistent frameworks for measuring vulnerability." However, there have been notable developments in quantitave social science, especially in the fields of sustainable livelihoods in "deriving metrics for vulnerability that are comparable across time and location" (Alwang, Siegel & Jorgensen 2001; Kamanou & Morduch 2004). According to Cutter, Boruff & Shirley (2003), there is limited research on social vulnerability because it is not easy to measure the social aspects of vulnerability. They used the hazards-of-place model of vulnerability to work out a composite social vulnerability index using socio-economic and demographic data at county level for the whole of the USA. This enables not only the comparison of vulnerability of the different counties spatially throughout the USA but also that the prediction of disaster impacts can be carried out.

Other work on social vulnerability was done by Fara (2001) in Namibia. The author noted that the indigenous people called the Nama of the southern communal lands of Namibia are highly vulnerable to drought. Several root causes were noted, and the major one being poverty. There is very little alternative employment. Most of the people live on less than US$30 per month and the main source of income is government pensions given to the elderly and livestock which are decimated by droughts from time to time. The literacy rate is very low and this limits their access to better-paying jobs, thus reinforcing poverty. The

people's perception is that they do not get meaningful assistance from the government. The author's view is that there is no sustainable development in this part of Namibia because government policy to the drought stricken region is reactive[10] and not proactive. The people are assisted using relief aid only to avert starvation. According to Fara (2001) sustainable development could address the root causes of the people's vulnerability to drought.

The concept of vulnerability with reference to southern Africa has been widely covered by a number of authors. According to Holloway (2003) and Maunder & Wiggins (2006), the 1991/92 drought was more severe than the 2001/03 drought but had a less severe impact on the population in southern Africa. A humanitarian crisis was experienced in 2001/03 in most of the SADC member countries because the population's vulnerability to hunger had worsened (Maunder & Wiggins 2006). Factors that have exacerbated the people's vulnerability to hunger include the inability to recover from successive crop failures and loss of livestock due to frequent droughts. Food shortages precipitated price increases resulting in reduced food intake for poor families. Chronic poverty increased, with a greater number of people surviving on less than US$1 a day (Clover 2003).

The HIV/AIDS pandemic had a negative impact on food security at household level. Infection levels are around 25 per cent on average in southern Africa (Clover 2003). The high incidence of HIV/AIDS adversely affects all dimensions of food security: availability, stability, access and use of food. Farming skills are lost, agricultural development efforts fail, rural livelihoods are likely to disintegrate, productive capacity to work the land declines and household earnings shrink (Clover 2003). Furthermore, the AIDS pandemic has worsened the population's vulnerability to shocks like drought hazards. Their adaptive capacity or ability to cope and recover from the impacts of the hazard is greatly reduced. It is likely that major droughts could become disasters in future because the population's vulnerability would be exacerbated by increased poverty and the HIV/AIDS pandemic. The 2001/03 humanitarian crisis underscores the need for the maintenance of national vulnerability assessment committees in each SADC member country so as to provide needs assessment information to enable timely assistance to be

[10] Reactive measures are improvised once there is drought and there are visible impacts already under way (Yevjevich 1980) cited by Hazelton, Pearson & Kariuki (1994). They are characterized by application of ad hoc measures.

given to vulnerable households (Maunder & Wiggins 2006). The Vulnerability Assessment Committee (VAC) system was established by the SADC in 1999. The Regional Vulnerability Assessment Committee (RVAC) has coordinated the vulnerability assessments in six SADC countries since 2002 (Tadonki 2006). The information obtained is used to make decisions on emergency interventions and for policy formulation (Tadonki 2006).

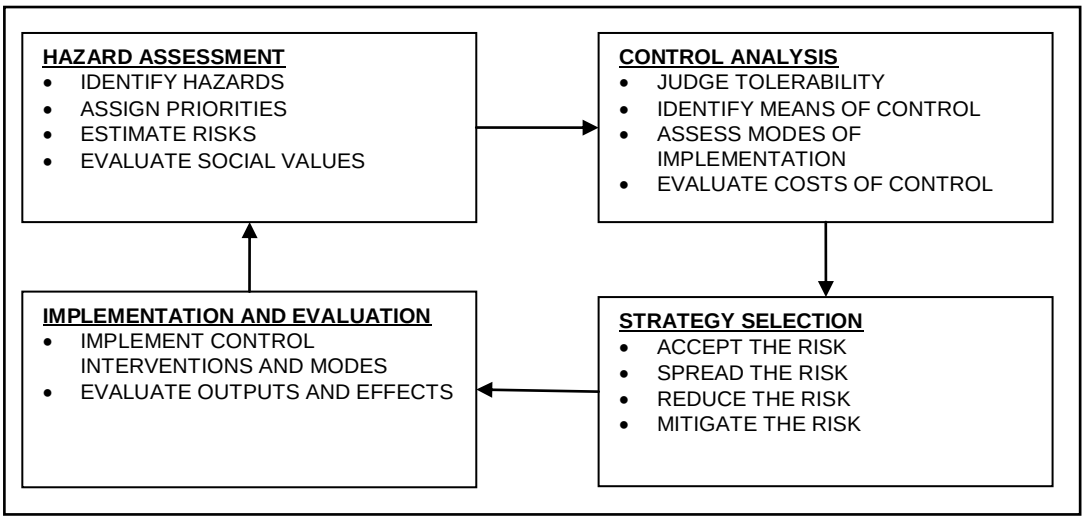
A review of the vulnerability assessment methodology used in Zimbabwe shows change of methodology over time. In 2002 the household economy approach was used where information on coping strategies, dietary intake, agricultural inputs and nutritional information was collected and analyzed (TANGO International 2005). In April 2003 a livelihoods based vulnerability analysis framework was adopted. A greater input of data is used which includes household demographics, asset ownership, food availability and access, agricultural inputs, consumption patterns, coping mechanisms, health and education, food availability, market prices and coping strategies (TANGO International 2005). Moreover, there has been an improvement in sampling with assistance from the Central Statistical Office (CSO). The main data collection techniques used were focus group discussions, household questionnaires and interviews. Secondary data on health and sanitation was collected to complement the primary data (TANGO International 2005).

However, there were problems with the representativeness of samples and because of resource constraints some data was left out, for example on nutrition. Stakeholders complained that raw VAC research products were difficult to access. The validity and reliability of the research findings are expected to get better as the sampling approach and questionnaire design improve. The government of Zimbabwe has used VAC results regularly to support requests for aid from international institutions (TANGO International 2005).

A number of frameworks on hazard assessment and management have been designed. Their value lies in that some of them can be adopted to form a theoretical basis for the development of drought policies. The next section deals with disaster management frameworks.

2.2.4 Disaster management frameworks

The first framework proposed by Kasperson, Kates & Hohenemser (1985) for hazard management recognizes four stages in the assessment and management of hazards as shown in Figure 2.3. The main components of this framework are hazard assessment, control analysis, strategy selection, and implementation together with evaluation. According to Emani (1998), the strength of the framework is that it conceptually distinguishes between risk assessment and management. Moreover, it is broad enough to include the concepts of disaster planning and management.



Source: Kasperson, Kates, & Hohenemser (1985: 4)

Figure 2.3: A framework for hazard management

The second framework designed by the National Research Council (NRC) proposes four stages namely hazard identification, dose response, exposure assessment, and risk characterization (NRC 1983). This framework is not generic and it is more relevant to risk assessment of industrial than climatological hazards. Moreover, it has nothing to offer with respect to the planning and management of a drought hazard. The third framework for management of disasters has been proposed by Quarantelli (1992) using the four temporal stages in a disaster cycle: mitigation, preparedness, response and recovery. Quarantelli (1992) outlines what is involved in the planning and management process as follows:

1. Mitigation or prevention refers to long range pre-impact activities of structural and/or non-structural nature that tend to be one of three kinds:

(a) Those that attempt to actually eliminate or reduce the probability of occurrence of disaster.
(b) Those that are designed to reduce the effects of a disaster.
(c) Those that help to redistribute the costs of disaster planning and disaster impacts.

2. Preparedness refers to pre-impact activities concerned with preparing for disasters. Preparedness measures are closer to the onset of impact than mitigation ones and are aimed at improving the emergency time response if a disaster were to occur.
3. Response deals with actions that follow a disaster impact.
4. Recovery covers those disaster-relevant activities that are undertaken after the emergency period is over in an attempt to return to relatively normal functioning.

The four stages described above can be used as guidelines for a proactive national drought policy that will alleviate the consequences (Hazelton, Pearson & Kariuki 1994).

The next section deals with drought policies. It shows crisis management of drought-related hazards in most countries in southern Africa. South Africa is the only country in southern Africa which has a well defined policy.

2.3 DROUGHT POLICIES

Drought policies are influenced by the way in which people perceive drought-induced disasters. The perception that drought impacts are natural and that humans are powerless to do anything, will result in a reactive policy or crisis management that focuses only on response and recovery. Relief aid is poured into the areas that are affected to avert a famine and loss of life (Higgins 2001; Holloway 2003). When the drought is over it is forgotten and there are hardly any mitigation measures aimed at reducing the impacts. On the other hand if people are aware that disasters often result from the interaction of humans with the environment, they will formulate proactive policies in which risk reduction is at the core of agricultural development programmes so as to avert a disaster when the drought hazard is realized (Wilhite 2002). In the following sections drought policy in the SADC, South Africa, Australia and the USA is reviewed.

2.3.1 Development of drought policy in the SADC

The risk reduction concept is not at the core of disaster management in most countries in southern Africa or Africa as a whole (Holloway 2003). Several reasons are given by Holloway (2003). First, Africa's risk profile differs from that of other continents in that its disaster losses have been associated with slow, insidious disasters such as famine, HIV/AIDS and humanitarian crises resulting from armed conflict, whereas in Asia, Europe and the Americas disaster losses are mainly a result of sudden events, for example earthquakes, tsunamis, cyclones and avalanches that produce visible damage of physical infrastructure. Second, the resolution of political conflict and security concerns has been prioritized more than disaster management in southern Africa. Third, patterns of disaster occurrence take place in rural areas in Africa – unlike other continents where there are higher levels of urbanization – so that African governments have not been concerned with vulnerability reduction. Furthermore, disaster management policy has been influenced most often by political expediency, media pressure, and the existence of humanitarian crises (Holloway 2003).

The Southern African Development Coordination Conference (SADCC), SADC's predecessor, established the Regional Early Warning Unit (REWU) in the SADCC Food Security Technical Advisory Unit based in Harare. The REWU built capacity to monitor and consolidate data on regional food security for each growing season. This is important in monitoring food security (Holloway 2003). South Africa and Botswana have made progress in the development of disaster management policy (Wilhite 2000). Although Botswana does not have a clear drought policy and plan, drought preparedness planning and the institutional structure is well defined. There is local involvement at district level. National disaster coordinating structures have been established in Lesotho, Mozambique and Zambia (Holloway 2003). Wilhite (2000) noted a significant institutional capacity to deal with drought in southern Africa but most countries had not developed permanent institutional capacity.

Holloway (2003) has outlined some shortcomings of the disaster management approaches applied by the governments in southern Africa. They continue to depend on international assistance in times of disaster. Moreover, disaster approaches are reactive and depend on outside initiative and financial support. Governments should prioritize developmental

objectives that build local resilience to hazard threats so as to avert disasters (Holloway 2003). The governments should act proactively to develop policies with inbuilt mitigation and preparedness programmes to anticipate disasters and avert the consequences of climate threats to food security. Moreover, they should address the causes of vulnerability to disaster such as poverty and HIV/AIDS. Furthermore, they should fund local research in order to develop the required theoretical frameworks (Holloway 2003).

UNSO (1999) compiled a disaster management report on 11 southern African countries, namely Angola, Botswana, Lesotho, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Zambia, and Zimbabwe. The countries had to respond to questions on: status of drought preparedness in terms of institutional capacity; constraints with regard to policy and plan development; and the primary drought policy and planning needs. The responses were analyzed and evaluated from the perspective of the critical components of a drought preparedness plan:

1. monitoring and early warning;
2. vulnerability and impact assessment; and
3. mitigation and response (Wilhite 1999).

The report highlighted the following common features on the current status of drought preparedness and institutional capacity. In most of the countries drought policies are usually lacking and so there is no permanent government body to deal with drought issues. Drought response is often coordinated through natural disaster authorities, for example in Lesotho, Zambia and Zimbabwe. Drought relief is directed toward human relief and protection of key assets. Recovery and post-drought evaluation of response is usually not undertaken and thus opportunities to learn from past mistakes are lost. Furthermore, formal drought contingency plans are rare and mainly directed at response actions. However, the following positive features were observed: drought and famine early warning systems commonly exist; vulnerability assessment of sectors, groups and areas at risk often exist; mitigation actions focus on economic diversification and poverty reduction; and drought management is increasingly viewed as part of the development process (Wilhite 2000).

The individual country reports also revealed that there were many problems that hindered drought policy and plan development (Wilhite 2000). The poor quality of meteorological networks results in an inadequacy of data needed for the assessment of drought and its

impacts. Because of minimal understanding of drought impacts, the measures implemented to mitigate drought impacts are not likely to be effective. Many of the countries lack institutional capacity and there is limited coordination between government agencies to effectively manage the impacts of droughts. In the assessment of drought impacts it was realized that in most cases there is a lack of understanding of household vulnerability. A low level of involvement of Non Governmental Organizations (NGOs) in drought management was also noted. Extension services are generally limited. Drought impacts are exacerbated by inequitable access to land. Most of the problems outlined above emanate from inadequacy of financial resources for drought management and human resource development. The unavailability of drought policies and plans results in failure to adequately deal with the impacts of drought. These problems could be addressed with the assistance of some United Nations organs and countries that have developed proactive drought policies.

2.3.2 South Africa

Drought hazard management in South Africa has shifted from a programme that initially focused on commercial farmers to one that includes the rural poor and farm workers (Monnik 2000). Past drought policy was aimed at sustaining livestock until the rains came and did not provide long-term proactive solutions. It encouraged high risk production systems that were harmful to the environment in the long run (Monnik 2000). According to Du Pisani, Van Themaat & Roux (1995) the main objectives of drought relief subsidies have been: to protect natural resources from deterioration; to protect rural communities by preventing disruption of agricultural infrastructure; and, to achieve socio-economic development. Since 1980, two important conditions for drought relief payments to stock farmers have been implemented: (1) a drought must assume disaster proportions (Bruwer 1990) and (2) stock numbers must not exceed the official carrying capacity (Department of Agricultural Development 1992) cited by Du Pisani, Van Themaat & Roux (1995). The present drought policy requires that “farmers must accept drought risk through their farming and financial management” (Department of Agriculture 1995) cited by Du Pisani, Van Themaat & Roux (1995). The farmers must plan for droughts in such a way that they survive them with as little assistance as possible from the government (Monnik 2000).

South Africa has a clear policy which aims to provide greater equity for the recipients of drought assistance and to achieve self-reliance, reduce risk and stabilize income (Wilhite 2000). The country has set up legal instruments and institutions for implementing the drought policy. Drought hazard is managed through the Disaster Management Policy and the Drought Management Plan (DMP) (South Africa 2005). The DMP, which is still in the process of formulation, falls under the agricultural sector policy. The White Paper on Disaster Management (South Africa 1999) and the Disaster Management Act (South Africa 2002) provide a framework policy on disaster management in South Africa. There are seven key policy proposals set out in the White Paper on Disaster Management (South Africa 1999). These are:

1. Inadequacy of financial resources for drought management and human resource development. The urgent integration of risk-reduction strategies into development initiatives.
2. The development of a strategy to reduce the vulnerability of South Africans, especially poor and disadvantaged communities, to disasters.
3. The establishment of a National Disaster Management Centre to:
    - ensure that an effective disaster management strategy is established and implemented in order to coordinate disaster management at various levels of government; and
    - promote and assist the implementation of disaster management activities in all sectors of society.
4. The introduction of a new disaster management funding system which:
    - ensures that risk reduction measures are taken;
    - builds sufficient capacity to respond to disasters; and
    - provides for adequate post-disaster recovery.
5. The introduction and implementation of a new Disaster Management Act which:
    - brings about a uniform approach to disaster management;
    - seeks to eliminate the confusion created by current legislation regarding the declaration of disasters; and
    - addresses legislative shortcomings by implementing key policy objectives outlined in the White Paper.

6. The establishment of a framework to enable communities to be informed, alerted and made self-reliant and capable of supporting and cooperating with government in disaster prevention and mitigation.
7. The establishment of a framework for coordinating and strengthening the current fragmented training and community awareness initiatives (Derived from the White Paper on Disaster Management, South Africa 1999: 13).

The policy seeks to introduce a paradigm shift from the reactive approach where disasters are viewed as rare occurrences managed by emergency rescue services. The proposed approach is proactive as it emphasizes risk reduction and hazard mitigation. This is likely to prevent many hazards from developing into major disasters in which huge losses are incurred in human lives as well as economic losses.

The White Paper on Agriculture (South Africa 1996) and the White Paper on Disaster Management (South Africa 1999) provide a legislative framework on which the Drought Management Plan (DMP) is based (South Africa 2005). The DMP embodies principles and guidelines outlined in the following documents:

1. Constitution;
2. White Paper on Agriculture (South Africa 1996);
3. White Paper on Disaster Management (South Africa 1999);
4. Disaster Management Act (No 57 of 2002) (South Africa 2002);
5. Strategic Plan for the Department of Agriculture (South Africa 2007); and
6. Conservation of Agricultural Resources Act (No 43 of 1983) (South Africa 1983).

The DMP proposes the development of a risk management system whose features are prevention or reduction of disasters, mitigation, preparedness, response and rehabilitation and guides interventions related to drought. It is based on four key performance areas, namely institutional arrangements; integrated institutional capacity; disaster risk assessment and reduction planning; and response and recovery.

The major shortcomings of the previous policy on drought are that it was reactive and government assistance was in the form of emergency drought relief which was not sustainable (Hazelton, Pearson & Kariuki 1994; South Africa 2005). Furthermore, government structures responded slowly and ineffectively to drought impacts especially to resource-poor farming communities (Hazelton, Pearson & Kariuki 1994). The roles and

responsibilities of the state and farming communities were not clearly outlined. The drought management plan must protect all farmers including the subsistence farmers. The DMP is based on the following overarching principles:

1. The objectives of the DMP should be in line with the Disaster Management Act (No 57 of 2002).
2. The DMP must create awareness and preparedness in the South African agricultural sector.
3. The DMP should emphasize the joint responsibility of the government and farming sector as well as redefine the role of drought assistance programmes.
4. The DMP should clarify the responsibilities of the different levels of government and all key stakeholders (South Africa 2005).

Drought mitigation aims to protect resources and community livelihoods and its basic components are: awareness, avoidance, early warning, and rehabilitation. People must be educated in order to create awareness. Avoidance involves the application of practices that reduce risky farming systems in drought prone areas. Early warning systems provide information on emerging droughts so as to improve the population's state of preparedness. On the basis of this information, government officials and the population at large will embark on drought mitigation measures in order to reduce the drought impacts.

Reciprocation is an important feature of the DMP. It is the commitment made by communities to implement good conservation measures and sound farming practices to mitigate the impact of drought before they can access drought assistance. With regards to institutional arrangements, the roles of the relevant institutions are clearly laid out. Duties include evaluation and monitoring, education and training, awareness campaigns, compilation of early warning systems, drought assessments and reports at national, provincial, and local or municipality level. The DMP will be implemented in conjunction with the Disaster Management Act (No 57 of 2002) through some of the structures stipulated in the Act (South Africa 2005).

Disaster risk assessment and risk reduction planning are other important features of the DMP. Response and recovery are also clearly outlined. Important for the effective implementation of the DMP are enablers in the key performance areas and these are: information and communication; education, training, public awareness and research; and

funding. Lastly, the DMP articulates disaster governance issues and the principles and procedures on which assistance schemes will be based.

On the whole the drought policy is proactive in that it encourages the reduction of risks and hence consequent losses as a result of the impact of drought. It also promotes sustainable land uses by putting a precondition that conservation measures should have been implemented before drought assistance can be disbursed. There are, however, challenges in implementing the policy among resource-poor farmers who lack financial resources to implement conservation measures. Furthermore, high levels of illiteracy among adults in the former homelands mean that training programmes are not likely to be very successful. Overcrowding in the former homelands has resulted in great pressure on the land. Communal use of the land is problematic for conservation because of the high competition for resources which is likely to result in their depletion (Ainslie 1999).

The southern African governments which are still lagging behind in the formulation of proactive drought policies need to make use of such findings and, with the assistance of United Nations agencies, draw up drought policies so as to better manage drought-related hazards. Australia established a drought policy based on risk reduction and self-reliance much earlier than South Africa and it is currently far more experienced in managing drought-related disasters. However, Australia faces frequent droughts which threaten the self reliance of farmers.

2.3.3 Australia

Australia has a highly unreliable climate characterized by recurring cycles of drought (Laughlin & Clark 2000). Farming is thus a risky endeavour. An assessment of the drought policy by Higgins (2001) shows that drought was initially perceived as a natural disaster. Producers could not plan for it but responded through the use of collective forms of support provided by the government (Stehlik, Gray & Lawrence 1999). The assistance was given by state governments in the form of subsidies, grants and loans which were coordinated federally through the Natural Disaster Relief Arrangements (NDRA). The measures available under the arrangements consisted of: concessional loans for carry on and restocking purposes; freight concession; subsidies to local and semi-government

authorities for the slaughter and disposal of surplus stock (Industries Assistance Commission 1983: 1) cited by Higgins (2001).

Rose (1993) points out that the Australian government ruled from a social point of view owing to its policy that it had a social responsibility to provide programmes of support to return farmers to a situation of profitability. This policy was not sustainable as was illustrated by the impacts of the 2002/3 drought. The drought was so widespread that the level of assistance required from the government by the farmers was too high (Higgins 2001). Moreover, it was noted by Freebairn (1983) that impromptu actions of the government through the NDRA could not be relied on by the farmers. A new drought policy had to be formulated to address the shortcomings of the previous policy. It was formulated and released in 1992 and is called the National Drought Policy 1992 (NDP).

The main focus of the NDP was on self-reliance and managed risk so as to discourage farmers from relying mainly on government assistance. The objectives of NDP were to: encourage primary producers and other sections of rural Australia to adopt self-reliant approaches to managing for climatic variability; maintain and protect Australia's agricultural and environmental resource base during periods of extreme climatic stress; and ensure early recovery of agricultural and rural industries, consistent with long-term sustainable levels (Commonwealth of Australia 1992) cited by (Higgins 2001).

To ensure success in the implementation of the new drought policy, a number of programmes were made available to farmers through the Rural Adjustment Scheme. These include:

- "skills enhancement measures – grants to eligible farmers to upgrade farm business and property management skills;
- farm productivity measures – interest subsidies of up to 50 per cent of the cost of commercial finance to 'viable' farmers for productivity improvement;
- re-establishment provisions – an enhanced grant of up to $45 000 for farmers wishing to leave the industry;
- land trading – the trading of land by a state to 'speed up' the process of amalgamation or retire land no longer suitable for agricultural production;

- exceptional circumstances – interest rate subsidies of up to 100 percent on commercial finance for severe events 'outside normal risk management strategies' and for which farmers could not reasonably be expected to plan." (Derived from: Rural Adjustment Scheme Advisory Council 1996: 24) cited by Higgins (2001).

Australia's Drought Exceptional Circumstances (DEC) policy was formulated after the 1994/95 drought. This was one of the most severe droughts in 100 years and it affected eastern Australia (Laughlin & Clark 2000). The 'exceptional circumstances' provision is meant to cater for events which the producer could not have been expected to plan for. In this case the Commonwealth Minister of Agriculture then steps in to provide assistance. According to the 1992 NDP farmers were expected to operate their farms like they would manage a commercial enterprise that required skill, quality assurance, risk management, financial planning and control, marketing management, agricultural technology management, and personnel and staff management (Commonwealth of Australia 1995) cited by Higgins (2001). Furthermore, nature conservation was supposed to be carried out as well. The government embarked on an ongoing education and training programme to enable the objectives of the NDP to be achieved (Higgins 2001).

A hotly contested issue in the policy, however, has been differentiating 'normal' from 'exceptional' droughts. In spite of the policy shift from the perception of drought as a natural disaster to self-reliance and risk management on the part of the farmer, the government still uses the exceptional circumstances clause to assist farmers, for example in cases where severe and prolonged droughts have reduced the farmers' ability to pay back their debts (Higgins 2001; White 1998). A national framework for assessing DEC was established in 1995 in order to distinguish exceptional drought from normal drought (Laughlin & Clark 2000). The Agricultural and Resource Management Council of Australia and New Zealand (ARMCANZ) has devised six criteria to assess the drought namely: meteorological conditions (the primary condition for the existence of severe drought); agronomic and livestock conditions; water supplies; environmental impacts; farm income levels; and scale of the event (Lembit & Kingma 1995). The combined impact of the six criteria should produce a rare and severe event triggered by meteorological conditions. Drought support continues until normal conditions return (Laughlin & Clark 2000).

In 1997 the DEC was replaced by Exceptional Circumstances (EC) in which other risks such as pests, disease, frosts and waterlogging were considered in addition to drought. New criteria were set up in 1999 as detailed below (ARMCANZ Resolution 3D, 5 March 1999) cited by (Laughlin & Clark 2000):

- The event or events must be rare and severe.
- The effects of the event or events must result in a severe downturn in farm income over a prolonged period.
- The event must not be predictable or part of a process of structural adjustment.

The decision to declare EC was to be based on the occurrence of a severe income downturn linked to a specific and rare event beyond the normal risk management strategies of responsible farmers (Laughlin & Clark 2000). A rare event is defined as occurring once every 20-25 years and severity should refer to a long duration of twelve months or more. The event should also be at such a scale that it affects a significant proportion of farm businesses in a particular region (Laughlin & Clark 2000; White & O'Meagher 1995).

Lack of agreement on the definition of exceptional circumstances has resulted in economists calling for more objective indicators to distinguish normal from exceptional drought (White & Bordas 1996; White & O'Meagher 1995). The answer lies in scientific methods of drought assessment using seasonal forecasts, agronomic models, agronomic and financial decision support systems, remote sensing imagery and GIS (White 1998). Some of the tools will greatly improve the assessment of drought exceptional circumstances to enable normal drought to be distinguished from exceptional drought for purposes of compensation.

According to White (1998) the implementation of the NDP has been hampered by the severity of El Niño events during which large parts of Australia experienced prolonged droughts since 1991. The DEC policy has thus been implemented from time to time by the government giving it the power to assist farmers whose operations had been devastated by drought. It appears that Australian farmers are not likely to become totally self-reliant because of droughts that can be so severe that in the worst affected areas, farmers fail to cope in spite of having made an effort to manage risks (White 1998).

