

Drought and Adaptive Strategies in the Dande Valley of Zimbabwe

Abstract: Purpose of the study: The thrust of this paper was to explore the adaptive strategies to climate change employed by the vakore kore community in Dande valley of Zimbabwe. Focus was on coping strategies in drought since the area experienced low, unreliable erratic rains the inhabitants of the area rely on the rain fed agriculture. Design / Methodology: This was a qualitative study, focus group discussions, interviews and field observations were used to get information from the Dande community. Rural appraisal was applied to solicit information on perception. Adaptation, and awareness to climate change. Findings: Results from the study revealed that the Dande community used a number of applicable adaptive strategies to counter the effects of drought. The strategies include diversified farming, inter cropping, use of alternative sources of income based on the dominant fruit tree species, *Zeziphus Mauritana* "Musawu", growing drought resistant crop like millet "mhunga", rappoco, wetlands farming, hunting, gathering of non timber products like mushroom "howa" and wild fruits as well as migration. The study also established that besides their own efforts the Dande valley communities depend heavily on the civil society. Nongovernmental organizations like World Versions and International federation of Red cross have played a significant role in assisting them during drought periods. Drought has caused a serious threat to the livelihood of vakore-kore and they also tend to rely on their indigenous knowledge as coping strategies. The adaptive strategies taken by this community, the study recommends should be taken with the seriousness they deserve to ensure that whatever invention should first respect and incorporate the existing strategies. Originality: This study was conducted in one of the peripheral areas often ignored by many academics yet it houses the most vulnerable members of Zimbabwe, Dande Valley. This study will provide very important /valuable input to policy makers, academics, scholars on Climate change, adaptation discourse in Semi arid regions like Dande Valley. Future Scope of Study: Future studies should have the following as their background information, that climate change is real, and has impacted the society and ecosystems in different ways. Examples include drought, flooding which influence agricultural crop yields, cause human health problems, changes to forests and other ecosystems, and change our energy supply. Focus should be on enhancing adaptation measures by the most vulnerable members of the society, through local National and International planning for the changes that are expected to occur.

Keywords: adaptive strategies, Climate change, coping strategies, drought, and indigenous knowledge

1. Introduction

Relying on rain fed agriculture in the Dande valley, the Northern part of Zimbabwe has posed a serious threat to the indigenous people vakorekore people's livelihood. Dande valley is a low lying area characterized by very low erratic, unreliable rainfall, periodically experiences alternate adverse climate conditions, drought and foods respectively. However besides the fragile climate conditions Dande valley is characterized by very rich self tilting soils. A climate change has been attributed to the mentioned adverse climate conditions. [12] predict that these conditions are likely to continue as the universal climate is changing, this means agriculture is and will continue to be threatened, hence disruption in poor people's livelihood. The thrust of this paper therefore is centered on the adaptive strategies to climate change especially drought by the local people from the Dande Valley in ward One Kaitano area of Mt Darwin District. According to [14]. Climate change is defined as significant change in weather patterns of a specific area or region over a long period of time. Climate Change is a manifest of various intertwined factors that include anthropogenic activities, earth's dynamic processes, external forces, that shape climate include such processes as variations in solar radiation, deviations in Earth's orbit, and variations in the level of greenhouse gas concentrations [1]. Climate change indicators include changes in agricultural yields, vegetation, pest and diseases.

The Scientific community is in agreement that climate change is taking place and is impacting heavily on the people's livelihoods [3], [1], [12]. Indigenous knowledge system indicate that there are quite a number of coping strategies that have evolved over the years [15]. Africa is

ranked as one of the worst continent affected by climate change especially to the poor communities in most rural areas. Reasons for this include low levels of adaptive capacity and over reliance on natural resources for example land; water based natural resources, which are also prone to the effect of climate change. Some parts of Africa are semi arid and agricultural activities have been and will continue to be adversely affected as growing seasons have been reduced. According to [12] domestic food in most parts of rural Africa has declined by 10%. Some scientist have projected a 50% reduction in food production by 2020 with poor peasant farmers being the worst affected putting their livelihoods under threat.

