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COPING WITH DROUGHT

Research findings from Bulilima and Mangwe Districts, Matabeleland South, Zimbabwe

Sithembisiwe Ndlovu

Local perceptions of drought include shortages of food and inadequate grazing, as well as low and erratic rainfall; yet the diverse drought coping and risk reduction strategies being promoted in the two districts are mainly based on agriculture and natural resources. While livelihood diversification has increased household income and resilience, badly managed strategies can exacerbate drought risks. Socio-economic factors including HIV/AIDS, land degradation and migration have limited opportunities while food aid has increased dependency. The role of institutions is critical for supporting knowledge transfer and the development of sustainable community owned initiatives.

1.0. Introduction

The increasing prevalence of drought in Zimbabwe has had a devastating impact on people's livelihoods, particularly in arid and semi arid parts of the country. This has been exacerbated by the fact that most communities are dependent on rain-fed agriculture.

In order to reduce their vulnerability, communities in Bulilima and Mangwe Districts prepare for and adopt drought mitigating strategies. There is a need to understand the factors that make communities vulnerable to drought and identify current community efforts to mitigate the impacts of drought, so that programs by Practical Action, other Non Governmental Organisations (NGOs) and Government departments can build upon these initiatives to increase their resilience. The research described had the following objectives:

- To profile the history and occurrences of droughts in Bulilima and Mangwe districts.
- To identify and analyse drought coping and risk reduction mechanisms.
- To identify institutions and their roles in drought coping and risk reduction.
- To define policy recommendations for drought risk reduction programming in Bulilima and Mangwe districts.

2.0. The Study site

Bulilima and Mangwe Districts of Matabeleland South Province are in the south-western part of the country, sharing a border with Botswana. The districts are characterised by low and erratic rainfall (<500 mm per annum) and have experienced more frequent and severe droughts compared to other parts of the country (Zimbabwe Meteorological Services, 2005). In Vincent and Thomas' (1960) agricultural survey, 75% of Bulilima district falls under agro-ecological region V whilst Mangwe district falls under agro-ecological region IV and V characterised by low agricultural potential. The temperatures in both areas are high, reaching 40 degrees Celsius during summer months and an average of 13 degrees Celsius during winter.

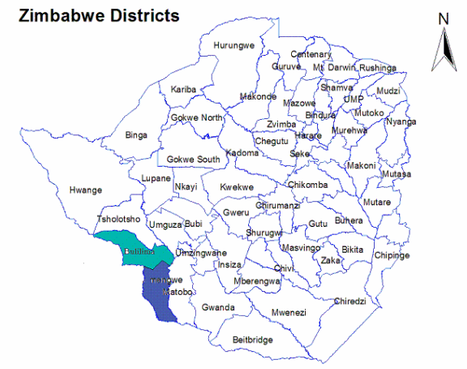

Figure 1. Location of the study wards

3.0. Methodology

The Khanya Sustainable livelihood framework was used to understand the impact of drought on the different assets (Human, Social, Physical, Natural and Financial Capital) communities have and how these assets increase or reduce drought risk and community vulnerability. A total of 80 households were randomly selected and interviewed. A case study approach was used in the research, focusing on coping and drought risk reduction strategies in the study area; four wards in Bulilima District (Natane, Hingwe, Malanswazi and Madlambudzi) and four wards in Mangwe District (Marula, Madabe, Tshitshi and Sanzukwe).Qualitative and quantitative methods were used to collect data from the local community and key informants, using a variety of tools (primary and secondary data collection) for triangulation purposes. The study made use of key informant interviews, household questionnaire interviews, focus group discussions, secondary data (Meteorological records, Agricultural Technical and Extension Services (AGRITEX), Department of Veterinary Services records and district profiles) and direct observations.

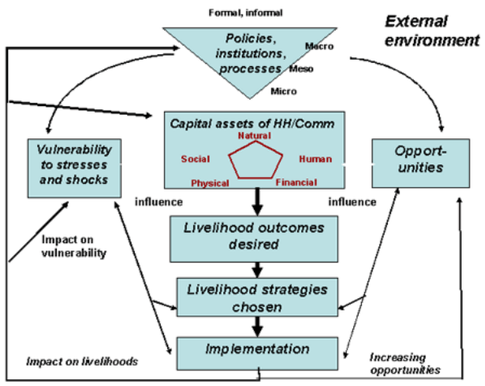

Figure 2: The Khanya Sustainable Livelihoods Framework: Adapted from (http://www.khanya-aicdd.org/site_files/index.asp?pid=53)

4.0. Results and Discussion

4.1. Household characteristics and Asset ownership

Livelihoods are constructed from assets and activities and the differential access to these are based on institutional and social considerations (Dekker, 2004). Individuals, households or communities draw upon different assets, capitals or resources to make a living, strategically choosing different combinations according to their availability and needs. It is thus necessary to identify the assets to which households have access and the role these assets play in reducing vulnerability to drought.

Both male and female headed households were interviewed. Sampled households in both Bulilima and Mangwe Districts had slightly more male headed than female headed households. In Bulilima District, 57.5% of households interviewed were male headed and 42.5% female headed, while in Mangwe District 51.5% were male headed and 48.5% female headed. In both districts, more than 50% of household heads were married with the rest widowed, single or separated/divorced. Household size ranged between 5-10 people.

In Bulilima, 65% of respondents had attained primary education compared with 41% in Mangwe. Fewer respondents had reached secondary education (Bulilima-27.5% and Mangwe – 39%). The rest had never gone to school.

