

Responses To Climate Change and Rural Livelihoods In Zimbabwe's Semi-Arid Areas: The Case of Chivi District

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Abstract

Climate change and its risk factors like drought have become an obstacle to ensure an optimum agricultural production. This is severe in countries that are largely depended on rain fed agriculture. Recurring droughts are an endemic feature for agriculture in Zimbabwe, where 70% of the population depends on agricultural based activities as their livelihoods resource. Small holder farmers in Zimbabwe have become victims of drought which has in turn contributed to the unsustainability of their livelihoods. Drought has largely resulted in persistent crop failures and subsequent food shortages yet rain-fed farming continues to be the principal livelihood activity for most farmers with small scale farming forming the mainstay of household economy. However, the need to respond to climate change should not be undermined given how climate change is irreversible and how it has negatively affected the livelihoods of the rural farmers. A qualitative methodology, involving a case-study design, is critical to the paper's objective as the paper seeks to understand discursive framings and responses within a locally-delimited area of Chivi. In so doing the paper brings out responses undertaken by Chivi farmers and highlights on the need to promote sustainable livelihoods.

Key Words: climate change, sustainable rural livelihoods, semi-arid areas, Chivi district, Zimbabwe

Introduction

Climate Change has become a major concern for many development practitioners due to its impact on several aspects that hitherto derail development and affects the livelihoods of the rural poor. The Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, 2001), for example, revealed that the global average temperature will increase by 1.4° C to 5.8° C between 1990 and 2100 if the levels of greenhouse gas emissions are not reduced. While developing countries especially in Africa have contributed less than any other region to the greenhouse gas emissions that are widely held responsible for global warming, they are more vulnerable due to

their dependence on rain-fed agriculture and natural resources for their livelihoods (Mawere 2011).

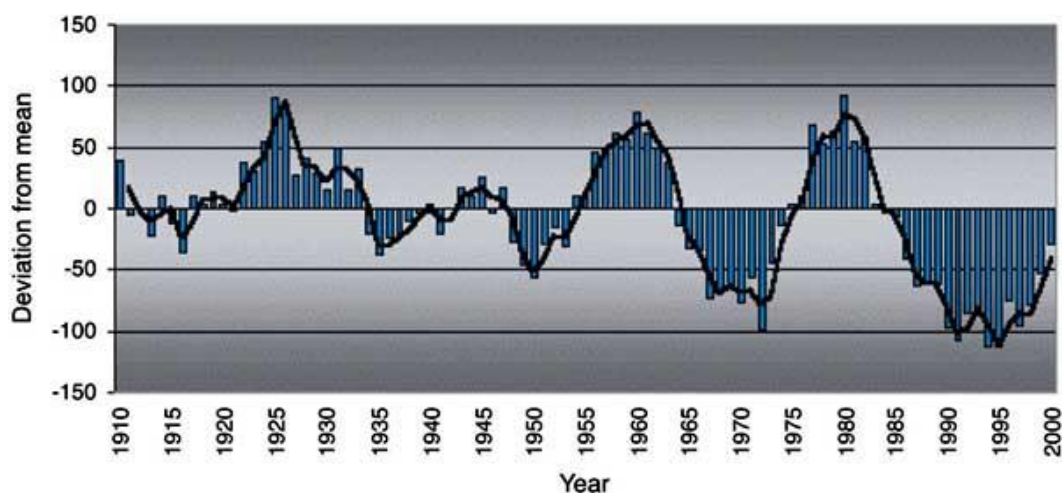
Given the heavy dependence of African people on agricultural production, it becomes worrisome how much they are likely to acquire from this important practice in light of climate change. Climate change risk factors like drought and floods will undermine rural livelihoods which are basically dependent on subsistence farming. Sub Saharan Africa in general and Zimbabwe in particular are not spared from the detriments of climate change. The United Nations Framework Convention on Climate Change (UNFCCC) highlights two fundamental response strategies to climate change which are mitigation and adaptation. While mitigation seeks to limit climate change by reducing the emissions of greenhouse gases and by enhancing 'sink' opportunities, adaptation aims to alleviate the adverse impacts through a wide-range of system-specific actions (Fussel and Klein, 2002). Successful adaptation however depends upon technological advances, institutional arrangements, availability of financing, and information exchange (Watson et al, 1996).

