Human Responses to Climate Change in the Second Millennium AD

Lessons from Bikita and Chivi Districts in South-Eastern and South-Central Zimbabwe

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Abstract

The history of past civilisations in southern Africa from AD 700 to AD 1450 has engendered unresolved debates on the social complexities and ultimate decline of these powerful states. The purpose of this paper is to examine the history of the Mapungubwe and Great Zimbabwe state systems in southern Africa through an environmental perspective by taking into consideration human responses to persistent droughts and dry spells. The theories underpinning this study are derived from contemporary societal responses to similar environmental hardships in the Bikita and Chivi districts of southern Zimbabwe. Using rainfall data, and interviews with chiefs, villagers, farmers and experts, this study notes that the occurrence of droughts and dry-spell experiences interfere with sociopolitical organisation. The concepts of sustainability, resilience and transformation are used to explain what could have transpired in societies in southern Africa in the second millennium AD in the face of persistent droughts and dry spells.

Keywords

historical climate change – droughts – sustainability – resilience and transformation – Great Zimbabwe – Mapungubwe

1 Introduction

This article focuses on drought and dry-spell occurrences in southern Zimbabwe over a period of eighty years to explore the effect these climatic events have on social organisation. The aim is to understand the role of climate change in social formation and the decline of complex societies in southern Africa. This study does not make conclusive statements regarding the role of climate change in social complexities but it does allow concrete facts to be stated about the impact of climate change on social organisation.

Resilience, vulnerability, adaptation and transformation define the new terminology that describes societal responses to catastrophes of different intensities. The conceptual insight of this research not only indicates occurrences of specific drought and dry-spell events in the context of environmental change, temperature and rainfall variations and climatic changes, but also relates to how people may have dealt with natural disasters in such circumstances in the past. Although it is very difficult to prove how historical societies interacted with the environment, whatever history presents in terms of transformation and reorganisation has to be understood as a result of legacies of past choices, beliefs and actions (Redman, 2005: 71). This study proposes that, through a cultural ecological perspective, one may identify, describe and explain how the process of rise, development and decline of states took place.

2 Background to Bikita and Chivi Districts, and Their Relevance to Social Complexity in the Second Millennium AD

Zimbabwe is located between latitudes 15° and 18° S and longitudes 23° and 33° E. It is bordered by South Africa, Mozambique, Zambia, Namibia and Botswana (Muzawazi, 2015: 5). The country is divided into provinces, with the southern part of the country falling within Masvingo Province in the southeast. Masvingo contains seven administrative districts, which include Bikita, Chivi, Gutu, Masvingo, Zaka, Mwenezi and Chiredzi. The first two are the areas of study. Figures 1 and 2 below are maps which show Zimbabwe and the study area in particular.

Zimbabwe has five distinct agroecological zones, distinguished by annual rainfall variability and agricultural potential (Vincent and Thomas, 1960). Among these agroecological zones, Natural Regions I and II are regarded as the most productive, while the other regions are characterised by low, unreliable rainfall (Chikobvu et al, 2010: 4). The area of study falls in Region V (Muzawazi, 2015: 6), characterised by high temperatures, heat waves, El Niño effects and

FIGURE 1 Location of Masvingo Province, Zimbabwe
SOURCE: MAP BY CHIKODZI D.

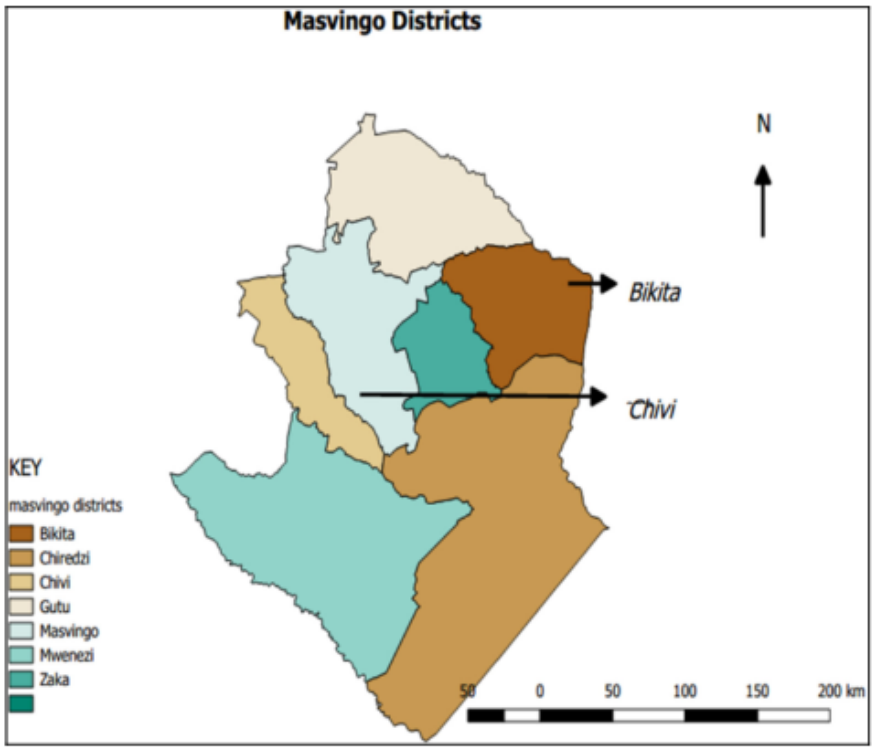

FIGURE 2 Location of the study area in Masvingo Province, Zimbabwe
SOURCE: MAP BY CHIKODZI D.

unpredictable rainfall.[1] What is clear is that the two districts have distinct and particular soils, which are closely related to their geology, climatic regime and topography. Some 70% of the population in Zimbabwe depends on farming, which makes agriculture the main source of livelihood in rural areas (Ndlovu, 2011: iv; Mushore et al, 2013:101).