Livestock, mainly cattle; farm implements and water sources were the most important owned assets in the study areas. In Bulilima District over 60% of households owned both cattle and donkeys whilst in Mangwe more than 60% owned cattle and 40% owned donkeys. An average of 35% of the sampled households in both districts did not own any cattle or donkeys and only about 25% did not own implements such as an ox-drawn plough. The major water

Case study

Fodder production in Greenfield Farm - Marula, Ward 11 - Mangwe District

During the wet season rangeland forage is of adequate quality and quantity for livestock to thrive, but grazing declines from April onwards By August/September, livestock need supplementary feeding to sustain growth rates and prevent lossof summer weight gains. Resources for feeding can be from specially grown pastures or multi-purpose trees, or crop by -products. During drought years, when rains are poor, rangeland grasses are scarce and supplementary feed is required In 2000, while living in a communal area and realising that their cattle were dying from the limited grazing available,Reuben (52years) and Mrs Thembelani (45 years) Khumalo of Greenfield Farm in Ward 11 started growing and storing fodder . Despite being resettled in Greenfield Farm, where grazing is plentiful, they have continued to make a variety of fodder for their cattle. Mr Khumalo produces several types of fodder;

1. Hay
Hay is cut during the growing season, dried and stored for use in the dry season. They start cutting and bailing the hyperrhenia species from May each year. As he uses a sickle,and the process is labour intensive, Reuben Khumalo can only cut and bail about fifty to sixty bags per season.

2. Pods from indigenous trees
The pods of indigenous leguminous trees that grow on rangelands are readily eaten by livestock. Reuben Khumalo collects pods from *Pilostigma thonningii* (Ihabahaba) and *Dichrostschys cinerea* (Ugagu) trees for use as. dietary supplements in the dry season and during drought years. He usually manages tocollect 5 x 50kg of *Pilostigma thonningii* and 7 x 50kg bags of *Dichrostachys cinerea* each year The pods can be fed whole to mature cattle, pounded for calves or mixed with other types of fodder like grass and crop residues.

3. Crop residues/by-products
Stover consists of the leaves and stalks of maize and sorghum. The residues of legumes such as soybean, groundnuts and cowpeas are of relatively high protein content. Crop residues are stored in a shed and kept dry so that they do not lose their nutritional value, or develop fungi which may be toxic to animals..

4. Fodder
The family has recently started to grow *Dolichos lablab* as a nutritious fodder crop. When veldt grasses begin to decline in nutritional value, Reuben Khumalo starts to feed his livestock. Normally this is in August, but in a poor year or after a fire he may start as early as April. Pregnant cows and calves are always given preferential feeding to prevent “checks” in their growth.

Before starting supplementary feeding the Khumalo family lost three cattle due to drought. Their remaining five cattle reproduced poorly, often only producing 2 calves in a year. Their few cattle limited their draught power and the small volume of manure limited their crop yields. They could not sell their few cattle to meet other household needs like buying food for the family and paying school fees for their children.

Supplementary feeding has resulted in the Khumalo family now owning 23 cattle, 23 goats and 7 donkeys. Each year they produce 5-8 calves and they usually sell two cattle per year to buy food, school fees and drugs for livestock. . The family has enough draught power and manure and has increased their crop yields. They now harvest an average of 150x50kg bags of maize, twice the yield in the past.

5.2. Recommendations

➢ To support farmers in reducing drought risks, there is a need to rehabilitate both boreholes and dams in order to enhance access to water resources which will encourage diversification of livelihoods. Large dams which harvest water during the rainy season can support irrigation farming. While in the short term, it is expensive to build large dams and the accompanying irrigation schemes, the long term benefits are enormous.. Most of the large dams which are still supporting many households were built during the colonial period. In the long –term cost-benefit analysis would indicate that it is worth investing in large dams. In the medium term, small-scale schemes for water harvesting should take priority. Such small water reservoirs would become an invaluable safety measure for small-scale intensive production units (e.g. family or village gardens) alleviating drought-induced crop failures. In seasons when rain did fall, the same production units could boost yields and income per household.

➢ It is important to increase the capacity of the district drought relief committee so that it is pro-active. Capacity building may be in the form of training and resource mobilisation. Local level disaster risk reduction structures are important ensuring that drought risk reduction initiatives are community driven. There is growing evidence that most top-down disaster risk management and response programs fail to address the specific local needs of vulnerable communities, ignoring the potential of local resources and capacities and may in some cases even increase people's vulnerabilities. It is therefore necessary to put more emphasis on community based disaster risk reduction programs. Vulnerable people themselves must be involved in planning and implementing disaster risk reduction measures in partnership with district, provincial and national structures. This ensures sustainability of drought risk reduction initiatives. There is also a need for increased coordination and networking between institutions (NGOs and government departments) so that there is reduced duplication of activities in the same community.

➢ Development practitioners should support and improve on community initiatives, assisting communities in the marketing of their products. For example, there are a lot of elderly women who make reed mats and clay pots but have problems with marketing these products. If markets can be sought for this vulnerable group of people, their vulnerability can be reduced. Women in Marula ward have been supporting their families by harvesting and selling thatching grass which is abundant in the area. However without a reliable market the grass often deteriorates before it can be sold.

➢ Testing the reliability of locally based early warning systems and building on these may reduce the vulnerability of communities by assisting them to plan and prepare for droughts.

➢ Small grains are more drought resistant than maize which often fails completely in the absence of sufficient rain. Encouraging the cultivation of small grains, should be accompanied by promotional policies that support the growing of these small grains.