This research largely focused on the responses given by Chivi people in an endeavour to adapt to climate change. Being depended on rain fed agriculture as the main livelihood strategy, the study sought to understand the responses that the Chivipeople have adopted so as to continue surviving under a changing climate. According to Mawere (2013) in Chivi one would notice that a significant proportion of the population is largely dependent on exploitation of environmental resources for their livelihoods and subsistence farming for their sustenance. Unfortunately, the past two decades have seen the nation experiencing pronounced increases in temperature, recurrent droughts and unpredictable rainfall patterns, all of which have exacerbated suffering among the people of Zimbabwe especially in the rural areas, where majority of the population resides. The reliance of the vast majority of Zimbabweans on rain-fed agriculture and the sensitivity of major sectors of the economy to the climate makes Zimbabwe particularly susceptible to the negative impacts of climate change.

Adaptation as a response mechanism has now emerged as an urgent policy priority, prompting action both within and outside the climate change negotiations (Parry *et al.* 2005). Adaptation calls for natural resource management, buttressing food security, development of social and human capital and strengthening of institutional systems (Adger *et al.* 2003). Such processes, besides building the resilience of communities, regions and countries to all shocks and stresses, including climate variability and change, are good development practice in themselves. In this regard the paper examined the response mechanisms that have been employed by Zimbabwe's rural farmers in order to promote their livelihoods (diversification).

Drought Occurrence in Zimbabwe

Sub Saharan Africa has become one of the major regions which have been affected by drought in recent years. Extreme drought in the Limpopo River Basin is a regular phenomenon and has been recorded for more than a century at intervals of 10-20 years. To illustrate this, an example for Zimbabwe is given in Figure 1.



Source: GOZ - ZMD (2001).

Figure 1: Zimbabwe National Rainfall Deviation From Mean 10- Year Running Mean (Period 1900 To 2000)

Zimbabwe lies between latitudes $15^{\frac{1}{2}}S$ and $22^{\frac{1}{2}}S$ and longitudes $25^{\circ}E$ to $33^{\circ}E$ with a population of about 14million people (UNDP, 2012). The country's mean annual rainfall ranges from below 300mm in the low lying areas to over 3000mm per annum in some high mountain areas. Zimbabwe's climate is mostly semi-arid. The country lies in a region with limited and unreliable rainfall patterns. The number of cold days is decreasing at a rate of about fifteen days per 100 years (Mugabe, 2010). This severity of increases in temperature has contributed to the severity of droughts across the country. On average, 1-3 droughts occur every 10 years in the country largely in response to changes in the phases of the El Nino – Southern Oscillations (ENSO) phenomenon and periodic global sea surface temperature oscillations (UNDP, 2012).

In the 1991/92 agricultural season, Zimbabwe experienced the worst drought in living memory, with complete failure of crops and devastation of the livestock sector that rendered most areas semi-deserts. The economic effects were also felt outside the agriculture sector. Largely as a result of the drought, through water and electricity shortages, manufacturing output in Zimbabwe declined by 9.3 percent, with a 25-percent reduction in volume of manufacturing output and 6-percent decline in foreign currency receipts (Benson and Clay, cited in SADC-IUCN-ZRA-SARDC, 2000). Serious reductions in agricultural output resulted in reduced economic growth and loss of the much-needed foreign exchange normally derived from agricultural exports.

Zimbabwe was affected by droughts in 1982, 1991/92, 2001/2002 and 2007. Table 1 shows the top ten natural risks in Zimbabwe for the period 1980 to 2010, where drought is the dominant climatic risk in terms of the number of people affected (OFDA/CRED, 2012).

Table 1: Top 10 Natural Disasters in Zimbabwe: 1982 to 2010 sorted by numbers of total affected people

Disaster	Year	Total People Affected
Drought	2001	6000000
Drought	1991	5000000
Drought	2007	2100000
Drought	2010	1680000
Drought	1982	700000
Epidemic	1996	500000
Flood	2000	266000
Epidemic	2008	98349
Drought	1998	55000
Flood	2001	30000

Source: adapted from: The OFDA/CRED International Disaster Database (OFDA/CRED, 2012)

The occurrence of drought, in the past years, has had implications on the wider Zimbabwe's economy as many people were laid off their employment, reduced crop yields, unsustainable marginal land for livestock. These have all resulted in the erosion of income for the country (FAO, 2004). Access to income determines the livelihood for households and as such if agricultural production systems are affected by drought, rural people's livelihoods are heavily impacted upon as subsistence farmers fail to sustain themselves.