What makes southern Zimbabwe important in this study is the evidence of early state systems in the region. Manyanga, Pikirayi and Ndoro (2000: 69) point to recent evidence from south-east and south-central Zimbabwe, which shows that the region was intensively occupied during the early second millennium AD. Further evidence comes from the National Museums of Human Sciences records (Zimbabwe, in Harare). The early second millennium AD in southern Africa marks a period when state systems developed and declined. Examples include Great Zimbabwe and Khami states, although many other sites of different sizes and greatness are widely distributed across the country. Great Zimbabwe (now a World Heritage Site), represents the greatest political centre of the past complex societies. The research area is part of a much bigger region in southern Africa, which witnessed the development of egalitarian communities into socially complex societies. It is therefore important to view the cultural landscape of southern Zimbabwe in terms of its relevance to the social complexity of southern Africa.

Many of the contemporary communities in southern Zimbabwe are populated by societies which directly related to these historical sites. For example, it is believed that the Karanga people migrated from Mapungubwe state and occupied Great Zimbabwe state between AD 1290 and 1450 (Huffman, 2000: 14). Studies also show that these communities in southern Zimbabwe are closely related to ethnic groups in South Africa and Botswana—for example the Sotho, Tsonga, Venda and Kalanga (Manyanga, 2006: 91). While physical boundaries exist today between Zimbabwe, Botswana, South Africa and Mozambique, available history and evidence suggests that they were absent in the past.

3 A Brief Archaeology of Mapungubwe and Great Zimbabwe

The Shashe-Limpopo basin in southern Africa contains evidence of past civilisations—centres such as K2, Shroda, Mapungubwe and Great Zimbabwe states —which have long drawn the interest of researchers. The formation and subsequent decline of Mapungubwe and Great Zimbabwe states have been dis-

1 Interview, Mr Chidhuza, 18.05.2018.

cussed and explained from various perspectives. Previous studies took into account historical, archaeological and environmental aspects to explain the social establishment and collapse of these states. The occurrence of droughts and dry spells in the second millennium is recorded but the magnitude of their impact on social organisations has not been well explained. Hannaford (2014) is not comfortable correlating climatic shifts and societal change but suggests that further inquiry is needed into the processes and mechanisms involved. Many archaeological sources claim that the climatic episodes experienced in southern Africa from the end of the first millennium to the second millennium AD presented different scenarios to different societies and the impression is that societies developed or declined due to climatic shifts, hence this probe for clarity and convincing explanations for that coincidence.

The construction of the chronology of early states in southern Africa has been dominated by the linear notion that Mapungubwe state (AD 1220–1290) was the first, followed by Great Zimbabwe state (AD 1300–1450) and Khami state in AD1450–1830 (Huffman, 1982, 1996, 2000). However, this idea has been challenged by new views which accommodate the peer-polity development idea (Chirikure et al, 2013: 76; Manyanga et al, 2000). This purports that social complexity in this region started from as late as the first millennium AD and resulted in the formation of states such as Mapela, Mapungubwe, Zimbabwe Hill and Khami. Current evidence from radiocarbon dating (Bayesian model) and material culture suggests that there were multiple trajectories of social formation, which overlapped chronologically.

4 Paleoclimate and the Second Millennium AD

Of interest are discussions on the collapse of Mapungubwe and the rise of Great Zimbabwe in the context of climate fluctuations during the Medieval Warm Epoch (also called the Medieval Warm Period and Medieval Climate Anomaly, which occurred during the eleventh to thirteenth centuries) and the early phase of the Little Ice Age (AD 1600–1850). While there were significant climate changes in the transitional stage from the Medieval Warm Epoch to the Little Ice Age in southern Africa, the whole process of climatic variations worldwide is less understood. Scholars have observed that, globally, climatic anomalies are connected with shifts in the Inter-tropical Convergence Zone (ITCZ) (Lozano-García et al, 2007:1; Russell and Johnson, 2007: 22; Nash et al, 2016: 16).

Scholars regard the Medieval Warm Epoch as a transitional period characterised by high temperatures, which demarcates the first and second millennia AD (Nesje and Dahl, 2002: 139; Nash et al, 2016: 9). What remains obscure, and

indeed contested, is the nature and timing of this period, which varied according to the different scales of continents. The Little Ice Age is controversial, too, because it was not an unbroken period of cold or warmth. Defining the term Little Ice Age has always been problematic since it caused regional differences in climate development. The causes and mechanisms behind these differences remain unclear but what is certain is that the Little Ice Age was a global event. Therefore no one disputes its occurrence.

These two periods show distinctive climatic features across the world. The general events brought about by the Little Ice Age were many and varied and these included intensely cold seasons, heavy storms, droughts and heat waves (Fagan, 2003: 13) and temporal warm intervals (Lozano-García et al, 2007). Of importance when addressing these climatic shifts is that they were not constant but showed persistent warming or cooling respectively (Soon et al, 2003: 237). An interesting aspect of these climatic episodes in the second millennium is that they caused cultures to thrive, adapt or fail (Prentice, 2009: 2). The expansion of states is therefore associated with the Medieval Warm Epoch whereas a decline of many societies was caused by the Little Ice Age.

In southern Africa, a warm period occurred from about AD 500 to 700, at a time when many first early agropastoralists were moving into the region. This was followed by the Medieval Warm Epoch from AD 1000 to 1300 (Huffman, 2007: 99). Oral histories and archaeological evidence suggest that climate shifts from the second millennium AD in southern Africa offer a new perspective on agropastoralist populations in the Shashe-Limpopo basin, where increased social complexity coincided with the Medieval Warming and wetter conditions around AD 900–1300 (Tyson et al, 2002: 132). Hannaford and Nash (2016: 376) say that the Medieval Warm Epoch between AD 1000 and 1220 swelled the flood systems in the Shashe River, reducing exposure to drought and enabling intensive agriculture, which promoted population growth. According to Huffman (2007: 99), the climate of the time permitted the build-up of large populations in that basin and the conditions of the Medieval Warm Epoch formed the environmental backbone of Iron Age life.