➢ In reducing drought risks, it is important to identify and understand which aspects of people's livelihoods are vulnerable to particular hazards as well as the nature of that vulnerability.

➢ Socio-economic factors such as land degradation, climate change/variability, policies and HIV/AIDS need to be mainstreamed in drought risk reduction interventions since they have been found to exacerbate the impacts of drought and negatively impacted on drought risk reduction initiatives.

sources used in Bulilima and Mangwe were dams and rivers with few households having access to boreholes (35% in Mangwe and 22.5% in Bulilima).

4.2. Overview of drought situation in Bulilima and Mangwe Districts

According to meteorological records, Bulilima and Mangwe Districts have been experiencing meteorological droughts every four years, on average (Meteorological Services Department, 2009). Community perspectives were however slightly different, especially after the year 2000. According to individual interviews and focus group discussions, both districts used to experience major droughts on a ten year cycle. Since 2000, droughts of varying severity have been experienced almost every year. The droughts of 1946/47, 1967/68, 1972/73, 1982/83, 1991/92, 2002/03, 2004/05 and 2006/07 are remembered for the severity of their impacts.

Meteorological data indicates that the frequency of droughts has indeed increased, since 2000. However there were some meteorological drought years that communities did not recall. A possible reason for this is that it is easier for respondents to recall recent droughts than droughts that occurred 40 to 60 years ago. On the other hand, there were some years communities pointed out as drought years that were not recorded in meteorological data. This is because communities understand drought in a number of ways, including shortage of grazing and food. To them it is not only a matter of the amount of rainfall but also the impacts that define a "drought".

4.3. Community perceptions of drought

Key informants and focus group discussions reveal that farmers in the two districts have experienced both meteorological and agricultural droughts in the past. Community perceptions of drought are influenced by the aridity of the geographical area, the frequency and severity of the drought and the impact that water shortage has had on both their domestic and productive activities. The majority of respondents identified inadequate water for agricultural activities, whilst in resettlement areas, the majority of respondents perceived drought as a shortage of food. Shortage of grazing was also considered to be a characteristic of drought in communal areas but not in resettlement areas where large tracts of land are available for grazing.

4.4. Early Warning Systems

Table 1: Indigenous drought early warning indicators

Flowering and fruiting of certain tree species -*Strychnos madagascarensis (Umwawa)* –Too many fruits especially in August. -*Colophospermum mopane(Iphane)* – Too many fruits and folded leaves. Shiny gum in September -*Azanza garckeana (Uxakuxaku)* – Too many fruits -Umkhaya – Too many white flowers. -*Sclerocarya birrea (Umganu)* – Too many fruits -*Boscia albitrunca (Umtopi)* – No or very little flowering -*Jasminum stenolobum (Idolo lenkonyane)* – No flowering especially From August to September. -*Lannea discolour (Isigangatsha)*- Too many fruits -*Acacia tortilis (Isinga)*- Too many white flowers -*Dovyalis caffra (Umqokolo)*- Few fruits
Wind direction, type of winds and frequency of occurrence -Reduced frequency of whirl winds especially in August. -Increased frequency of East-Westerly winds.
Behaviour of animals, birds and ants -Guinea fowls have no or very few chicks. -Cattle will have more calves being bulls during that year. -Reduced ants. -Inkanku, Isingizi, Chibelu birds –No singing in drought year.
Moon and sun -No dam around the moon -Dam around the sun
Seasons -Extended winter – up to August and sometimes September.

Early warning, a major element of disaster risk reduction, can help prevent loss of life and reduce the potential economic impacts of a disaster if people are prepared and know what to do in response to the warning. More than 50% of respondents in Bulilima and Mangwe Districts indicated that they have access to meteorological early warning systems, mostly through extension workers, fellow farmers and to

a lesser extent through radio and television. Less than 50% of those who have access to weather forecasts use the information for planning their agricultural activities, because it has proved to be unreliable. The communities indicated that they have locally based early warning signs which have been used in the past and which some respondents believe still work. The table below shows some of the drought indicators used by communities, with some variation between the two districts especially on tree species, due to different local vegetation.

Box 1: Indigenous Drought Early Warning Systems – The Bulilima District Experiences

Nelson Moyo is 79 years old and has lived in Bulilima District since 1970. His livelihood is based on cropping and livestock production which have a high water dependency. "When I was growing up, my parents used to tell me that certain trees or the behaviour of certain animals could indicate the likelihood of drought. As a farmer, I started using these indicators to help look after my livestock and plan for the coming agricultural season.

When the indicators predict a drought year, I plant early so that I can take advantage of the moisture left in the soil from the first rains. I also plant small grains like millet (nyauthi) and sorghum (amabele) as they do better in dry conditions compared to maize.

There is an initiative that was introduced by Dabane Trust and World Vision called conservation farming. When indicators point to drought I make sure that I put some crops under conservation farming as I have discovered that they have a higher chance of survival. I also start preparing supplementary feed for my lievestock consisting of cut grass, bird nests and if I am lucky I collect pods from Dichrostachys cineria (Ugagu) trees.

I have benefited a lot from using these drought indicators. The number of livestock that I lose is minimal as I will still be able to feed them. When other households in the ward fail to get even a single bag of sorghum or millet, I get up to 10 bags.