It has come to the attention of most researchers that, more than 80% of Zimbabwe is subject to conditions which make dry land cropping a risky undertaking because of low and erratic rainfall (Gambiza and Nyama, 2000). Agriculture has always been the most important economic activity in Zimbabwe, with about 60% of industry being agro-based with maize as the main cultivated crop (Rukuni, 1994). Furthermore, in previous years, the agricultural sector consumed about 20% of total output of industry (CFU, 2000). The agricultural sector employed a large proportion of the country's labour force and contributed about 18% of GDP and 40% of export earnings annually in a normal year.

About 70% of the Zimbabwean population lives in rural areas and derives its livelihood from subsistence agriculture. Within the agricultural sector Buckland et al (2000) noted that drought is arguably the most important climatic challenge and has major impacts on rural livelihoods. Past droughts are known to have had devastating environmental and socio-economic impacts on the country, particularly in rural areas such as Chivi district where livelihoods are agriculture dependent (Dercon et al, 2005). Socio-economic impacts arising from drought have included shortage of water, food insecurity, poor health, extreme events and damage to infrastructure in this district.

Droughts have had drastic effects in Chivi district. Effects of drought in this area include the suffering of livestock, with many farmers having to sell their cattle at distress prices because they lacked fodder or needed cash to buy food which had

increased in price because of scarcity. The widespread human distress resulting from reduced crops, reduced employment and incomes, and increased food prices has been considerable. Increasing climate risks undermine development and poverty reduction efforts in drought-prone areas like Chivi district. It appears future climate variability will aggravate these problems even more in these drought-prone environments. Despite the difficulties and unreasonably low returns, agriculture continues to be a source of livelihood for more than 80% of rural people in Zimbabwe (Corbett, 1988).

Problem Statement

Climate change has grossly affected agricultural production especially for subsistence farmers in Chivi District who are depended on agriculture. Noteworthy is that climate change is an irreversible process that requires farmers to come up with strategies so that they can survive. It becomes apparent that responses taken by farmers are put into consideration. This could be a starting step towards surviving under a changing climate.

Objectives

1. To highlight on the impact of climate change on rural livelihoods in Chivi District.
2. To investigate the responses that have been implemented by Chivi farmers.
3. To examine the challenges faced by Chivi farmers in responding to climate change.

Theoretical Framework

The study was guided by the Sustainable framework by Scoones (1998), Conway and Chambers (1992). A livelihood can be understood as the way one earns money to live. A livelihood comprises of the capabilities, assets (store, resources, claims) and activities required for means of living: A livelihood is sustainable when it can cope with and recover from stress and shock, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in short and long term (Chambers and Conway 1992). In order for livelihoods to be sustainable they, have to comprise assets (capital, natural, physical, human, financial), with access to supporting institutions, in the context of trends (population, migration, micro & macro policies), which will result in livelihood strategies. These livelihood strategies will be composed of natural resource based activities and non-resource based (trade, remittances). This in-turn has an effect on livelihood security (income level, income stability, seasonality, degree of risk) and environmental sustainability. Thus, these aspects correspond and they need to be integrated to achieve sustainability at household level. Hence, omission of any of the sustainable livelihood framework aspects will compromise sustainability. To this end this approach was applicable to this research as it brings out the importance of encompassing a wider dimension or a variety of livelihood strategies so as to promote human survival. With the threat that drought poses on rural livelihoods it is crucial that other livelihood strategies are

promoted. In many cases people have failed to recover from risks or a shock like drought showing that agriculture has become an unsustainable livelihood strategy.

To this end the Sustainable Livelihoods Framework is very significant as it aims at increasing livelihood strategies. The Sustainable Livelihoods Framework for analysis shows how, “in different contexts, sustainable livelihoods are achieved through access to a range of livelihood resources (natural, economic, human and social capitals) which are combined in the pursuit of different livelihood strategies like agricultural intensification/extensification, livelihood diversification and migration.