The United States of America is still grappling with the problem of developing and implementing a proactive national drought policy similar to Australia's 1992 NDP. A number of individual states, however, have made commendable progress. They have developed and implemented drought plans which provide them with guidelines for managing a drought hazard.

2.3.4 United States of America

According to Wilhite (2001) the USA is poorly prepared to deal with the impacts of major droughts in spite of the fact that they are common occurrences. The federal government's approach to the impacts of drought has been to give relief which is usually too little and comes too late. There is need for a major policy shift towards drought risk management and mitigation. Studies show that drought relief increases the vulnerability of the recipients because it perpetuates unsustainable land uses (Wilhite 2001). Many states have taken the initiative to produce their own drought plans whose goal "should be to improve the effectiveness of preparedness and response efforts by enhancing monitoring and early warning, risk and impact assessment, and mitigation and response" (Wilhite 2001: 23). The plans have gradually evolved from mere response strategies to mitigation. There is a move to develop regional and local plans within each state, for example in the states of Colorado, Georgia, Hawaii, Nebraska, New Mexico, Texas and Utah. Currently more than 30 states have drought plans (Wilhite 2001).

The Federal Emergency Management Agency (FEMA), whose task it is to coordinate federal response efforts to disasters, was the lead agency in the management of other natural disasters. There was no lead agency for the management of drought (Wilhite 2001). There was a need to develop a national drought policy that is consistent with the goals of sustainable development. Wilhite (2001) criticizes the traditional crisis management approach that has been used by federal government on the grounds that the element of evaluation is not part of the response. Failures are constantly repeated. In an effort to create a lead agency and to promote drought management at federal level the National Drought Policy Act was passed in 1998. The goals of the policy are to:

1. "incorporate planning, implementation of plans and mitigation measures, risk management, resource stewardship, environmental considerations, and public education as key elements of an effective national drought policy;

2. improve collaboration among scientists and managers to enhance observation networks, monitoring, prediction, information delivery, and applied research, as well as foster public understanding of and preparedness for drought;
3. develop and incorporate comprehensive insurance and financial strategies into drought preparedness plans;
4. maintain a safety net of emergency relief that emphasizes sound stewardship of natural resources and self-help; and
5. coordinate drought programmes and resources effectively and efficiently and in a customer-oriented manner (Wilhite 2001: 26)."

However, an assessment by Wilhite (2001) of the application of the policy at federal level showed that the status quo has been maintained. Federal response to drought is still reactive and is based on drought relief disbursed through poorly coordinated programmes. The states have made far more progress in the implementation of proactive drought policies than the federal government. There is need to educate civil servants at federal level so as to change their mindset. This will improve their capacity to embrace proactive approaches to managing droughts.

2.4 SUMMARY

There is lack of agreement on the definition of drought because of the varied perspectives. Defining drought as meteorological, agricultural or hydrological provides conceptual definitions which do not show its inception, duration, cessation, and severity. The solution is the development and use of operational definitions in the form of a range of drought indices. The realization of a hazard on a vulnerable community turns the hazard into a disaster whose impact can be reduced by enhancing a community's adaptive capacity. Mitigation, preparedness, response and recovery – the four components of a disaster management cycle – can be used as a basis for developing a proactive drought policy. Most countries in southern Africa engage in crisis management of drought induced disasters. South Africa and Australia, which have introduced risk management and mitigation in the management of drought, face a number of challenges. In the USA individual states have made far more progress in using proactive drought policies than the federal government. The next chapter provides background information on the study area in order to contextualize the research geographically and socio-politically.

CHAPTER 3: STUDY AREA MATABELELAND SOUTH PROVINCE, SONTALA WARD

The previous chapter dealt with the definition of drought and examined a variety of drought indices that could provide operational definitions of the concept. It also covered some disaster management concepts and frameworks and how drought policies have developed in selected countries. Most SADC member countries including Zimbabwe respond to drought induced disasters through crisis management but South Africa, Australia and the USA have developed proactive drought policies. This chapter outlines the geographical and socio-political situation of Zimbabwe, the study area, so as contextualize the research further. The agricultural potential of most parts of the country is very low due to semi-arid conditions and poor quality granitic soils. It is in these areas where the majority of the black population was forced to live by the colonial governments. The recent collapse of the economy is blamed on the fast track land reform programme and bad governance. These national issues are addressed first and then the scale of the profiles is narrowed to focus on the chosen study area in Matabeleland South province.

3.1 ZIMBABWE: NATIONAL PROFILE

Zimbabwe is a landlocked country in southern Africa as shown in Figure 3.1. It has an area of 390 760 square kilometers and lies within the tropics between 15º 30' S and 22º 30' S and 25º E and 33º E (Mano & Nhemachena 2006). It is a member of an economic organization of 14 southern African countries called the SADC. The country has varied biophysical characteristics and is divided into five agro-ecological regions. These features and divisions are covered in the next two sections respectively.

3.1.1 Biophysical characteristics

Three relief regions based on altitude have been identified in Zimbabwe. The Highveld, at an altitude of between 1200 and 1700 metres, covers 25 per cent of the country. The Middleveld extends over 40 per cent of the country and varies from 900 to 1200 metres in height.

Figure 3.1: Location of Zimbabwe in southern Africa

The Lowveld, at an altitude of less than 900 metres, makes up 35 per cent of the country. It consists of the river valleys of the Limpopo River in the south and the Zambezi River in the north. In the eastern part of the country there is a narrow mountainous area called the Eastern Highlands. It lies at an altitude of between 2000 and 2400 metres and extends from north to south along the border with Mozambique (Mano & Nhemachena 2006; Muir 1994). Altitude and relief greatly influence the country's climate.

The country has a subtropical climate. Only 35 per cent of the country receives more than 700mm annual average rainfall considered necessary for semi-intensive farming and so rainfall is the most important limiting factor to agriculture (Thompson 1993). The average annual rainfall varies from less than 300mm in the low-lying parts of the country to over 1000mm on the Highveld (Muir 1994). Small parts of the Eastern Highlands receive over

1500mm of rainfall. The reliability of the rainfall decreases from north to south and from east to west. Variability ranges from 20 per cent in the north to 45 per cent in the south (Bratton 1987). Rainfall is seasonal with 90 per cent falling in the six months from 1 October to 31 March (Mano & Nhemachena 2006). There are three distinct seasons: a hot and dry season from mid-September to the onset of the rains, a hot but moist summer from November to March and a dry winter period consisting of cool nights and warm cloudless days lasting from April to September (Mano & Nhemachena 2006). More than 75 per cent of the country has physical conditions that make dryland production of crops risky (Muir 1994). One of the major features of Zimbabwe's climate is the occurrence of periodic droughts.

Over the last century, Zimbabwe has suffered from major droughts as shown in Table 3.1 and Figure 1.1. A major drought is defined as a year when the average national rainfall falls below 75 per cent of the long-run average of 650mm of rainfall per annum (National Economic Planning Commission 1999). On average this occurs every six years in Zimbabwe (Munro 2006). According to Table 3.1 major nationwide extreme[11] droughts occurred during the years 1911/12, 1915/16, 1921/22, 1923/24, 1946/47, 1967/68, 1972/73, 1981/82, 1982/83, 1986/87, 1991/92 and 1994/95 (see Figure 3.1). An examination of the "percentage of normal" column in Table 3.1 shows that the 1991/92 drought was the most severe in 100 years followed by the 1946/47, 1972/73, 1921/22 and 1915/16 droughts. The 2006/07 season was a drought year during which the drought was most severe in the south and western part of the country (FEWS NET 2007a).

It must be noted that the country's rainfall is highly variable spatially. During certain years some parts of the country, especially those falling into natural farming regions IV and V (see Figure 3.2), may experience extreme droughts while the rest of the country receives above normal rains.

[11] Extreme droughts are experienced when the average national rainfall falls below 70 per cent of normal (see Table 3.1).

Table 3.1: Zimbabwe's drought years

DROUGHT YEARS	RAINFALL (mm)	DEVIATION FROM NORMAL	PERCENTAGE OF NORMAL[12]	SEVERITY
1911/12	433.2	-229.1	67	Extreme
1913/14	473.2	-189.1	73	Severe[13]
1915/16	394.3	-268.0	61	Extreme
1921/22	385.0	-277.3	59	Extreme
1923/24	399.0	-263.3	61	Extreme
1926/27	512.6	-149.7	79	Severe
1941/42	500.8	-161.5	77	Severe
1946/47	365.2	-297.1	56	Extreme
1949/50	518.9	-143.4	80	Severe
1950/51	516.8	-145.5	80	Severe
1959/60	483.4	-178.9	74	Severe
1964/65	509.2	-153.1	78	Severe
1967/68	404.8	-257.5	62	Extreme
1972/73	371.1	-291.2	57	Extreme
1981/82	439.7	-222.6	68	Extreme
1982/83	403.1	-259.2	62	Extreme
1986/87	422.4	-239.9	65	Extreme
1990/91	501.6	-160.7	77	Severe
1991/92	335.2	-327.1	52	Extreme
1993/94	519.3	-143.0	80	Severe
1994/95	418.8	-243.5	64	Extreme
2001/02	465.8	-196.6	72	Severe

Adapted from Gandure (2005: 74)

Agriculture is further constrained by soil quality. Two thirds of the country consists of sandy soils, derived from granite, which are inherently infertile. Most of the communal lands have such soils. The soils are heavily leached and have a low nutrient content. They lack organic matter and minerals such as nitrogen, phosphates and sulphur which are important for crop production (Muir 1994). However, there are pockets of fertile areas throughout the country and the largest areas of heavy clayey soils occur on the Highveld (Mano & Nhemachena 2006). Fertile basaltic soils are found in the south-eastern Lowveld where a high crop output can be produced under irrigation. Soils, to a certain extent, give rise to the variation in vegetation type.

[12] The long-run national average of 650mm of rainfall per annum as defined by National Economic Planning Commission (1999)

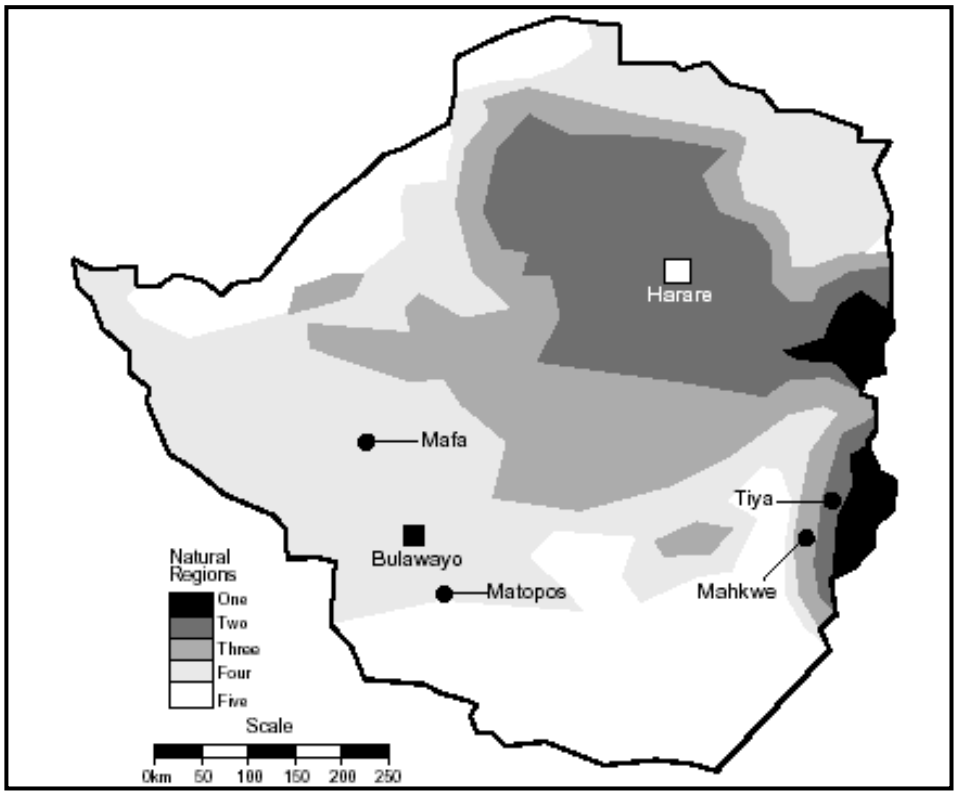
[13] Severe droughts occur when the average national rainfall is between 70 and 80 per cent of normal (see Table 3.1).

The vegetation consists of savanna woodland with a sparse understorey of herbs and grasses (Clatsworthy 1987). The distribution of tree species varies with the rainfall, altitude and soil type. In areas with high altitude and high rainfall *Brachystegia spiciformis* dominates. *Julbernardia globiflora* and *Brachystegia boehmii* are concentrated at lower altitudes. Acacia are found on heavy soils whereas *Terminalia sericea* is common on light sandy granitic soils (Clatsworthy 1987). *Baikiaea plurijuga* is mainly found on the Kalahari sands. In low lying, hotter and drier zones occupied by sodic soils with poor infiltration, the drought resistant *Colophospermum mopane* is widespread (Dye & Walker 1980). Montane forest occurs in the eastern border districts. Dambos or vleis occur in poorly drained areas, mainly in the north-west and centre of the country. These perennially wet areas have open grasses and sedges (Muir 1994).

Combinations of the varied biophysical characteristics such as climate, relief, soils and vegetation constitute agro-ecological regions for which different farming systems are recommended. The next section deals with the country's five agro-ecological regions.

3.1.2 Agro-ecological regions

Zimbabwe is divided into five natural farming or agro-ecological regions on the basis of effective rainfall (see Figure 3.2 and Table 3.2). Vincent & Thomas (1960) recommended farming systems for each of the regions that can be successfully based on the natural rainfall. Natural farming region one, located in Manicaland province, receives more than 1050mm annual rainfall, characterized by a longer rainy season. Important agricultural activities include the production of coffee, tea, timber, deciduous fruits, market gardening and dairy farming. Natural farming region two extends over the three provinces of Mashonaland East, Mashonaland Central and Mashonaland West. The rainfall is seasonal and ranges from 700mm to 1050mm. This is the main crop farming area of Zimbabwe with 75 per cent of the farming area planted with crops (Muir 1994). Tobacco, maize, cotton, wheat, soya beans and coffee are grown intensively. Horticulture and livestock rearing are other important activities.



Source: Vincent & Thomas (1960)

Figure 3.2: Agro-ecological regions of Zimbabwe

Table 3.2: Characteristics of the agro-ecological regions of Zimbabwe

NATURAL FARMING REGION	AREA (ha)	% AREA	CHARACTERISTICS
One	613 233	1.56	1050mm or more rainfall per annum with some rain in all months of the year and relatively low temperatures
Two	7 343 059	18.68	700-1050mm rainfall per annum with rainfall confined to summer
Three	6 854 958	17.43	500-700mm rainfall per annum with relatively high temperatures and infrequent, heavy falls of rain; subject to seasonal droughts
Four	13 010 036	33.03	450-600mm rainfall per annum and subject to frequent seasonal droughts
Five	10 288 036	26.2	Normally less than 500mm rainfall per annum. Very erratic rainfall. Northen lowveld may have more rain but the topography and soils are poorer.
The remainder	1 220 254	3.1	Unsuitable for any form of agricultural use

Source: Muir (1994: 43)

Natural farming region three with an annual rainfall of 500-700mm and characterized by mid-season droughts, is suitable for the production of drought tolerant crops such as cotton and sorghum, and raising beef cattle. Maize, groundnuts and sunflowers are also

important. Natural farming region four receives 450-600mm annual rainfall with frequent droughts. Region five experiences the lowest rainfall – less than 500mm annual rainfall which is very erratic. It is risky to grow crops in regions four and five because of frequent droughts. Crops such as sugar cane, cotton and wheat are successfully produced under irrigation around Chiredzi in the south east lowveld. Cattle- and game ranching are the recommended farming systems for region five as they use the natural rainfall. However, communal farmers produce maize, millet, sorghum, legumes and cotton under dryland farming. A good harvest is expected once in every four to five years (Bratton 1987; Mombeshora & Wolmer 2000). The remainder of the land surface (3.1 per cent) is unsuitable for any form of agricultural use. Most of the country has a low agricultural potential, with about three quarters of the land falling into natural farming regions three, four and five (see table 3.2).

Land alienation from blacks by the colonial regime resulted in the creation of communal lands in natural farming regions four and five, which have low agricultural potential. These soon became overcrowded and they lie at the heart of the country's land question.

3.2 THE LAND QUESTION

The Land Apportionment Act of 1930 distributed land along racial lines in terms of quality and quantity. This Act reserved 50.8 per cent of the land for whites and most of this lay on the Highveld, an area with a high agricultural potential (Lebert 2003). The African population was allocated 30 per cent of the land in areas where land is ecologically fragile and has a low agricultural potential. These areas, formerly called African Reserve Areas, are now called communal lands. The rest of the land amounting to about 20 per cent was either state land or company property. Most of the communal landholdings are on marginal land with infertile sandy soils; 91 per cent of the holdings are in natural regions three, four and five, and 74 per cent of holdings are in Natural Regions four and five as shown in Table 3.3 (Bird, Shepherd, Scott & Butaumocho 2002). Although natural farming regions three, four and five are unsuitable for intensive cultivation, they contained 57 per cent of the population in 1982 (Bird et al 2002). A very small area, 0.05 per cent called Native Purchase Areas could be purchased by wealthy Africans and could be held through either freehold or leasehold (Lebert 2003).

Table 3.3: Percentages of land categories in natural regions one to five in Zimbabwe

REGION	COMMUNAL	COMMERCIAL		RESETTLEMENT	OTHER
		Large scale	Small scale		
One	0.7	3.0	0.5	11.0	8.4
Two	8.7	28.6	17.8	33.7	1.3
Three	17.1	17.5	37.9	38.1	18.7
Four	47.6	25.2	36.9	15.3	28.8
Five	25.9	25.7	6.9	1.9	43.8
	100	100	100	100	100

Source: Bird et al (2002: 5)

However, at independence in 1980 the land set aside for Africans had been increased to 40 per cent whereas white-owned commercial farming areas had been reduced to about 40 per cent. These changes were implemented using the Land Tenure Act of 1969 which replaced the Land Apportionment Act of 1930 (Poulton, Davies, Matshe & Urey 2002).

Due to natural population increase, the communal areas had become overpopulated resulting in land degradation (Bratton 1994; Lebert 2003). About 1 million families lived on 42 per cent of the land area in the worst natural farming regions (Thompson 1993). There was a need to embark on a land reform programme so as to relieve population pressure in the overpopulated communal lands. Three phases of the land reform programme have been identified (Chigumira 2006): 1980 (independence) to 1996 the Land Reform and Resettlement Programme Phase I; 1997 to 2000 the Land Reform and Resettlement Programme Phase II; and the Fast Track Land Reform Programme of 2000 to 2002.

The aim of land reform after independence was to promote equal access to land for the majority of the population so as to remedy past injustices in land distribution. The government aimed to resettle 162 000 households by 1984, but by 1989 the target had not been achieved (Bratton 1994; Lebert 2003; Poulton et al 2002). Only about 52 000 households had been settled on land acquired on a willing seller/willing buyer basis on 15 per cent of the large scale commercial farming areas (Bratton 1994; Lebert 2003). The distribution of resettlement schemes in the natural farming regions is recorded in Table 3.3. Most of the schemes (55 per cent) were located in drier regions (three, four and five) and the rest in regions one and two. The large farms owned by whites were well serviced with infrastructure, marketing systems and financial support. Communally owned farms

were subsistence orientated, with little government support, and not linked to markets. After independence, participation by communal farmers in marketing agricultural products gradually increased (Bratton 1994).

The expiry of the Lancaster House Constitution in 1991 removed one of the main hurdles to accelerated land redistribution. ZANU-PF, the ruling party, was then faced with growing resentment to the negative impacts of the IMF-imposed Structural Adjustment Programme. The government embarked on fast-tracking the land reform process to maintain political support in the rural areas by 1998 (Poulton et al 2002). This was followed by compulsory acquisition of land without compensation (Human Rights Watch 2002; Richardson 2007). The UNDP (2002) noted that the fast track land reform process could reduce productivity.

According to Clemens & Moss (2005) and Richardson (2007) there is no correlation between the collapse of the economy since 2000 and the reduction in rainfall. The collapse of the economy is blamed on bad governance characterized by misrule, poor fiscal policies, heavy handed price controls, a huge payout to war veterans in 1998 and loss of the rule of law. The infrastructure and equipment on the expropriated commercial farms were looted and vandalized and many of the farms now lie idle. There have been drastic declines (between 25 and 70 per cent) in the output of cash crops such as tobacco, wheat, soybeans, coffee and sunflowers (Richardson 2007). The decline in crop yields is also attributed to shortage of inputs such as equipment, seed, fertilizers and other agro-chemicals (FAO/WFP 2002; Richardson 2007).

Agriculture has hitherto been the backbone of Zimbabwe's economy. It provided more than half of the country's total employment and contributed about 15 per cent of the GDP before 2000. It generated 40 per cent of the country's foreign exchange earnings and provided the bulk of raw materials to the manufacturing sector (FAO/WFP 2002; Ngara & Rukobo 1999). The collapse of the agricultural sector as a result of the fast track land reform programme had a negative impact on the wider economy which is currently characterized by hyperinflation. According to official sources it stood at 5000 per cent in May 2007, the highest in the world at that time (*Daily Dispatch* 2007; Duncan 2007; *Pretoria News* 2007). Unemployment is over 80 per cent and at least 80 per cent of the population lives below the poverty threshold of US$2 a day (*Sunday Times* 2007).

The Zimbabwean government, however, blames the collapse of the economy on sanctions (*The Herald* 2007). According to Gono (2007) sanctions have been imposed by multilateral financial institutions such as the World Bank and the International Monetary Fund. "All forms of balance of payments support, technical assistance, grants and infrastructural development flows to both government and private sector" were temporarily stopped (Gono 2007). All lending operations were suspended and this worsened the shortage of foreign currency. Furthermore, targeted sanctions were imposed on government officials and members of the ruling party ZANU PF by the European Union and the USA (Africa Research Bulletin 2006).

The next section profiles one of the country's provinces in which the study area is located and where some of the empirical data was collected.

3.3 PROFILE OF MATABELELAND SOUTH PROVINCE

3.3.1 General description

Matabeleland South is one of the ten administrative provinces in Zimbabwe. It covers a total area of 54 172km^2 and makes up 13.8 per cent of the total area of the country (MLGPW&UD 2006). It lies in the southern and south-western part of Zimbabwe and shares an international boundary with South Africa and Botswana (Figure 3.3). Within the country it shares boundaries with Matabeleland North and Midlands provinces in the north and Masvingo province in the east (see Figure 3.4).

The province is largely rural in nature as there are only three major urban settlements: Gwanda, Plumtree (see Figure 3.4) and Beitbridge. Other smaller urban settlements include Filabusi, Maphisa, Esigodini and Shangani. There are seven districts in the province; Beitbridge, Bulalima[14], Gwanda, Insiza, Mangwe, Matopo, and Umzingwane (see Figure 3.3). Gwanda town (see Figure 3.4) is the administrative centre of the province where the provincial government offices are found (MLGPW&UD 2006).

[14] GIS data for figure 3.3 was produced by SAHIMS (2002) before Bulalima-Mangwe district was split into two districts – Bulalima in the south and Mangwe in the north.

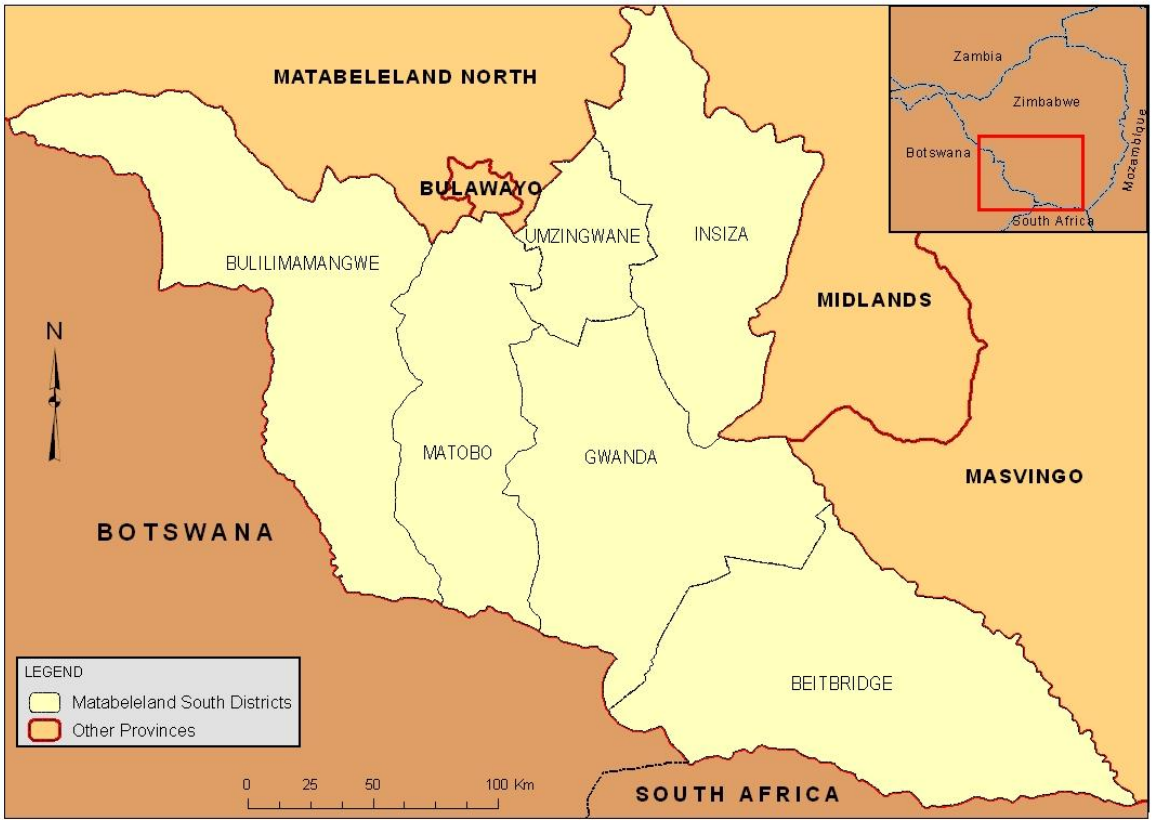


Figure 3.3: The districts of Matabeleland South province in Zimbabwe

According to the 2002 census, the total population of the province was 653 054 comprising 309 316 males (47.4%) and 343 738 females (52.6%) (MLGPW&UD 2006). The majority of households (56%) were headed by males and 44 per cent by females. The provincial population grew by 63 132 people between 1992 and 2002 at 1.06 per cent per annum as compared to a national average of 1.1 per cent (MLGPW&UD 2006). The province has the second lowest population density in the country at 12 people per km^2 after Matabeleland North with a density of 9 people per km^2. Other provinces have far higher population densities with Manicaland reaching 43 people per km^2. Matabeleland South's low population density can be attributed to adverse climatic conditions and to the effect of outmigration of the working population (15-30 age group) to neighbouring countries, such as Botswana and South Africa, in search of employment (MLGPW&UD 2006).