It is unfortunate that most people in the area are aware of these drought indicators but are reluctant to use them. I want to encourage other farmers to take these indicators seriously so that they can plan and prepare for droughts

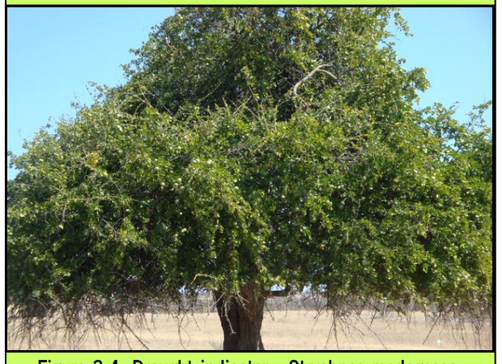

Figure 3.4: Drought indicator - Strychnos madagascarensis (Umwawa.) will bear a lot of fruits when it is a drought year

4.5. Livelihood strategies

Household interviews and focus group discussions in the two districts, identified the following common livelihood activities: crop production, livestock production, gardening, brick moulding, handicrafts, remittances, cross-border trading, selling thatch grass and other piece jobs for cash or in exchange for food. Harvesting of natural resources is prominent during times of hardship, especially during drought periods. The main livelihood strategy in both Bulilima and Mangwe Districts has always been the selling of livestock (cattle, goats and chicken) as the area is not good for crop production. This is consistent with the previous studies carried out by Gandure (2005) in Bulilima and Mangwe. The extent to which these communities are able to diversify their livelihood strategies depends upon the tangible and intangible assets available to them under the prevailing environmental constraints

Communities in the study area have been surviving on these strategies for a long time, despite the fact that some livelihood strategies did not significantly reduce the vulnerability of these households to drought. For example, the selling of livestock has in some cases led to an erosion of the household asset base, exacerbating the impacts of future droughts. In most cases such "distress sales" result in households failing to recover. The viability of some of these strategies has also been negatively affected by socio-economic factors such as the impacts of HIV/AIDS, land degradation and migration. The fact that most of the livelihood strategies employed in the two districts are largely agricultural based and depend on natural resources, makes them particularly vulnerable to climate variation. Furthermore, natural resource

5.0 Conclusions and Recommendations

5.1. Conclusions

Records show that the frequency of droughts in the two districts has increased since 2001. Drought was perceived differently by different households; being defined not only by the amount of rainfall but also by the impact this had on livelihood assets. Indigenous drought early warning signs have been used in the past and some community members still believe that they are useful. There were no significant differences in terms of drought impacts in the two districts or between communal and resettlement areas. However, in resettlement areas, food shortages were felt most acutely because of a lack of support from NGOs (e.g. food aid) whilst in communal areas food aid was provided by NGOs.

Water availability is critical in both districts. The two districts have few dams, boreholes or rivers. The dams that exist are small and silted and hence can not support irrigation farming. Uptake of water harvesting initiatives, such as contours are hampered by the amount of labour required. However, working groups are being created to ease this problem.

Livelihood diversification has proved to be one of the drought coping and mitigation strategies that have assisted the survival of communities in the two districts. Instead of depending solely on agriculture, communities have reduced their exposure to drought risks by engaging in other activities, many of which are not directly affected by drought or changes in climate. The communities have engaged in the making and selling of handicrafts, brick moulding and the sale of thatching grass.

While the drought coping and risk reduction strategies adopted in both districts are diverse, they have not significantly reduced the risks to which people are exposed. The economic environment, problems of availability and access to markets, lack of community ownership of some initiatives and labour shortage due to HIV/AIDS related illnesses, death and migration undermine these strategies. Some of the drought coping and risk reduction strategies used by communities have the potential to actually increase the vulnerability of communities to future droughts. For example, food aid is said by some respondents to be creating dependency such that some households no longer see the need to cultivate their fields. Selling of core assets like livestock also reduces the asset base that is useful in reducing future drought risks. Livelihood diversification based on the use of natural resources may with time be detrimental to the environment eventually increasing drought risks. Changes in both drought coping and risk reduction strategies can be summarized as being the result of external factors such as land pressure, climate variability, economic conditions and HIV/AIDS. These factors have exacerbated the impacts of droughts as well as impacting negatively on drought risk reduction initiatives.

The role of local and external institutions and particularly the private sector in drought risk reduction remains limited. The history of drought management in the two districts reveals a reliance on relief and post drought recovery activities rooted in promoting crop and livestock production. This has suppressed farmers' potential to be innovative and adopt diverse drought response strategies. NGOs and government departments often duplicate each others support to communities in drought risk reduction. While drought management structures exist at district level, they are not visible at ward or village level. There is a District Drought

Management Committee chaired by the District Administrator (DA), but this committee is not pro-active and does not have the resources to carry out its mandate. The committee is reactive, only meeting when there is a disaster which requires the distribution of maize and other inputs from the government controlled Grain Marketing Board (GMB).

4.9 Institutional interventions

Various institutions are involved in drought management within the two districts including government departments, traditional institutions and NGOs. The private sector is not very visible in drought management, only NGOs are involved in different aspects of drought risk reduction; many offering short-term assistance (relief services) that satisfy immediate needs. Some also provide technical assistance and financial/ material support for initiatives that help communities in rebuilding their livelihoods. Major activities include, harnessing of surface and ground water, rehabilitation of water sources, small livestock support, agricultural inputs, supporting irrigation schemes, supporting conservation farming, promoting planting of drought tolerant crops, promoting small gardens, food relief and capacity building in various aspects of drought coping and risk reduction.