All the possibilities for societal demise can be accepted but there still lacks a well-defined theory or a convincing conceptualisation to explain the process. Hannaford and Nash (2016: 378) claim that beyond coincidences of social formation or decline with climatic shifts, there are minimal grounds to ascertain the decline of Great Zimbabwe, even when scholars have cited geopolitical and economic changes. This problem is not helped by the fact that the available paleoclimate data cannot substantiate inferences of that state's demise. Therefore, this article connects livelihoods with politics and the governance of societies. It is not enough to explain social development or collapse based on

coincidences since, at one point, these cultural changes had been interpreted solely with no climate change interference. Against this thinking, Manyanga (2000) cautions by saying that the development or decline of complex societies is related not only to environmental issues but also to political issues as well.

Other scholars have examined the history of state systems in the context of environmental changes, particularly droughts (Pandey et al, 2003: 47; De Monocal, 2001: 661). Human migrations in response to drought and floods are a known factor (Boko et al, 2007: 452) but little attention has been paid to how these past complex societies responded in such situations. Their decisions in the face of resource constraints are not known, which then creates a knowledge gap in southern Africa.

5 Methodology

This research combined archaeological ethnography and archival research to understand how the environment has changed or is changing in southern Zimbabwe, and the human responses to this. The archaeological ethnographic approach involved discussions with farmers on the subjects of ecological histories over eighty years, and included oral histories and personal biographies. People's experiences, perceptions and past decisions in the face of natural catastrophes were understood through their narratives. The researcher was thus able to understand people's culture/behaviour through their lived experiences or from the perspectives of those under study. In addition, a desktop study was conducted at the National Archives of Zimbabwe and the National Museums and Monuments of Zimbabwe. Studying these archives was important in order to understand the background to droughts and the dry-period experiences of the people.

Participant and expert interviews provided narratives for noticeable changes in climatic conditions, such as reduced rainfall and increased rainfall, over decades. Focus group interviews using the Participatory Rural Appraisal (PRA) technique were carried out to discuss with farmers how the environment is changing or has changed, perceptions of drought and the effect on their livelihoods. The Participatory Rural Appraisal (PRA) approach is considered to be a popular and effective method for gathering information in rural areas (Chikodzi, Murwendo and Simba, 2013: 40). Expert interviews were carried out with respondents who held key positions in relevant institutions, such as the Department of Agricultural Technical and Extension Services (AGRITEX), district councils, the Meteorological Department, and the National Museums and Monuments in Zimbabwe (NMMZ). In general, the information solicited

from these interviews was memories of droughts and dry spells, environmental changes, human responses and adaptation options.

The participant interviews involved structured and semi-structured interviews, purposively administered with community leaders and individual family households. From each district, the researcher did interviews using purposive sampling technique to ensure a balance in terms of coverage. The researcher was directed to the elderly individuals in the area, who were deemed to have a historical knowledge of the place. The sample size was shared between south-central, western and south-eastern areas to allow comparative measures as well as an evaluation of the whole region. The survey targeted farmers who were over fifty years of age as they were considered old enough to report on weather change patterns over a longer period. The study also involved five chiefs per district with ten villages under a single chief. This meant that a total number of fifty villages per district participated in the study. In each of the ten villages, five households were randomly selected specifically for interviews. The total sample size was fifty households for the study. Eight key experts from various government departments and state institutions were selected for interviews. The reliability of the research sampling method was determined by the sample size, which ensured that it accurately reflected the experience of the entire population.

6 Conceptual Framework

The researcher proposes that through cultural-ecological perspectives one may identify, describe and explain how the process of the rise, development and decline of a society took place. Ecology is usually associated with the physical or material world and this is interrelated with human beings and their culture. Therefore, ecology connects environmental sciences with human culture. Hannaford et al (2014: 434) point out that the cultural-ecological approach gives more insights into human-environment relationships than other approaches, which are weak in explaining coincidences of events. Memories of different droughts and dry spells can be used to interpret climate events to which people responded. The researcher suggests that the memory of climate change in recent times might be documented or communicated orally but the beliefs and the culture can tell us about the remote past. In this case, environmental memories are not necessarily verbal, but embedded in habits, routines or iconic images to which one can allude to appreciate environmental information. As years pass by, memories of the past may diminish, but people do not forget everything.

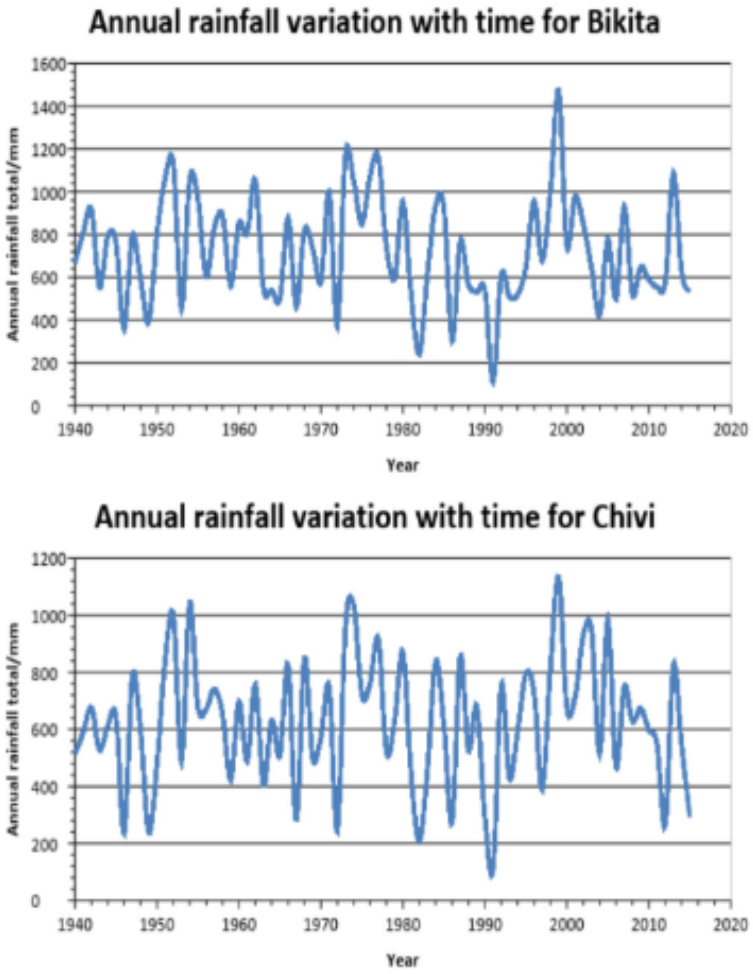

FIGURE 3 Rainfall data for south-east and south-central Zimbabwe
SOURCE: ZIMBABWE METEOROLOGICAL DATA, HARARE