In each of Matabeleland South's districts there is a greater proportion of females than males. This is probably a result of the selective migration process in which males tend to dominate. Of the number of people employed in the province, most (64%) are engaged in

agriculture and related occupations followed by services (11%) (MLGPW&UD 2006). The rest are employed in other sectors such as mining. The population in the province is predominantly rural and only 10 per cent of the total population is found in urban areas (MLGPW&UD 2006). The following paragraphs cover the biophysical environment: climate, drainage and vegetation.

In summer absolute daily maximum temperatures may exceed 40°C while in winter absolute daily minimum temperatures may fall below 0°C resulting in ground frost in susceptible areas. The mean maximum daily temperature varies from about 22°C-26°C in winter to 30°C-34°C during summer whereas the mean minimum daily temperature in most areas lies between 5°C -10°C in winter and 18°C-22°C in summer (FAO 2004). The rainfall varies greatly spatially and temporally (Von Blanckenburg 1994). The annual rainfall is below 600mm and has an east-west and north-south gradient. The short rainy season occurs from late November to late March and the long dry season from April to October (Bratton 1987). Due to the hot and arid conditions, the area is suitable for extensive animal husbandry. Crop cultivation is only successful under irrigation. Mid-season dry spells occur regularly in January and February at the time when the grain crops have greatest need for moisture (Bratton 1987). The province lies in natural farming Region four and five which have the lowest agricultural potential (see Figure 3.2 and Table 3.2).

The province lies within the Limpopo and Gwayi catchment areas and is drained by, among others, the Limpopo, Umzingwane, Inyankuni, Ncema, Tuli, Shashe, Ramakwebana and Simukwe rivers. All the rivers are seasonal except the Limpopo which is perennial (MLGPW&UD 2006).

The main vegetation type is tree bush savanna in which the dominant species is *Colophospermum mopane*. The *Acacia–Combretum–Terminalia* woodland type is fairly common. Acacias provide nutritious fodder, improve soil fertility and rehabilitate degraded sites (FAO 2004). The region has both sourveld and sweetveld. There is severe pressure on the sweetveld due to poor range management. The patchy nature of the vegetation makes the area susceptible to environmental hazards such as flooding and soil erosion (MLGPW&UD 2006). The vegetation type described above mainly occurs in the drier parts of the province such as Sontala ward.

3.3.2 Sontala ward

Sontala ward, shown in Figure 3.4, is one of the 12 wards of Matobo District. It lies in the drier part of the district, natural farming region five – where droughts occur frequently as illustrated by the climate graph of Kezi (Figure 3.7). The ward is located 120 kilometres south of Bulawayo, Zimbabwe's second largest city (Figure 3.4). Five villages occur in the ward; namely Magololo, Makwati, Mloyi, Silonkwe and Sontala (Dube 2007, pers com).

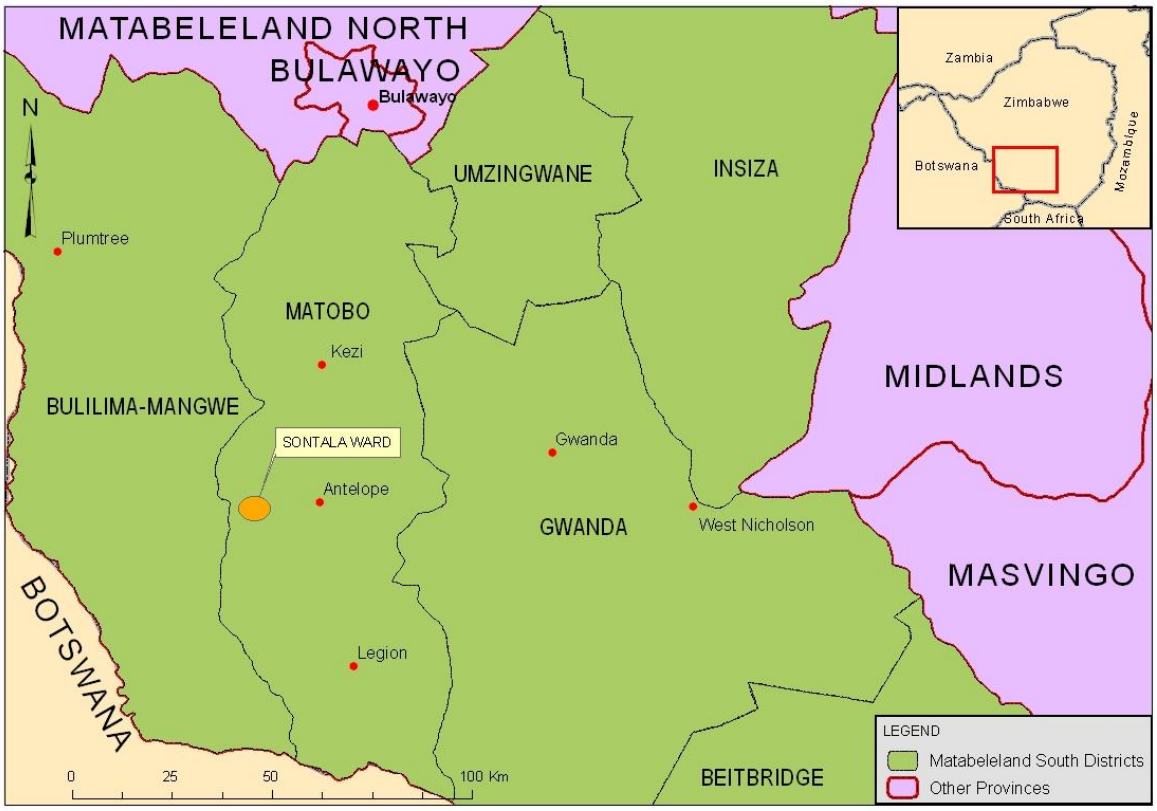


Figure 3.4: Location of Sontala ward in Matabeleland South province

The climate of Sontala ward is best represented by Kezi weather station (Figure 3.5). The station is located 34 kilometres north-east of Sontala along the road to Bulawayo (Figure 3.4). The mean monthly minimum temperatures of Kezi range from 6°C-13°C in winter to 14°C-19°C in summer, while mean monthly maximum temperatures vary from 23°C in June and July to 31°C in October and November (Figure 3.5). The mean annual temperature range is moderate (14°C). Sontala ward experiences a short rainy season in summer from November to March. The mean annual rainfall is low (508mm) (Zimbabwe Meteorological Services Department 2008). Rainfall is unreliable and droughts occur

frequently (see Figure 3.6 and 3.7). The rainfall pattern is characterized by a high degree of intra-seasonal and inter-annual variations as illustrated by Figures 3.6 and Figure 3.7.

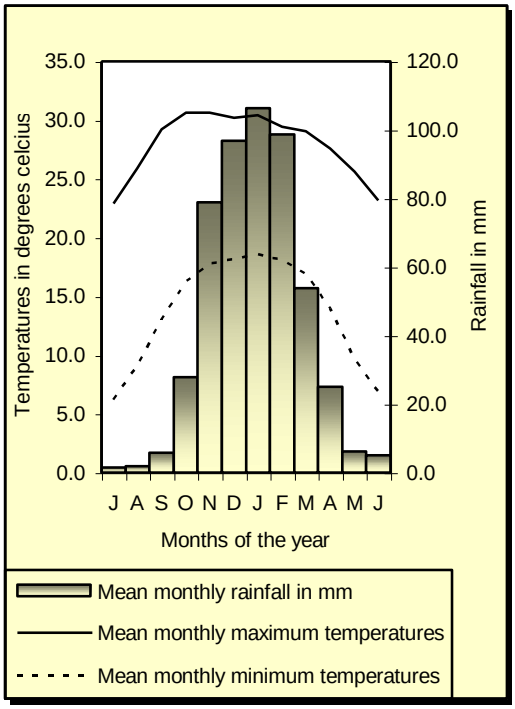


Figure 3.5 Kezi's climate, 1960-2007

Mid-season dry spells are quite common and if they are prolonged, the crop output can be adversely affected. According to Figure 3.6, the intra-seasonal rainfall variation was quite pronounced during the 2000/01, 2001/02, 2002/03, 2003/04 and 2004/05 seasons. The rainfall was well distributed during the 1999/2000 and 2005/06 seasons (see Figure 3.6). Excessive rainfall is occasionally experienced, for example during the 1999/2000 season the total annual rainfall was 1082mm (Zimbabwe Meteorological Services Department 2008) as a result of the tropical Cyclone Eline's influence in the eastern and southern parts of Zimbabwe. Mid-season dry spells, associated with the occurrence of tropical cyclones in the Mozambique Channel, commonly occur during January (Unganai & Bandason 2005).

In the 46 years between 1961/62 and 2006/07 there is a significant number of years during which severe droughts occurred (see Figure 3.7). Considering a meteorological drought to be a year when the average annual rainfall falls below 75 per cent of the long-term average

of 508mm (National Economic Planning Commission 1999), droughts occurred in 17 of the 46 years (37% of the years) between 1959/60-2006/07.

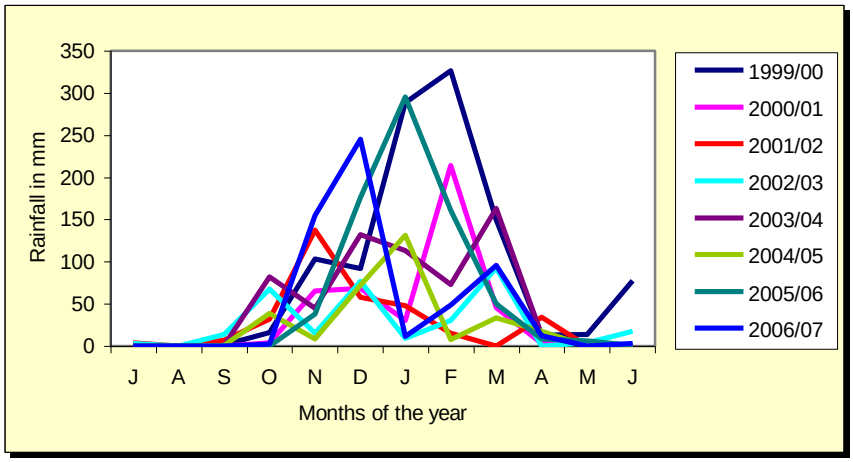


Figure 3.6 Intra-seasonal variation of rainfall in Kezi, 1999-2007

According to Zimbabwe Meteorological Services Department (2008) the total annual rainfall for the 2006/07 season was 573mm, reflecting a normal season without meteorological drought. However, the 2006/07 seasonal distribution (Figure 3.6) shows a drastic drop in the rainfall in January to 11mm and a slight increase in March to 49mm. This resulted in agricultural drought and widespread crop failure in Matobo District (Mpofu 2007, pers com; Sibanda 2007, pers com).

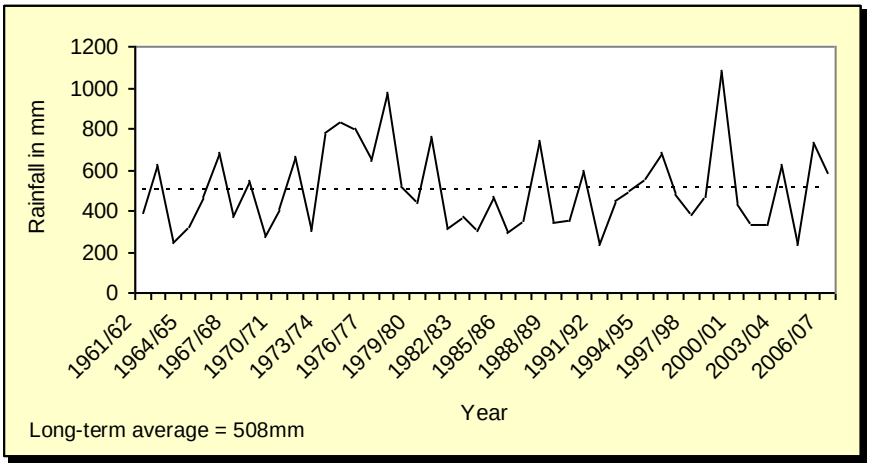


Figure 3.7 Inter-annual variation of rainfall in Kezi 1961-2007

Crops often fail in Sontala ward during years when there is no meteorological drought because of the erratic nature of the rainfall characterized by frequent dry spells. South

African government officials have acknowledged that drought impacts do not only arise from rainfall deficits but also result from erratic rainfall (Vogel 1994). According to Figure 3.7 there is no evidence of either a long-term increase or decrease in the annual rainfall as noted by Scoones et al (1996).

Soil types in Sontala ward vary from heavy reddish clay loams locally known as *isibomvu* to sodic soils and granitic sandy soils (*ihlabathi*). *Colophospermum mopane* and *combretum spp* grow on sodic soils. Acacia is predominantly found on heavy soils (*isibomvu*). Scoones et al (1996) noted that the response of crops to rainfall varies with soil type. Because heavier clayey soils have low infiltration rates, high rainfall must occur before the land preparation for planting can take place. Heavier rainfall is required for a good harvest on heavier soils. The clayey soils are inherently more fertile than sandy soils and given higher rainfall, higher yields can be obtained. On the other hand, sandy soils can be planted after much lower rainfall has occurred and a moderate harvest can be obtained during years of lower rainfall. Such soils are, however, less fertile and higher crop yields can only be obtained through the application of animal manure or fertilizers. Soil type is an important factor that partially explains the variation in crop output among small-scale farmers in Sontala ward.

3.4 SUMMARY

Zimbabwe is a semi-arid country which experiences recurrent droughts and thus it has a generally low agricultural potential. Sandy soils, derived from granitic rock, cover most parts of the country. The vegetation is predominantly savanna woodland with a sparse ground cover of herbs and grasses. Differences in climate, soil type and relief explain the variation of the vegetation from place to place. Land alienation by the colonial governments resulted in the creation of communal lands on ecologically-fragile regions. The fast track land reform programme, among other factors, is believed to have caused the collapse of the economy. Matabeleland South in which the study area, Sontala ward is located, is a semi-arid province in Zimbabwe where production of crops under dryland farming is a risk. The next chapter describes the methodology applied to determine the nature and impact of Zimbabwe's drought policy on a rural community.

CHAPTER 4: METHODOLOGY, DATA PRESENTATION AND DESCRIPTION

The previous chapter outlined the geographical and socio-political situation of Zimbabwe, the country in which the research was carried out, so as contextualize the study. Part of the empirical data needed to investigate some of the objectives (section 1.4), was collected in Matabeleland South province. This chapter describes the methodology which was used to achieve these objectives. The study was conducted using a qualitative research design. It is dominated by the interview method complemented with the use of government documents and qualitative analysis of the textual data.

4.1 METHODOLOGY

Matabeleland South province was selected because it is one of the driest regions in the country (Vincent & Thomas 1960). According to Bratton (1987) droughts tend to be more frequent in drier regions in Zimbabwe. Empirical data was obtained from the provincial offices in Gwanda town and Sontala ward in Matopo district, one of the seven districts in Matabeleland South (see Figure 3.3 and 3.4). Government documents such as reports, legislation and other regulations relating to the management of drought and other hazards, were used as well. These include the Civil Protection Act (Chapter 10:06) of 1989 (Government of Zimbabwe 1989), the Provincial Disaster Preparedness and Response Plan (MLGPW&UD 2006) and the Provincial Drought Report for Matabeleland South province (MLGPW&UD 2007).

4.1.1 Interviews

The researcher conducted semi-structured interviews with key informants (see Table 4.1) in which the main questions had been prepared in advance to serve as an interview guide (Appendix A). The interviewer could ask follow up questions to explore emerging issues (Arksey & Knight 1999).

Table 4.1: Interview schedule for key informants

NAME OF INTERVIEWEE	POSITION OF INTERVIEWEE	DATE OF INTERVIEW
Mpofu DA	Provincial Administrator of Matabeleland South	03-07-2007
Sibanda C	Provincial Head of Environmental Management Agency Matabeleland South	03-07-2007
Bango Q	Head of Sontala Primary School	05-07-2007
Ndebele P	Deputy Head of Sontala Primary School	05-07-2007
Dube P	Chief's Aide (acting in place of deceased Chief)	06-07-2007
Other	Heads of households in Sontala village	08-07-2007

The Provincial Administrator and the head of the Environmental Management Agency, who chairs the drought committee, were interviewed at the provincial offices. At ward level the School head and deputy head of Sontala Primary School in Matopo district were interviewed about the school feeding programme. Other informants in the interview programme were: the Chief's Aide who is currently the acting Chief; the Village Development Committee (VIDCO) chairperson; and twelve heads of households. The Chief of the area passed away recently and so the Chief's Aide was interviewed instead. Data was validated by cross-checking with official documents and academic literature. Some of the data supplied by small-scale farmers was verified with the Chief's Aide and the VIDCO chairperson.

According to Bratton (1987) the household is regarded as the key unit of production and consumption in the literature on peasant agriculture. The sample of heads of households was purposefully selected in order to provide a diverse profile of participants; female-headed households, male-headed households, the elderly, middle-aged persons, young adults and formerly employed persons. The interviewees were selected with the assistance of VIDCO chairperson to fit the categories listed above. Patton (1990) quoted by Hay (2000: 46) maintains that there are "no rules on sample size in qualitative enquiry" and that "the sample size depends on what the researcher wants to know, the purpose of the study, what will be useful and what will give credibility."

4.1.2 Data needs

Primary data was obtained from semi-structured interviews and other sources such as government documents mentioned above. GIS data in the form of vector format shapefiles

was sourced from the Stellenbosch University's Geography and Environmental studies department database and the United Nations SAHIMS website. The Zimbabwe Meteorological Services Department in Harare supplied the climate data for Kezi weather station. Sources of secondary data include academic literature in the form of books and journals which provided the conceptual framework to the study. The Internet also provided useful papers compiled from conference proceedings. Other pertinent documents were downloaded from SADC and SAHIMS websites.

Mr DA Mpofu, the Provincial Administrator and Mr C Sibanda, the Head of Environmental Management Agency, elucidated the legal framework and the institutional structures used for disaster management at national, provincial and district level. They also clarified how the institutional structure is used to manage drought induced disasters. The textual data supplied by the two officials was supplemented with information from academic sources and discussed in chapter five. Mrs Q Bango and Mr P Ndebele, the head and deputy head of Sontala Primary School respectively, provided data on the Child Supplementary Feeding Programme run by World Vision Zimbabwe. This is an NGO involved in drought relief and community development projects in rural parts of Matabeleland South. This data and information were supplemented with academic literature and used in the discussions in chapter six.

Most of the data generated during the research is of a textual nature. There is a limited amount of numerical data. The next section presents a profile of the respondents and the results of the interviews.

4.2 DATA PRESENTATION AND DESCRIPTION OF RESPONDENTS' ASSETS

The data obtained through interviews with villagers in Sontala ward is inventorized in Appendix B. The data shows information on the profile of the respondents, some household assets such as animals, fields and crops, the impact of the 2006/07 drought on crop output and how respondents cope with drought. The data from Appendix B was used to construct tables on age composition, dependency load, types of occupations, types of livestock and size of cultivated area. Other tables show the relationship between the number of draught animals, size of cultivated area and farm output. A pie graph illustrates the composition of domestic animals owned by the respondents. Qualitative descriptions

of the strategies used by the respondents to cope with drought are presented as case studies. Each case study is an illustration of how other households, experiencing similar circumstances in the ward, cope with food shortages.

4.2.1 Profile of ward respondents

The respondents consisted of 33 per cent females and 67 per cent males. Seventeen per cent were single females, 16 per cent widowed females and 67 per cent married males. Table 4.2 and 4.3 show the age composition and the dependency load of the sample respectively. The majority (58 per cent) of the respondents were middle-aged (41-60 years). A small proportion (17 per cent) consisted of young adults (21-40 years) and the elderly (61-80 years) made up one quarter of the sample. Two thirds of the respondents (67 per cent) had a small number of dependents (between one and three) and one third had five or more dependents.

Table 4.2: Age of respondents

AGE	FREQUENCY	%
21 – 30	1	8.3
31 – 40	1	8.3
41 – 50	1	8.3
51 – 60	6	50
61 – 70	1	8.3
71 – 80	2	16.7
	12	100

Table 4.3: Number of dependents

NUMBER OF DEPENDENTS	FREQUENCY	%
1	1	8
2	2	17
3	5	42
4	0	0
5	1	8
6	2	17
7	0	0
8	1	8
		100

The sample was selected from a population affected by the impact of outmigration and the HIV/AIDS pandemic (Munyati 2006). Part of the working population migrates to employment opportunities mainly in, neighbouring countries, Botswana and South Africa (Gandure 2005; Munyati 2006). Some of the members of the community work in the city of Bulawayo. Some of the elderly support a large number of AIDS orphans and grandchildren whose parents work in neighbouring countries (Munyati 2006).

The small-scale farmers engage in mixed farming of dryland cropping and livestock keeping as noted by Scoones (1992). With regards to occupations (see table 4.4), about two fifths of the respondents were engaged in small scale farming only while one third participated in small-scale farming as well as non-farm activities to obtain additional income. Seventeen per cent worked in Bulawayo but their wives were small-scale farmers and one respondent did not have land and thus earned a living wholly from non-farm activities.

Table 4.4: Types of occupations

OCCUPATION	FREQUENCY	%
Small-scale farming only	5	42
Small-scale farming and informal employment	4	33
Formal employment and small-scale farming	2	17
Non-farm activities only	1	8
Total	12	100

4.2.2 Respondents' assets

The respondents owned five types of livestock as shown in Figure 4.1. They predominantly rear small livestock (72 per cent) in the form of chickens and goats. There are smaller proportions of large livestock such as cattle (20 per cent) and donkeys (7 per cent). Very few sheep are kept by the respondents.

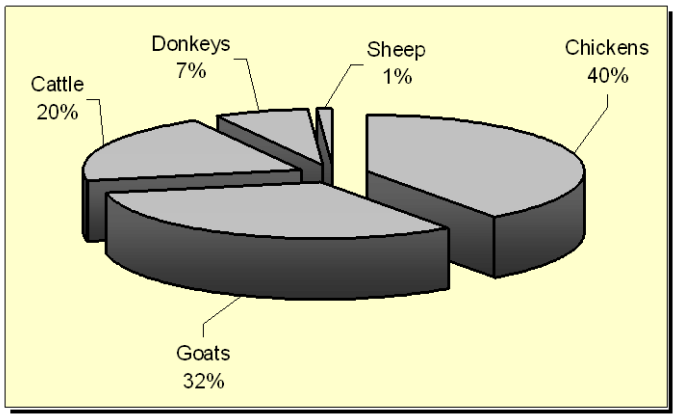


Figure 4.1: Types of livestock owned

In response to a question on the size of their land planted with crops in the 2006/07 season, half of the respondents revealed that they cultivated only a small part of their fields (one to two hectares) as shown in Table 4.5. About two fifths of the respondents tended between two and a half to four hectares and one respondent did not farm at all.

Table 4.5: Size of cultivated area

SIZE OF CULTIVATED AREA (ha)	FREQUENCY	%
1	4	33.3
2	2	17
2.5	3	25
3	1	8.3
4	1	8.3
0	1	8.3
Total	12	100

The results of the question about the quantity of their harvest during the 2006/07 season and how long they thought the food they had produced would last them are shown in Table 4.6. One third of the respondents produced a fairly good harvest of between 8 to 21 bags of grain and had a secure food supply until the next harvest in the 2007/08 season.

Table 4.6: Size of harvest and household food situation

RESPONDENT	SIZE OF CULTIVATED AREA IN (ha)	SIZE OF GRAIN HARVEST (NO OF 90-KG BAGS)				DURATION OF FOOD SUPPLY (MONTHS)	NO OF MEALS PER DAY
		MAIZE	SORGHUM	PEARL MILLET	TOTAL		
1	2.5	0.5	0	0.5	1	5	3
2	2.5	0.5	0	1	1.5	4	2
3	1	1	0	0	1	1	2
4	1	2	0	0	2	2	3
5	1	0	0	0	0	None	2
6	2.5	5	2	1	8	8	2
7	2	0	0	0	0	None	3
8	2	2	2	6	10	18	3
9	No fields	0	0	0	0	None	2
10	3	5	4	4	13	7	2
11	1	0	0	0	0	None	2
12	4	5	2	14	21	12	3
Total	22.5	21	10	26.5	57.5		

Another third experienced a poor harvest of one to two bags of grain. Their food stocks would run out within the next two months. About one quarter experienced a total failure of

crops and one respondent had no fields. Two thirds of the respondents were experiencing either transitory or chronic food insecurity[15] due to failure of their crops. For those with a small harvest the food would run out in a few months. The majority of respondents (58 per cent) had two meals a day and a surprisingly significant proportion (42 per cent) had three meals a day. The number of cattle owned by a household affects the size of land cultivated and the quantity of the harvest. Table 4.7 shows that the respondents who own a herd of at least five cattle produced a better harvest than those who have fewer or no cattle.

Table 4.7: Draught power, size of cultivated area and crop size

RESPONDENT	DROUGHT POWER		CULTIVATED AREA IN HA	OUTPUT TOTAL NO OF BAGS
	CATTLE	DONKEYS		
1	0	2	2.5	1
2	2	2	2.5	1.5
3	0	3	1	1
4	30	6	1	2
5	1	0	1	0
6	5	0	2.5	8
7	0	0	2	0
8	5	5	2	10
9	0	0	No fields	0
10	15	3	3	13
11	1	0	1	0
12	5	0	4	21
Total	64	21	22.5	57.5

Four respondents who own five or more head of cattle produced eight or more bags of grain each. They have a more secure food supply than those with very few or no cattle. Cattle provide draught power for ploughing the fields but anomalously the one respondent with the largest number of draught animals, a herd of 30 cattle and 6 donkeys, has the smallest size of cultivated area (one hectare) and the third lowest harvest (see Table 4.7). Donkeys can also provide alternative draught power in the absence of cattle but only one respondent has a viable number of this type of animal for cultivating the fields. The next section deals with case studies from Sontala ward which show the strategies used by the respondents to cope with food insecurity.

[15] Chronic food insecurity is a long-term or persistent shortage of food (Maunder & Wiggins 2006).