Informal institutions have not played a major role in drought risk reduction. It was pointed out during focus group discussions that local institutions like chiefdoms are only active in food distribution and trying to promote the concept of *Isiphala senkosi* (Chief's granary). Traditional norms and beliefs are no longer effective in reducing land degradation because law enforcement is now weak. The scale of intervention differs as some of the institutions give help to the needy on an individual basis whereas other institutions give help to a particular area as a whole. All the institutions interviewed indicated that they carry out a needs assessment before an intervention is initiated. However, the communities were not happy with some of the organisations who they feel do a superficial assessment that is not representative of the community needs.

During the interviews, institutions highlighted a number of challenges to the implementation of drought coping and risk reduction initiatives. Government departments are commonly constrained by inadequate resources (both financial and material) to implement programmes; they don't have transport or the resources for training farmers. High staff turnover due to poor remuneration has led to high farmer to extension worker ratio, particularly in the case of AGRITEX, with the result that extension workers are not able to cover all the farmers in their working areas. Most NGOs have a small number of staff, based at district level and not at ward or local level making monitoring of NGO projects weak. Challenges common to both NGOs and Government departments include political interference in day to day activities that sometimes derail implementation of drought risk reduction activities. The existing economic environment has also led to high staff turn-over in most government departments and shortages of inputs and materials required for drought risk reduction. The current global economic crisis will further exacerbate the situation as it has already started affecting funding inflows for some NGOs.

The recurrent droughts have made it difficult for communities to recover, resulting in a continuous need for drought relief. Migration of some members of the household, especially the bread winners and able bodied, to neighbouring countries such as Botswana and South Africa has led to a shortage of labour affecting some drought risk reduction activities. HIV and AIDS has also had an impact on drought risk reduction activities reducing the availability of labour and exhausting household assets in order to meet medical expenses.

The rate of adoption of appropriate mitigation initiatives has been a challenge in some communities with planned interventions either curtailed or not taken up at all. Funding for disaster reduction is limited. Most institutions do not have a budget for drought reduction. These institutional challenges increase the vulnerability of communities.

based livelihoods if not properly regulated are likely to increase land degradation and so increase the impacts of drought.

4.6. Impact of drought on livelihoods

Droughts have had a devastating impact on people's livelihoods: the magnitude of which depends on the particular characteristics of the household, the assets available to them as well as the institutions and policies that operate within their community.

Droughts have left most people in the study area without livestock. All respondents (100%) in both Bulilima and Mangwe Districts indicated that they had lost most of their livestock during the 1992 drought. Cattle were worst affected, leaving most smallholder farmers without draught power. The worst droughts have left rivers and dams dry affecting both domestic and productive activities; notably crop failure. During the 2006 drought year, average crop yields for maize, sorghum and pearl millet were far below what was expected, in both Bulilima and Mangwe Districts (Agritex records, 2007), leading to food insecurity for most households.. Drought has led to children dropping out of school due to an inability to pay school fees as well as inadequate food to support them on their walk to school.

In response, households have had to sell productive assets such as livestock, ploughs, harrows, wheelbarrows, scotch-carts and bicycles to raise income to buy food. Focus group discussions revealed that there has been an increase in land degradation, as recurrent droughts have forced people to become more dependant on exploiting natural resources, selling firewood, brick moulding and wood crafts.

Droughts have led to an increase in migration to neighbouring countries such as South Africa and Botswana causing a disintegration of the family unit and the loss of the most productive age group, creating a shortage of labour which affects crop production. Migration has been blamed for increasing the prevalence of HIV/ AIDS as breadwinners have left their families and in many cases started new families where they work.

4.7. Drought coping strategies

The drought coping strategies used by households have evolved over years, both in response to recurrent drought and changes in local institutional and national policies.

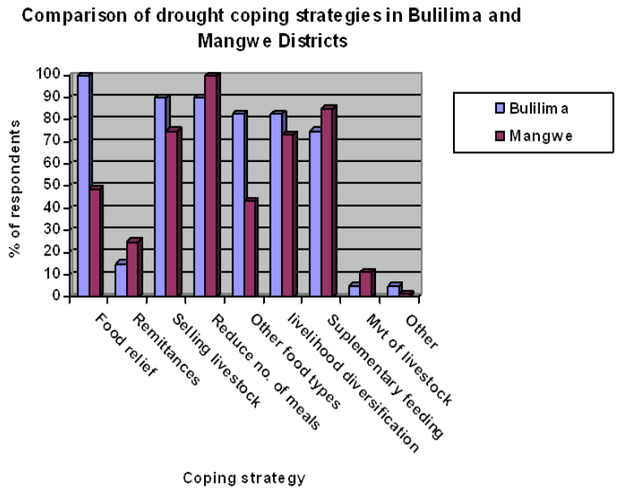

Figure 3: Drought coping strategies

In the past the role of the extended family was very important as a coping strategy during drought years. Food relief was not common. Respondents in the sampled areas reported that recurrent droughts have destroyed the social capital that existed in the past and the role of the extended family as a support mechanism during crises is now negligible. While food relief was common in the communal areas of both Bulilima and Mangwe districts, it was not very common in the resettlement areas of Mangwe district. This is as a result of the differences in institutions that exist in the communal and resettlement areas. (Many of the NGOs offering food aid are reluctant to work in the resettlement areas). Some respondents were concerned that

food aid was creating a dependency syndrome for most of the recipient households. Mr Peter Ncube (Village head) from Ward 3 of Mangwe district was quoted saying *"Ukudia kwe Vision sokusiwonele abantu. Abantu kabasafuni kusebenza ngoba bathi silimelani thina sithola ukudla kwamhala okuvela kuVision"*, meaning food aid from World vision has spoiled people because they say, "why should we cultivate our land when we are getting free food from World Vision". However food aid inflows are likely to be affected by the current global financial crisis as policy makers and donors are likely to drop overseas aid from their list of priorities (IMF, 2009).