Climate change others consider it as a monster capable of destroying environmental, social, and economic fabric of any society on this planet today. In most semi arid regions of Africa, climate change will be felt heavily on the livelihoods and living conditions of the poor. Hence it poses a serious threat to the attainment of the Millennium Development Goals (MDGs) and any meaningful sustainable development in Africa.

1992, 2002 has been recorded as the worst drought years in Southern Africa, this had a negative impact on rural people who depend on rain fed agriculture. Many other regions are affected, and will continue to be affected by adverse weather conditions. The Dande Valley is a semi arid region whose temperatures are generally high throughout the year. Agriculture is the main source of livelihood, and Climate change as known elsewhere in Africa has meant animal production and crop production has declined over the years. Global warming anomaly predicts an increase in temperature of 3°C and + 250 million people may be at risk of food

insecurity with half of these people found in Western Asia and Africa. Dande valley is composed of very poor peasant farmers who also over depend on natural resources this puts the region as one of the most vulnerable parts of Zimbabwe to Climate Change. Food shortages have been experienced in the region when it experienced the worst drought of 1992 ad 2002, adding on the list the peasant lost their livestock water became very scarce.

Zimbabwe Meteorological Services (ZMS) predicts a general steady increase in temperature and most parts of the Zimbabwean economy would be at risk because of climate change. Top on the least is the agricultural sector which almost 70% of the population in Zimbabwe depend on.

Drought is a difficult term to explain and many scientist have given different version of its meaning, however what remains core of all these definitions is that, drought is situation specific, it varies in terms of its intensity, effects, is spatially and temporally variable, it can be a reoccurring natural phenomenon. Drought could be classified as, hydrological, meteorological, agricultural drought however all have an impact on farming and socio economic activities of people. Hydrological drought signifies inadequate surface water supplies, unlike the agricultural drought, hydrological droughts are longer in time scale. Meteorological droughts, are rainfall based, they are on indication of a dry spell due to absence or departure of rainfall over a longer period. Agriculture drought as already mentioned are of a shorter spell and are a result of inadequate soil moisture of specific location, to a specific crop and time. The levels of moisture will reduce crop yields and agricultural production.

The main objective of this study was to assess the impacts of climate change and variability on rural livelihoods with particular focus on agricultural production, food security and existing adaptive capacities in the semiarid areas of Dande Valley. Droughts and Floods have over the years periodically become a threat to the livelihood of poor communities. It is imperative to note that the adaptive strategies of these affected communities' needs to be taken seriously. Adger, et al (2003) The study focused on the adaptive strategies used by the locals in Ward one of the Dande Valley in Zimbabwe.

2. Study Area

Dande Valley is found in the Northern Part of Zimbabwe the universal inhabitants of the area are called Vakorekore Dande Valley is a lower region, which houses quite a number of District namely Mt. Darwin Mzarabani and Mbire of Mashonaland Central. All these districts have wards which are part of Dande Valley which share the same physical, sociological characteristics. Mean annual rainfall is potential evapotranspiration above 1500mm average, maximum temperature + 26°C and the main rivers are Hunyani, Hoya, Musengezi, Musingwa and Mukumbura. The study area is found in Mt Darwin district and is in ward one better known as Kaitano. Musingwa, is the main river that pass through the study area, it is a seasonal river. There are patches of wetland in the area. Perennial water reservoir points within these identified rivers. (*Pana Nyangwena*)

meaning the crocodile spot. Ward One of Mt Darwin District lies in the Dande Valley ([Figure 1](#)).

Mt Darwin district lies in the Northern part of Zimbabwe and houses the Dande Valley in its northern part. It lies within the semi arid areas of Zimbabwe where rainfall is unreliable and erratic and there are frequent food shortages [10]. Thus the area provides an opportunity to study impacts associated with community livelihoods. Climatically, Dande Valley receives a unimodal rainfall regime, which spans from mid November to early April. The mean annual rainfall ranges from 450 to 750 mm. The Dande Valley region experiences annual mean, maximum and minimum monthly temperatures of 23°C, 27°C (October) and 18.4°C (in June) respectively. The [16] show that the study area had a total population of 3 489 people with 819 households.