4.2.3 Case studies in Sontala ward

The information relating to the twelve anonymous heads of households is presented as case studies and illustrates how various coping strategies were used during the 2006/07 drought period. The cases are ranked according to levels of wealth determined using livestock ownership as a proxy (Scoones et al 1996). Heads of households who own the most cattle are ranked highest followed by those with the most donkeys because these animals provide draught power used to cultivate the land. The ability to produce food crops helps to improve food security at household level among rural communities.

Case 1 is a 79-year-old male. Mr B, a retired civil servant, has five dependents. His wife is a retired schoolteacher who used to work at the local primary school. Mr B and his wife receive government pensions monthly but they can no longer live on the pensions because of hyperinflation. Other dependents are Mr B's mother-in-law, two grandchildren and a worker who herds cattle and performs other household chores such as collecting water and firewood. The family's assets consist of arable land, a herd of 30 cattle, 6 donkeys, 10 goats and 20 chickens. The couple only planted one hectare of land during the 2006/07 season because they are no longer strong enough to work in the fields. They harvested two bags of maize grain which would provide them with only three months food supply. The family has three meals a day. When the available grain supply runs out, Mr B sells some of the cattle to obtain cash to purchase maize grain or maize meal. The family obtains irregular donations of groceries from five working adult children, two of whom work in other countries (South Africa and Britain).

Case 2 is a 53-year-old married male. Mr K works in the city of Bulawayo in the service sector. He visits the family regularly at the end of each month and on public holidays, bringing groceries. Other members of the household are his wife and seven children. The wife is a small scale farmer who lives with the children in Sontala ward. The family assets consist of a herd of 15 cattle, 3 donkeys, 16 goats and 25 chickens as well as land for cultivation. During the 2006/07 season the family planted three hectares of land and obtained five bags of maize, four bags of millet and four bags of sorghum. The harvest provided them with seven months' supply of food and they subsist on two meals a day. When the available food reserve is depleted, Mr K purchases more food using his salary and income from the sale of cattle and goats.

Case 3 is a 40 year old married male. Mr V's dependents include his wife, one child and Mr V's mother. The family owns arable land, a herd of five cattle, five donkeys, seven goats and 15 chickens. Two hectares of land were planted with crops during the 2006/07 season and two bags of maize grain, two bags of sorghum and six bags of millet were produced. The family had food reserves for 18 months until the next harvest and enjoys three meals a day. Mr V is a skilled builder who gets off-farm income from building brick houses for members of the community.

Case 4 is 41 year old male. Mr J is a married male who has six dependents consisting of his wife, four children and his father. The family owns arable land, a herd of five cattle, 11 goats and 20 chickens. He cultivated four hectares of land during the 2006/07 season and obtained a fair harvest in the form of five bags of maize grain, two bags of sorghum and 14 bags of millet. The grain would last them until the next harvest in May/June 2008. The family enjoys three meals a day. Mr J obtains additional off-farm income from building contracts entered into with members of the local community. The wife has recently joined a gardening project run by World Vision near Sontala dam along Mbembeswana river valley.

Case 5 is a 61-year-old female. Mrs A is a widow with three dependents; a grandchild, a general worker and a herdboy. She is a small scale farmer who owns arable land, a herd of five cattle, three goats, two sheep and three chickens. During the 2006/07 season, she prepared two and half hectares of land for planting and obtained five bags of maize grain, two bags of sorghum and half a bag of millet. The food supply was expected to last the family for eight months and they eat two meals a day. During the time of the fieldwork in July 2007, Mrs A received Z$3 000 per month from her late husband's pension. This amount has been eroded by inflation and is now valueless. She receives regular donations of cash and groceries from four adult children, three of whom work in South Africa and one works in Britain. Additional activities include brewing beer for sale and gardening to produce vegetables for consumption and for sale.

Case 6 is a 60 year old female. Miss D is a single woman who is a small-scale farmer. She owns arable land, a herd of two cattle, two donkeys, seven goats and eight chickens. During the 2006/07 season she cultivated two-and-half hectares of land and obtained half a

bag of maize grain and a bag of millet. The family subsists on two meals a day. The food supply would sustain the family for four months. She looks after two grandchildren whose mothers work in South Africa. Her two adult children occasionally send her cash and groceries from South Africa. Miss D and Miss N (Case 10) combine their donkeys to make a span for ploughing. They pool their labour as well and then take turns to plough each other's fields. She obtains additional income from cutting and selling thatching grass, making bricks for sale, harvesting and selling mopane worms and gardening to produce vegetables for consumption and sale.

Miss D is the (VIDCO) chairperson of Sontala village. Her role is to forward people's grievances to the Ward Councilor who in turn reports them to the relevant government officials. She requested government authorities to improve the supply of maize grain at the local Grain Marketing Board (GMB) depot for the benefit of the members of households who had experienced crop failures, but at the time of the interview, the villagers were still waiting for a response from the government. She was also lobbying for an increase in the number of boreholes so as to improve the water supply in Sontala village.

Case 7 is a 56 year old married male. Mr K is disabled as a result of falling off a scotch cart. There are three dependents in his homestead who consist of his wife and two children. The family's assets consist of arable land, one cow, 29 goats and seven chickens. He was only able to prepare one hectare of land for planting during the 2006/07 season. The crops failed and so his family depends on purchases for food. Mr K generates off-farm income from repairing bicycles. This is supplemented by selling vegetables, goats and chickens. The family survives on two meals a day.

Case 8 is a 55 year old male. Mr M has a wife and four children. He is a small scale farmer who earns additional off-farm income from building. In 2007 he experienced problems in getting building contracts due to a low demand for builders as a result of drought and adverse economic conditions. The assets of the family consist of arable land, one cow, three goats and 15 chickens. Mr M planted one hectare of land with crops during the 2006/07 season but they failed. The family subsists on two meals a day. He earns cash from building contracts to buy food.

Case 9 is an 80 year old female. Mrs T is a widow who engages in small scale farming. She looks after three orphans. Her assets consist of land for cultivation, three donkeys, six goats and six chickens but she has no cattle. She planted one hectare of the land with crops during the 2006/07 season and obtained one month's supply of food in the form of one bag of maize grain. The family has two meals per day. She obtains food assistance from two of her adult children who are newly resettled farmers.

Case 10 is a 56 year old female. Miss N is a single woman without any children. She is a retired domestic worker. The only dependent is her mother who is an invalid. Her assets consist of two donkeys, one goat and arable land but she has no cattle. She pools draught power and labour with Miss D (Case 6) as noted above in order to prepare the land for planting. Two and half hectares were planted with crops during the 2006/07 season. The harvest consisted of half a bag of maize grain and half a bag of millet. She attributed the low harvest to drought and infertile soils that have been cultivated for a long time without manure or fertilizer. She had five months food supply due to the fact that they were still consuming the previous year's harvest. She engages in gardening during the dry season to obtain vegetables for sale so as to raise income to purchase food. They consume three meals a day.

Case 11 is a 53 year old male. Mr D is a married man with three dependents consisting of his wife and two children. He works in a factory in the city of Bulawayo but his wife is a small scale farmer in Sontala ward. He visits the family regularly at month ends and public holidays, bringing groceries. The family owns arable land, ten goats and five chickens. Mr D has no cattle. The wife prepared two hectares of land for planting during the 2006/07 season but the crops failed. The family purchases food using the man's income. They survive on two meals a day. Mr D complained that the family could not live on the low income. In order to raise additional income, he has joined a money club which raises income through lending and charging interest (*chimbadzo*).

Case 12 is a 25 year old male. Mr X is a young man who is married and has one child. Unlike the other respondents, he has no assets such as arable land and domestic animals. As a result, he cannot produce food for family consumption. The family survives on two meals a day. He earns a living through casual work, making bricks for sale and also grows vegetables for sale.

4.3 SUMMARY

The analysis of the interview results shows a generally low output of crops that resulted in food insecurity for the majority of the respondents. The case studies reveal that the respondents who own a viable herd of cattle (five or more) have a more secure food supply than those who have a smaller herd size. Ownership of cattle and donkeys helps to improve food security through improved access to draught power. Most of the female respondents have very few or no cattle. As a result they experience food insecurity. Production and sale of vegetables is an important source of additional income to purchase food. A significant number of respondents are assisted by their adult working children with groceries and money. The focus now shifts to the legal framework and the institutional structure for disaster management in the next chapter. It is this institutional structure that is used to manage drought-related disasters.

CHAPTER 5: THE STATUS OF DISASTER MANAGEMENT IN ZIMBABWE

In the previous chapter, the analysis of the data and case studies showed a generally low output of crops and food insecurity for the majority of the respondents. Most respondents rely on off-farm income to purchase additional food as well as on remittances of cash and groceries. The data also showed that ownership of cattle improves food security. This chapter deals with the status of disaster management in Zimbabwe. It covers the legal framework and national institutional structures for managing disasters, the civil protection plan, constraints on disaster management and the disaster management policy review. The last section deals with the management of drought-related disasters.

5.1 DISASTER MANAGEMENT

There is a legal framework for managing disasters in the country. The Civil Protection Act, complemented by sections of other laws, provides a legal framework for the management of disasters in general including those induced by droughts.

5.1.1 The legal framework and national institutional structures

A tenet of the national policy on disaster management is that every inhabitant of the country should help, where possible, to prevent or reduce the effects of disasters (Madamombe 2004). Drought, flooding, disease epidemics, public transportation accidents, industrial accidents, forest fires and environmental degradation are some of the major hazards that affect Zimbabwe (MLGPW&UD 2006). The Civil Protection Act (Chapter 10:06) of 1989 is the principal act which regulates disaster management (Marjanovic & Nimpuno 2003; UNISDR 2004). Sections of certain laws complement the Civil Protection Act in the management of disasters (MLGPW&UD 2006). The Environmental Management Act (Chapter 20:27) of 2002, the Public Health Act (Chapter 15:09), the Rural District Councils Act (Chapter 29:13), the Urban Councils Act (Chapter 29:15), the Defence Act (Chapter 11:02), the Regional Town and Country Planning Act (Chapter 29:12) and the Police Act (Chapter 11:10) have portions which can be used

together with the principal act in disaster management. The relevant sections of the laws are summarized in Table 5.1.

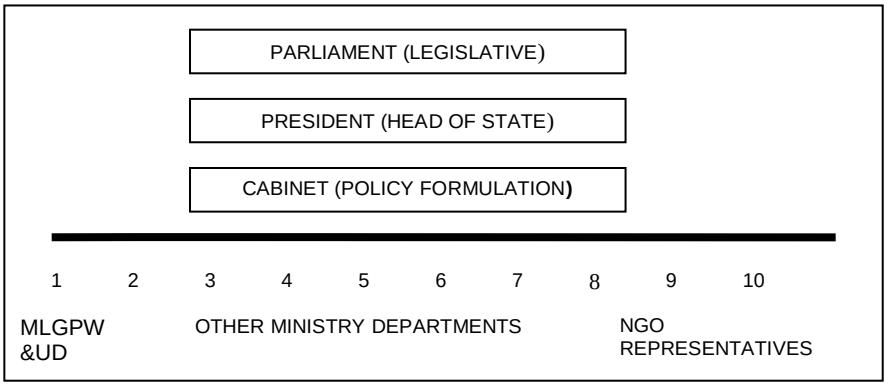
Table 5.1: Legislation used with the Civil Protection Act for disaster management

LEGISLATION	RELEVANCE
Environmental Management Act (Chapter 20:27)	Part IX on environmental quality standards; Projects subject to environmental impact assessments
Public Health Act (Chapter 15:09)	Section 22 to 35 on prevention and suppression of infectious diseases; Part V – International sanitary regulations; Part VI – Water and food supply issues; Part IX – Sanitation and housing
Rural District Councils Act (Chapter 29:13)	Rural district councils empowered to control bush fires, regulate farming and pollution through by-laws
The Regional, Town and Country planning Act (Chapter 29:12)	Control of development in environmentally sensitive areas through by-laws
The Police Act (Chapter 11:10)	Guides the Zimbabwe Republic Police on how to deal with disasters to reduce loss of life
The Defence Act (Chapter 11:02)	Provides guidelines on how defence forces can be mobilized in peace times to deal with disasters

Adapted from MLGPW&UD (2006: 13)

Disaster preparedness programmes are initiated by Central Government through relevant sector ministries and local administration takes the responsibility for implementing and maintaining its effectiveness (Marjanovic & Nimpuno 2003). The current system uses the existing government, private sector and NGOs whose regular activities contain elements of disaster risk prevention and community development (Marjanovic & Nimpuno 2003; UNISDR 2004). "The organizations are adopted structurally, materially and technically so that they can be shifted rapidly from their regular activities to undertaking protective, relief and rehabilitation measures in times of disaster" (Madamombe 2004: 9).

The Civil Protection Act empowers the Minister of Local Government, Public Works and Urban Development to have a coordination role (MLGPW&UD 2006). The model of the civil protection system is illustrated by Figure 5.1. The coordination function is carried out by the Department of Civil Protection run by the Civil Protection Directorate in the Ministry of Local Government, Public Works and Urban Development. The Civil Protection Act (Chapter 10:06) of 1989 stipulates that a Civil Protection Directorate should be formed. The Directorate is assigned a number of responsibilities by the Act.



Adapted from MLGPW&UD (2006: 12)

Figure 5.1: Structural model of Zimbabwe's civil protection system

These include the establishment, promotion and directing of civil protection organizations in civil protection provinces and civil protection districts and the appointment of planning committees in civil protection provinces and civil protection areas. The planning committees have to draft civil protection measures to be submitted to the Director, then the Minister, for approval. Institutions, ministries, departments, private and non-governmental organizations have to be assisted by the Directorate to come up with plans for emergency preparedness and disaster prevention (MLGPW&UD 2006). The Directorate has to forward a request through the Minister to the President to declare and gazette a disaster in cases where the magnitude of the disaster is high. Other responsibilities are: to ensure that the data gathered by different persons from various disciplines is not contradictory; to maintain regular contact with international disaster management and disaster relief organizations; to arrange to get first-hand information on major incidents; to develop public awareness programmes on emergency preparedness and response; and to promote research and training on matters relating to disaster management (Government of Zimbabwe 1989).

The Directorate is further empowered to establish, coordinate and direct the activities of both the public and private emergency services. This should be done by providing guidelines for action and maximum use of resources since disaster mitigation requires a multi-sectoral and an interdisciplinary approach (Government of Zimbabwe 1989). The Act also stipulates that a national Civil Protection Fund should be established that receives money from the Government and the public. The monies in the fund are applied to the development and promotion of civil protection activities throughout the country. Sources

of funding are the government, donations from individuals, private companies and NGOs (Government of Zimbabwe 1989). To ensure that there is transparency in the use of the funds, the Comptroller and Auditor-General have to audit the expenditure. Furthermore, the fund should be applied for: research and training in order to promote civil protection; acquisition of necessary property in order to promote the objects of the fund; and meeting the cost of any scheme which the Minister considers to enhance civil protection. The National Civil Protection Coordination Committee, which is responsible for formulating the national civil protection plan, falls within this department and is chaired by the Director of the Civil Protection Department (Government of Zimbabwe 1989).

The National Civil Protection Coordination Committee (NCPCC) is empowered by section (41) (2) of the Civil Protection Act (Chapter 10:06) of 1989 to execute civil protection functions. The Committee consists of senior officers selected from government ministries/departments, parastatals and NGOs (MLGPW&UD 2006). The Provincial Civil Protection and Planning Committee (PCPPC), chaired by the Provincial Administrator, operates at provincial level whereas the District Civil Protection and Planning Committee (DCPPC) operates at district level and is chaired by the District Administrator as shown in Table 5.2.

Table 5.2: The operational structure of the civil protection organization in Zimbabwe

LEVEL	INSTITUTION	RESPONSIBILITIES
National NCPCC	Minister (LGPW&UD) Civil Protection Directorate Secretariat	Coordination function Director chairs National Civil Protection Coordination Committee with a multi-sectoral representation
Provincial PCPPC	Provincial Administrator	Chairs Provincial Civil Protection and Planning Committee with a multi-sectoral representation
District DCPPC	District Administrator	Chairs District Civil Protection and Planning Committee with a multi-sectoral representation

Adapted from MLGPW&UD (2006: 15)

The provincial and district committees retain a multi-sectoral composition as well. At each level there are subcommittees whose responsibilities are determined by their area of specialization (Mpofu 2007, pers com; Sibanda 2007, pers com). The members of the NCPCC, PCPPC and DCPPC are grouped into the following sub-committees: food supplies and security, chaired by the Ministry of Public Service, Labour and Social

Welfare; health, nutrition and welfare, chaired by the Ministry of Health and Child Welfare; search, rescue and security, chaired by Zimbabwe Republic Police; international cooperation and assistance, chaired by the Ministry of Finance (MLGPW&UD 2006). National food security is the responsibility of national government which operates through the (GMB), a parastatal. The responsibility of this institution is to maintain strategic grain reserves both in grain and cash (UNISDR 2004).

The Civil Protection Act requires that emergency preparedness and response plans should be formulated so that they are activated during emergencies. The planning for emergencies as stipulated by the Act, is done at various levels: sectoral, local authority, district, provincial and national level (Mpofu 2007, pers com; Sibanda 2007, pers com).

5.1.2 The National Civil Protection Plan

The National Civil Protection Plan forms the overall framework for the promotion, coordination and execution of emergency and disaster management in Zimbabwe. First, it allocates responsibilities and duties to appropriate authorities at different levels so that the organizations can prepare their own plans and make them operational when required. Second, it provides guidelines for the planning, execution and preservation of the civil protection system and its functions. The ward, district and provincial plans should fit into the national plan (Mpofu 2007, pers com; Sibanda 2007, pers com; UNISDR 2004).

The civil protection system faces a number of constraints. These relate to the fragmentation of the legislation caused by the fact that the principal act has organizational gaps. Another problem is lack of finance at provincial and district level to carry out civil protection activities. The next section deals with the constraints on disaster management.

5.1.3 Constraints on disaster management

The finance budgeted by the government yearly for disaster management is inadequate (Madamombe 2004; MLGPW&UD 2006). As a result, the local structures at provincial and district level are not provided with a budget to finance their activities related to disaster management (MLGPW&UD 2006). Moreover, it is difficult to implement disaster preparedness programmes due to shortage of funds. There are certain parts of the country,

for example the remote parts of Matabeleland South, where there is no radio or telephone communication. It is therefore difficult to give early warning for imminent disasters in such places (Mpofu 2007, pers com; Sibanda 2007, pers com). The legislation for managing disasters is fragmented and the principal act, the Civil Protection Act, is weak causing a civil protection organizational structure that is weak (Sibanda 2005). The current policy is under review so as to improve the management of disasters.

5.1.4 Disaster management policy review

The Civil Protection Act is being reviewed in order to deal with gaps in the legislation with regards to fire and ambulance services and to put into effect sectoral preparedness planning (UNISDR 2004; Sibanda 2005). The new policy will address the problem of funding of the disaster management system and enable disaster risk reduction to be strengthened. The Emergency Preparedness and Disaster Management Bill was presented for consideration to parliament in 2004 (Madamombe 2004). The Bill will change the disaster management policy in a number of ways (UNISDR 2004). The current Civil Protection Act will be repealed and replaced with the Emergency Preparedness and Disaster Management Act. It will facilitate the establishment of an Emergency Preparedness and Disaster Management Authority. One of the major functions of the Authority is to develop a risk reduction strategy in order to minimize the population's vulnerability to both natural and man made or technological hazards. Other changes in the policy include: establishment of an integrated early warning system for emergencies and disasters; promotion of training and research in matters relating to disasters; integration of disaster risk reduction into all developmental initiatives; standardized training for emergency services; establishment of a funding mechanism for disaster risk reduction at both the local and national levels; and capacitating the local authorities to manage emergencies and disasters at the local level. The new Act will move the country towards the establishment of a proactive disaster management policy framework (Sibanda 2005).

The country currently has no database on disaster risk reduction. The information is managed at institutional level through sharing reports, minutes, newsletters and email facilities. The new bill proposes the establishment of a Disaster Management Centre for housing and linking relevant stakeholders (UNISDR 2004). It is not clear how the new Act

will be used to manage drought-related disasters but the country definitely needs to develop better strategies for dealing with them.

5.2 MANAGEMENT OF DROUGHT

As noted in chapter three, Zimbabwe is a semi-arid country which is drought-prone. According to Scoones (1992) droughts have been frequent in recent years in Zimbabwe (see Table 3.1 and Figure 1.1). Between 1961 and 1980 the country experienced only three drought years, whereas between 1981 and 2000 there were seven, four of which were extreme (see Table 3.1). Between 1988 and 1992, over 15 drought events affected at least one percent of various countries' populations in southern Africa, compared to fewer than five such events between 1963 and 1967 (World Conference on Natural Disaster Reduction 1994) cited by Glantz, Betsill & Crandall (1997). It is therefore crucial that the country should have a policy in place so as to mitigate the impacts of a drought-related disaster.

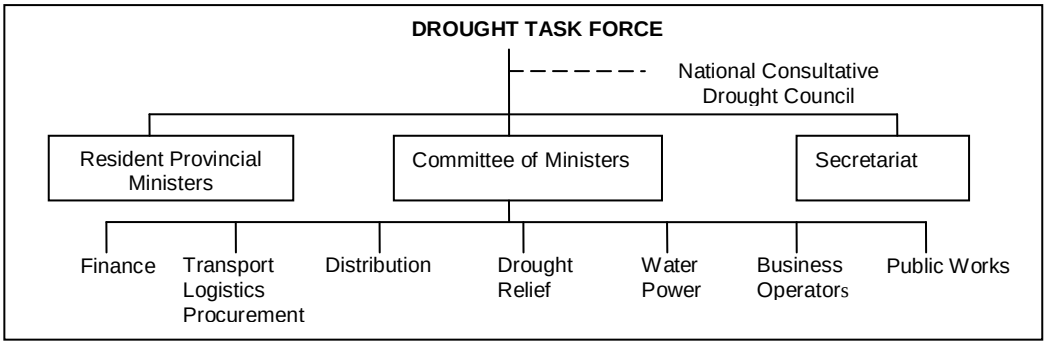
During the 1990s the national drought policy emphasized efficient use of water, increased agricultural production in both commercial and communal areas, good land use management and careful management of the environment and natural resources (Government of Zimbabwe 1995) cited by (Poulton et al 2002). Other drought relief strategies include the drought levy that was designed to run drought-related programmes in the future. The target amount raised through the fiscal system as drought levy was $Z50 million during the 1984/85 season (Poulton et al 2002). This was used to set up a Drought Insurance Fund.

According to Government of Zimbabwe (1995) cited by Poulton et al (2002) communities were encouraged to prepare for droughts in the following manner. They were advised to maintain a two year supply of grain in community granaries as well as dry vegetables, meat and indigenous fruits in such a way that they could be kept over extended periods. Their cattle could be saved by carrying out multi-species livestock husbandry and using supplementary livestock feeding during severe droughts. They were urged to reduce mono-crop production, terrace fields, practise multi-cropping and to diversify sources of income. In order to improve food security in drought-prone areas communities were advised to adopt millet and sorghum varieties developed by ICRISAT. Research carried

out at the University of Zimbabwe succeeded in developing soybean crop varieties suitable for production in rotation with other crops (Poulton et al 2002). The government set up an ad hoc administrative structure to manage one of the most severe droughts during the twentieth century, the 1991/92 drought.

5.2.1 The 1991/92 emergency drought response

The 1991/92 drought was declared a national disaster by the President and a temporary drought-response administration was set up as shown by Figures 5.2 and 5.3 as well as Table 5.3 (Ministry of Information, Posts and Telecommunications 1993; SADC-FSTAU 1993; Thompson 1993). According to Thompson (1993) communication from local communities to central government was good but decisions and implementation were generally slow. The drought response administration consisted of a number of structures. The Drought Relief Task Force shown in Figure 5.2 was chaired by the Vice-president and comprised a committee of Ministers and one of the Resident Provincial Ministers assigned to oversee drought-relief activities at provincial level.

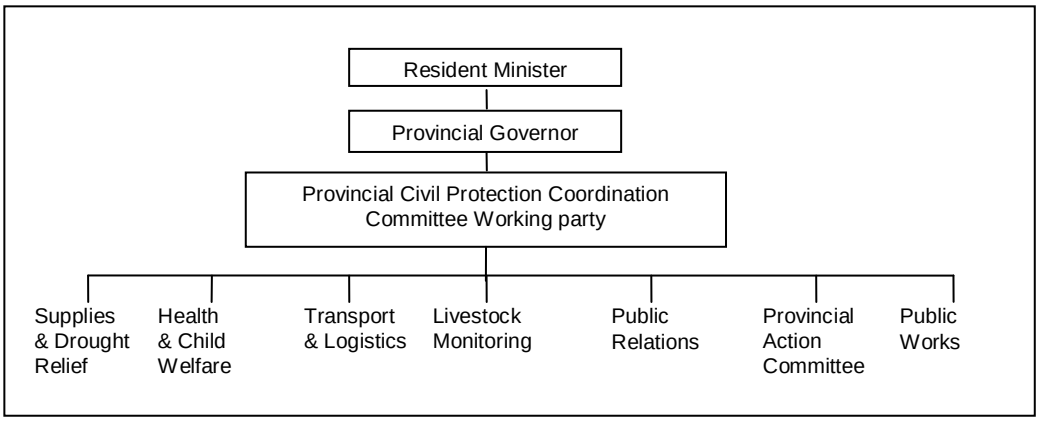


Source: Thompson (1993: 86)

Figure 5.2: Zimbabwe national action group

The Task Force had a number of sub-committees with a multi-sectoral composition as illustrated in Figure 5.2 and Table 5.3. The National Consultative Drought Council, chaired by the Vice-president, consisted of representatives from ministries as well as international agencies directly involved in drought relief (see Figure 5.2). In the Provincial Drought Administration, the designated Resident Minister coordinated drought relief within the province. The Provincial Governor was expected to work with the Provincial Civil Protection Coordination Committee composed of a number of working committees

(Ministry of Information, Posts and Telecommunications 1993): Supplies and Drought Relief, Health and Welfare, Transport, Livestock Monitoring, Public Awareness/Relations, Provincial Action Committee and Public Works (see Figure 5.3).