Asset disposal has increased over the years with the selling of cattle and small livestock like goats and chickens being the most popular coping strategy in the two districts. As well as providing income during a period of drought, selling cattle does have the benefit of reducing the herd size so that not all livestock die due to a shortage of feed. Some cattle may be sold to buy supplementary feed to save other cattle during drought years. Although the selling and consumption of small livestock, especially chicken and goats, was common to most of the households who had them, this coping mechanism did not significantly reduce vulnerability because of the little money they fetched on the market. The selling of assets, if relied upon too much, can in the long run increase drought risk, as communities will not have enough productive assets to prepare for future droughts.

Reducing the number of meals per day has been the main strategy adopted over the years. All households in Bulilima and Mangwe Districts indicated that they cut down the number of meals during a drought year. This also shows that food aid in communal areas is not adequate to meet household food needs. The reduction or skipping of some meals has a negative impact on the health of some of the most vulnerable members of the household such as the sick, elderly and children under five years due to poor diet. There has been a reduction in the consumption of less favourable types of food over the years. Communities used to eat wild fruits in the past because they were plentiful, however an increase in population and recurrent droughts have led to the over-exploitation of natural resources such as trees.

In Mangwe District, 43.5% of respondents eat less favourable types of food whilst 92.5% do the same in Bulilima District. The less favourable types of food are now less likely to be wild fruits and more likely to consist of foods provided by NGOs in the form of aid, such as bulgar wheat. The higher figure in Bulilima is due to the abundance of a wild fruit called *Strychnos madagascarensis (Umwawa).* Where there is no food relief, as in the resettlement area of Marula, some households drink wild okra to sustain themselves for the whole day. Some of the wild fruits that are still available are Azanza garckeana (Uxakuxaku), Opuntia megacantha (Amadholofiya).

Opuntia megacantha – one of the wild fruits eaten to cope with drought (Grandmother Emily Sibanda of Marula standing near the plant).

Remittances were less important as a drought coping strategy in the past as households were able to engage in productive agricultural activities that supported their families without outside assistance. The economic environment was still favourable and there was less migration to urban areas and other countries. The increase in migration, mainly due to economic hardships, has forced most of the young generation to

importance on water harvesting at household level whilst in Bulilima no respondents had considered household water harvesting as a strategy because of the costs that are involved. Large scale water harvesting had been undertaken by the government and NGOs, but farmers pointed out that the construction of dams and boreholes is now rare.

A small dam in Ward 3 – Madabe dam

Households in all the four wards have access to boreholes, small dams and rivers. However, with only a few dams, most of which are either silted or seasonal, households must often walk long distances to collect water for livestock and domestic purposes. The situation is made worse by the small number of boreholes available to households, most of which are non functional due to a shortage of spare parts. Some households rely on open wells in the river bed (sand abstraction), for domestic water, most notably in Makuzeze village.

Due to the small number of small and silted dams that exist, irrigation farming has not been possible for the farmers in the sampled wards. As most of the dams and rivers are seasonal, gardening is restricted to the period immediately after the rains after which the water is reserved for livestock: showing the importance that households place on livestock. Where boreholes are seasonal, there are also restrictions on water use, with people only allowed to fetch water during certain periods of the day and not for gardening. The limited water sources have limited livelihood options for many households. Several households pointed out that while horticulture could be an important source of income, without water it cannot be supported.

Rain making ceremonies were once very common as a drought risk reduction strategy, but with the increasing influence of Christianity, they have lost their popularity. However, there are still some households in Mangwe District (5%) who believe that rain making ceremonies can reduce the frequency of droughts. This was pointed out by elders who still have strong traditional beliefs. Rain making ceremonies are not very common in Bulilima.

Communities in both communal and resettlement areas have realised that they need to reduce their exposure to the impact of droughts.. Most households (80% in Bulilima and 95% in Mangwe) have done this by diversifying their livelihoods, both as a short-term coping and as a longer-term risk reduction strategy. Livelihood diversification includes the provision of both on and off-farm alternative sources of income for households before and during drought periods. Communities no longer rely exclusively on crop and livestock production as their major source of income, they have diversified into off-farm activities, often exploiting available natural resources. For example, many households in the resettlement areas depend on selling thatching grass. Women in both Bulilima and Mangwe Districts make handicrafts like reed mats and baskets. Men make stools, cooking sticks and curios for decorations. Cross border trading has become a source of income for many households near the border with Botswana. Others buy and sell groceries and clothing. Fierce market competition limits the success of many of these strategies in spreading risk.

were recently conducted on how to make the dead level contour that captures rain water and conserves moisture in the fields, reducing the chances of total crop failure during drought. The low rate of adoption (average of 32%) in both areas points to the fact that the technology is labour intensive and most households no longer have enough labour due to migration and illnesses and deaths caused by HIV/AIDS.

Dead level contour in Mrs Benefit Mtonga's field- Ward 11

In the past, households used to have a granary for the household head (i*siphala sikababa*) that was filled with grain and sealed with mud. This granary was only opened when there was a drought. Respondents pointed out that due to recurrent droughts this is no longer possible as it is rare to have surplus harvest that can be stored in the granary for the household head. More households in Mangwe District used granaries (50%) compared to Bulilima District (25%).