Studies in southern Zimbabwe indicate a history of droughts and dry spells of various intensities and magnitude. Figure 3 presents rainfall data for Bikita and Chivi districts between 1940 and 2020. It shows that southern Zimbabwe communities experienced varied rainfall (excessive, normal, insufficient), which had repercussions on the economy and the society at the large. The two above-mentioned districts have no weather stations. Therefore, Bikita's rainfall history is represented by readings from Zaka station, whereas Chivi district is represented by readings from the Renco Mine station some 60 km south-east of the town of Masvingo.

7.1 *The Impact of Drought and Dry-Spell Occurrences in South-Eastern and South-Central Zimbabwe*

The interviewees mainly explained the impact of droughts and dry spells in southern Zimbabwe in the social, economic and political contexts. There were some striking responses to drought occurrences in Bikita and Chivi regions. Chiefs and villagers from both districts agreed that the hunger that resulted from droughts divided people and strained social relationships. It compelled people to disregard traditional or royal authority. It was indicated that the climate vagaries caused chaos, misunderstandings, fights, hostility and rampant disease. Human and livestock deaths were witnessed in such situations. Apart from that, the interviewees stated that drought as a catastrophe robbed people of their belongings in that it led to unfair trading.

Agronomists from both districts, on the other hand, viewed hunger experiences in the region as connected to climate change. However, they noted that the timing and onset of seasons, and rainfall patterns, distribution and frequency, had all changed. Even the mists that were common in the past no longer occurred. The farmers who were interviewed narrated that instead of encountering droughts after every five years, they were experiencing them more frequently in recent times. The positive impacts of droughts and dry spells which resulted in innovations were noted but these were outweighed by the negative impacts.

The agronomists related hunger to social and economic vulnerability, whereas the chiefs and villagers saw the potential threat to power and relationships. Headman Mpakwa, under Chief Mukanganwi from Bikita District, stated that hunger created a gulf between chiefs and their subjects, threatening their power and role in society.[2] He further explained that during normal patterns of drought communities always looked up to their chiefs/kings, but in recent times even chiefs suffered from these recurrent droughts.[3] The same perception was shared by Chief Marozva who pointed out that it was not easy to govern hungry people because what mattered most in drought situations was to feed the people before they could submit to royalty.[4] According to him, hunger and starvation among his subjects weakened him as a traditional leader.[5] It was also asserted that failure by chiefs to deliver the expected help to their subjects reduced them to ordinary people. In emphasising how hunger divided people, Headman Madamombe from Chivi District remarked:

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2 Interview, Headman Mpakwa, 19.05.2018.

3 Ibid.

4 Interview, Chief Marozva, 06.06.2018.

5 Ibid.

> Hunger is a war in itself. As a chief, it's not easy to rule people who are hungry; you can't charge any case, even with little costs because that person cannot afford to pay it. That same person will fight against you.[6]

Chief Marozva, from Bikita District, related that as a result of the continuous occurrences of droughts in the area his subjects were no longer as loyal as they used to be in the past.[7] Chief Mazungunye also said: "there is no cooperation where hunger exists".[8] On a similar note, villagers under Chief Budzi, also from Bikita District, concurred with their chiefs that hunger caused petty issues to develop into major ones, leading to unnecessary conflict.[9] Those under Chief Budzi's area highlighted the possibility of strained parent–child relationships during a drought situation. They mentioned that children would think that parents were not doing enough to look after them, and vice versa.[10]

In recent times, the politics of hunger has been associated with donor food, which was blamed for dividing people through the selection criteria of age or poverty level (difficult to measure), which benefited some and discriminated against others.[11] Headman Masunda from Chivi District added that if people desisted from accepting donor food in exchange for their labour or /service for food, unnecessary misunderstandings and fights could be avoided.[12] He further mentioned that those who were not ready to work or passionate about working burdened the community. Such people were accused of rising against others during years of catastrophe. Chief Marozva's villagers, in Bikita District, added that hunger politics usually began at family level before getting to the communal stage.[13]

The District Crops and Livestock officer for Bikita District stated that evidence of climate change in south-central Zimbabwe was characterised by the emergence of invasive vegetation species, such as *Lantana camara*.[14] He further explained that such vegetation is known for lowering agricultural production. The agronomists cited the increased frequency of cyclones and dry spells as triggering droughts in both regions.[15] Despite other factors connected with

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6 Interview, Headman Madamombe, 06.07.2018.
7 Interview, Chief Marozva, 06.06.2018.
8 Interview, Chief Mazungunye, 18.05.2018.
9 Interview, Chief Budzi, 29.05.2018.
10 Interview, 01.06.2018.
11 Ibid.
12 Interview, Headman Masunda, 05.06.2018.
13 Interview, 25.05.2018.
14 Interview, Mr Chidhuza, 18.05.2018.
15 Ibid.

TABLE 1 Human responses to drought, 1942 to the present

Characteristic of economy	Drought occurrences	Human response
Farming (crops and livestock)	1942–1960	– Temporary migration – Donor food – Food-gathering (wild fruits, grasses and tubers)
	1960–1980	– Temporary migration – Proliferation of donor food – Food-gathering
	1980–2000	– Temporary migration – Active food donation – Introduction of gardens and irrigation schemes
	2000 to present	– Introduction of new farming technologies (conservation farming, crop rotation, water harvesting) – Adoption of drought-resistant crops (small grains) – Introduction of short-season maize variety – Petty business, e.g. poultry farming, small livestock husbandry.

hunger, Chivi communities linked hunger to reduced maize production.[16] One point to note is that drought occurrences for both regions are not tied to low rainfall but to shifting rainfall patterns.