Source: Thompson (1993: 86)

Figure 5.3: Provincial drought administration

Table 5.3: The multi-sectoral composition of Task Force subcommittees

SUBCOMMITTEE	COMPOSITION
Finance	Ministries of Finance, Industry and Commerce, Foreign Affairs – relating to the Reserve Bank and Bankers Association
Transport and logistics	Ministries of Transport and Energy, Industry and Commerce, Defence, Home Affairs, Lands, Agriculture and Water development as well as Customs, GMB, National Railways of Zimbabwe – relating to the Commercial Farmers Union (CFU), Indigenous Business Development Centre (IBDC) and the Reserve Bank
Distribution (grain allocation)	Ministries of Lands, Agriculture and Water development; Public Service, Labour and Social Welfare; Local Government, Urban and Rural Development; Home Affairs; Transport and Energy; Health and Child Welfare – relating to IBDC, Confederation of Zimbabwe Industries, Zimbabwe Farmer's Union (ZFU), Zimbabwe National Chamber of Commerce (ZNCC), National Association of NGOs (NANGO)
Drought relief (distribution of foodstuffs)	Ministries of Public Service, Labour and Social welfare; Local Government, Urban and Rural Development; Lands, Agriculture and Water Development; Transport and Energy; Health and Child Welfare – relating to ZFU and NANGO
National action and power (for issues of water sanitation and power)	Ministries of Transport and Energy; Lands, Agriculture and Water Development; Finance relating to Zimbabwe Electrical Supply Authority (ZESA), ZFU, CFU
Public works	Ministries of Finance; Lands, Agriculture and Water Development; Public Service, Labour and Social Welfare; Transport and Energy; Health and Child Welfare; Education and Culture relating to CFU, ZFU, NANGO
Business operations	Ministries of Finance; Lands, Agriculture and Water Development; Transport and Energy relating to CZI, ZNCC, IBDC, ZFU, CFU, Reserve Bank and Banker's association

Adapted from Thompson (1993: 87)

The District Drought Committees were established in every district following the above coordination structure. Lastly, the National Association of Non-Governmental Organisations (NANGO) set up a Drought Relief and Rehabilitation Committee which was to meet monthly (Thompson 1993). The Drought Relief Programme carried out to relieve the impacts of the 1991/92 drought was a major success as it helped to avert a famine for half the population (5 600 000) severely affected by drought (Munro 2006; World Bank 1995). In the 1980s and 1990s, Zimbabwe responded to droughts through a large government-led relief programme. This included massive grain distributions through the Drought Relief Programme, a smaller Child Supplementary Feeding Programme and a post-drought Agricultural Recovery Programme (Munro 2006).

5.2.2 Drought relief in 1982 to 2000

According to Government of Zimbabwe (1995) the primary objectives of the Drought Relief Programme were:

- to prevent hunger, starvation, malnutrition, disease outbreaks and mass starvation through food aid;
- to reduce malnutrition of young children through the Child Supplementary Feeding Programme; and
- to protect the asset base of the rural smallholder households through the Agricultural Recovery Programme.

A lot of criticism has been levelled against the GOZ Drought Relief Programme on the grounds that it was inadequate (Eldridge 2002; Kaseke 1993; Rukuni & Jayne 1995; Thompson 1993).

The drought relief was financed through the Department of Social Welfare but the day to day administration of drought relief was in the hands of the Ministry of Local Government Rural and Urban Development. It consisted of 10kg maize/person/month in the 1980s (Munro 2006). Quantities were reduced over time during the 1990s. Targeting the needy was initially determined through the Ministry of Agriculture's crop production index. This was geographical targeting whereby food was only sent to drought stricken areas between 1982 and 1985 (Poulton et al 2002). However, targeting became more difficult in the 1990s than in the 1980s because of an increased number of vulnerable households (Munro 2006). In 1995 the Zimbabwean government launched three forms of disaster relief: the

Grain Loan Scheme (GLS), which is estimated to have benefited about 5 050 000 Zimbabweans; the Free Food Programme (FFP), which assisted about 733 000 people; and the Child Supplementary Feeding Programme (SFP), which benefited approximately 800 000 children (Munro 2006). The GLS was used as a targeting mechanism. Under the scheme villagers borrowed maize grain from the government with the understanding that they would repay it after a good harvest (Kinsey, Burger & Gunning 1998). Only a quarter of the grain loans were repaid (Munro 2006). The FFP disbursed free rations to those who were unable to repay a grain loan such as the elderly, disabled and invalids. A number of agricultural recovery programmes implemented after the drought years involved the distribution of seed and fertilizer packs and support by both the government and NGOs to replenish herds of cattle belonging to rural households (Poulton et al 2002).

Munro (2006) has made pertinent observations concerning GOZ's Drought Relief Programme in the 1990s. The Programme kept food moving into food deficit areas during drought and post-drought periods thus reducing the likelihood of famine. Food was generally targeted at small-scale farmers in food deficit areas in significant quantities and with high regularity. The programme was slightly pro-poor. Therefore, the worst effects of severe food shortage were averted, for example death from starvation, outbreak of infectious diseases, widespread acute malnutrition and massive migration. However, the SFP was erratic and failed to reach large numbers of its target group, vulnerable children. According to Munro (2006), the objectives of the GOZ Drought Relief Programme were largely achieved during this period.

However, Eldridge (2002) has argued that famine was avoided during the 1991/92 drought mainly by the activities of those most affected by the drought rather than by relief. He adds that villagers' sources of food included remnants of their harvests, wild fruits, the exchange of labour or livestock for grain, as well as the purchase of maize meal or grain. The food that many of the poorest households received from relief food programmes lasted them for about a week on average (Eldridge 2002). Because of the drying up of water points, women spent several hours fetching water from more distant water points. The GOZ programme to improve water sources only achieved 11 per cent of the target of 4086 pumps planned for rural areas and villagers obtained 70-90 per cent of their staple food from non aid sources (Eldridge 2002). These provided two to three times as much as drought relief aid. Thompson (1993) concurs with these findings that drought relief to

households provided 30-40 per cent of daily calorific requirements in 1992. Very little external support was received by the villagers for their livestock (Eldridge 2002). Kinsey Burger and Gunning (1998) present empirical evidence about rural households in resettlement schemes in Mupfurudzi, Sengezi and Mutanda showing their exceptional abilities for coping with droughts during the 1990s. The households did so through grain retention from previous seasons, selling cattle, off-farm jobs, financial asset savings as well as remittances of cash and groceries from relatives in urban areas.

According to FAO/WFP (2002) the food crisis in 2002 followed a season in which rainfall was 70 per cent of normal. The drought was not as severe as the other recent droughts which occurred in 1981/82, 1982/83, 1986/87, 1991/92 and 1994/95 (see Table 3.1). However, the seasonal distribution pattern was such that the early part of the season, from October to December, had above-average rainfall in most parts of the country but an extended drought was experienced from January to March (FAO/WFP 2002). The national cereal harvest fell to 669 000 tonnes[16] during the 2001/02 season (FAO/WFP 2002). The decline in agricultural production has been attributed to other factors besides drought (Glantz & Cullen 2003). These include bad governance, shortage of inputs and the impact of the HIV/AIDS pandemic (Jooma 2005). Food supply and food access conditions were much worse in 2002 than during the 1992/93 drought due to a lack of carry over maize stocks in 2002 compared to 1992. The import capacity of the country was very low and there was little donor interest. The country experienced a severe shortage of foreign currency due to a decline in the exports of cash crops such as tobacco, cotton and minerals such as gold (FAO/WFP 2002). The population's traditional coping mechanisms had been greatly reduced by the HIV/AIDS pandemic, economic decline characterized by hyperinflation and the impact of the recent droughts (FAO/WFP 2002; Jooma 2005; Maunder & Wiggins 2006). Most researchers who have dealt with Zimbabwe's response to drought are not aware of the drought policy formulated in 1998.

5.2.3 The 1998 national policy on drought management

The 1998 national policy on drought management was launched in 1999 in order to develop government planning capacities and provide comprehensive drought preparedness

[16] Zimbabwe needs 1 400 000 tonnes of maize annually to feed a population of about 11 600 000 (FAO 2007).

and mitigation strategies at national, provincial, district, and community levels. Other objectives include the development of more appropriate water use policies so as to promote more efficient and equitable use of water and to promote research and dissemination of improved water-harvesting techniques suitable for communal areas and to build drought contingency plans into the budget (National Economic Planning Commission 1999). Its emphasis was on sustainable livelihoods of populations most at risk to drought-induced shocks. It was developed as a fundamental part of the national development process. The policy was designed to focus on sustainable management of resources, rural industrialization, provision of water and irrigation development, food security and nutrition (National Economic Planning Commission 1999).

According to FAO (2004) the policy strategies were to facilitate sustainable management of natural resources. This would be achieved through encouraging: crop production only in those areas that are climatically and topographically suitable for particular crops; proper mechanical and biological precautions against soil loss; good land use practices through educational awareness campaign; and, research into promotion of drought-tolerant food crops. Good animal husbandry methods in which communities practised correct stocking rates of domestic livestock and the establishment of grazing schemes would be implemented. The policy would support current programmes on reforestation and enforce correct protection and management of water catchment areas. To alleviate the impacts of drought, more dams were to be constructed for irrigation, and sustainable exploitation of underground water would be encouraged. A number of activities would help to reduce land pressure and diversify income sources for the rural communities: rural industrialization; promotion of small-scale enterprises; resettlement; and improved land use practices.

The Provincial Administrator and Head of Environmental Management Agency were not aware of the above policy (Mpofu 2007, pers com; Sibanda 2007, pers com). They make no reference to the policy in the Provincial Disaster Preparedness and Response Plan. The policy was probably suspended after the implementation of the fast track land reform programme. The recent collapse of the economy has resulted in reduced capacity to implement the drought policy due to shortages of skilled labour, fuel and capital.

5.3 SUMMARY

The Civil Protection Act, complemented by sections of other laws, provides a legal framework for the management of disasters in general including those induced by droughts. The Act empowers the Minister of Local Government Public Works and Urban Development to coordinate civil protection activities through the Department of Civil Protection. The Act also creates a Directorate in the same ministry to guide civil protection activities. Among other responsibilities, the Directorate provides guidelines for the development of Planning Committees with a multi-sectoral composition at national, provincial and local level. The committees are responsible for the formulation of disaster response plans to be activated during a disaster. The passing of the Emergency Preparedness and Disaster Management Act will address the shortcomings of the civil protection system, such as the weak institutional structure, crisis management of disasters, inadequate funding and lack of capacity to manage disasters at local level. The government manages droughts through crisis management by providing drought relief to avert famine and starvation. The 1998 national policy on drought management does not appear to have been implemented. In the next chapter the case of Matabeleland South is used to illustrate the implementation of disaster management policy at provincial level.

CHAPTER 6: DISASTER MANAGEMENT IN MATABELELAND SOUTH PROVINCE

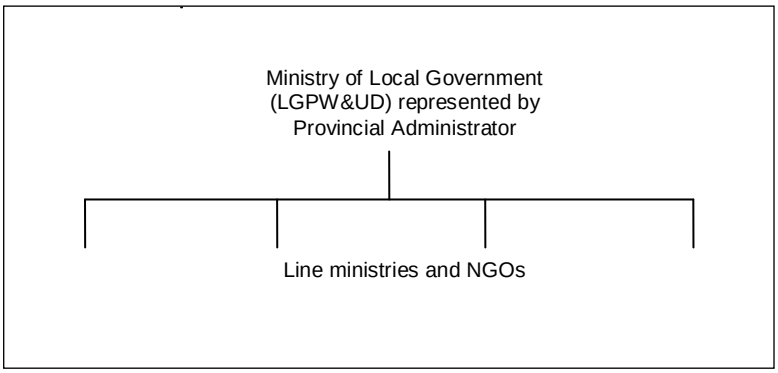
The previous chapter dealt with the legal framework and institutional structures for the management of disasters. This chapter demonstrates how the civil protection system operates at provincial level in Matabeleland South. The province has a clear disaster response framework, as stipulated in the Civil Protection Act, which can be activated during a disaster. As a result of drought and other factors such as shortage of inputs during the 2006/07 agricultural season, a significant number of households experienced severe food insecurity. The government did not respond to the request for food relief forwarded by the Provincial drought committee.

6.1 PROVINCIAL DISASTER PREPAREDNESS AND RESPONSE PLAN

A Provincial Disaster Preparedness and Response Plan (PDPRP) was developed in 2006 by the Matabeleland South Provincial Civil Protection and Planning Committee (PCPPC) with the assistance of World Vision Zimbabwe, a non-governmental organization. The plan complies with the provisions of the principal act – the Civil Protection Act (Chapter 10:06) of 1989. It is a plan of action for the management of both slow onset disasters such as drought and rapid onset disasters, for example floods (Mpofu 2007, pers com; Sibanda 2007, pers com).

6.1.1 Organizational structure and roles

The Provincial Administrator is the representative of the coordinating Minister of Local Government Public Works and Urban Development. The Provincial Civil Protection and Planning Committee is chaired by Provincial Administrator whose responsibility it is to inform the line ministries and NGOs to act on a looming or occurring disaster as shown in Figure 6.1 which illustrates the civil protection structure at provincial level (Mpofu 2007, pers com; Sibanda 2007, pers com).



Source: MLGPW&UD (2006: 27)

Figure 6.1: The provincial civil protection structure

Through the PCPPC and the Provincial Disaster Management Team (PDMT) as well as technical task forces, the Provincial Administrator plans and implements long term risk reduction and preparedness measures. Furthermore, she/he requests and administers drought relief and rehabilitation operations (MLGPW&UD 2006). The functions also include making requests through the responsible minister and the State President for national or international assistance if required and coordinating all disaster-related assistance programmes whether nationally and internationally funded. The PCPPC works through the PDMT which has a core group consisting of humanitarian and relief NGOs, the ZRP, Zimbabwe Defence Forces, health personnel and the MLGPW&UD representative (Mpofu 2007, pers com; Sibanda 2007, pers com). The Provincial Administrator is empowered by the Civil Protection Act (Chapter 10:06) of 1989, to set up committees headed by technocrats depending on the type of disaster. The PDMTs (provincial technical task forces) will be convened and chaired by the provincial heads or technocrats whose activities are closely related to the imminent disaster (Mpofu 2007, pers com; Sibanda 2007, pers com) as shown in Table 6.1. The provincial civil protection structure described above is replicated at district level where the PCPPC is chaired by the District Administrator (Mpofu 2007, pers com; Sibanda 2007, pers com).

To improve coordination of disaster preparedness and response in the province, the PCPPC is not a stand-alone institution reporting to the Civil Protection Directorate in Harare but is a subcommittee of the Provincial Development Council (Mpofu 2007, pers com; Sibanda 2007, pers com). This ensures easier communication, information exchange and development of consensus at provincial level.

Table 6.1: Provincial disaster management teams

TYPE OF DISASTER	TECHNICAL CHAIRPERSON	CORE GROUP
Floods	Joint Operations Command	UN-Habitat office Harare / EMA, humanitarian agencies, army, local government representatives
Drought	AREX	Social welfare, all humanitarian and relief organizations, GMB, country-level representatives of WFP, local government representatives
Road carnage / derailments	ZRP	Ministry of Health, red cross, fire brigade, ministry of transport and local government representatives.
Veld fires	EMA	ZRP, Forestry Commission, local authorities, defence forces.
Epidemics	Ministry of Health	All humanitarian aid organizations, local government organizations, country representatives of WHO
Invasive alien species	EMA	Local authorities, humanitarian organizations with an environment portfolio
Mining accidents	Regional Mining Engineer's Dept	Mining Commissioner, EMA, Joint Operations Command, humanitarian aid organizations, Ministry of Health
Transboundary movement and spillage of hazardous substances	EMA	Joint operations command, local authorities, Ministry of Health, fire brigade, Representative of the Hazardous Substances Department
Environmental pollution/degradation including illegal gold-panning	EMA	Local authorities, ZRP, Mining Commissioner, mining companies and syndicates

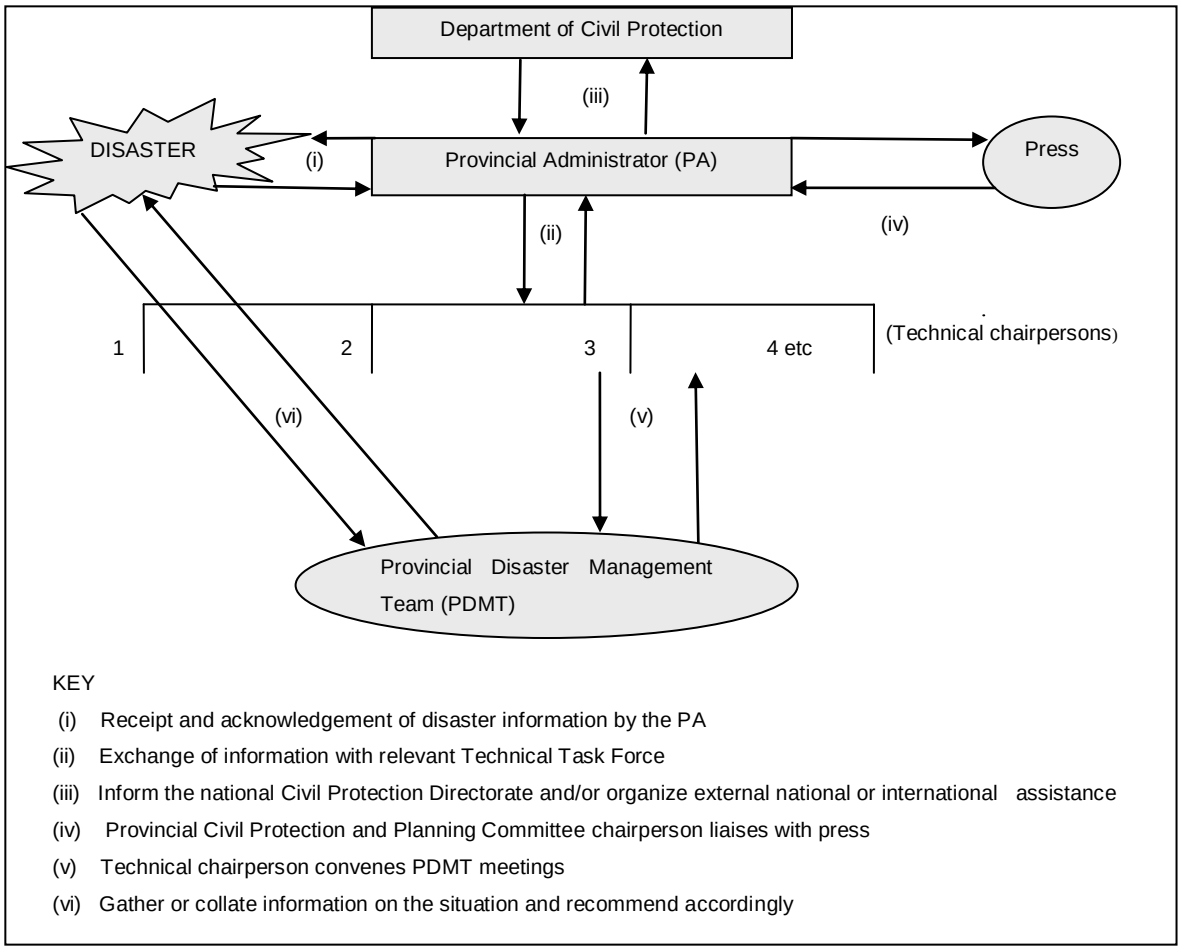
Source: MLGPW&UD (2006: 28)

The provincial disaster management chairpersons (see table 6.1) will be responsible for convening, chairing, planning and implementing of long-term risk reduction and preparedness measures in addition to launching emergency preparedness measures for rapid onset disasters. The next section describes how the province responds to both rapid onset and slow onset disasters. It shows the role of the different institutions at this level.

6.1.2 Provincial response to disasters: Rapid onset disasters

When the Provincial Administrator or representative receives a warning of a looming disaster threat, she/he will act as illustrated in Figure 6.2. She/he contacts and exchanges information with the Technical Task Force chairperson or (PDMT) chairperson and then

convenes a (PDMT) meeting to confirm readiness and assistance if needed. A provincial command centre is established with reliable telecommunications between the disaster site and the command centre (MLGPW&UD 2006).



Source: MLGPW&UD (2006: 30)

Figure 6.2: The call procedures during a disaster

There are other activities carried out by the Provincial Administrator. These include gathering and collating information on the situation and participating in initial reconnaissance visits to the disaster site; mobilizing the provision of professional external assistance for the assessment of the situation if there is need; and giving sudden-onset warnings. Information concerning imminent disaster threats is disseminated to government officials, institutions and the population at large in areas at immediate risk, manually or through the print and electronic media. It is necessary to undertake sudden-onset evacuation from areas where risk of injury or death could be high. This involves relocating the population from zones at risk of imminent disaster to a safer location, for example

during the occurrence of cyclone-induced floods and industrial accidents (MLGPW&UD 2006).

The Provincial Administrator's role as coordinator during the occurrence of a disaster is quite clear. However, the response framework fails to clarify the interaction between the lower level civil protection structures at ward and district level and the provincial structures.

6.1.3 Slow onset disasters

The preparedness activities for slow-onset disasters such as drought differ from those of sudden-onset disasters, for example floods. The slow-onset disaster requires that planners, government and non-governmental organizations monitor early warning systems for drought (Mpofu 2007, pers com; Sibanda 2007, pers com). The PDMT has to meet regularly and submit reports to the Provincial Development Council through the provincial chairperson of the Civil Protection and Planning Committee. The technical task force is involved in early warning and the preparation of preparedness plans. The activities also include monitoring the situation in communities known to be particularly at risk to the effects of drought, crop failures and changes in economic conditions (MLGPW&UD 2006). The call procedures are the same as those for rapid onset shown in Figure 6.2. On receipt of reports about a drought-related disaster threat, the Provincial Administrator or her/his representative will contact and exchange information with the Provincial Development Council and Provincial Council structures. Interventions by government, NGO organizations as well as other stakeholders, should be streamlined in order to eliminate duplication and reduce gaps in services.

Nationally, the 2006/07 season's agricultural production in the southern and western part of the country including Matabeleland South province was partially affected by drought conditions linked to El Niño. The drop in agricultural production was also attributed to other factors such as poor access to fertilizer and fuel as well as underutilization of land (FEWS NET 2007a). The Provincial Civil Protection and Planning Committee prepared a report appealing to central government to declare a state of disaster in the province on the basis of severe agricultural and hydrological drought (Mpofu 2007, pers com; Sibanda 2007, pers com).

6.2 MATABELELAND SOUTH 2007 DROUGHT REPORT

A drought impact assessment by the provincial drought committee revealed that drought in the seven districts was so severe that there was a 95 per cent crop failure. River-beds dried up to the extent that water could not be extracted from the sand. On average dams were 56 per cent full but some extreme situations existed such as the Umzingwane dam which was only 1 per cent full (MLGPW&UD 2007). Of the 2732 boreholes, 2277 (83.3 per cent) were functional. The number of functional wells was 1475 (68.5 per cent) out of 2154 (MLGPW&UD 2007). Grazing was expected to be exhausted by May 2007. According to Table 6.2 the actual production was five per cent of a total requirement of 115 565 tonnes, resulting in a 95 per cent food deficit. The total population to be fed was just under one million people as ascertained from community baseline surveys by the province. To feed the total population in the province 8561 tonnes of maize were required each month (MLGPW&UD 2007).

Table 6.2: Agricultural yield forecast per district in Matabeleland South (2006/07)

DISTRICT	POPULATION	YIELD/ha	EXPECTED YIELD	AREA PLANTED	FOOD REQUIREMENT (TONNES/YEAR)	DEFICIT
Beitbridge	104 000	0.10	411.00	4 110	19 200	18 789
Bulalima	133 000	0.15	1 042.95	6 953	15 960	14 917
Esigodini	79 000	0.20	1 296.20	6 481	19 849	18 553
Gwanda	160 000	0.14	1 095.95	7 824	19 200	18 105
Insiza	124 000	0.30	368.40	1 228	12 700	12 332
Mangwe	88 000	0.15	1 042.95	6 953	12 816	11 773
Matopo	116 600	0.20	323.60	7618	15 840	15 516
TOTALS	804 600	-	5580.05	41 167	115 565	109 985

Source: Adapted from MLGPW&UD (2007: 2)

The provincial drought relief committee made several recommendations to the government. It requested the government to treat the province as a priority area in terms of food relief. A suggestion was made to the GMB to set up satellite selling points closer to villages and scale up grain delivery to meet demand (MLGPW&UD 2007; Mpofu 2007, pers com; Sibanda 2007, pers com;). At least five 30 tonne trucks were to be made available per district from the Ministry of Transport for hire by the GMB for transporting of grain. There was a request that central government continue to provide free food to vulnerable groups such as the elderly, chronically ill, orphans and the disabled.

Furthermore, it was recommended that the Ministry of Education, Sports and Culture should expand the Child Supplementary Feeding Programme of school-going children to cover all schools. The District Development Fund (DDF) and ZINWA were urged to repair all broken down boreholes in all districts. Last, a request was made to the Department of Veterinary Services and Livestock Development to establish at least one feeding lot per communal area in order to save livestock from the impact of drought (MLGPW&UD 2007; Mpofu 2007, pers com; Sibanda 2007, pers com).

A drought disaster was declared in March 2007 by the President (*Chronicle* 2007; IRIN 2007) and this obligated the government to provide relief services to people in need by either using its own resources or even appealing to international relief agencies (Chigodora 1997; FAO/WFP 2002). The declaration of drought as a disaster enables the country to mobilize a substantial relief programme for both humans and livestock (Chigodora 1997).

In the next section the drought impact on food production in Sontala ward as well as the coping strategies used to alleviate the shortage of food are assessed. The information gathered is used to assess the adequacy and effectiveness of central government's response to the plight of rural communities.

6.3 THE IMPACT OF THE 2006/07 DROUGHT IN SONTALA WARD

According to Dube (2007, pers com) the drought situation was not as severe in Sontala ward as in other wards in Matobo district. The assessment by the Chief's Aide differed from the findings of the provincial drought task force outlined above. The former's assessment was one of a generally fair harvest in the ward and that the animals were in a good condition. The water-supply situation was good. Torrential rains at the end of the 2006/07 season saved some of the crops and filled the local dams (Dube 2007, pers com). Local dams consist of Sontala dam (which supplies Sontala and Makwati villages), Magololo village dams, Mbembeswana dam (which supplies Silonkwe village) and Tshatshani dam (supplying Mloyi village).

However, because of the erratic rains at the beginning of the 2006/07 season, the majority of the respondents (75 per cent) planted one to two and half hectares of their fields (see

Table 4.5). A few respondents (17 per cent) prepared all their fields (three to four hectares) for planting and one respondent earned a living wholly from non-farm activities. It appears as if the size of land prepared was related to the number of draught animals owned by a household. Households owning draught animals had more inputs for crop production. Studies have shown that households with draught power generally have a better harvest than those without (Bird et al 2002; Bird & Shepherd 2003; Collinson 1982; Shumba 1984). Preparation and planting of the land can take place in good time and draught animals provide manure to enhance soil fertility. One respondent stood out in that despite owning the largest number of draught animals, only one hectare, was cultivated (see Table 4.7 and Appendix B). This is an elderly person who is no longer fit enough to do arduous farming activities. If rainfall is adequate, the households with draught power can prepare all the land for planting whereas those without draught power have to hire oxen or donkeys from others only when they become available. The amount of land prepared by households without draught power is limited by the availability of finance.