Livestock is considered to be a very important asset for food security and income generation in both Bulilima and Mangwe Districts. . The most common strategy that has been adopted to reduce the impact of drought on livestock is the storing of livestock feed The most common types of feed stored are maize stover, groundnut and bambara nut leaves and acacia and *Dichrostachys cinerea* pods. Making hay is prominent in Marula ward (resettlement area) where there is a partnership with a commercial farmer. Acacia pods are collected for goats for which they are said to be good fodder. While the collection and storage of supplementary livestock feed is common in both districts, the scale at which it is practised is limited by the amount of stover available . Some households pointed out that they store small quantities because that is all they get due to drought. Collecting acacia pods is labour intensive, meaning that a person with a large herd cannot actually collect enough to feed their livestock.

In the past, farmers used to keep indigenous livestock breeds that Khombe and Ndlovu (2008) point out were hardier, and possessed valuable genetic properties including high fertility and resistance to local diseases. Adoption of exotic breeds has increased the vulnerability of many farmers as these animals are more adversely affected by drought and diseases, leading to higher death rates. Very few respondents in Mangwe District still placed importance on indigenous livestock breeds and no respondents in Bulilima Disrict were adopting this strategy. However, some respondents pointed out that most NGOs who were supporting livestock production were promoting indigenous breeds.

Most vulnerable households in Mangwe District own small livestock which are well suited to semi -arid conditions. A number of organisations are involved in small livestock restocking programmes to help smallholder farmers rebuild their herds following years of successive droughts. 60% of respondents in Mangwe District indicated that they now put more emphasis on small livestock production. This is because they have realised the advantages of small livestock in a drought prone area and have increased their knowledge on small livestock management after attending training courses held by organisations such as World Vision, Hlekweni and Practical Action. In contrast, few respondents in Bulilima had adopted the strategy (17.5%) due to a lack of awareness on the importance of small livestock in drought prone areas. Household water harvesting has not been adopted by many households. In Mangwe District, 20% of the respondents placed

Box 2: Thatching Grass in Mangwe District

Livelihood strategies in Marula resettlement area - Thatching grass selling (Mrs Linje Moyo standing by her stack of thatching grass).

My name is Linje Moyo. I am 48 years old My husband is unemployed and we live with six children who need to be taken care of. Our major livelihood strategy is cropping, livestock selling and to a limited extent horticulture. However, with low rainfall experienced in this region, it is difficult to depend entirely on these strategies. Thatch grass has been a blessing to the community of Marula, providing an alternative livelihood strategy for my family and others in the ward.

Thatching grass is harvested by women between May and December. I usually harvest 3 times a week with friends whom I have formed a working group with (amalima). We harvest an average of 2000 bundles (isithungo) in a season, making an average of 7000 Rands. Sometimes we exchange grass for soap, utensils, blankets and clothes. Our major markets are the communal areas of Bulilima and Mangwe Districts as well as people from Botswana. A major problem we have is that due to the abundance of the resource the prices we fetch at market are often low and what is not sold is left to rot after the rain season.

However, selling thatching grass has improved the socio-economic status of the household. My husband and I are able to look after our children, providing them with food, clothing and school fees. The money we have made has enabled us to connect to the neighbouring schools piped water system, providing clean water for domestic purposes and our household garden. With the money from thatch grass we have also managed to complete our three roomed house. Thatch grass now contributes 60% towards our *household needs, with cropping 30% and livestock 10%.*

migrate to South Africa and Botswana. Though a number of households had family members out of the country, only 15% and 25% of the sampled households in Bulilima and Mangwe were reliant on remittances. This low percentage is probably the result of the migrants working in informal sectors which pay low wages and being unable to earn enough to support their families back home. Permanent migration is likely to exacerbate the impacts of droughts and increase drought risks through labour shortages.

Pot moulding by Mrs Mollinah Tshuma

Livelihood diversification is prevalent in both districts (all above 70%). Generally, communities are engaged in a variety of income generating activities such as horticulture, selling thatching grass, home-made mats, bricklaying, wood carving, pot moulding and piece-jobs to reduce the impacts of drought. Food and Agriculture Organisation (2003) observed that while the significant use of natural resources for livelihoods is acknowledged by some, the situation in reality is complex and variable, and limited empirical data from across a range of regions, vegetation types, and socio-economic contexts are available to assess the ability of these products to create lasting opportunities for local livelihood enhancement. Selling of thatching grass is very common in Marula ward (resettlement area) of Mangwe District, where grass is plentiful and population density is low. Selling of home-made mats and clay pots was unique to elderly females. The diversity of strategies is an indicator of the state of the natural resource base and the local socio-economic conditions. Horticulture as a coping strategy has been limited by inadequate water sources in the study area as well as the seasonality of these water resources. Most of the dams and rivers are silted. With inadequate water to reliably support horticultural activities most of the households have diversified their income earning opportunities using the available

natural resources.

Supplementary feeding of livestock has increased over the years. This is due to a decrease in grazing land as well as a reduction in the quality of fodder due to recurrent droughts. For households with large herds, it is common to sell some livestock in order to buy feed for the remaining herd. Alternatively, Khombe and Ndlovu (2008) observed that supplementary feeding is often in the form of crop by-products such as maize stover, groundnut and bambara nut leaves, and to a limited extent acacia pods. This strategy has been adopted in both districts by 75% of respondents in Bulilima and 85% in Mangwe. However respondents pointed out that recurrent droughts have limited the amount of Stover available to replenish stores in order to support livestock during future droughts.