Study Area

The study focused on Chivi district (figure 2 below) due to its geographical location which makes it susceptible to drought. Chivi is one of the most drought prone areas of Zimbabwe. It is found in the agro-ecological region 4 and 5 (Mudavanhu et al, 2013). In the Zimbabwean context, agricultural regions are delineated on the basis of soil type, rainfall and other climatic factors with region 5 having the least amount of average rainfall (Mafu, 2008). There are sandy, acid, infertile soils in this region receiving about 500mm mean annual rainfall. However, this rainfall is erratic and unreliable hence often fails to support rain-fed agriculture resulting in persistent crop failures and subsequent food shortages in the district. Despite this, rain-fed farming continues to be the principal livelihood activity for most farmers with subsistence agriculture forming the mainstay of household economy. (Mudavanhu et al, 2013). Chivi district was selected for this study because the area is prone to droughts. Number of growing days in this area is 60-120 and in very extreme cases there are less than 70-135 number of growing days (Motsi et al, 2003).

The area experiences seasonal drought with severe rain season dry spells. Rainfall is low and erratic with frequent droughts. Temperatures average annually to 28⁰C , which causes a lot of evapotranspiration, thus arable farming without irrigation can hardly yield anything. The district has a total population of about 166 277 (CSO, 2012). The district covers an area of 3 534 km² with an average population density of 43.9 people/ km² (CSO, 2003). The area experiences crop failure due to drought every three years on average (Frost et al, 2007). Persistent drought and aridity in the area has seen recurrent crop failures and continued drought relief hand-outs from NGOs and government for survival. Land use is mostly peasant farming.

Soils are poorly structured and infertile. Chivi’s vegetation cover comprises of annual grasses with scattered shrubs and stunted trees. A distinct climatic feature of Chivi district is that it is characterized by strong climatic variations and fluctuations of rainfall that is highly irregular both spatially and temporarily. These rainfall fluctuations make Chivi an agricultural marginal area, which has a fragile ecosystem, and experiences high temperatures making it prone to drought (*ibid*). Communal farming is the chief source of livelihood in the district but the rain fed agriculture is highly vulnerable to the vagaries of climate variability and change (*ibid*). Water scarcity in this area has affected agricultural produce of community farmers in this area.

Historically, the Chivi area used to receive reasonable amounts of rainfall amounting to 800mm. In cases where rainfall failed the people believed that the

ancestors were angry and sacrifices were made so as to please their ancestors. In most cases this appeared to work as rains would be evidenced. However the occurrence of drought from 1992 and 2002 and its level of intensity have called for attention. The Government of Zimbabwe in many cases has shown that it does not have the capacity to be of assistance to these poorly disadvantaged people. Non-Governmental Organizations (NGOs) which have assisted in giving food handouts like maize, wheat and sorghum have since completed their programmes and departed from the area. The study made use of Ward 2 and Ward 3 of Chivi District. From each of these wards one village was chosen, Mutsaurifrom Ward 2 and Befura from ward 3.