The harvest obtained by the respondents was generally poor. Table 4.6 shows that one third of the respondents had a secure food supply until the next harvest. Another third would experience a severe shortage of food before the next harvest. One quarter had no stock of food owing to absolute failure of the harvest and one respondent earned a living wholly from non farm activities. Surpluses of maize are produced in only one year out of every four in the drier parts of Zimbabwe (Bratton 1987; Mombeshora & Wolmer 2000). The FAO/WFP (2002) mission also noted that in a normal year crop production contributes 15-20 per cent of annual food needs for poor households in places like Beitbridge, whereas better-off households get 60-70 per cent of their annual food needs from crops. A number of factors contributed to a poor harvest experienced by most respondents; the poor distribution of the rainfall during the season and lack of inputs such as seed, fertilizer and draught power.

Besides arable land, animals are an important asset to rural communities in Zimbabwe. Goats and chickens are the most common livestock (Figure 4.1) in Sontala village. Almost every respondent (92 per cent) owned goats and chickens (Appendix B). A significant proportion (58 per cent) of the respondents own cattle and half the respondents (50 per cent) owned donkeys. A survey carried out in rural areas in Matabeleland South showed that only 51 per cent of the population owned cattle (Mpofu 2007, pers com; Sibanda

2007, pers com). Goats provide meat and milk for food and cash income from sales of some of the products. According to Kindness, Sikosana, Mlambo & Morton (1999) each household owned 14 goats on average in Mbembeswana ward adjacent to Sontala ward. The survey also established that goats were ranked second in importance to cattle in Matobo district for the following reasons: they can be used more quickly to solve financial problems; they are drought resistant and can survive much better in harsh environments; they are the main source of meat and milk during the dry season; and they breed quickly (Kindness et al 1999).

Chickens are a source of food and cash income. Sheep are not common as evidenced by one respondent owning sheep. Cattle are reared for beef and milk for food as well as draught power. They also provide a source of income from sales. The donkeys are drought-tolerant animals which provide draught power for ploughing and drawing the carts. Donkey meat and milk are not consumed by the villagers. The respondent who earns income solely from non-farm activities did not possess any livestock. Households in Sontala ward can cope with drought impacts through consumption and sale of livestock products. They are likely to be affected by low prices for their animals due to large numbers being sold within a short space of time during a drought situation. This is likely to result in a reduced income. Kinsey, Burger & Gunning (1998) established that the most important way in which households in resettlement schemes in eastern Zimbabwe cope with the drought risks is through the sale of cattle.

The majority of respondents had two meals a day consisting of lunch, supper and no breakfast. These findings are corroborated by Bratton (1987) who observed that the majority of Zimbabwe's rural population survives on two daily meals. When their food supplies become depleted some of the respondents are likely to further reduce the number of meals to one per day and this could have detrimental effects on their health. The next section deals with the measures used by households to cope with food shortages.

6.4 COPING WITH FOOD SHORTAGES DURING THE 2006/07 DROUGHT

Some households coped with food shortages during drought using their own resources and with assistance from working members of the family. This is illustrated by cases 1 to 5 discussed in Chapter 4. However, a significant number of the most vulnerable members of

the community (see cases 6 to 12) often needed assistance from the government and NGOs to deal with food shortages.

6.4.1 Measures taken at household level

The twelve case studies outlined in Chapter 4 revealed that households headed by elderly respondents, illustrated by cases 1 and 9, produced inadequate food to sustain their families until the following season. The male respondent had adequate draught power in the form of cattle and donkeys but he could not produce enough food. He had to rely on his own assets, especially cattle, in order to obtain cash to buy food. The respondent also received irregular donations of cash and groceries from working adult children. However, the female respondent relied on two donkeys for draught power. She had to be supported by her adult children who are newly resettled farmers. According to the government's drought relief policy, the elderly should receive free cash under the Cash-for-Work programme or free food under the Food-for-Work programme (Dube 2007, pers com). This programme, however, excludes individuals such as the elderly male who owns a large herd of cattle. Furthermore, the elderly female respondent looks after orphans who are supposed to get financial assistance from the government. At the time the survey was done, elderly members of the community and orphans were not receiving any assistance from the government (Dube 2007, pers com).

Case 12 illustrates households headed by younger members of the community. They have not yet accumulated enough assets such as domestic animals or land for cultivation. They are likely to experience chronic food insecurity unless they seek alternative non-farm employment. This group is usually excluded from programmes designed by the government or non-governmental organizations to benefit vulnerable members of the community such as the elderly, children, orphans, disabled and invalids. Case 12 survives through casual work, making bricks for sale, and producing vegetables for sale. His labour is available for hire by other members of the community who need it. Case 7, a disabled respondent, relies on his own assets as well as off-farm employment such as doing bicycle repairs to obtain cash for food because the crops failed. He also buys and sells vegetables. Although he was supposed to benefit from government assistance, he was not getting any assistance during the time of the research.

Cases 2, 3, 4, and 5 have adequate draught power. As a result they obtained a fair harvest to ensure a secure food supply. Cases 3 and 4 have building skills which they use to earn additional income. Case 5 practises several survival measures such as brewing beer for sale and gardening to produce vegetables. She also receives regular donations of groceries and cash from her adult children who work in South Africa and Britain. Cases 1 and 5 get government pensions which are now worthless due to the high level of inflation. Inflation stood at 5000 per cent in May 2007 (*Daily Dispatch* 2007; Duncan 2007; *Pretoria News* 2007).

On the other hand, cases 6 to 11 had little or no harvest. Their poor harvest can be attributed partly to the shortage of draught power for land preparation and partly to late planting, drought and poor soils. Case 6 and 10 pooled their labour and draught power to make a span of donkeys for ploughing their fields. Their poor harvests are partly attributable to the infertile sandy granitic soils they have tilled for too long without fertilizer. Case 6 obtains additional income from cutting and selling thatching grass, harvesting mopane worms for sale, vegetable gardening for selling as well as producing bricks for sale. She also occasionally gets donations of groceries and cash from her adult children who work in South Africa. Case 8 raises money to sustain the family through building brick houses for members of the community in Sontala ward. Case 10 produces and sells vegetables during the dry season to raise money to buy more food. Case 11, a low paid factory worker, joined a fund-raising club in the city *(chimbadzo)* to obtain additional income to supplement his wages. Vegetable gardening for own use and sale appears to be a popular activity among the respondents. It is carried out during the dry season along the Mbembeswana river valley using water from Sontala dam to water the plants.

Some villagers provide labour to other wealthier villagers who can afford to pay them (Dube 2007, pers com). Scoones (1992) and FAO/WFP (2002) also noted that households in the southern part of the country have a variety of mechanisms for coping with drought which include receiving remittances and cross-border work and trade in South Africa and Botswana (FAO/WFP 2002). Other important activities include gold-panning, craft sales and brewing beer. According to Thompson (1993) traditional means of coping include regular urban-rural intra-household income transfers. The movement of cash and purchased food from urban to rural areas was the most important drought relief

mechanism in 1992/93 (Thompson 1993). The role of the government is examined in the following sections.

6.4.2 The role of government

The current government policy on the distribution of food aid during drought is that no able-bodied individual will be given free food (Mpofu 2007, pers com; Sibanda 2007, pers com). Able-bodied members of the community must engage in Food-for-Work or the Cash-for-Work programmes. Free food is given to the most vulnerable members of the community such as the elderly, the disabled, children and adults who are too sick to work.

At the time the survey was done, some heads of households in Sontala village were involved in the Cash-for-Work programme which had resumed in May 2007 (Dube 2007, pers com). The remuneration was Z$8 000 after 20 working days. The villagers forwarded a request to the government that the remuneration should be raised because it had been eroded by inflation. They complained about the low remuneration which was not even enough to purchase a loaf of bread at Z$30 000 (12 cents US currency at black market rates) at that time. Male and female adults younger than 60 can register for the Cash-for-Work programme. Persons who are 60 years and older, the disabled and invalids who are too ill to work, can register for free cash (Dube 2007, pers com). Local leaders identify projects for the Cash-for-Work programme and work done since the resumption of the programme in 2007 involved cleaning the Chief's office premises and repairing the fence. Other projects done in the past at village level involved road repairs and fencing of the local school premises (Dube 2007, pers com).

None of the heads of households who were interviewed mentioned the Cash-for-Work programme as a possible source of income to purchase food. They were probably discouraged by the erratic payments and the inflation-eroded remuneration. Those who had registered had not been paid for two months since they started participating in May 2007 (Dube 2007, pers com). A countrywide survey carried out by FAO/WFP (2002) established that the majority of households enrolled in the Cash-for-Work programme at that time had received payments only once, or very irregularly and that the last payments were made several months ago. The cash obtained would have relieved food shortages through purchases by poor families (FAO/WFP 2002).

The Cash-for-Work or Public Works Programme was introduced in 1983/84 to "instill self reliance in able bodied people who required drought aid" (Poulton et al 2002: 65). Unlike the Food-for-Work programme, the Cash-for-Work programme was established to achieve development objectives (Webb 1995). The rural population is expected to participate in labour intensive activities in projects with high priority in national and regional development plans. Construction materials and equipment are provided and people are paid wages. Criteria for participation are similar to those for receiving free food: (1) no regular income, (2) no food stocks, and (3) no more than 10 head of cattle per household. Webb (1995) noted that the Cash-for-Work programme was highly effective in targeting poverty; it eased potential food shortages after depletion of household food reserves and represented one third of the total household income in Zimbabwe.

During the 1981/82 drought there were free food handouts to vulnerable households. In 1989 the Food-for-Work Programme replaced large-scale distributions of free food. A bottom-up approach to project identification was applied in which the projects were initiated by the villagers subject to approval and supervision by government technicians. The projects that were carried out involved brick molding, small building construction, dam construction and maintenance of feeder roads. Initially the remuneration was 10 kilograms of maize per capita per month supplemented with beans and dried meat or fish (Webb 1995).

The Food-for-Work or the Public Works Programme can involve environmental management at community level. Able-bodied community members who require assistance for food and cash can engage in programmes such as gully filling and reforestation (UNISDR 2004). According to a Zimbabwe National Report submitted to the SADC regional workshop held in Harare, there have been problems with the Food-for-Work programmes in the past (Chigodora 1997). The unreliable distribution of food reduced the level of participation in the progamme. People were unwilling to work because receipts of food were not always certain (Gandure 2005; Thompson 1993). Projects lacked material inputs and technical supervision and some people regarded it as a waste of time and labour. Furthermore, some dams were so badly constructed that they were washed away by the first rains (Chigodora 1997; Thompson 1993). The high failure rate of some of the projects was also attributed to the low level of commitment by the people (Thompson 1993).

6.4.3 Government response to the 2006/07 drought relief appeal

The villagers were not receiving any government food aid during the time of the research in June 2007. Central government had not yet responded to the recommendations made by the provincial drought task force. According to the villagers, one truck from the GMB depot in Maphisa near Antelope (see Figure 3.4) had brought maize grain to villagers for sale. The maize grain was too expensive at Z$185 000 for a 50kg bag, up from Z$18 000 in 2006. According to anecdotal sources in July 2007, the GMB depot in Maphisa and the silos in Bulawayo had run out of maize grain. The government has often been criticized for failing to maintain adequate strategic grain reserves and responding slowly to warnings of food shortages by the national early warning system (Rukuni & Eicher 1994). In April 1993 the country's food stocks consisted of 340 000 tonnes of grain – one and half months food supply (SADC-FSTAU 1993). Strategic grain reserves can sustain the population for four months or more before imported food supplies arrive (Rukuni & Eicher 1994; Thompson 1993). It is part of government policy to assist rural communities to recover from the impacts of severe droughts.

Although some households had a secure food supply, other households whose food supply would run out in a few months or those who had no harvest (cases 6-12), deserved to obtain food aid from the government (Dube 2007, pers com). The households experiencing food insecurity were likely to engage in distress sales of assets such as equipment and livestock to pay for current consumption or to buy seeds and fertilizers for the 2007/08 season (Munro 2006). Since 2000 the distribution of drought relief food has been politicized, with regions such as the urban areas, Matabeleland and Midland provinces which are MDC opposition strongholds, being supplied with less food than the eastern and the northern parts of the country where the ruling ZANU-PF party, has its support base (Bird & Busse 2007; Solidarity Peace Trust 2006;). The food assessment mission sent by FAO/WFP (2002) observed that maize grain was available for sale at twice the GMB price in the northern part of the country. In the southern and south western parts of the country, maize was not seen in the market and the small quantities reported to be available were being sold for up to four times the GMB price (FAO/WFP 2002).

Some drought recovery programmes were organized at provincial level so as to enhance the livelihood of the population (Mpofu 2007, pers com; Sibanda 2007, pers com). One of

these involved the distribution of small livestock, mainly chickens and goats, to improve the population's nutrition status. Another one is the "give a dam campaign" initiated by ORAP (Nyoni 1993). Its weakness has been that the irrigation component was missing (Mpofu 2007, pers com; Sibanda 2007, pers com). This would be incorporated in the new dam projects to alleviate poverty and to improve food security in the province. In addition, a business mindset would be introduced in the dam projects (Mpofu 2007, pers com; Sibanda 2007, pers com). An example is the Silikwe dam in Gwanda district where 20 small-scale farmers worked in partnership with Agribusiness, a company that processes vegetables. The partnership would operate for five years during which the company would assist them with skills transfer, marketing and transport. Other examples of dams with irrigation schemes include Zhove, Umtshabezi, Tuli-Makwe, Valley and Silalatshani irrigation projects which were being supervised by soldiers under Operation Taguta/Sisuthi to increase production (Mpofu 2007, pers com; Sibanda 2007, pers com).

Some of the households in Sontala ward received seed and fertilizer packs at the beginning of the 2006/07 planting season under a programme called Operation Taguta/Sisuthi. Not all households got the inputs. It is not clear what targeting mechanism was used because some households headed by the poor elderly and women did not benefit (Dube 2007, pers com). As part of the National Drought Recovery programme after the 1991/92 drought, the government only managed to provide free ploughing of 20 000 hectares nationally for households without draught power through the District Development Fund due to a shortage of funds (Thompson 1993). Free seed and fertilizer packs were distributed to 800 000 communal farmers. These were enough for one hectare of cultivated land. They were distributed through AREX and the District Councils (Thompson 1993).

Operation Taguta/Sisuthi, started in 2005, is a command agriculture model which involves participation of the army in the production of food crops and distribution of grain through the GMB (Bird & Busse 2007; Solidarity Peace Trust 2006). *Taguta* is a Shona word meaning we are full and *Sisuthi* in Sindebele has the same meaning. This implies an abundance of food or a bumper harvest resulting from the implementation of the programme. "The government's Command Agriculture Model intended to place 1 500 000 hectares under maize production in the 2005/6 season and to produce 2 250 000 tonnes of maize. It furthermore intended to produce 90 000 tonnes of tobacco, 49 500 tonnes of maize seed, 210 000 tonnes of cotton, and 750 000 tonnes of horticultural crops."

(Solidarity Peace Trust 2006: 8). According to Bird & Busse (2007) and Solidarity Peace Trust (2006), the model has been a failure due to corruption, shortage of inputs and lack of agricultural skills on the part of the army personnel. Where the army has taken over supervision of irrigation schemes run by small-scale farmers, this has had negative impacts. These include the destruction of lucrative and nutritious crops planted by small-scale farmers in order to make way to maize cultivation. The army has forced small-scale farmers to sell grain to the GMB leaving them with inadequate food. Operation Taguta/Sisuthi threatens the efforts made by the province to improve food security.

NGOs assist the government by helping communities to cope with drought. The next section deals with their contributions to drought relief efforts in the province.

6.4.4 The role of non-governmental organizations

NGOs complement government efforts in providing drought relief and alleviating water shortage problems in the worst affected areas. These are often the more remote and inaccessible areas (Thompson 1993). At the time of the fieldwork in June 2007, World Vision Zimbabwe was involved in the Child Supplementary Feeding Programme in the local primary school. Another project involved 32 women in Sontala ward who were being assisted by the NGO to run a community nutrition garden project using water from Sontala dam. Other villagers got donations of vegetable seeds and were encouraged to run their own gardening projects in order to produce additional food and income (Dube 2007, pers com**)**. During the 2001/02 drought World Vision Zimbabwe provided food aid which involved the distribution of food rations to households in the province (Gandure 2005). It engaged in universal targeting in which all villagers were being given food rations (Gandure 2005).

The Child Supplementary Feeding Programme was taking place at Sontala Primary School in Sontala village. It catered for both school-going and non-school going children between 5 and 13 years old. The meals consisted of barley cereal, beans and cooking oil and were provided at 13:15 pm in winter and at 13:00 pm in summer. Each child obtained 150 grams cereals, 50 grams pulses and 10 grams cooking oil per day (Bango 2007, pers com; Ndebele 2007, pers com). The food was prepared by local women hired by World Vision Zimbabwe. Each cook was paid with food rations which consisted of 60kg cereals,

10kg pulses and 4 litres of vegetable oil after 20 days (Bango 2007, pers com; Ndebele 2007, pers com). In the past the mothers of the children took turns to cook meals supplied by the government and to feed the children at village feeding points and at school (Thompson 1993). The feeding programme run by World Vision Zimbabwe was taking place at primary schools in the whole of Matopo district (Bango 2007, pers com; Ndebele 2007, pers com).

The school feeding scheme had a positive impact on school attendance by the pupils (Bango 2007, pers com; Ndebele 2007, pers com). Gandure (2005) established that the school feeding scheme in Bulalima district during the 2002 drought in Zimbabwe had "a positive impact in addressing the immediate food needs of the pupils and was a relief to both parents and teachers." The Child Supplementary Feeding Programme run by central government was phased out in 1986 nationally and local authorities were given the responsibility to feed children younger than five years (Thompson 1993). Central government has reinstated the Child Supplementary Feeding Programme on a crisis basis during the droughts of 1991/92, 1994/95 and 2002/03 (Chigodora 1997; Poulton et al 2002; Thompson 1993).

There was no supplementary feeding scheme to cater for non school-going children younger than five years in Sontala ward (Dube 2007, pers com). This gap in the child feeding programme is likely to result in severe malnutrition of non-school going children under five years old. There was no contribution to the school feeding programme by the government despite an appeal made by the Matabeleland South Provincial Drought Task Force to the Minister of Education, Sports and Culture to expand the Child Supplementary Feeding Programme to cover all schools (Bango 2007, pers com; Ndebele 2007, pers com). Gandure (2005) noted a general decline in government support to communities in the recent droughts. However, during the 1991/92 drought the government played a greater role than NGOs in the supplementary feeding of children between the ages of 0-8 years at feeding points in the villages and at primary schools nationally (Thompson 1993).

6.5 SUMMARY

There is a Provincial Disaster Preparedness and Response Plan (PDPRP) in Matabeleland South as stipulated in the Civil Protection Act (Chapter 10:06) of 1989. The response plan

is activated when there is a looming disaster. The Provincial Administrator in her/his capacity as the representative of Minister of Local Government Public Works and Urban Development coordinates civil protection activities with the assistance of the Provincial Civil Protection and Planning Committee and the Provincial Disaster Management Teams. Response to drought currently takes place through the civil protection system for responding to disasters in general. Most households in Sontala ward experienced a severe shortage of food. They were assisted by World Vision Zimbabwe through the school Child Supplementary Feeding Programme. Central government had not responded to the appeal for food aid made by the provincial drought task force at the time this research was done. Command Agriculture is likely to have a negative effect on the drought recovery effort of Matabeleland South province. The next chapter concludes the report.

CHAPTER 7: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The previous chapter showed how the disaster management policy is implemented in Matabeleland South province. This chapter starts with a summary of the thesis followed by the conclusions and recommendations. The conclusion section begins with a recap of the objectives and then evaluates the current status of disaster management, coping with drought in Sontala ward and the government's response to drought-related disasters. The last section deals with recommendations that are pertinent to policy and future research.

7.1 SUMMARY

The climate of southern Africa is characterized by recurrent droughts and a high degree of spatial variation. Climate change resulting from global warming could increase the frequency and severity of droughts but the climate change predictions still have a high level of uncertainty. Droughts are believed to result from disturbances in the global atmospheric circulation linked to variations in ENSO events. The occurrence of tropical cyclones off the eastern coast of southern Africa is likely to trigger droughts inland due to the development of upper level anticyclonic conditions which inhibit convection. Drought impacts can be categorized into economic, social and environmental. Primary impacts, such as reduced crop yields and shortage of power, occur when water is a major input in the production process. Secondary impacts arise when sectors are not influenced by drought themselves, but by the influence of drought on other sectors. Economic impacts include a drop in agricultural production and increased unemployment. Food shortages, famine and reduced quality of life are some of the social impacts that may be experienced. Severe environmental impacts may be manifested in the loss of species diversity.

This study sought to determine the nature of Zimbabwe's drought policy and to evaluate its impact on rural communities in Sontala ward in Matabeleland South province. A qualitative research design was used. This involved the semi-structured interviews and case study method. Drought is a slow-onset disaster which differs from rapid onset disasters in that its impacts are non-structural and more widespread and this causes the quantification of the impacts of drought to be problematic. Although there are many

definitions of drought, the concept has been defined from four perspectives: meteorological, agricultural, hydrological and socio-economic. Conceptual definitions of drought do not give information on its inception, duration, severity and cessation. Drought indices provide operational definitions to complement conceptual definitions. They shed light on when a drought started, how long it lasted, its severity and when it ended. Drought indices such as the Palmer Drought Severity Index, the Crop Mixture Index and the Surface Water Supply Index are region specific. The Standardized Precipitation Index, deciles and per cent normal are more widely applicable because they can be calculated more easily.

A number of concepts are important in disaster management such as mitigation, protection, human vulnerability and adaptation. The vulnerability of a population is one of the main factors determining the severity of the impact of a drought hazard. It refers to the state of susceptibility to harm from exposure to a drought hazard combined with the absence of capacity to adapt. The vulnerability to environmental shocks such as drought has increased in recent years in southern Africa due to high levels of poverty and the HIV/AIDS pandemic.

The disaster management cycle is a useful theoretical basis for a proactive drought policy because it contains two essential components; risk management and crisis management. Risk management activities mitigate the impacts while crisis management deals with response to drought when it occurs. South Africa is the only country in southern Africa which has made progress in formulating drought policy. It has drafted a Drought Management Plan which will be implemented using the institutional structure set up by the Disaster Management Act of 2002. The plan emphasizes risk management and conservation of natural resources by farmers. Australia moved from crisis management to proactive management of drought through the introduction of the 1992 National Drought Policy. The main goals of the new policy were to introduce the element of risk reduction in the management of drought, increase the self-reliance of the farmers and protect natural resources through improved conservation measures. The occurrence of severe El Niño related droughts, however, has been a great challenge to the implementation of the new drought policy. In the United States of America, the states have made more progress in developing drought contingency plans than the federal government. Although a drought

policy aimed at increasing risk management now exists, response to drought at federal level is still largely reactive.

Zimbabwe, a semi-arid country, experiences frequent droughts whose occurrence seems to have increased since 1960. Matabeleland South, the study area, is one of the driest provinces in the country where bumper harvests are obtained once in every four years. Data was collected at the provincial offices in Gwanda and at Sontala village in Sontala ward. During the colonial era land alienation from Africans created communal lands on marginal areas that were ecologically fragile. The land reform programme was implemented after independence in 1980 in order to relieve pressure on the overpopulated communal lands. After 1999 the chaotic fast track land reform programme is believed to have resulted in the collapse of the economy, but the government blames it on sanctions.

Zimbabwe uses a framework stipulated by the Civil Protection Act (Chapter 10:06) of 1989 to respond to disasters. The coordination function is carried out by the Department of Civil Protection run by the Civil Protection Directorate in the Ministry of Local Government, Public Works and Urban Development. The Act requires that Disaster Response Plans should be drawn up at national, provincial, district and ward level. In the 1980s and 1990s, Zimbabwe responded to droughts through a large government-led relief programme. A temporary institutional structure in the form of a Drought Task Force was set up during the most severe droughts to coordinate national drought relief activities.

Most sampled households in the in Sontala village, prepared much less land for planting due to erratic rains and the shortage of inputs such as draught power. This resulted in a poor harvest for most of the households. The Cash-for-Work programme had resumed operation but the participants had not been paid for two months since the resumption of the programme. There was no government food aid for deserving cases such as the children, the elderly, disabled people and invalids. The supervision of irrigation schemes had been taken over by the military under the command agriculture model set up in 2005. Some observers argue that this programme is depriving the communal households of their livelihoods because they have been forced to replace lucrative cash crops with maize. The households benefited from World Vision Zimbabwe through assistance in income-generating projects and the Child Supplementary Feeding Programme for primary school children.

7.2 CONCLUSIONS

The objectives of the study were to: explore the different meanings of the concept of drought; explain the relevant concepts and frameworks of the hazard assessment and management discipline; describe the current status of disaster management in general and drought in particular in Zimbabwe; identify the mechanisms used by small-scale farmers to cope with drought in Sontala ward during the 2006/07 season; and evaluate the adequacy and effectiveness of Zimbabwe's drought policy in reducing the vulnerability of the rural communities to drought impacts in Sontala ward. The objectives were largely achieved.

The main limitation of the research, however, is the use of a small sample of households to determine the mechanisms employed in coping with drought. The findings should therefore be treated cautiously. However, an attempt was made to select individual household heads who were as demographically diverse as possible. In the analysis, each of the 12 heads of households was presented as a case study to illustrate how villagers in similar circumstances cope with food shortages in Sontala ward. The information obtained from the interviews was verified with the Chief's Aide and the Village Development Committee chairperson. Literature sources were also used extensively to corroborate the findings.

7.2.1 The current status of disaster management

The civil protection system is run using a framework provided by the Civil Protection Act (Chapter 10:06) of 1989. The weakness of the Act has necessitated use of other legislation to complement it. The Minister of Local Government Public Works and Urban Development has a coordinating role carried out by the Civil Protection Department. Response to disasters is highly centralized. Funding is provided to the civil protection directorate and it is inadequate at provincial and district level. The current system uses government, private sector and NGOs whose regular activities contain elements of disaster risk prevention and community development.

Matabeleland South province responds to disasters using the Provincial Disaster Preparedness and Response Plan (PDPRP). The plan is suitable for rapid onset disasters and not slow onset disasters such as drought. There is no drought contingency plan to provide guidelines for responding to droughts. In the PDPRP, the role of the district civil protection structure in response to disasters is not clarified.