Similarities in the effects of droughts were noted for both regions. These included social problems such as prostitution, high-school drop-out, early marriage, divorce and theft, which were consistently on the increase. The District Crops and Livestock officer for Bikita District stated that before the introduction of feeding schemes at schools the total number of pupils was low, but more students attended the schools after the programme was introduced.[17] The researcher was told that risks of hunger made women more vulnerable as they were subjected to early forced marriage and prostitution. Headman Mpakwa made it clear that not all communities under his area were still tied to farming;

16 Interview, 05.06.2018.
17 Interview, Mr Chidhuza, 18.05.2018.

some had shifted to non-agricultural activities.[18] He further stated that community granaries and collective work were a past coping strategy organised by chiefs but due to climate change these activities had ceased.

8 Analysis

A closer analysis of the drought narratives reveals several problems that come with this type of catastrophe. Fobo (2009: 6) argued that drought impacts can be economic, social or environmental. However, from the interviews it was clear that the impact of droughts and dry spells are felt politically as well. The study found that each drought situation presented unique challenges. Possible opportunities revolved around innovation and development but vulnerability was also defined in such contexts. One point to note is that women and children are more vulnerable to climate change risks. This is supported by Muruviwa, Nekhwevha and Ige (2013: 88) who state that particular people in a society, such as the widowed/divorced women and children, are more vulnerable to climate change.

Furthermore, the agrarian nature of southern Zimbabwe's communities exposes rural people to a high risk of climate events impacting their livelihood. The occurrence of droughts invited other natural disasters, such as the outbreak of disease and insect infestations. Both the Intergovernmental Panel on Climate Change (IPPC) and the World Health Organization (WHO) have raised concerns about the potential adverse effects of climate change on human health. A study conducted by Mawere, Madziwa and Mabeza (2013: 20) in south-central Zimbabwe indicated some human diseases and ailments associated with the changing climate, which include cancer, typhoid, fevers, chronic headaches, malaria, various types of heat rashes and cholera. Hulme and Sheard (1999) indicated sleeping sickness (*nagana*) and the tick-borne livestock disease called East Coast fever as animal diseases commonly associated with climate change, which result in livestock loss (Mapfungautsi and Munhande, 2013: 32).

According to Buckland, Eele and Mugwara (2000), drought is arguably the most important climatic challenge within the agriculture sector and has a major impact on rural livelihoods. Unganai and Murwira (2010) assert that the occurrence of droughts is associated with an impact on humans and livestock. Muruviwa et al (2013: 88) observe that climate change has long-term effects on

18 Interview, Headman Mpakwa, 19.05.2018.

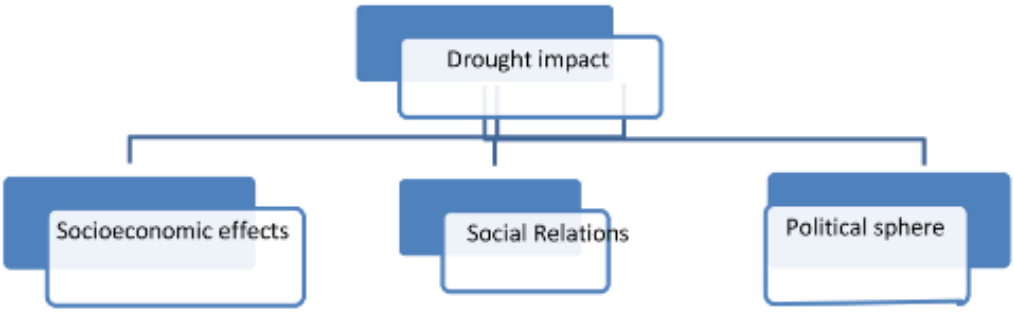

FIGURE 4 Drought impact

the resource base, such that it causes structural changes to the characteristics of a household's livelihood processes. Table 1 indicates the changes in livelihood strategies from previous years to the present period as driven by climate change.

Based on the community narratives, most droughts in southern Zimbabwe were/are triggered by insufficient rainfall, although incidences of heavy rains and cyclones are recorded during the droughts. However, perceptions of drought are understood differently. The scientific understanding points to the uneven distribution of rainfall, changes in the onset of seasons and climatic shifts as factors that compromise yields. Above all, the rainfall patterns as depicted in Figure 3 show a changing trend. Culturally, there is a taboo against cutting down the so-called rain trees because it is believed that this will stop the rain. Removal of these trees does in fact interfere with hydrological processes. It was noted during the research that the unpredictable nature and uneven distribution of rainfall exacerbates the occurrence of hunger and starvation in these regions. The preference for maize as a crop over small grains in a semi-arid region is another reason for unending hunger.

In response to this loss of livelihood, farmers sell their assets, this is referred to as asset-stripping by the Zimbabwe Human Development Report (2017: 3). Chikodzi et al (2013: 36) claim that if communities took advantage of the opportunities presented by climate change and variability they could easily embrace climate change adaptation (Chikodzi et al., 2013: 36). Figure 4 categorises and indicates the areas of drought impact.

Droughts and dry-spell occurrences in a particular area cannot be isolated from sociopolitical events that strain social relations. As the saying goes, "A hungry man is an angry man." The impact of droughts is felt by everyone and because they often lead to social unrest, those in leadership feel more threatened.

It is clear that during droughts anything can be politicised, and the politics of hunger begins at a family level. According to Manyeruke, Hamauswa and Man-

dara (2013: 283), food shortages and the depletion of water resources have a greater chance of triggering the escalation of conflicts that may influence shifts in the country's balance of power. Scoones and Wolmer (2003: 1) demonstrate the connection between droughts and their economic impact by relating livelihood adaptations to the dynamics of politics and power. This study in southern Zimbabwe shows that it is through politics that people are united or divided. Drought scenarios, therefore, create misunderstandings and conflicts that can make cooperation and loyalty extremely volatile. This is what Manyeruke et al (2013: 283) describe as the geopolitical dimension of climate change, which poses severe challenges for the political balance of power.