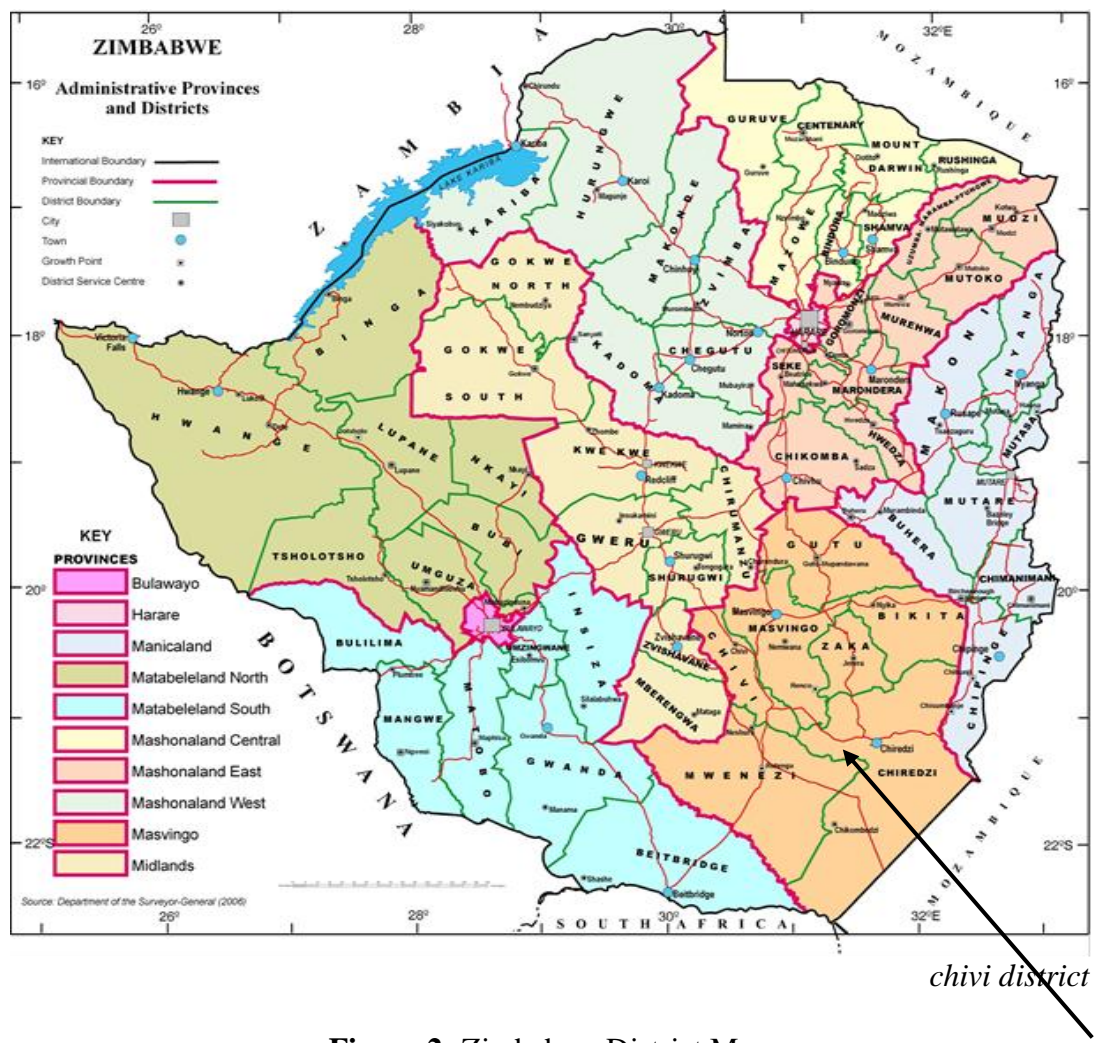


Figure 2: Zimbabwe District Map

Methodology

The study was largely qualitative and made use of a case study design. This was very helpful in most respects since it enabled the researcher to have first-hand experience pertaining to the effects of drought in the area. Within Chivi District the researcher purposively chose Ward 2 and Ward 3. From these wards the researcher chose one

village from each. In ward 2 Befura village was purposively chosen and from ward 3 Mutsauri village was purposively chosen. There are 350 households in Mutsauri village and 300 households in Befura village.

Data collection instruments encompassed interviews, key informant interview guides; household questionnaire interviews with structured and unstructured questions were used. For interviews the researcher used convenience sampling as all the villagers qualified to be interviewed or questioned since they were faced with the same predicament of climate change.

Thirty-five households each were randomly selected from the two villages and questionnaires were distributed so as to have wholesome collection of information pertaining to how they are responding to climate change. The questionnaire was made up of 50 questions. The researcher took into consideration issues to do with gender and made effort by all means to encompass both male and female households in the study. Of the 35 randomly selected households in Mutsauri village 15 households were female headed. Of the 35 households sampled in Befura village 17 were female headed. Gender dynamics appeared to be a matter in the way the villagers responded to climate change. In most cases male headed households responded better compared to female headed households.

The researcher also took advantage of 6 FGDs comprising of 8 to 10 people to collect more information from farmers in the area. In so doing issues to do with gender, age, educational level and marital status were also taken into consideration. The researcher maintained gender balance in the FGDs and encompassed households of those who were divorced, single and married. FGDs were a significant method of collecting information as it opened room for discussion, reasoned arguments, ideas and understanding. Major recurring themes came out of these FGDs which added great value to the research. Purposive sampling was used to get respondents from offices such as Agritex, Christian Care, Care International and sub-Chief.