7.2.2 Coping with drought in Sontala ward

Most of the respondents prepared and planted a much smaller portion of the arable land than they would normally have done. This can be explained by the erratic rains at the beginning of the season, lack of draught power and a shortage of other inputs such as seed and fertilizer, and labour in the case of elderly households. The majority of respondents were experiencing food insecurity due to a poor harvest. The number of meals did not reflect the food shortages that some households were experiencing. The number (2-3 meals per day) was normal according to Bratton (1987).

The respondents mainly own small livestock such as goats and chickens. One young male respondent had no assets in the form of animals and land. He earned a living wholly from non-farm activities. People like this respondent are at risk of being affected by famine. Respondents engaged in a number of coping mechanisms to deal with food insecurity. The three most popular ones are gardening and sale of vegetables, followed by remittances of groceries and building projects. Other less common sources of income include moulding bricks for sale, selling cattle and receiving pensions. There are a number of other less significant sources of income such as cutting thatching grass for sale, harvesting and selling mopane worms, bicycle repairing, selling goats and chickens, brewing beer for sale, running money clubs to raise additional funds and casual work. In trying to cope with food insecurity the community is adversely affected by the hyperinflationary economic environment which has greatly eroded the purchasing power of the local currency.

World Vision Zimbabwe operated a supplementary feeding programme for children in primary schools in the province. It universally targeted all school going children and non school going children between the ages of 5 and 13 years. World Vision Zimbabwe also assisted the community with other projects such as the establishment of vegetable gardens so as to improve community nutrition and provide a source of income.

7.2.3 Government's response to disasters and drought: An evaluation

Central government's response to the impact of drought in the ward was inadequate. There was a gap in the Child Supplementary Feeding Programme for children between the ages of 0 and 4 years which the government could not fill. This could result in increased malnutrition among the children. Despite the appeal for drought relief to central government by the provincial drought task force, the distribution of grain was poor. The Cash-for-Work programme was underfunded and the remuneration had been severely eroded by inflation. It is likely that the communities would rely on their own coping mechanisms with very little assistance from central government. At the beginning of the 2006/07 planting season some members of the community had been assisted with inputs of seed and fertilizer packs under Operation Taguta/Sisuthi. It is not clear what targeting mechanism was used because deserving heads of households such as the elderly and female-headed households were excluded. Command agriculture implemented through the army could have negative consequences such as destroying the livelihoods of small-scale farmers who earn their living from irrigation farming in the province. Operation Taguta/Sisuthi has interfered with the production of lucrative crops from which the farmers earned a living. This programme could also have negative consequences on efforts made by the province to adapt to drought and become self reliant in food production.

To respond to disasters in general and drought in particular, the government of Zimbabwe largely responds through crisis management. This corresponds with the lower part of the disaster management cycle (mitigation – preparedness – response – recovery) in which the main activities are impact assessment, response, recovery and reconstruction. During recent droughts government has been assisted by the international community and non-governmental organizations to respond to major drought-related disasters. This has been done through the provision of massive drought relief to vulnerable communities (Munro 2006). However, due to the current economic problems faced by the country, the findings in Sontala ward show that the government response to drought impacts in rural communities is inadequate as observed earlier by Gandure (2005).

Since the publication of the UNSO (1999) findings, there have been minor positive changes in the country's response to droughts and other disasters. First, a drought policy was formulated in 1998 which, unfortunately, was not implemented. Second, there is an

institutional structure in the form of the civil protection system to respond to disasters. This is also used to respond to drought-related disasters. Third, the civil protection system is currently being reviewed so as to replace the existing legislation with the Emergency Preparedness and Disaster Management Act. This will introduce the concepts of risk management and disaster mitigation in disaster management. Hopefully, crisis management of drought will be replaced by proactive drought policies implemented using the institutional structures set up by the new Act. An outline of the recommendations is provided in the next section.

7.3 RECOMMENDATIONS

7.3.1 Implications of findings on policy

The research findings have a number of implications on policy. First a national drought policy is required. It should incorporate drought management plans at national, provincial and district level that are distinct from disaster response plans. The drought management plans will provide guidelines on drought mitigation strategies to reduce drought impacts and on measures to respond to drought-related disasters. The new drought policy should be based on the main components of a disaster management cycle (mitigation – preparedness – response – recovery). Drought plans will help to improve preparedness and response efforts by enhancing monitoring and early warning, risk and impact assessment, mitigation and response. There is a need to revisit the 1998 drought policy and use it to formulate a new policy. An evaluation of government responses to past droughts should be done so as to learn from successes and avoid mistakes in the future. Second, drought impact assessment methods should be improved. These should be more efficient so as to produce more detailed information on the areas where food deficits are found. This will assist the government and non-governmental organizations with geographical targeting of food aid.

Third, food security for rural communities should be addressed at household level through support provided to the small-scale farmer in the form of inputs such as draught power, seed, fertilizer, credit, and extension services. Rural communities should also be encouraged and assisted with technology to store grain at household level. Self sufficiency in food can even be extended to provincial level in Matabeleland South through support in

operating irrigation schemes and improved animal husbandry. Fourth, the capacities of local government structures to adequately respond to disasters in general and drought-related disasters in particular should be improved. They should be provided with material resources to do so in the form of finance and a provincial supply of grain that is locally stored. Training should also be provided in order to enhance the capacity of the officials. Central government can play a supervisory role and get involved during extreme disasters.

Fifth, drought recovery programmes should be taken seriously. They help to enhance the population's livelihood and improve the its resilience to future droughts. Households should be helped as much as possible to reduce losses of animals during droughts through communal grazing schemes and animal restocking exercises after the drought because loss of draught power has a negative impact on crop cultivation. Sixth, the Cash-for-Work programme should be replaced with the Food-for-Work programme in a hyperinflationary environment during a drought such as the situation in 2006/07 in Matabeleland South Province. Seventh, government should expedite the enactment of the new disaster management legislation to improve disaster management and to provide the institutional structure to implement a national drought policy. Last, the meteorological services department should work closely with the agricultural extension department to assist small-scale farmers to use weather forecasts to plan the type of crops suited to the weather and to be advised to plant at the right time depending on the weather conditions.

Intensive research can assist the government with the development of the theoretical framework required for developing a national drought policy. The next section covers recommendations for future research.

7.3.2 Recommendations for future research

There is need for more research in a number of areas. First, more work is required on drought management strategies that have been used in the past in subsistence agriculture, commercial agriculture and urban water management, including an analysis of the 1998 drought policy, to provide an input of ideas for the development of a national drought policy. Second, researchers should produce drought indices that are applicable to local conditions. This is likely to improve drought monitoring through the development of early warning systems. Response programmes to drought induced disasters can then be

activated quickly. Third, scholars should produce improved and more efficient vulnerability assessment methods to help government and NGOs to streamline targeting of food aid during droughts because universal targeting of food aid is very expensive. Fourth, there is a need to investigate and document the coping mechanisms of rural households to enable development programmes to focus on enhancing the population's ability to cope with shocks such as drought and other disasters. Fifth, there should be continued research on crop and animal varieties that can withstand hotter temperatures and drought so as to introduce them in the drier parts of the country such as Matabeleland South province. Such focused efforts will surely go along way in improving food security at household level in southern African countries experiencing recurrent droughts.

REFERENCES

ADB (Asian Development Bank) 1991. *Disaster mitigation in Asia and the Pacific*. Manila: ADB.

Adger WN 2006. Vulnerability. *Global Environmental Change* 16, 3: 268-281.

Africa Research Bulletin 2006. Zimbabwe Government in crisis [online]. *Economic, Financial and Technical Series* 43, 9: 17112A–17112C. Available from http://www.blackwell-synergy.com/doi/pdf/10.1111/j.1467-6346.2006.00504.x [Accessed on 18 October 2007].

Ainslie A 1999. When 'community' is not enough: Managing common property natural resources in rural South Africa. *Development Southern Africa* 16, 3: 375- 402.

Alexander D 1997. The study of natural disasters, 1977-1997: Some reflections on a changing field of knowledge. *Disasters* 21, 4: 284-304.

Alley WM 1984. The Palmer Drought Severity Index: Limitations and assumptions. *Journal of Climate and Applied Meteorology* 23: 1100-1109.

Alwang J, Siegel PB & Jorgensen SL 2001. *Vulnerability: A view from different disciplines.* Discussion Paper Series No. 0115. Washington D.C.: Social Protection Unit, World Bank.

Arksey H & Knight P 1999. *Interviewing for social scientists: An introductory resource with examples.* London: Sage Publications Ltd.

ARMCANZ (Agriculture and Resource Management Council of Australia and New Zealand) 1999. *Record and resolutions: Fifteenth meeting Adelaide 5 March 1999.* Canberra: Commonwealth of Australia.

Benson C & Clay E 1998. *The impact of drought on sub-Saharan African economies.* World Bank Technical Paper No. 401. Washington D.C.: The World Bank.

Benson C & Clay E 1994. *The impact of the drought on sub-Saharan African economies: A preliminary examination.* London: Overseas Development Institute.

Bird K & Busse S 2007. *Re-thinking aid policy in response to Zimbabwe's protracted crisis: A Discussion Paper* [online]. London: Overseas Development Institute. Available from http://www.odi.org.uk/pppg/poverty_and_inequality/Events/2007_Zim_Roundtable/ZimDiscussionPaper.pdf [Accessed on 28 August 2007].

Bird K & Shepherd A 2003. *Chronic poverty in semi-arid Zimbabwe.* CPRC Working Paper No 18 [online]. Chronic Poverty Research Centre, Overseas Development

Institute. Available from http://www.chronicpoverty.org/pdfs/18Bird_Shepherd.pdf [Accessed on 18 August 2007].

Bird K, Shepherd A, Scott A & Butaumocho B 2002. *Coping strategies of poor households in semi-arid Zimbabwe* [online]. Natural Resources Systems Programme Report. Available from http://www.odi.org.uk/pppg/publications%5Cpapers_reports%5Cdfid%5Ccountries%5Czim01_vol2.pdf [Accessed on 27 May 2007].

Blaikie P, Cannon T, Davis I & Wisner B 1994. *At risk: Natural hazards, people's vulnerability and disasters*. London: Routledge.

Bratton M 1987. Drought, food and the social organization of small farmers in Zimbabwe. In Glantz MH (ed) *Drought and hunger in Africa: Denying famine a future*, 213-243. Cambridge: Cambridge University Press.

Bratton M 1994. Land distribution, 1980-1990. In Rukuni M & Eicher C (eds) *Zimbabwe's agricultural revolution*, 70-86. Harare: University of Zimbabwe Publications**.**

Bruwer JJ 1990. Drought policy in the Republic of South Africa. In *Proceedings of the SARCCUS Workshop on Drought, June 1989*. Pretoria, South Africa: Southern African Commission for Conservation and Utilization of the Soil *(*SARCCUS).

Byun HR & Wilhite DA 1999. Objective quantification of drought severity and duration. *Journal of Climate* 12: 2747-2756.

Cane MA, Eshel G & Buckland RW 1994. Forecasting Zimbabwean maize yield using eastern equatorial Pacific sea surface temperature. *Nature* 370: 204-205.

Cardona OD 2004. The need for rethinking the concepts of vulnerability and risk from a holistic perspective: A necessary review and criticism for effective risk management. In Bankoff G, Frerks G & Hilhorst D (eds) *Mapping vulnerability*: *disasters, development, and people*, 37-51. London: Earthscan.

Chigodora J 1997. Famine and drought: The question of food security in Zimbabwe. *Drought Network News* 9, 1: 3-7.

Chigumira E 2006. An appraisal of the impact of the Fast Track Land Reform Programme on land use practices, livelihoods and the natural environment at three study areas in Kadoma District, Zimbabwe. MSc thesis. Grahamstown, South Africa: Rhodes University.

Chipindu B 2002. Possible causes of drought in southern Africa. In the *Report of the sixth Southern Africa Regional Climate Outlook Forum*, 23-24 [online]. Harare: SADC Drought Monitoring Centre. Available from

http://www.dmc.co.zw/SeasonalForecasts/SARCOF6FinalEdition.pdf [accessed on 31 May 2007].

Chronicle 2007. 2007 declared a drought year. 20 March.

Clatsworthy JN 1987. Feed resources of small-scale livestock producers in Zimbabwe [online]. In Kategile JA, Said AN & Dzowela BH (eds) *Animal feed resources for small-scale livestock producers*. Ottawa, Canada: International Development Research Centre. Available from http://www.ilri.org/InfoServ/Webpub/Fulldocs/X5548e/x5548e04.htm [Accessed on 10 August 2007].

Clemens M & Moss T 2005. *Costs and causes of Zimbabwe's crisis*. CGD Notes [online]. Washington D.C.: Centre for Global Development. Available from http://www.cgdev.org/content/publications/detail/2918/ [Accessed on 12 September 2007].

Clover J 2003. Food security in sub-Saharan Africa. *African Security Review* 12, 1: 5-15.

Collinson M 1982. Demonstrations of an interdisciplinary to planning adaptive agricultural research projects: Chibi District, southern Zimbabwe. Report No 5. Nairobi, Kenya: International Maize and Wheat Empowerment Centre.

Commonwealth of Australia 1992. *National drought policy: Managing for risk and productivity*. Canberra: Australian Government Publishing Service.

Commonwealth of Australia 1995. *Managing for the future: Report of the land management task force*. Canberra: Australian Government Publishing Service.

Cutter SL, Boruff BJ & Shirley WL 2003. Social vulnerability to environmental hazards. *Social Science Quarterly* 84, 2; 242-261.

Dagel KC 1997. Defining drought in marginal areas: The role of perception. *Professional Geographer* 49, 2: 192-202.

Daily Dispatch 2007. It's time to turn or burn. 2 August: 9.

Department of Agricultural Development 1992. *Assistance to agriculture: Schemes for implementation*. Pretoria: Directorate of Agricultural Information.

Devereux S & Tapscott C 1995. Coping mechanisms of communal farmers in Namibia in response to drought. In Moorsom R, Franz J & Mupotola M (eds) *Coping with aridity: Drought impacts and preparedness in Namibia: Experiences from 1992/93*, 125-146. Windhoek: Namibian Economic Policy Research Unit (NEPRU).

Dilley M 2000. Reducing vulnerability to climate variability in southern Africa: The growing role of climate information. *Climatic Change* 45, 1: 63-73.

Dilley M & Heyman BN 1995. ENSO and disaster: Droughts, floods and El Niño/Southern Oscillation warm events. *Disasters* 19, 3: 181-193.

Duncan F 2007. Zim government makes old mistakes. *Citizen* 10 July: 18.

Du Pisani AL 1990. Drought detection, monitoring and early warning. In *Proceedings of the SARCCUS Workshop on Drought*, 6-11. Pretoria: Southern African Regional Commission for the Conservation and Utilization of the Soil *(*SARCCUS).

Du Pisani LG, Van Themaat RV & Roux F 1995. Drought Monitoring and Information Centre established for arid zone of South Africa. *Drought Network News* 7: 32-33.

Dye PJ & Walker BH 1980. Vegetation-environment relations on sodic soils of Zimbabwe-Rhodesia. *The Journal of Ecology* 68, 2: 589-606.

Edwards DC & McKee TB 1997. *Characteristics of 20th century drought in the United States at multiple time scales.* Climatology Report Number 97-2. Fort Collins, Colorado: Colorado State University.

Eldridge C 2002. Why was there no famine following the 1992 southern African drought? *IDS Bulletin* 33, 4: 79-87.

Emani S 1998. *GIS applications in hazard assessment and management: A Review.* Worcester, USA: Clark University, Clark Labs for Cartographic Technology and Geographic Analysis.

FAO 2004. *Drought impact mitigation and prevention in the Limpopo River Basin: A situation analysis* [online]. Prepared by FAO Subregional Office for southern and east Africa. Harare: Food and Agriculture Organization of the United Nations. Available from http://www.altavista.com/web/results?itag=ody&q=lada.virtualcentre.org%2Feims%2Fdownload.asp%3Fpub_id%3D92846%26app%3D0&kgs=0&kls=1 [Accessed on 7 September 2007].

FAO 2007. *FAO in Zimbabwe* [online]. Harare: FAO Emergency Unit. Available from http://www.fao.org/reliefoperations/pdf/Zimbabwe_factsheet.pdf [Accessed on 22 September 2007].

FAO 1983. *Guidelines: Land evaluation for rainfed agriculture.* Rome: FAO Soils Bulletin 52.

FAO/WFP 2002. Special Report on Crop and Food Supply Assessment Mission to Zimbabwe. Rome: Food and Agriculture Organization of the United Nations and World Food Programme.

Fara K 2001. How natural are 'natural disasters'? Vulnerability to drought in southern Namibia communal areas. *Risk Management* 3: 47-63.

Fauchereau N, Trzaska S, Rouault M & Richard Y 2003. Rainfall variability and changes in southern Africa during the 20th century in the global warming context. *Natural Hazards* 29**:** 139-154.

FEWS NET (Famine Early Warning Systems Network) 2007a. Zimbabwe food security update [online]. Available from http://www.sahims.net/doclibrary/Sahims_Documents/220807_FEWS_Zimbabwe_Food_security.pdf [Accessed on 22 September 2007].

FEWS NET (Famine Early Warning Systems Network) 2007b. Southern Africa food security updates [online]. Available from http://www.sahims.net/doclibrary/Sahims_Documents/180907_FEWS_Food_security.pdf [Accessed on 22 September 2007].

Freebairn JW 1983. Drought assistance policy. *The Australian Journal of Agricultural Economics* 27, 3: 185-199.

Frere M & Popov GF 1979. *Agrometeorological crop monitoring and forecasting: Plant production and protection.* FAO Paper 17. Rome: FAO.

Friedman DG 1957. *The prediction of long-continuing drought in south and southwest Texas*. Occasional Papers in Meteorology, No. 1. Hartford, Connecticut: The Travelers Weather Research Centre.

Gandure S 2005. Coping with and adapting to drought in Zimbabwe. PhD dissertation. Johannesburg: University of the Witwatersrand, Faculty of Science.

Garanganga BJ 2003. Efforts made in preparedness and management of perennial climate-related disasters in southern Africa. Contribution for UN International Strategy for Disaster Reduction Conference Bonn, German, 16-18 October 2003 [online]. Harare: SADC Drought Monitoring Centre. Available from http://www.ewc2.org/upload/downloads/Garanganga2003AbstractEWC2.DOC [Accessed on 26 April 2007].

Giambelluca TW, Nullet D & Nullet MA 1988. Agricultural drought on south-central Pacific Islands. *Professional Geographer* 40, 4: 404-415.

Gibbs WJ 1975. Drought – its definition, delineation and effects. In Special Environmental Report No 5 *Drought lectures presented at the twenty-sixth session of the WMO Executive Committee,* 1-39. Geneva: World Meteorological Organization.

Gibbs WJ & Maher JV 1967. *Rainfall deciles as drought indicators.* Melbourne, Commonwealth of Australia: Bureau of Meteorology Bulletin No. 48.

Glantz MH 1994. Drought, desertification and food production. In Glantz MH (ed) *Drought follows the plow: Cultivating marginal areas*, 9-30. Cambridge: Cambridge University Press.

Glantz MH 2001. *Currents of change: Impacts of El Niño and La Niña on climate and society*. 2nd ed. Cambridge: Cambridge University Press.

Glantz MH, Betsill M & Crandall K 1997. *Food security in southern Africa: Assessing the use and value of ENSO information.* Boulder, CO: National Centre for Atmospheric Research.

Glantz MH & Cullen H 2003. Zimbabwe's food crisis. *Environment* 45, 1: 9-11.

Gono G 2007. How sanctions are ruining Zimbabwe [online]. *African Banker, The New Quarterly on Finance in Africa*. Available from http://www.africasia.com/africanbanker/afbnk.php?ID=1329 [Accessed on 18 October 2007].

Government of Zimbabwe (GOZ) 1989. *Civil Protection Act* (Chapter 10:06). Harare: Government Printers.

Government of Zimbabwe (GOZ) 1995. *Zimbabwe's agricultural policy framework*: *1995-2020*. Harare: Government Printers.

Halpert MS & Ropelewski CF 1992. Surface temperature patterns associated with the Southern Oscillation. *Journal Climate* 5: 577-593.

Hay I (ed) 2000. *Qualitative research methods in human geography*. Oxford: Oxford University Press.

Hayes MJ 2006. *What is drought? Drought indices* [online]. Lincoln: University of Nebraska, National Drought Monitoring Centre. Available on http://drought.unl.edu/whatis/indices.htm [Accessed on 1 May 2007].

Hazelton DG, Pearson I & Kariuki AW 1994. *Development of drought response policy options for the cost-effective provision of water supply to rural communities subject to recurring droughts*. Pretoria: Water Research Commission Development Services and Technology Programme, Division of Water Technology, C.S.I.R.

Heim Jr RR 2002. A review of twentieth-century drought indices used in the United States. *American Meteorological Society* 83, 8: 1149-1166.

Higgins V 2001. Calculating climate: 'Advanced liberalism' and the governing of risk in Australian drought policy. *Journal of Sociology* 37, 3: 299-318.

Holloway A 2003. Disaster risk reduction in southern Africa. *African Security Review* 12, 1: 31-38.

Hulme M 1996. Climatic change within the period of meteorological records. In Adams WM, Goudie AS & Orme AR (eds) *The physical geography of Africa***,** 88-102. Oxford: Oxford University Press.

Hulme M, Arntzen J, Downing T, Leemans R, Malcolm J, Reynard N, Ringrose S & Rogers D 1996. *Climate change and southern Africa: An exploration of some potential impacts and implications in the SADC Region* [online]. Norwich, UK: Climatic Research Unit/WWF. Available on http://www.cru.uea.ac.uk/~mikeh/research/cc_safr.htm [Accessed on 4 April 2007].

Hulme M & Kelly M 1993. Exploring the links between desertification and climate change. *Environment* 35, 6: 4-11.

Human Rights Watch 2002. Fast track land reform in Zimbabwe. Vol. 14, No. 1 (A) [online]. New York. Available from http://www.hrw.org/reports/2002/zimbabwe/ZimLand0302.pdf [Accessed on 15 August 2007].

Industries Assistance Commission 1983. *Rural Adjustment (Interim Report)*. Canberra: Australian Government Publishing Service.

Intergovernmental Panel on Climate Change 2001. In McCarthy J, Canziani O, Leary N, Dokken D & White K (eds) *Climate change 2001: Impacts, adaptation, and vulnerability.* Cambridge: Cambridge University Press.

IRIN 2007. Zimbabwe: Govt declares drought, but says no to food aid [online]. Available from http://www.sahims.net/doclibrary/Sahims_Documents/290307_IRIN_Zimbabwe_Govt_declares_drought_no_food_aid.mht [Accessed on 13 May 2007].

Jackson I 2001. *Drought hazard assessment and mapping for Nevis* [online]. St John's, Antigua: Ivor Jackson & Associates. Available from http://www.oas.org/cdmp/PGDM/hazmap/drought/nvdrttec.pdf [Accessed on 1 March 2007].

Jackson SP & Tyson PD 1971. *Aspects of weather and climate over southern Africa*. Occasional Paper 6. Johannesburg: University of the Witwatersrand, Department of Geography and Environmental Studies.

Jooma MB 2005. Southern Africa assessment food security and HIV/AIDS. *African Security Review* 14, 1: 59-66.

Jury MR & Majodina M 1997. Preliminary climatology of southern Africa extreme weather: 1973-1992. *Theoretical and Applied Climatology* 56: 103-112.

Kamanou G & Morduch J 2004. Measuring vulnerability to poverty. In Dercon S (ed) *Insurance against poverty*. Oxford: Oxford University Press.

Kaseke E 1993. *Rural social security needs: The case of Zimbabwe*. Harare: School of Social Work.

Kasperson RE, Kates RW & Hohenemser C 1985. Hazard management. In Kates RW, Hohenemser C & Kasperson JX (eds) *Perilous progress: Managing the hazards of technology*, 43-66. Boulder, CO: Westview Press.

Kassas M 1999. Rescuing drylands: A project for the world. *Futures* 31: 949–958.

Kindness H, Sikosana J, Mlambo V & Morton J 1999. *Socio-economic surveys of goat keeping in Matobo and Bubi Districts*. Bulawayo: Natural Resources Institute and Matobo Research Institute.

Kinsey B, Burger K & Gunning JW 1998. Coping with drought in Zimbabwe: Survey evidence on responses of rural households to risk. *World Development* 26, 1: 89-110.

Landsberg HE 1975. Drought, a recurrent element of climate. In Special Environmental Report No 5 *Drought lectures presented at the twenty-sixth session of the WMO Executive Committee,* 41-90. Geneva: World Meteorological Organization.

Laughlin G & Clark A 2000. Drought science and drought policy in Australia: A risk management perspective. Paper presented at the Expert Group Meeting on Early Warning Systems for Drought Preparedness and Drought Management [online]. Lisbon, Portugal: Bureau of Rural Sciences, Department of Agriculture, Fisheries and Forestry-Australia. Available from http://www.drought.unl.edu/monitor/EWS/ch3_Laughlin.pdf [Accessed on 2 August 2007].

Lebert T 2003. *An introduction to land and agrarian reform in Zimbabwe* [online]. Available from http://www.foodfirst.org/bookstore/pdf/promisedland/2.pdf [accessed on 15 August 2007].

Lembit M & Kingma O 1995. Commonwealth drought policies. Paper presented at the Coping with Drought. Sydney: The Australian Institute of Agricultural Science Drought Forum.

Madamombe EK 2004. *Zimbabwe: Flood management practices – selected flood prone areas Zambezi basin.* Harare: Zimbabwe National Water Authority, Research and Data Department.

Mano R & Nhemachena C 2006. *Assessment of the economic impacts of climate change on agriculture in Zimbabwe: A Ricardian approach*. CEEPA Discussion Paper No. 11[online]. Pretoria: University of Pretoria, Centre for Environmental Economics and Policy in Africa. Available from http://www.ceepa.co.za/docs/cdp11.pdf [Accessed on 29 April 2007].

Marjanovic P & Nimpuno K 2003. Living with risk: Toward effective disaster management training in Africa. In Kraimer A, Anorld M & Carlin A (eds) *Building safer cities: The future of disaster risk*, 197-209. Washington D.C.: World Bank.

Mason SJ, Waylen PR, Mimmack GM, Rajaratnam B & Harrison JM 1999. Changes in extreme rainfall events in South Africa. *Climatic Change* 41: 249-257.

Matanyaire CM 1995. The combined effects of aridity and drought on agriculture. In Moorsom R, Franz J & Mupotola M (eds) *Coping with aridity: Drought impacts and preparedness in Namibia: Experiences from 1992/93*, 105-123. Windhoek: Namibian Economic Policy Research Unit (NEPRU).

Matarira CH 1990. Drought over Zimbabwe in a regional and global context. *International Journal of Climatology* 10, 6: 609-625.