The speculation that most droughts in southern Zimbabwe coincide with years of intense political upheaval tempts one to conclude that politics and the occurrence of natural disasters, whether in the past or present, cannot be separated. It is clear that societal challenges become more pronounced whenever natural catastrophe affects humanity. This is the actual experience in this study, where family breakups were recorded during droughts. One can apply this to a larger community or even a kingdom where, before it is weakened or destroyed by climate change, the first impact is self-destruction. What this explains is that, before kingdoms are affected, there is self-destruction at a family level.

9 The Effect of Climate Change on Social Complexities in the Second Millennium AD

A regional overview of climatic evidence from south-central and south-eastern Zimbabwe over the past eighty years illustrates that climatic variability forces communities to either innovate or face exposure to climate change risks. The emerging results from southern Zimbabwe show different levels to which droughts and dry spells have shaped or dictated the existence of societies. Diaz and Trouet (2014: 160) regard the influence of climatic variability on human affairs as being as old as humankind. They further state (2014: 164) that abrupt climatic perturbations on different timescales, short or long, remain disruptive to agricultural societies. Similarly, this study shows that contemporary societies in southern Zimbabwe respond to these climatic shifts. An analysis of drought history in contemporary society shows that climate change issues are not divorced from social, political and economic issues. Therefore, when exploring the impact of droughts and dry spells on southern African societies in the second millennium AD attention should be paid to politics and the vulnerability that comes with changing livelihoods, and the nexus of livelihoods dynamics, human responses and social organisation. This calls for contextual-

ising the recurrent shifting nature of power in Zimbabwe culture in a transformational sense, as a response to climate change.

The coalescence of past farming communities into complex states indicates their transformability. This is a phase when societies face predicaments and thus evolve through untried beginnings (Gunderson and Holling, 2002; Walker et al, 2004). The other observation made from this present study is that droughts or any natural catastrophe push people to the extremes of breaking societal norms by making compromises. From the narratives gathered in southern Zimbabwe, one may say that climate change and variability amplifies stresses in the sociopolitical fabric because it affects the governance of resources. Therefore, societies with poor central leadership and weak institutions (Manyeruke et al, 2013: 271) are more vulnerable to climate-induced conflicts. The relationship between leaders and subjects becomes strained, as does the relationship between parents and children at household level, but this can reverberate at a national level. Brown et al (2012: ii) remind us that climate change presents risks to lives and livelihoods at the individual, regional and national levels. Hunger can be likened to a "war", a period of disorder and disputes where misunderstandings and social conflicts arises. It is clear that when there is hunger, harmony becomes difficult, which affects social relations. These matrixes and complexities cannot be dismissed for the communities of the past.

The findings of the study reflect that climate change can be a powerful force of change, a force above ideology and chiefly authority. They indicate that complying with society's rules, norms and values becomes less important than responding to the individual need for survival. Climate change therefore challenges communities by either pushing or pulling people to change. Data from contemporary societies shows that climatic shifts accidentally weaken or strengthen power, depending on the decisions made. Power gradually shifts towards those who can rescue people from hunger, which weakens the existing power structures. Strauss (2012: 4) emphasises this point by stating that during such catastrophes, people make their own rules and decisions, that these new rules may not be "right" for everyone. Based on this assessment, one could argue that the local governance of past civilisations in southern Africa is very likely to have been threatened directly or indirectly by the occurrence of droughts.

Controlling people who are struggling to feed themselves is not easy. But can one also argue that the expansion/decline of states in the past was a result of this same problem? Concrete conclusions cannot be made but available data from southern Zimbabwe shows that multivariate reactions led to multidirectional responses to climate change. While the role of climate change is

acknowledged, Hannaford et al (2014: 438) have warned that misleading narratives should be avoided and caution against contextualising climate change alongside a range of human forces. This study indicates that a changing environment triggers changes in human ideology, perception of environment, livelihood sources and strategies. Under normal circumstances people are united by some sort of ideology to maintain relationships. But a negative environmental change has repercussions on social relations and social organisations. One may conclude that all climatic perturbations trigger social, economic and political disorder. Therefore, climate change cannot be separated from power, ideology and organisation of the social entity.

The formation and decline of past complex societies in southern Africa can therefore be viewed in the context of drought-coping decisions. Travelling long distances in search of food or pastures for livestock is evident in past and contemporary societies. In a way this exerted territorial influence. Strauss (2012: 3) observes that changes in livelihood sources and subsistence strategies through time and space caused past migrations. It is possible to claim that power and influence over those who migrated to distant places was lost or undermined when those people left. Migration, hence, is accepted as a coping strategy and this, probably, explains how former states became vulnerable and were weakened.

However, Holmgren et al (2008: 591) point to the need for understanding adaptive responses that distinguish those societies that survived major environmental impacts from those that did not. At this juncture, we can look at those components of societies that allowed the capacity for flexibility and relevant adaptations. Hannaford (2018: 104) identifies synergies between different types of vulnerability and reveals how resilient systems could be constituted and dependent on systematically entrenched individual vulnerabilities. The major impact of climate change for past societies, as observed by Hannaford et al (2014: 415), is its repercussion on the economy of the time, and this is reflected in contemporary societies. If the economic base is weakened, political power is threatened and societies are bound to transform socially, physically and politically. Strauss (2012: 1) argues that cultures are not static but they change in response to wars, plagues, new inventions, and environmental and climate variability. In this context, climate change can be viewed as responsible for a multiplicity of threats that interact with socioeconomic and political systems to create social conflict.

Based on the evidence on results from contemporary societies, adaptation to a changing environment is not an intended choice but a way out. Strauss (2012: 3) emphasises this point by stating that human cultures ought to be dynamic, whether they want to change or not. The controversial debate on the

role of precipitation variability and the causal link with the defining moments of the rise and decline of the Mapungubwe and Great Zimbabwe states can be ended if the process on mechanisms that relate to human responses and to the occurrence of droughts are understood. Additionally, understanding livelihood dynamics and their association with power and politics on a broader scale can give an array of some explanation for the trajectory of these complex societies. As suggested by Scoones (2009: 12), the connection between livelihoods and governance should not be underestimated. However, policies and statutes that govern access to resources and ideology should also be taken into consideration (Hannaford et al, 2014: 415).