In the past livestock were commonly moved to areas with better grazing grass. Respondents indicated that in the past, a smaller population and fewer settlements meant there were large tracts of unoccupied land available for grazing livestock. During drought years, people would move their cattle to these areas, known locally as *emlageni.* Nowadays, due to population growth there is less unoccupied land. Fewer people now send their cattle to those areas which are known as 3-tier farms. 5% of respondents in Bulilima District have adopted this strategy whilst 11.5% have done the same in Mangwe District. Some respondents in communal areas pointed out that they no longer send their cattle to 3-tier farms because they either cannot afford to pay or their herd size does not meet the minimum requirement of 25. The monetary costs that are attached to the movement of livestock are also beyond the reach of many.

4.8. Drought risk reduction strategies

Drought risk reduction strategies are long term and preventive in nature and encompass mitigation and preparedness. They are concerned with reducing the level of vulnerability and minimising the disruptive effects of droughts by building community capacities or increasing resilience. Whilst drought risk reduction strategies are long term in nature, drought coping strategies are short term responses aimed at alleviating the impact of shock once it has occurred. Due to the increase in frequency of droughts, farmers in Bulilima and Mangwe Districts have adopted a number of drought risk reduction strategies. These strategies have evolved over years.

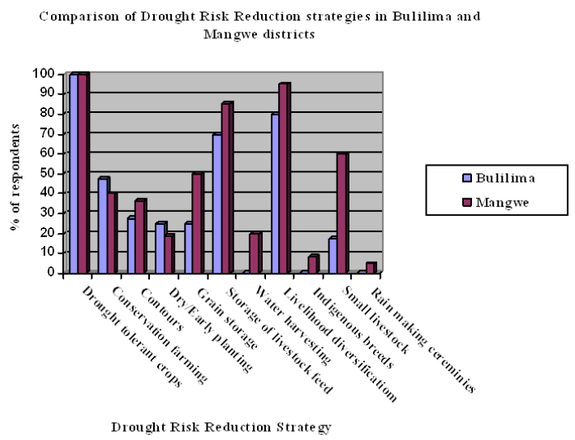

Figure 4: Drought risk reduction strategies

Historically farmers have resorted to growing drought tolerant crops such as sorghum and millet. In response to the increasing frequency of droughts, farmers in both Bulilima and Mangwe districts continue to grow these small grain crops, but changing food preferences and policies that are biased towards maize have led to the reduction in the acreage of small grains. Maize is the staple and preferred food for most households. Growing and processing of small grains is viewed as labour intensive. This situation is exacerbated by a shortage of labour due to migration and HIV/AIDS related illnesses. The respondents also pointed out that, small grains are prone to bird attacks, and farmers have to scare off birds every day until harvest.

Box 3: Conservation Farming in Bulilima District

Figure 2.10: Conservation farming in Mrs Sibongile Nkomo's Field—Wilfred's Hope Farm, Marula

Benefit Mtonga is 45years old and settled in Madlambudzi Ward, Bulilima District in 1993. Her husband works in South Africa and together, they have six children none of which are resident in the area. .The family's livelihood is based mainly on crop production, though they also own a a small number of livestock, including 2 cattle and 3 donkeys. Due to the low rainfall the area receives, the family has not had a good harvest for a number of years. Due to a shortage of draught power, Benefit Mtonga's family have used hand tillage since 1993. This has led to planting occurring later in the season, resulting in poor yields.

Benefit Mtonga started practising conservation farming in 2007 after she had attended a training workshop facilitated by World Vision. In 2008 she also attended a rainwater harvesting exercise, facilitated by Hlekweni in partnership with Practical Action.. After a demonstration in one of the fields in the ward, she started to practice the initiative, planting small grains such as Marcia.

She used to harvest 3 bags of Marcia on a 50x50m of land, but after practising CF she is now harvesting double the number of bags. She also observed that the crops under CF grow faster and have bigger heads compared to those under conventional farming. The crop matures faster, and there will still be adequate moisture in the ground.

Limited soil disturbance and the mulch effect of crop residues left in the field, reduce the amount of soil erosion. While their livestock limit the amount of manure they available, CF reduces wastage by ensuring accurate placement of inputs such as manure and fertiliser

Preparing her land during the dry season enables her to plant early after the first rains, so her crop can make the best use of soil moisture. However, while land preparation is supposed to start as early as June, other household duties and limited labour mean she usually starts a little bit late. Despite the benefits of conservation farming, Benefit Mtonga points out that the process is labour intensive and so she has not been able to practice it on a larger scale. She also has problems with inadequate inputs like manure and fertilisers which affects the growth of her crop and leads to lower yields

Growing small grains—sorghum

Conservation farming aims to conserve soil and water by using surface cover to minimise runoff and erosion, where soil and nutrients are washed away. Small implements such as the hand hoe are used to create planting basins. Plant residues from the previous crop are left on the land to minimize erosion and provide organic material and soil cover. Known locally as *gatshompo,* conservation farming is a technology that was used less in the past but has been encouraged by development organisations in trying to assist farmers in dealing with drought. World Vision has been at the fore- front in promoting this initiative in the two Districts. The rate of adoption of the strategy has been almost the same in both districts (about 42% on average). Some respondents pointed out that the initiative required a lot of labour which most households do not have due to youth migration and an increase in HIV/AIDS. Efforts have been made to create working groups to reduce the problems of labour.

Contour ridges were common during the 1970s as farmers were forced to construct them by the then colonial government. The enforcement made the initiative unpopular, leading to poor maintenance of these contours. During the time of the study, farmers pointed out that there was a new initiative by NGOs like Practical Action to introduce a modified version of the standard contour called the dead level contour. Trainings