The area is characterized by rich self tilting soils, and some of the farmers do not use fertilizers for traditional reasons. Dande Valley is characterized by poor people who are vulnerable to the effect of climate change, mainly because they lack resources, income and over rely on Indigenous knowledge system, [13].

However some have blamed their poor status to the effect of climate change mainly because year in year out, their crops had been affected by either drought or floods.

3. Methodology

Data was collected using a cross sectional survey of the small scale farmers in the study area, and this was supported by focus group discussion, structured questionnaires, interview of local indigenous knowledge experts, key informants, interviews, desktop searches, which answered most of the useful relevant sources of secondary data. The research assistant and the researcher, organized a pilot, or a baseline a survey in the study area of Dande Valley. 100 households were interviewed, 80 respondents were woman and 20 were men. Key Informants were drawn from village heads, indigenous knowledge experts, government and nongovernmental officials based in the area.

Group discussion comprised women, men and children. All this was supplemented by field observation carried out by the researchers. A panel of key information constituted, traditional village heads, and Indigenous knowledge experts participated, and these contributed immensely in producing the consensual matrix for the most important adaptation Strategies to drought in Dande Valley. Information solicited from the affore said meeting was, supplemented by secondary source of data i.e. related literature. Respondents were randomly selected from their pools or groups. Reading all the respondents was not any easy task since the study area is found at the periphery of Mt Darwin District, some of the parts are not easily accessible. Indigenous travel means had to be used for example use of ox drawn carts. Though permission had been sought from local leadership some of the respondents were difficult to work with. Some refused to be interviewed or they could mistake us for government officials who wanted to give them food aid, hence they would shift attention when

interviewed, for Example one women said “Ko Chibage chedu chinouya rinhi” “when are we going to receive our grain” Many people in the area use Chikore kore the local language as a means of communication, the researcher had to translate the English version of questioners into Chikore kore. Random Selection from the available farmers made it possible to tap unbiased response from the community studied. The solicited data was qualitatively analysed through triangulation of narratives from focus group discussion, key informant interview and evidence from field observations. Summaries of the narrations were made part of the discussions in this study. Statistical Package for Social Science (SPSS) was used to analyse the quantitative data coded.

4. Results and Discussion

Of the 100 individuals interviewed (n = 83) 83% concurred with the idea that indeed climate change was taking place (n = 17) were not aware or didn’t believe climate change was taking place. However the majority 96% (n=96) indicated that they were using different adapting strategies and had necessary indigenous knowledge to adapt and mitigate themselves against climate change. Almost all stated the following as the main adaptation strategies namely;

reliance on the non timber forest and of note the Zeziphus Mauritania (*musawu*), adjusting and realigning their existing agricultural practices, environmental migration ,adjustment

in socio economic activities such as livelihood diversification and relying on formal institution structures.

The research established that the majority rely on Zeziphus Mauritania, as a food safety net, as they get remarkable amount of money from the sale of *masawu* fruits, or alcohol brewed from the *masawu* fruits. All of the respondents acknowledged the fact that they all know how to dry and store the Zeziphus Mauritania fruits as they adapt to drought throughout the year. Other fruit trees they also turn to during drought are the baobab fruits (*mawuyu*) used to prepare porridge or a source of income. These important tree species are guarded jealously by the Dande Community and indigenous practices are passed on from generation to generation to ensure sustainability, [1], [4],[13]. The study established that severe drought was experienced in the Dande Valley in 1992 and 2002. Asked to give reasons behind the droughts 68 % linked it to punishment by the ancestors or god for unsocial activities being practiced by the so called (born free generation) those who were born after Zimbabwean independence (1980). All the respondents gave the following agricultural practices as some of the adaptive strategies to climate change diversified or mixed farming, improved short duration drought resistant crops, supplemental irrigation, wetland farming.