Responding to droughts through diverse coping strategies is evidence that people are not always victims of climate change. Apart from making decisions that threaten the structure of societies it is worth considering that at particular times states come to terms with themselves. Before making claims that southern African societies of the past responded to severe droughts or climatic shifts in a certain way, one should address a series of critical research issues in line with livelihood dynamics, coping strategies, resources and technological developments and the significance of non-agricultural livelihoods. This would allow greater strides in understanding societal change in the context of climatic events and this could strengthen explanatory models for scholars studying complex societies.

Land and water constitute major natural resources available to people. Water is a significant natural resource that is compromised by extended droughts. Water scarcity is also the major limiting factor in agricultural production and the greatest source of uncertainty for farmers (Bratton 1987: 218). Consequently, climate change that results in droughts affects mainly food and water resources that are critical for livelihoods and survival (Manyeruke et al, 2013: 271). The presence of water reservoirs in the archaeological record (see Pikirayi et al, 2016) probably signifies one of the coping strategies during such circumstances but their sustainability cannot be ascertained. In other words, prehistoric wells minimised life risks. Scoones (2009: 17) states that people's initiatives and local knowledge enhance their resilience to shocks and stresses. One may be tempted to conclude that climate change is not divorced from other environmental challenges that threaten social organisations. A closer look at contemporary societies shows the strong connection between hunger, power and politics. However, the study from southern Zimbabwe further shows that social organisations slowly transform socially, politically and economically as they respond to droughts and dry spells. There is a strong connection between hunger, power and politics. That same transformation cannot be ruled out for past complex societies in southern Africa.

The explanation for and understanding of social formation in southern, eastern and western Africa has been dominated by studies that connect cultural change to climatic shifts (Huffman, 1996, 2009), but contrasting situations indicate that there is room for further enquiry. These different hypothetical scenarios whereby climate change-induced low rainfall does not affect social organisations reflects the role of resilience or sustainability. This brings the issue of livelihoods and coping strategies into the picture. Apart from relying on the so-called backbone of the economy (farming) it is possible that other livelihoods could have been pursued. Therefore, experiences of varied climatic shifts and the human responses demonstrated in this study help to explain an earlier view that was deterministic for social organisations. Findings from this study suggest that livelihood could be a perspective that incorporates human response and decisions in the face of natural catastrophes to interpret cultural change in an ever-changing environment.

Some scholars see multiple pathways and feedbacks between the climate system, natural resources, human security and societal stability (Scheffran et al, 2012: 870). While farming, trade (local and intercontinental), hunting and gathering constituted major livelihood sources for farming communities (Huffman, 2009), they also relied on a wide spectrum of livelihoods and were fully capable of adopting less-preferred strategies to avoid hunger or starvation (Manyanga, 2006). Diverse livelihood sources have been identified but Hannaford (2018:101) finds it difficult to ascertain the relative importance of some aspects, such as fishing and hunting. The significance of diversified livelihoods in sustaining a society during climatic shifts or droughts is debatable but one can formulate new hypotheses about local processes of cultural adaptation to explain how these catastrophes impacted or presented opportunities to societies. Table 1 indicates that even during severe droughts or other stress-induced environmental events, people in southern Zimbabwe employed multiple coping strategies to reduce the risk and impact of climatic change. Based on this observation, this could have been the case with southern African complex societies. The interesting aspect of climate change rests not only on the challenges it poses but also the opportunities it has created (Rodning, 2009: 183).

10 Mapungubwe and Great Zimbabwe

It is now clear that it is not enough to blame climate change alone for social formation or decline, unless opportunities and constraints are taken into context. As Huffman (1996: 59) pointed out, the correlation is not notional or specula-

tive, therefore more has to be said or investigated. In this case, one has to look at livelihood sources and their significance in the context of the agrarian nature of past societies.

The data suggests that there were different scenarios for Mapungubwe and Great Zimbabwe in terms of climatic shifts. The repercussions of extreme drought for Mapungubwe included population decline of the grazers, cattle and zebra, crop failure and destabilisation of pastoralism, with the possibility of compounding food insecurity (O'Connor and Kiker, 2004: 49). Even so, in all these climatic change situations, O'Connor and Kiker (2004: 62) point out that it was still possible for Mapungubwe society to have maintained a cattle-based economy.

According to Ndoro (2001:22), Great Zimbabwe's economic power was based mainly on cattle husbandry, crop cultivation and trade. Great Zimbabwe exported gold and imported a variety of items, including glass beads, cloth, porcelain, stoneware and earthenware (Pikirayi, 2001: 20). The environmental data indicate that Great Zimbabwe declined when climatic conditions were favourable (Pikirayi, 2005:1).

Garlake (1973) and Huffman (1986, 1987) point to the possibility that trading posts were moved from Mapungubwe to Great Zimbabwe as an explanation for the expansion of the latter's influence. Huffman (2009) views control over long-distance trade as a factor that enabled states to grow into impressive urban centres. This suggests that Great Zimbabwe grew significantly as a result of non-agricultural activities, probably driven by climate issues. Woodborne et al (2009: 100) doubt the significance of gold mining as a livelihood in a traditionally farming and pastoral society except for introducing social classes within a society. It is not clear if focus was placed on alternative livelihoods as a response to climate change but non-agricultural activities at this juncture paved the way for the expansion of its territories.

Relating the diversification of livelihood in the past to the responses of contemporary societies to drought as given in Table 1, one can hypothesise that coping strategies, livelihoods and ideology changed as a result of climate shifts and that this ultimately transformed societies. This view is supported by Pwiti (1996: 31), who has stated that the development of social complexity was initially the result of changes in economic practices, ideology and population increase rather than migration into a community. This is further supported by Manyanga et al (2000), who argue that ideological changes within a society are necessary for sociopolitical transformations. Decline occurred when humans lacked creativity and innovation, or else the growth or success of a state paradoxically led to its vulnerability (Manyanga et al, 2000). Pikirayi (2005: 12) surmises that the survival of Great Zimbabwe was compromised by the need to

respond to the vagaries of environmental change and the simultaneous desire to consolidate political and economic gains by long-distance trade.

