LINKING LIVELIHOOD AND ECOSYSTEM CHANGE IN TWO DRYLAND SITES IN SOUTHERN AFRICA OVER A PERIOD OF 30 YEARS

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CURRENT MASUNUNGURE

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ABSTRACT

The ongoing and rapid change (from global to local level) in climate, populations, governments, cultures, environment, land use and economies are critical issues, especially for poor rural communities found in the dryland parts of southern Africa. The manifestations of change can combine to increase rural livelihood vulnerability, through the erosion of assets and insecurity, but can at the same time create new opportunities. Studies that consider the complex nature of change across scales and how it affects changes in livelihoods, ecosystems and responses at local level, are increasingly needed. This study, carried out in two purposefully selected study sites in the communal drylands of south-eastern Zimbabwe (Marwendo village) and Limpopo province in South Africa (Tshivhulani village), examined the complex nature of change across scales by assessing the way in which change at the global scale results in localised trends, shocks and stressors, and its impacts on livelihoods and ecosystems and responses over the past 30 years. The study applies social-ecological system thinking in understanding human-environment change. Particular emphasis was put on the role of social protection and natural resources in responding to change, shocks and stressors. The study employed a mixed method approach to gather data which included a household survey, life history interviews, transect walks, focus group discussions as well as secondary sources of information.

The results of the study illustrate that shocks and stressors are common in both villages and are likely to increase in severity and frequency with ongoing and rapid human-environmental change, especially climate change. The local responses to change, shocks and stressors are primarily reactive and mainly intensify exploitation of existing natural resources and social protection as safety-nets. In Marwendo village, the villagers relied more on the use and sale of natural resource products readily available to them, whereas in Tshivhulani village they mainly tend to rely on social grants. Thus, in the future, households' vulnerability might increase, and may be worse in Marwendo village, since important components of current livelihoods remain natural resource-based and climate sensitive. In Tshivhulani village, livelihoods characterised by high dependence on social grants can have severe consequences for households as children get older or elderly members die and grants cease to be available. Social grants therefore only really offer a temporary relief. This coupled with environmentally destructive practices such as brick-moulding in Marwendo village and

uncontrolled settlements in Tshivhulani village may reinforce the negative impacts of change and thus undermine sustainable adaptation. The study concludes that multiple lenses for understanding the links between livelihood and ecosystem vulnerability in the context of the ongoing and rapid change are essential, and these provide insights into how different policy options for livelihood improvement and social protection might be appropriate for reducing household and ecosystem vulnerabilities in the future.

Keywords: Global change, drylands, vulnerability, livelihoods, responses, shocks and stressors

DECLARATION

I, Current Masunungure, hereby declare that the work described in this thesis was carried out in the Department of Environmental Science, Rhodes University under the supervision of Professor Sheona Shackleton. The thesis has not been submitted to a university other than Rhodes University, Grahamstown, South Africa. The work presented here is that of the author unless otherwise stated.

Current Masunungure

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CHAPTER ONE

INTRODUCTION

1.1 Chapter overview

In this chapter, I provide the overall introduction to this study. It sets the scene regarding the broader literature surrounding human-environment change, the impacts of this change on vulnerable rural communities and ecosystems, the challenges it poses and local level responses. The study specifically focuses on the dryland (semi-arid and arid) regions of southern Africa.

Following this, I discuss how this study will seek to contribute to knowledge on the complex nature of change. Specifically, I give particular attention to the role of natural resource and woodland product harvesting as an important household diversification mechanism. I also investigate how social protection can support coping and adaptation and whether it can substitute for natural resource safety-nets. Thereafter I present the study aim, objectives, key questions and propositions underlying the study. The last section outlines the structure of the rest of the thesis.

1.2 Introduction

1.2.1 Linking change, rural livelihoods and vulnerability in dryland environments in Africa

It is becoming evident that the on-going and rapid change (from global to local level) in climate, populations, governments, cultures, environment, land-use and economies are critical issues facing contemporary society (Wilbanks and Kates 1999; UNEP and UNAIDS 2008; Schroter *et al.* 2009; Field and Van Aalst 2014). Global level changes converge in localities, and in turn, changes at the local level contribute to global changes creating reciprocal feedbacks (Wilbanks and Kates 1999). These reciprocal feedbacks generate a variety of stressors that often result in locally experienced shocks being manifested in land-use changes, declining agriculture activities, and land degradation to mention but a few (Reid and Vogel 2006; Thomas *et al.* 2010; Fraser *et al.* 2011). Many of the changes are socio-economic, but are accompanied by increasing environmental pressures on natural resources (Swart 1996) that can affect the structure and function of social-ecological systems (Sonwa *et al.* 2012). Environmental pressures can for example lead to local and regional biodiversity changes and can have profound impacts on the functioning of Earth Systems through increasing the vulnerability of aquatic and terrestrial ecosystems (Rockstrom *et al.* 2009). In addition, these