Maunder N & Wiggins S 2006. *Food security in southern Africa: Changing the trend? Review of lessons learnt on recent responses to chronic and transitory hunger and vulnerability* [online]. Report prepared for OXFAM (Great Britain), World Vision International, CARE, RHVP and OCHA. Available from http://www.sahims.net/doclibrary/Sahims_Documents/280207_OCHA_OXFAM_WVI_CARE_RHVP_Changing%20the%20trend.pdf [Accessed on 24 March 2007].

McKee TB, Doesken NJ & Kleist J 1993. The relationship of drought frequency and duration to time scale. In *Proceedings of the 8th Conference on Applied Climatology*, 179-184. January 17–22, Anaheim, California.

Menzhulin GV, Savvateyev SP, Cracknell AP & Boken VK 2005. Climate change, global warming and agricultural droughts. In Boken VK, Cracknell AP & Heathcote RL (eds) *Monitoring and predicting agricultural drought: A global study*, 429-449. New York: Oxford University Press.

Mileti DS 1999. *Disasters by design: A reassessment of natural hazards in the United States.* Washington D.C.: Joseph Henry Press.

Ministry of Information, Posts, and Telecommunications 1993. *President R.G. Mugabe's drought assessment tours 1992-93.* Harare: The Government Printer.

MLGPW&UD (Ministry of Local Government, Public Works and Urban Development). *Matabeleland South provincial disaster preparedness and response plan* 2006. Gwanda, Zimbabwe: MLGPW&UD.

MLGPW&UD (Ministry of Local Government, Public Works and Urban Development) *Matabeleland South drought report* 2007. Gwanda, Zimbabwe: MLGPW&UD.

Mombeshora S & Wolmer W 2000. Sustainable livelihoods in southern Africa: Institutions, governance and policy processes - Zimbabwe Country Paper, SLSA.

Monnik K 2000. Role of drought early warning systems in South Africa's evolving drought policy. In Wilhite DA, Sivakumar MKV & Wood DA (eds) *Early warning systems for drought preparedness and drought management*. *Proceedings of an expert group meeting in Lisbon, Portugal, 5-7 September.* Geneva: World Meteorological Organization [online]. Available from http://www.drought.unl.edu/monitor/EWS/ch5_Monnik.pdf [Accessed on 30/09/07].

Muir K 1994. Agriculture in Zimbabwe. In Rukuni M & Eicher C *Zimbabwe's agricultural revolution,* 40-55. Harare: University of Zimbabwe Publications.

Munro LT 2006. Zimbabwe's drought relief programme in the 1990s: A re-assessment using nationwide household survey data. *Journal of Contingencies and Crisis Management* 14, 3: 125-141.

Munyati S (ed) 2006. *A census of orphans and vulnerable children in two Zimbabwean Districts.* Prepared by the Biomedical Research and Training Institute (BRTI) and the National Institute of Health Research (NIHR) of the Ministry of Health and Child Welfare. Cape Town: HSRC.

Nagarajan R 2003. *Drought assessment, monitoring, management and resources conservation*. New Delhi: Capital publishing company.

NDMC (National Drought Mitigation Centre) 2006. What is drought? Understanding and defining drought [Online]. Lincoln: University of Nebraska, National Drought Monitoring Centre. Available from http://www.drought.unl.edu/whatis/concept.htm [Accessed on 1 May 2007].

NEPC (National Economic Planning Commission) 1999. *National policy on drought management*. Harare: National Economic Planning Commission, Office of the President and Cabinet.

New M, Hewitson B, Stephenson DB, Tsiga A, Kruger A, Manhique A, Gomez B, Coelho CAS, Masisi DN, Kululanga E, Mbambalala E, Adesina F, Saleh H, Kanyanga J, Adosi J, Bulane FLL, Mdoka ML & Lajoie R 2006. Evidence of trends in daily climate extremes over southern and West Africa [Online]. *Journal of Geophysical Research* 111: D14102. Available from http://www.ouce.ox.ac.uk/~mnew/research/publications/new_et_al_SA_Extremes_2005JD006289.pdf [Accessed on 29 March 2007].

Ngara T & Rukobo A 1999. *Environmental impacts of the 1991/92 drought in Zimbabwe*: *An extreme event*. Harare: Radix Consultants.

Nicholson SE 1989. African drought: Characteristics, causal theories and global teleconnections. In Berger A, Dickinson, RE & Kidson JW (eds) *Understanding climate change,* 79-100. Geophysical Monograph 52. Washington D.C.: American Geographical Union.

Nicholson SE & Entekhabi D 1986. The quasi-periodic behaviour of rainfall variability in Africa and its relationship to the Southern Oscillation. *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser A.*, 34, 311-348.

NRC (National Research Council) 1983. *Risk assessment in the federal government: Managing the process.* Washington D.C.: National Academy Press.

Nyoni S 1993. The impact of the 1992 drought in southern Africa and the measures taken: With special reference to the work of ORAP. Paper presented at a conference of the Royal African Society. Oxford: Royal African Society.

Ogallo L 1987. Impacts of the 1982-83 ENSO event on eastern and southern Africa. In Glantz MH, Katz R & Krenz M (eds) *The societal impacts associated with the 1982-83 worldwide climate anomalies.* Boulder, CO: National Centre for Atmospheric Research.

O'Hare G, Sweeney J & Wilby R 2005. *Weather, climate and climate change: Human perspectives*. New York: Prentice Hall.

Olszewski J & Moorsom R 1995. Rainfall records and the analysis of drought. In Moorsom R, Franz J & Mupotola M (eds) *Coping with aridity: Drought impacts and preparedness in Namibia,* 39-49. Windhoek: Namibian Economic Policy Research Unit (NEPRU).

Palmer WC 1965. *Meteorological drought.* Research Paper No. 45. Washington, D.C.: U.S. Department of Commerce Weather Bureau.

Palmer WC 1968. Keeping track of crop moisture conditions, nationwide: The new crop moisture index. *Weatherwise* 21: 156-161.

Patton MQ 1990. *Qualitative evaluation and research methods*. 2nd ed. Beverly Hills: Sage Publications Inc.

Paul BK 1998. Coping mechanisms practised by drought victims (1994/95) in North Bengal, Bangladesh. *Applied Geography* 18, 4: 355-373.

Pelser AJ 2001. Socio-cultural strategies in mitigating drought impacts and water scarcity in developing nations. *South African Journal of Agricultural Extension* 30: 52-74.

Poulton C, Davies R, Matshe I & Urey I 2002. *A review of Zimbabwe's agricultural economic policies: 1980-2000*. Imperial College Wye ADU Working Paper 02/01 [online]. Wye: Department for International Development of the United Kingdom (ESCOR Project R7989).
Available from http://ageconsearch.umn.edu/bitstream/123456789/25392/1/adwp0201.pdf [Accessed on 29 March 2007].

PTA (Preferential Trade Area for southern and eastern African states) 1994. *A subregional food security strategy and action programme for eastern and southern Africa*. Rome: Food and Agriculture Organization (FAO).

Preston-Whyte RA & Tyson PD 1988. *The atmosphere and weather of southern Africa*. Cape Town: Oxford University Press.

Pretoria News 2007. Tough action needed to save Zimbabwe. 10 July: 3.

Quarantelli EL (ed) 1978. *Disasters: Theory and Research*. Sage: California.

Quarantelli EL 1992. *Some aspects of disaster planning in developing countries.* Prepared for the workshop on Integrated Approach to Disaster Management and Regional Development with People's Participation held in Dhaka, Bangladesh, January 28-February 1, 1990. Reprinted as Article # 247. Delaware: University of Delaware, Disaster Research Centre.

Richard Y, Trzaska S, Roucou P & Rouault M 2000. Modification of the southern African rainfall variability/ENSO relationship since the late 1960s. *Climate Dynamics* 16: 883-895.

Richardson CJ 2007. How much did droughts matter? Linking rainfall and GDP growth in Zimbabwe. *African Affairs* 106: 463-478.

Rook J 1994. The SADC Regional Early Warning System: Experiences, gains and some lessons learnt from the 1991-92 southern African drought. In *Usable science: Food*

security, early warning, and El Niño. Proceedings of the Workshop on ENSO/FEWS, Budapest, Hungary, 25-28 October.

Ropelewski CF & Halpert MS 1989. Precipitation patterns associated with the high phase of the Southern Oscillation. *Journal Climate* 2: 268-284.

Rose N 1993. Government, authority and expertise in Advanced Liberalism. *Economy and Society* 22, 3: 283-299.

Rouault M & Richard Y 2003. Intensity and spatial extension of drought in South Africa at different time scales [Online]. *Water SA* 29, 4: 489-500. Available from http://www.egs.uct.ac.za/~rouault/out1/out/pdf/RouaultRichard2003.pdf [Accessed on 24/03/07].

Rukuni M & Eicher CK (eds) 1994. *Zimbabwe's agricultural revolution*. Harare: University of Zimbabwe Publications.

Rukuni M & Jayne TS 1995. Alleviating hunger in Zimbabwe: Towards a national food security strategy. *Zambezia Supplement*. Harare: University of Zimbabwe.

Rural Adjustment Scheme Advisory Council 1996. *Annual Report 1995-96*. Canberra: Australian Government Publishing Service.

SADC-FSTAU 1993. *Assessment of the response to the 1991/92 drought in the SADC Region*. Harare: Food Security, Technical and Administrative Unit.

SAHIMS (Southern Africa Humanitarian Information Management Network) 2002. GIS Library: Country data sets and geographical information [Online]. Available from http://www.sahims.net/gis/Gis%20Input/GIS_library_Zimbabwe.asp?start=11 (Accessed on 6 March 2007).

Scoones I 1992. Coping with drought: Responses of herders and livestock in contrasting savanna environments in southern Zimbabwe. *Human Ecology* 20, 3: 293-315.

Scoones I, Chibudu C, Chikura S, Jeranyama P, Machaka D, Machanja W, Mavedzenge B, Mombeshora B, Mudhara M, Mudziwo C, Murimbarimba F & Zirereza B 1996. *Hazards and opportunities farming livelihoods in dryland Africa: Lessons from Zimbabwe*. London: Zed Books.

Shafer BA & Dezman LE 1982. Development of a Surface Water Supply Index (SWSI) to assess the severity of drought conditions in snowpack runoff areas. In *Proceedings of the Western Snow Conference*, 164-175. Fort Collins, Colorado: Colorado State University.

Shumba E 1984. Reduced tillage in the communal areas. *Zimbabwe Agricultural Journal* 81, 6: 235-239.

Sibanda D 2005. Plugging loopholes: Craft legislation to encompass disaster risk reduction. *Chronicle* 19 February.

Smakhtin VU & Hughes DA 2004. *Review, automated estimation and analyses of drought indices in South Asia*. Working paper 83. Colombo, Sri Lanka: International Water Management Institute.

Smith K 2004. *Environmental hazards: Assessing risk and reducing disaster*. 4th ed. London: Routledge.

Solidarity Peace Trust 2006. *Operation Taguta/Sisuthi: Command Agriculture in Zimbabwe: its impact on rural communities in Matabeleland* [online]. Available from http://www.sarpn.org.za/documents/d0001952/Command_Agric_Zim_Apr2006.pdf [Accessed on 29 August 2007].

South Africa (Republic of) 1983. The Conservation of Agricultural Resources Act, 1983 (Act no 43 of 1983). *Government Gazette* 214, 8673.

South Africa (Republic of) 1996. *White paper on agriculture*. Pretoria: Directorate of Agricultural Information.

South Africa (Republic of) 1999. White Paper on Disaster Management. *Government Gazette* 403, 19676.

South Africa (Republic of) 2002. *Disaster Management Act, 2002 (Act No. 57 of 2002)*. Pretoria: Department of Provincial Affairs and Constitutional Development.

South Africa (Republic of) 2005. Drought Management Plan (Draft Paper). *Government Gazette* 50, 28169.

South Africa (Republic of) 2007. *Strategic plan for the Department of Agriculture*. Directorate Agricultural Information Services: Pretoria

Stehlik D, Gray I & Lawrence G 1999. *Drought in the 1990s: Australian farm families' experiences*. Canberra: Rural Industries Research and Development Corporation.

Sunday Times 2007. Zim introduces new banknote [online]. 31 Jul. Available from www.thetimes.co.za/News/Article.aspx?id=528616 [Accessed on 19 August 2007].

Swearingen WD 1992. Drought hazard in Morocco. *Geographical Review* 82, 4: 401-412.

Tadonki G 2006. Strengthening SADC national VAC data management capacity using DevInfo [Online]. Johannesburg: SAHIMS. Available from http://www.sahims.net/doclibrary/Sahims_Documents/2006/may/~9058143.pdf [Accessed on 6 March 2007].

Takeuchi K 1974. *Regional water exchange for drought alleviation.* Hydrology Paper 70. Colorado: Colorado State University.

TANGO International 2005. Vulnerability assessment methodology review: Zimbabwe country report. The Southern Africa Development Community: Food, Agriculture and Natural Resources, Regional Vulnerability Assessment Committee (SADC-FANR RVAC) [online]. Available from http://www.sahims.net/doclibrary/Sahims_Documents/081105_VAC_ZIM_ass.pdf [Accessed on 2 March 2007].

The Herald 2007. Zimbabwe: Illegal sanctions to blame for economic challenges – Mutasa [online]. 21 September. Available from http://allafrica.com/stories/200709210109.html [Accessed on 18 October 2007].

Thompson CB 1993. *Drought management strategies in southern Africa/from relief through rehabilitation to vulnerability reduction.* In association with Food Security Unit, Southern African Development Community (SADC). Windhoek: UNICEF, Policy Monitoring Unit.

Torry WI 1979. Hazards, hazes and holes: A critique of the environment as hazard and general reflections on disaster research. *Canadian Geographer* 23, 4: 368-383.

Tyson PD 1987. *Climatic change and variability in southern Africa*. Cape Town: Oxford University Press.

Tyson PD & Preston-Whyte RA 2000. *The weather and climate of southern Africa.* 2nd ed. Oxford: Oxford University Press.

Unganai LS & Bandason T 2005. Monitoring agricultural drought in southern Africa. In Boken VK, Cracknell AP & Heathcote RL (eds) *Monitoring and predicting agricultural drought: A global study,* 266-275. Oxford: Oxford University Press.

Unganai LS & Mason SJ 2002. Long-range predictability of Zimbabwe summer rainfall. *International Journal of Climatology* 22: 1091-1103.

UNDP 2002. *Zimbabwe land reform and resettlement: Assessment and suggested framework for the future. Interim Mission Report* [online]. New York: United Nations Development Programme. Available from http://www.undp.org/rba/pubs/landreform.pdf [Accessed on 20 September 2007].

UNFCCC 2006. Africa makes the lowest contribution to global warming, but could suffer most from its effect [online]. Nairobi: Climate Conference, *Africa Research Bulletin: Economic, Financial and Technical Series* 43, 11: 17171A–17174C.

Available from http://www.blackwell-synergy.com/doi/pdf/10.1111/j.1467-6346.2007.00594.x [Accessed on 26 September 2007].

UNISDR 2004. Disaster risk reduction efforts in Zimbabwe [online]. Available from http://www.unisdr.org/eng/mdgs-drr/national-reports/Zimbabwe-report.pdf [Accessed on 17 August 2007].

UNISDR (Ad Hoc Discussion Group on Drought) 2003. *Living with risk: An integrated approach to reducing societal vulnerability to drought* [online]. Geneva: International Strategy for Disaster Reduction. Available from http://www.unisdr.org/eng/task%20force/tf-adhoc/droughts/WGD-doc1.pdf [Accessed on 1 August 2007].

UNSO 1999. *Drought preparedness and mitigation in Sub-Saharan Africa*. New York: United Nations Office to Combat Desertification and Drought.

USAID-OFDA 1998. *Annual Report.* Washington, D.C.: USAID-OFDA.

Usman MT, Archer E, Johnston P & Tadross M 2005. A Conceptual framework for enhancing the utility of rainfall hazard forecasts for agriculture in marginal environments. *Natural Hazards* 34: 111–129.

Van der Linden E, Dekkers T & Hommes A 1995. The macro-economic effects of drought. In Moorsom R, Franz J & Mupotola M (eds) *Coping with aridity: Drought impacts and preparedness in Namibia: Experiences from 1992/93*, 181-197. Windhoek: Namibian Economic Policy Research Unit (NEPRU).

Van Heerden J 1990. Drought prediction: Some early results in southern Africa. In *Proceedings of the SARCCUS Workshop on Drought, June 1989*. Pretoria, South Africa: Southern African Commission for Conservation and Utilization of the Soil *(*SARCCUS).

Van Heerden J, Terblanche DE & Schulze GC 1988. Southern Oscillation and South African summer rainfall. *Journal of Climatology* 8, 6: 577-797.

Vincent V & Thomas RG 1960. *An agricultural survey of southern Rhodesia: Part I: Agro-ecological survey*. Salisbury: Government Printer.

Vogel CH 1989. A documentary-derived chronology for southern Africa, 1820-1900. *Climate Change* 14: 291-306.

Vogel CH 1994. Consequences of droughts in southern Africa (1960-1992). Unpublished PhD dissertation. Johannesburg: University of the Witwatersrand, Faculty of Science.

Von Blanckenburg P 1994. *Large commercial farmers and land reform in Africa: The case of Zimbabwe*. Aldershot: Ashgate Publishing Company.

Vossen P 1990. Comparative statistical validation of two ten-day water-use models and of three yield-reduction hypotheses for yield assessment in Botswana. *Agricultural and Forest Meteorology* 51:177-195.

Weather Bureau 2001. *Condensed synoptic climatic climatology of South Africa*. Pretoria: Weather Bureau, Department of Environmental Affairs.

Webb P 1995. Employment programs for food security in rural and urban Africa: Experiences in Niger and Zimbabwe. In Von Braun J (ed) *Employment for poverty reduction and food security*, 174-196. Washington, D.C.: International Food Policy Research Institute.

White DH 1998. Australia's National Drought Policy continues to evolve. *Drought Network News* 10, 2: 15-17.

White DH & Bordas VM (eds) 1996. *Indicators of drought exceptional circumstances.* Canberra: Bureau of Rural Sciences.

White DH & O'Meagher B 1995. Coping with exceptional drought in Australia. *Drought Network News* 7, 2: 13-17.

Whitmore JS 2000. *Drought management on farmland.* London: Kluwer Academic Publishers.

Wilhite DA 1997. *Improving drought management in the west: The role of mitigation and preparedness.* Lincoln, Nebraska: University of Nebraska, National Drought Mitigation Centre.

Wilhite DA 1999. Preparing for drought: A methodology. In Wilhite DA (ed) *Drought: A global assessment* 2: 89-84. London: Routledge Publishers.

Wilhite DA 2000. Drought preparedness and response in the context of sub-Saharan Africa. *Journal of Contingencies and Crisis Management* 8, 2: 81-92.

Wilhite DA 2001. Moving beyond crisis management. *Forum for Applied Research and Public Policy* 16, 1: 20-28.

Wilhite DA 2002. Combating drought through preparedness. *Natural Resources Forum* 26: 275-285.

Wilhite DA & Glantz MH 1985. Understanding the drought phenomenon: The role of definitions. *Water International* 10: 111-120.

Wilhite DA & Glantz MH 1987. Understanding the drought phenomenon: The role of definitions. In Wilhite DA, Easterling WE & Wood DA (eds) *Planning for drought: Toward a reduction of societal vulnerability,* 11-27. Boulder, CO: Westview Press.

Wilhite DA, Svoboda MD & Hayes MJ 2005. Monitoring drought in the United States: Status and trends. In Boken VK, Cracknell AP & Heathcote RL (eds) *Monitoring and predicting agricultural drought*: *A global study,* 121-131. New York: Oxford University Press.

Willeke G, Hosking JRM, Wallis JR & Guttman NB 1994. *The national drought atlas*. Institute for Water Resources Report 94-NDS-4. U.S. Army Corps of Engineers.

Wisner B 1993. Disaster vulnerability: Scale, power and daily life. *GeoJournal* 30, 2: 127-140.

World Conference on Natural Disaster Reduction 1994. *Disasters around the world*: A *global and regional view*. Information Paper #4, Yokohama, Japan, 23-27 May.

World Bank 1995. Southern Africa 1995: Drought vulnerability, drought mitigation and long-term development strategies. Washington DC: World Bank, Agriculture and Environment Division, southern Africa Department.

Yevjevich V 1980. State-of-the-art of drought and low-flow control technology, NATO Advanced Study Institute on Droughts, Lisbon, Portugal. In Yevjevich V, Cunha L and Vlachos E (eds) *Coping with droughts*. Michigan: Water Resources Publications, Book Crafters Inc.

Zimbabwe Meteorological Services Department 2008. Rainfall and temperature data for Kezi 1959/60-2006/07.

PERSONAL COMMUNICATION

Bango Q 2007. Head of Sontala Primary School, Sontala ward. Interview on 5 July 2007 about the school Child Supplementary Feeding Programme.

Dube P 2007. Chief's Aide (Acting in place of deceased Chief). Interview on 6 July 2007 about the impact of the 2006/07 drought and government/NGO drought response programme.

Mpofu DA 2007. Provincial Administrator and Chairperson of Provincial Civil Protection and Planning Committee, Matabeleland South province. Interview on 3 July 2007 about the 2006/07 drought in the province, and response to disasters and drought.

Ndebele P 2007. Deputy Head of Sontala Primary School, Sontala ward. Interview on 5 July 2007 about the school Child Supplementary Feeding Programme.

Sibanda C 2007. Provincial Head of Environmental Management Agency and Provincial chairperson of Drought Task Force, Matabeleland South province. Interview on 3 July 2007 about 2006/07 drought in the province, and response to disasters and drought.

APPENDIX A: INTERVIEW GUIDE

1. **PROVINCIAL ADMINISTRATOR (Matabeleland South province): Policy and response to drought**
    (a) How severe was the 2006/07 drought in the province?
    (b) What programmes have you put in place to alleviate the impacts of drought in rural areas in the province?
    (c) Please explain how the following are used to respond to general and drought-related disasters in the province:
        (i) The disaster management policy?
        (ii) The national drought policy?
    (d) What problems have you experienced in trying to respond to the 2006/07 drought in the province?

2. **CHIEF'S AIDE: Status of drought, impact and implementation of policy**
    (a) How severe was the 2006/07 drought in the ward?
    (b) What was the impact of the drought on
        (i) Crop output and domestic animals?
        (ii) Water supply?
        (iii)Food security?
    (c) What programmes have been implemented by government to alleviate food shortages?
    (d) What assistance is provided to the villagers by non-governmental organizations such as World Vision Zimbabwe?

3. **VILLAGERS: Profile, assets and coping with food shortages**
    (a) How old are you?
    (b) What is your marital status?
    (c) How many dependents do you have?
    (d) State the number of different types of domestic animals which you own.
    (e) Do you own land for cultivation? If so how much of the land did you cultivate at the beginning of the 2006/07 season?
    (f) What was the size of harvest for each the different grain crops.

(g) For how many months will the food supply from the harvest last?

(h) How many meals do you eat per day?

(i) What mechanisms will you use to cope with food shortages if the harvest does not last you until the 2007/08 season?

4. Head of Sontala Primary School: Child Supplementary Feeding Programme

(a) Who runs the Child Supplementary Feeding Programme – is it the government or non-governmental organizations?

(b) Which age group is targeted by the programme?

(c) What type of food are the children given? What quantity does each child get per meal and at what time of the day do they have meals?

(d) What role is played by the villagers in the preparation of the food?

(e) Does the feeding scheme have any impact on school attendance?

APPENDIX B: COPING WITH DROUGHT IN SONTALA VILLAGE

Respondent	Gender and marital status	Age	Number of dependents	Occupation	Number of animals owned	Size of cultivated area	Size of harvest of grain crop	Duration of food supply	No of meals a day	Coping mechanisms
1	Female Single	56	1	Retired domestic worker Small-scale farmer	2 donkeys 1 goat	2.5ha	50kg maize 50kg millet	5 months	3	Still eating last year's harvest Engages in gardening to produce vegetables for sale
2	Female Single	60	2	Small-scale farmer	Herd of 2 cattle 2 donkeys 7 goats 8 chickens	2.5ha	50kg maize 90kg millet	4 months	2	Cutting thatching grass for sale Making bricks for sale Harvesting and selling mopane worms Gardening to produce vegetables for sale
3	Female Widow	80	3	Small-scale farmer	3 donkeys 6 goats 6 chickens	1ha	90kg maize	1 month	2	Food assistance from children who are newly resettled farmers
4	Male Married	79	6	Retired from formal employment Small-scale farmer	Herd of 30 cattle 6 donkeys 10 goats 20 chickens	1ha	2 x 90kg maize	2 months	3	Selling cattle to purchase maize grain Irregular donations of groceries from children
5	Male Married	56	3	Disabled Informal employment Small-scale farmer	1 cow 29 goats 7 chickens	1ha	Grain crops failed	Relies on purchases	2	Buys and sells vegetables Repairs bicycles Selling goats and chickens
6	Female Widow	61	3	Small-scale farmer	Herd of 5 cattle 3 goats 2 sheep 3 chickens	2.5ha	5 x 90kg maize 2 x 90kg sorghum 1 x 50kg millet	8 months	2	Late husband's pension Z$3 000 per month Brewing beer for sale Groceries from children Gardening to sell vegetables
7	Male Married	53	3	Factory worker in Bulawayo Wife is a small-scale farmer	10 goats 5 chickens	2ha	Grain crops failed	Relies on purchases	3	Difficulties in coping with a small salary Runs money club to raise additional funds
8	Male Married	40	3	Informal employment Small-scale farmer	Herd of 5 cattle 5 donkeys 7 goats 15 chickens	2ha	2 x 90kg maize 2 x 90kg sorghum 6 x 90kg millet	18 months	3	Self-employed as a builder Wife joined World Vision gardening project
9	Male Married	25	2	Casual work	None	No fields	None	Relies on purchases	2	Gardening to produce vegetables for sale Casual work Making bricks for sale
10	Male Married	53	8	Employed in service sector in Bulawayo Wife is a small-scale farmer	Herd of 15 cattle 3 donkeys 16 goats 25 chickens	3ha	5 x 90kg maize 4 x 90kg millet 4 x 90kg sorghum	7 months	2	Can purchase more food using salary and income from animals
11	Male Married	55	5	Informal employment Small-scale farmer	1 cow 3 goats 15 chickens	1ha	Grain crops failed	Relies on purchases	2	Self-employed as a builder Low demand for builders due to drought
12	Male Married	41	6	Informal employment Small-scale farmer	Herd of 5 cattle 11 goats 20 chickens	4ha	5 x 90kg maize 2 x 90kg sorghum 14 x 9 kg millet	Until next harvest in May – June	3	Income from building to supplement food