In the study area the most common crops grown by the farmers in Ward one of Mt Darwin District are shown below:

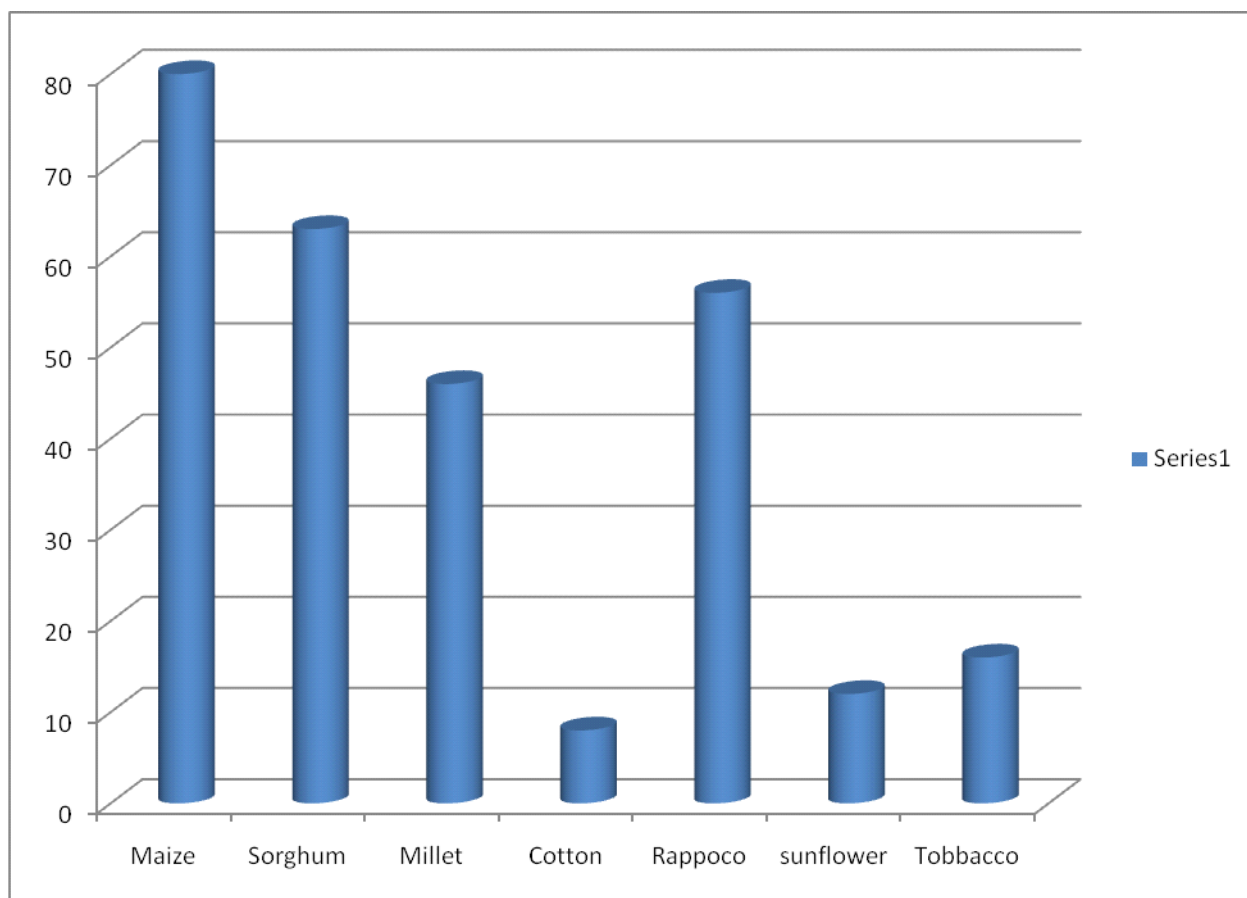


Table 1.0

80% of the respondents in the study area grow maize and use the short term variety popularly known in the area as the “*mukadzi usaende*” (my wife don’t go), meaning very soon we are going to harvest even though we are experiencing hard times, presumably because of drought. Even though they grow many different crops maize is the main source of the staple food “*sadza*”. Of late tobacco has been introduced in the area replacing cotton mainly because of its unecomic value on the market. Table 1.0 shows how unpopular cotton has been despite the fact that some farmers would have migrated from as far places like Masvingo just to grow cotton.