global changes interact with, and may be exacerbated by, country-level economic, structural and political processes (Shackleton and Luckert 2015). Rural livelihoods and rural development are areas where impacts are increasingly felt especially in dryland areas of Africa, threatening the stability of these communities (Loevinsohn and Gillespie 2003) - *see Chapter 3 section 3.2.*

Several examples have been documented on how the changes act across scales (Field and Van Aalst 2014). The change in economies through for example, globalization, which links countries and economic systems in diverse and often unpredictable ways (Shackleton and Shackleton 2012), is an important issue with an effect at the local level. This is evident through "increased levels of international migration, rural-urban migration, and transportation and technological innovations that compress time-space dimensions of agriculture and livelihood activities both between and within countries" (Zimmerer 2007, page 9). In recent research, globalization has been shown to offer a mixture of outcomes (both negative and positive) for agriculture, livelihoods, and resource use (Zimmerer 2007). HIV/AIDS, another important source of change, exacerbates existing livelihood shocks and undermines livelihood strategies previously used to respond to shocks, weakening community and household level adaptive capacity (Drimie and Gillespie 2010). Evidence from work by Hunter *et al.* (2009) suggests that HIV/AIDS poses a substantial threat to household food security and may intensify pressure on local natural resources, especially in dryland areas.

A series of reports produced by the Intergovernmental Panel on Climate Change (IPCC) (2001, 2007, 2012, 2014) not only highlight the effect of green-house gas emissions on global climate, but also that Africa will experience extreme weather events and conditions. Reduction in the quality and quantity of ecosystem services, biodiversity loss, increased extreme events and variability in weather patterns, droughts, floods, increased temperatures, the spread of disease and pathogens, food insecurity, changes in agricultural productivity (rain-fed crop production), changes in land suitability, and hindered development are just some of the impacts that climate change will bring (Agrawal and Perrin 2009; Millennium Ecosystem Assessment 2005; Reid and Vogel, 2006). Furthermore, "climate change exacerbates other threats to social and natural systems, placing additional burdens particularly on the poor" (Pauchari *et al.* 2014, *p 31*). Land-use changes will have immediate and strong effects on agriculture, forestry and rural communities, especially in densely populated areas (Schroter *et al.* 2009). Such severe changes coupled with past anthropogenic impacts on the

environment have led to increasing awareness of the need to research and find ways to address these changes.

The above-mentioned manifestations of change can combine to increase rural livelihood erosion and insecurity, and at the same time create new opportunities. The manifestations of change are more amplified in vulnerable rural communities mostly found in dryland parts (semi-arid and arid) of the world, especially those in southern Africa (Mbow *et al.* 2008; Chidumayo and Gumbo 2010; Speranza 2010) and their impacts are far reaching (Agrawal and Perrin 2009). This can be mainly through increased exposure to environmental risk, loss of livelihood opportunities and increased stress on a variety of formal and informal social institutions (Agrawal and Perrin 2009). According to Shackleton *et al.* (2010), the list of shocks and stressors in southern Africa is long and poor people across this region are exposed to a number of the shocks and stressors mentioned above. The Millennium Ecosystem Assessment (2005) report highlights that over 40% of the land surfaces are drylands, and these are home to 2.5 billion people. The effects of exposure to change is exacerbated by high levels of sensitivity in the social-ecological systems in the region, coupled by lack of capacity in civil society, the private sector and governments to respond appropriately to these emerging threats (Brown *et al.* 2012). Households' vulnerability to shocks and stressors (a result of change) is often high due to existing multiple stressors and poverty, and lack of necessary physical and human capital (Del Ninno and Marini 2005). Such households face chronic stresses such as heightened food insecurity and hunger, shortage of and/or unsafe water supplies and lack of other basic services and infrastructure, inferior education and health care services, amongst other stressors (Parker and Kozel 2007).