Discussion and Analysis

Drought in Chivi district has become a recurring event with this year's harvest likely to be affected as well. Agriculture which majority of Zimbabwean people especially the rural folk depend on is no longer productive. FGDs carried out in Mutsauri and Befura village shared the same sentiments as respondents pointed out that agriculture is no longer the main reliable source of livelihood in Chivi. The unpredictable changes of weather patterns make the people susceptible to climate change. The location of Chivi district in the lowveld of Zimbabwe can also not be ignored. Results from FGDs also showed that most people in Chivi district now depend on gardening as a response mechanism to drought and climate change. However the reliability of these gardens also proved to be questionable to the researcher given how the gardens also relied on availability of water sources. FGDs in Mutsauri village showed how the people depended mostly on Musavesi River as the main water source to their gardens. Of the 35 questionnaires distributed in Mutsauri village 75 % proved to be involved in gardening while 70% were involved in gardening in Befura village. Gardening has since become a livelihood strategy in the area. With rainfall failing it has become

useless for the farmers to cultivate in their farms only as failure of rainfall has resulted in their crops drying up as has been evidenced in previous years.

In an interview with Mutsauri the sub-Chief in Mutsauri village it was noted that gardens had proved to be the best response mechanism practiced by most people of Mutsauri and Befura. According to the sub-Chief each villager has an allowance of two beds where they can cultivate different crops like vegetables, onions, carrots which they can later sell. However when the sub-Chief was asked on the reliability of such gardens as a survival means of the people in the area, he mentioned other strategies that they have incorporated. For instance in the event that gardening fails provision of labor on other people's farms (an act commonly known as *maricho*) was the next source of livelihood strategy. This however depends on whether there are villagers who have other sources of income so that they are better equipped to find people who can farm their land and in so doing pay them for that labor. Being involved in *maricho* is a means of survival as they are likely to be given maize as payment or a few dollar notes which they can always use to cover for their needs.

The table below shows the response mechanisms by Chivi people in the order they are preferably practiced.

Response	Percentage of people involved
Gardening	70%
Maricho	15%
Working in South Africa	10%
Mining in Zvishavane	5%
Total	100%

From the results gathered from questionnaires, interviews and FGDs it was discovered that the major response to climate change and drought was gardening followed by *maricho*. There are also households whose heads have left Chivi to look for employment opportunities in neighboring South Africa. Some of them have managed to get informal jobs which have assisted in the survival of their families as they can send remittances back home. A small group of people, just 5% has managed to go to nearby Zvishavane where they are involved in mining. Illegal mining has proved to be dangerous in Zimbabwe in most respects but due to the need to get some form of income the young generation is forced to engage in such life threatening activities. What makes the situation worse for Chivi people in particular and other people in Zimbabwe's rural areas in general is that NGOs have since dropped out of rural areas. All villagers who were asked whether NGOs are still operating in the area reiterated the same answer. According to one worker from Christian Care MrShumba, NGOs have since walked out of Chivi as they have completed their projects. Care International which in most instances was very helpful in giving food handouts to the starving people has also done the same. Under this note it is a matter of urgency that adequate response mechanisms are implemented so that the villagers can survive with enough basics like food. Agritex is also promoting the issue of gardens in the area as one sustainable way of surviving at the moment. Multiple ways of promoting gardening have been implemented in the area like "*dhigaudye*", use of

organic matter and drip irrigation. It is expected that through these strategies water is saved and the crops are likely to respond better given the harsh climatic conditions in the area.

Conclusion

In conclusion climate change has grossly devastated farming practices in Chivi district. The people in the area have begun to adapt to climate change after realizing the irreversibility of the process. There are limited response mechanisms that Chivi people have implemented in order for them to survive. The major response in the area is gardening. Gardening has come as an answer to the problems faced by the villagers. However the sustainability of these gardens is also questionable in most respects. For instance it is questionable as to how much a household can be food secure for 365 days. It is crucial that the Government of Zimbabwe comes in so as to continue the role that NGOs have since dropped.

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