From the study's findings, it appears that the quest to minimise risk by diversifying livelihoods is a normal societal stance. Widening livelihood sources through networks of interaction turns the fortunes of polities, as observed by Rodning (2009: 185). In reference to past hunter-gatherer societies in southern California, who experienced recurrent droughts, Gamble (2005: 98) observed that livelihood diversification was one of their risk minimisation techniques The possibility of migration towards ecologically more sustainable places is acknowledged (Pikirayi, 2005: 1) but it is clear that this is one of an array of coping strategies which defined the history of these complex societies.

If one looks closely at how droughts in recent times have triggered temporary migrations, it is tempting to conclude that past societies expanded or declined unintentionally as a result of direct/indirect shifting climatic conditions, as propounded by Huffman (2010). Various scholars (see Smith, Lee-Thorp and Hall, 2007: 115; Hannaford et al, 2014: 429; Tyson et al, 2002:13) who have studied social complexities in southern Africa understood that climate change in the form of droughts and dry spells interfered with economic systems, but their studies lacked clarity on the processes and the magnitude to which climate change affected social organisation. The connection between climate changes, the establishment of a variety of livelihoods (trade networks) and the expansion of territories during the second millennium sheds light on the context history of southern African societies.

The current study shows the diverse implications of fluctuating precipitation for societies. It was not a matter of low precipitation which negatively impacted on people but some innovations occur under such circumstances. What this really calls for is an explanation of climate mechanisms that interact at different levels in society. It is probable that a push for broadening livelihoods resulted in temporary migrations in search of natural resources, and political systems were formed by the groups who set off looking for resources. There is some doubt, nevertheless, that those who migrated looking for resources returned, having settled elsewhere.

The connection between rainfall patterns and sociopolitical relations in the study, therefore, helps to account for what could have transpired in the agrarian communities of southern Africa in the second millennium. Agriculture expanded from the eleventh to thirteenth centuries and this is considered as a primary indicator of climate-permitted human activity (Hannaford et al, 2014: 418), while livelihood diversification also could have strengthened the state's power base and influence. Thus, climate change is directly connected to what people possess or can produce at a particular time. Corresponding changes

of ideology over time and space in terms of religion and settlement pattern are reflected from pre-Mapungubwe to the Mapungubwe state and other Zimbabwe culture sites in the later period.

The history of social complexities in southern Africa in the second millennium cannot be explained by coincidences; the processes behind the human response to environmental changes should be understood. In as much as climate change acts as a catalyst and not a cause for societal changes (Diaz and Trouet, 2014: 160), it cannot be denied that whatever the variables, a society does interact with climate change.

11 Sustainability, Resilience and Transformation as New Pathways to Understanding Social Complexities

This study in southern Zimbabwe in recent times proves that societies adapt and thrive in times of large inter-annual climate variability and this reflects both the resilience and vulnerability of large complex civilisations to climate change. As in any other particular society, past complex societies were bound to decline or transform if their sources of livelihood were not sustainable or they did not pursue new livelihood strategies. Prentice (2009: 11) observes that more persistent climate change events have different challenges and require different coping strategies.

In the second millennium AD, the natural resources available to people were land and water. The exhaustion of these resources meant that livelihoods were threatened. However, the question to ask at this point is whether past societies declined or transformed as a result. In this study, the researcher argues that it is wrong to expect any particular society to remain stagnant in an ever-changing environment but it is worth considering how flexible or /rigid people can be in such a situation. The study in southern Zimbabwe for a period over eighty years reflects that different environmental experiences drive change and this gradually transforms a society. Considering this time span of eighty years, one might suggest that societal change was bound to happen, which could be extrapolated to societies that existed in southern Africa in the second millennium AD. Therefore, in this context, transformation is the best description of societal change in the context of time over space.

This complex interaction between environmental and socioeconomic processes helps to explain why Mapungubwe state did not totally collapse, but transformed into other states (such as Moloko). The factors that trigger this kind of social transformation have been observed by Walker et al (2006: 1), while Gunderson, Holling and Light (1995) connect societal failure with a

resource crisis or shifts in social values. The process for change or transformation is, however, less understood (Walker et al, 2006: 1). Can the relocation of trade posts from Mapungubwe to Great Zimbabwe explain the business/livelihood threshold limit in the Shashe-Limpopo basin? Manyanga's view (2006), which suggests a later occupation in the basin after AD1300, points to the importance of sustainable livelihood sources to the politics and power in social organisations, as reflected by contemporary studies in southern Zimbabwe.

12 Conclusion

The way people interact with a changing environment over time reflects a certain level of adjustments (as they respond to the changing situations) and transformation of social organisation. Drought narratives and rainfall data indicate acute droughts and dry spells in southern Zimbabwe from 1940 to the present. The narratives and rainfall data present not only experiences of drought but also the realities of its impact. The connection between climate change, the establishment of trade networks as an alternative livelihood and a means to expand territory during the second millennium sheds light on how southern African societies may have developed. Therefore, social formation history should be explained in the context of coping with disaster and inherent vulnerabilities instead of focusing on disaster agents. This thinking allows one to move away from environmental determinism towards the dynamic relationship that exists between climate and society at multiple scales. There is a need to question how poor people confronted with continuous stresses and shocks forge a living. Why would people continue to live in an environment where they continuously faced disasters? In coping with natural disasters, there is a possibility that societies subsist.

Is it possible that the memory of the droughts during the Medieval Warm Epoch and Little Ice Age was imprinted and remembered at a later time? No one is certain about this but there are interesting features of the modern climate of south-central and south-eastern Zimbabwe that may indicate why past complex societies decided to abandon their settlements during the thirteenth century. While it is acknowledged that there were spatial differences in the environmental setting of past societies, different soil character and agricultural systems, human responses to climatic change shows how social organisations are impacted. What researchers have failed to define is the role of dynamism in livelihoods and their connection with power. I argue that livelihood dynamics with changing ideology as a result of droughts and dry spells and time defined the history of southern Africa complex societies.

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