1.2.2 Responses to change, trends, shocks and stressors

As a result of increased vulnerability (even if not necessarily vulnerable), individuals, households, communities, governments and the private sector respond to the trends, shocks and stressors associated with change. As discussed above, vulnerable rural communities face greater exposure to livelihoods threats (Wisner and Luce 1993) and have to engage in diversified livelihood strategies against risks and uncertainties (Chambers 1989). Responses often involve renegotiation of the relationship between people and their immediate environment (Scherr 2000) and adaptation of livelihood strategies accordingly (Berkes and Jolly 2002; Snel and Staring 2001). This is meant to smooth consumption and help people to survive. Livelihood sources have become more diversified and include farming, wage labour, and employment in the rural, non-farm economy, migration, and in many drylands increased

dependence on non-timber forest products (Abdulai and CroleRees 2001; Frost *et al.* 2007; Mushongah and Scoones 2012; Quinn *et al.* 2011). Livelihood diversification appears to be a strategy born out of poverty, and intended to secure and improve livelihood (Ellis 2005). Evidence from studies in many rural settings in developing countries shows that the use of forests (cash and consumption) provides a natural form of insurance to many rural poor households (Angelsen and Wunder 2003; Shackleton and Shackleton 2004). In an extensive comparative review, Bryceson (1999) noted an increase in the contribution of non-farming income sources from nearly 40% in the 1980s to 60-80% in the late 1990s, a process described as 'de-agrarianisation' in sub-Saharan Africa.

Understanding the coping and adaptive mechanisms engaged in by households (*see Chapter 2*), whether they have access to social protection programmes or welfare interventions, the use of natural resources and other strategies used in response to shocks and stressors are important. A majority of rural poor households get several benefits from the goods and services readily available in their immediate environment (Shackleton and Shackleton 2004). Paumgarten (2005) and Shackleton and Shackleton (2004) acknowledge that households rely on a variety of goods and services, whose contribution is more than direct use and cost saving, also including indirect benefits and an important "gap-filling" and "safety-net" role. The safety-net dimension as explained by Shackleton and Shackleton (2004), involves three dimensions: increased use of a resource already an integral component of livelihoods; adoption of a resource that is not usually used; and temporary trade in wild products, which may turn into a permanent livelihood strategy.

Woodlands are therefore important natural assets for rural households in drylands environments in Africa, providing subsistence and commercial livelihood options (Campbell 2002; Barany *et al.* 2005) - *see Chapter 2*. In a study in south-eastern Zimbabwe, Campbell (2002) found that the average yearly in-kind subsistence value earned from collected woodland goods was approximately 30% of the average gross cash income per household. The commercialization of woodland products such as fuelwood, construction materials, wild foods and leaf litter provides rural households with a range of market-oriented woodland livelihood opportunities (Campbell 2002; Barany *et al.* 2005). In a study in Mozambique by Serra and Zolho (2003), charcoal suppliers in Beira earned a monthly average of US$70-140, thus providing a viable livelihood opportunity. In the livelihoods literature, woodlands or forests are an important "fall-back" option, accessible mainly through reallocating more

household labour to woodland harvesting (Wunder *et al.* 2014). This provides asset-poor households with additional alternatives in times of adversity (Wunder *et al.* 2014).

1.2.3 Gaps in understanding of local level change and responses

Given the evidence above, it is possible to propose that with increasing vulnerability and reliance on natural resources, there is potential for negative effects or feedbacks on the capacity of the ecosystems to deliver the goods and services so needed by local residents (Shackleton and Shackleton 2012). Volker and Waibel (2010) recognise that as vulnerability increases, natural resources become more critical to rural society, but at the same time more susceptible to loss. This can create a mutually reinforcing feedback loop that sets off a spiral of ever-increasing human vulnerability and ecosystem degradation (Shackleton and Shackleton 2012), from which escape is near impossible. Despite increasing numbers of studies from the region that show how vulnerable people turn to natural resources in response to stress and shocks (*see Chapter 2*), few studies have addressed the impacts of this increased use on the quality and quantity of natural resources, particularly at local level (Shackleton and Shackleton 2012).

Against this backdrop, there is a growing need for studies that seek to understand the complex nature of change across scales and how it affects changes in livelihoods and landscapes at the local level. The direction and magnitude of change is often difficult to foresee and therefore historical data are essential to analyse complex and evolving human-environment inter-relationships (Mbow *et al.* 2008). Given these changes, it is crucial to understand from a local point of view: a) how households and communities are being affected by changes, stressors and shocks, b) whether or not they are coping and adapting to these changes and associated shocks (Adger and Vincent 2005; Stringer *et al.* 2009), and c) what the future trajectories associated with such change might be. In responding to change, questions such as "how and in what circumstances people may turn to the environment as a safety-net and as a coping and adapting strategy" (Shackleton and Shackleton 2012, page 283), remain unanswered. In circumstances where people do turn to natural resources, little work has been done to understand how this use is affecting the natural resource of interest and the ecosystems from which they are harvested (Shackleton and Shackleton 2012). Shocks and stressors such as climate change can destroy or damage the natural resource base thus negatively affecting livelihood prospects over both the long- and short-term (Sallu *et al.* 2010). Furthermore, there is limited understanding of the specific mechanisms by which the responses of individuals or households feed back into the functioning of the broader social-