As mentioned before the farmers in the Dande Valley practice mixed or diversified farming, were a variety of crops are grown in the same field and these include beans, groundnuts, sorghum, millet depending on the farmer’s choice. All these crops are grown during the rainy season summer October to April. This practice is known to be a food security measure. [8], [9], [5] also observed that mixed or diversified cropping improve enhances storage and act as a safety net or reserve in which to rely on in times of need during the dry or drought periods.

The study noted that 80% women were the custodians of these crops, reasons for the gender discrepancy rested upon the fact that, environmental migration is one of the coping strategies. Hence man normally live to these village to find employment in towns or other neighboring countries like Mozambique, Zambia or even South Africa.

The results from the study area, through focus group discussion, revealed that though Dande valley is dry land, it has patches of wetlands like the Benya and Kagurura wetlands. Peasant farmers have naturally secured a farming option area, especially during drought period, and they safeguard these areas jealously [3],[4]. The study areas, farmers because of the high temperature experienced in the Dande Valley farmers, have devised technique to ensure the sustainable utilization of residual moisture, [10], [9],[13], and these include:

- Raised ridges
- Mulching
- Deep planting

Dande valley being a fragile environment [13],[4], characterized by floods or drought. Excess water at times is controlled by making raised ridges. Different crops have also been grown in these regions even vegetables like cucumbers, rape, and tomatoes.

Crop residue or local grass is sometimes used to cover soil in the field, this is meant to reduce moisture loss, most of the farmers who attended the focus group discussion agreed that they used the method to retain moisture in their fields; however this practice is normally practiced in the patchy wetland areas of the area under study.

Evapo-transpiration is a serious environment threat to the farmers in Dande in an effort to combat this, some when planting dig very deep hole to ensure that the seeds will at least receive considerable moisture that will at least enable

them to germinate. Observation and reviews of related literature testified the farmer’s beliefs [5],[7]. 76% of the respondents acknowledged that they had at least an average 800m² wetland plot which they use a garden, this is to ensure that at least they have something to learn in times of drought. Treddle pumps though not many were seen being used as means of irrigating the crops in the garden fields.

Environmental migration is one adaptive strategy [14], that has been taken by the farmers in Dande Valley. This concurs with [12] which reads “climate related disruptions of human populations can be expected over the coming decades”. 80% of the respondents acknowledged the fact that roughly 60% of the male population were involved in some form of environmental migration. The researchers of this study concurred with the [12]’s assertion, as they observed some of the deserted homes due to environmental stressor’s especially from those who were not the original inhabitant of the area.

A statistical analysis of the environment migrants revealed that there was positive correlation between environmental migration and the movement elsewhere when a natural disaster strikes like drought. The reason being the fact that some fail to adapt to the ever changing climatic condition in Dande valley, yet the original inhabitants, will have acquired the adaptation strategies over a long period. The ability of the Zimbabwean government to manage the environmental migration due to drought is a subject worth investigating considering the prevailing harsh economic conditions.

Lastly the study established that farmers, also relied on external formal institutions [6], [7], provide relief aid in times of drought, Almost all respondent highlighted international federation of Red Cross, World Vision and the government as the main food aid donors, [2]. The research failed to dwell much on this strategy as authors felt it was not a sustainable strategy to combat climate changes but recommends its worth investigating.

5. Conclusion

Climate change is real and adaptation strategies in the fragile environments like Dande Valley exist. Various strategies the research established are used and these included reliance on non timber forest fruit trees like the *Zeziphus Mauritania*, which provide food safety nets during drought period, adjusting and reliance on external formal institution like non-governmental organization. The adaptive strategies the research noted should be documented and given due recognition, as the locals are the only people who have day to day contact with their ever changing environment. The study achieved its main thrust of exploring the adaptive strategies to climate change used by the rural folks in dry and regions like Dande valley during drought periods.

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