ecological system of which they are part (Eakin and Luers 2006). The role of social protection systems in countering asset erosion, maladaptation and decreasing ecosystem vulnerability that results from increased dependency on natural resources is also not yet fully documented.

1.3 Aim and Objectives

Recognising the current context of change across scales in drylands and the need to understand the consequences of this change for livelihoods and ecosystems, in this thesis I focussed on the complex nature of change and aim to contribute to an enhanced understanding of the interacting factors driving local level trends, shocks and stressors and responses. This involved assessing the way in which change (at a global level) has resulted in localised trends, shocks and stressors, how local people have responded to this change, and how both stressors and responses have affected livelihoods and ecosystems. This essentially involved examining whether people's livelihoods have deteriorated/maladaptation ("losing-out"), stayed the same/maintaining livelihood levels ("hanging-in"), improved/expanding activities ("stepping-up"), or accumulated assets ("stepping-out") (Dorward *et al.* 2009).

Specifically, this study explores and compares the drivers and links between livelihood and woodland change and responses within two dryland sites in South Africa and Zimbabwe over a period of 30 years. A temporal approach that combined local and scientific knowledge was adopted. Study objectives and associated questions included:

1. To consider the current vulnerability context of the two study sites.

- What is the existing context of household's livelihoods in the two study sites and how vulnerable are they?
- What are the changes, if any, in livelihoods and assets that might have occurred?

2. To identify contemporary short-term shocks and stressors and understand local responses to these, with an emphasis on the relative contributions of natural resource-based safety-nets and state-supported social protection.

- What short-term shocks and stressors are households in the two study sites experiencing and how frequently do they occur?
- What are the perceived impacts of these on household livelihoods and vulnerability?

- How are households responding and what role do woodland resources and social protection play?

3. To examine long-term trends and changes (positive and negative) in the two study sites over a period of 30 years and the drivers behind these.

- How have livelihoods and woodland resources in the two sites changed over the last 30 years?
- What drivers, at different times, have influenced livelihood and natural resource change within the two villages?
- How does this long-term change interact with contemporary shocks and stressors, and impact vulnerability?

4. To consider the implications of the findings for future livelihood trajectories in the two study sites.

- What are the people's concerns regarding the future?
- What do the findings suggest in terms of future livelihoods?
- What role has, or could, social protection play in reducing vulnerability to change and shocks?

From the theoretical section, the following propositions can be drawn, which underlie this research:

I. The on-going and rapid change, from global to local level, is increasing shocks, level of stress and vulnerability amongst natural-resource dependant households in dryland areas of southern Africa.

II. As a result, households are diversifying their livelihood strategies, turning to accessible safety-nets such as the use and sale of natural resources.

III. Such use is affecting the natural resource base with potential negative feedbacks on livelihoods and coping and adaptive choices, and future trajectories, although forms of social protection, such as social grants, reduce negative impacts and increase adaptive capacity.

1.4 Structure of the thesis

The empirical basis of this thesis was formed from household surveys, focus group discussions, secondary sources of information, transect walks and life history interviews of

local experiences of change, trends, shocks and stressors and responses (both livelihood and natural resources change). The research was undertaken in two rural dryland sites: Tshivhulani village in the Limpopo Province, South Africa and Marwendo village in Manicaland Province, Zimbabwe. The biophysical context of these sites are similar, but they differ socio-economically with households in the South African site having access to government social grants.

This thesis is composed of seven chapters: ***Chapter 1*** (this chapter) provides an introduction to human-environment change and its impacts on vulnerable rural communities living in the drylands of southern Africa. It is also in this chapter that I summarise the rationale for this research and present the study aim, objectives and research questions. ***Chapter 2*** discusses the broader theoretical and conceptual context of the study, including a literature review of relevant research trends and perspectives as well as definitions of key terms and concepts. In this chapter, I seek to outline the conceptual orientation of the study, highlighting themes that will be pursued in the empirical chapters that follow. ***Chapter 3*** seeks to contextualise the study by providing a description of the two study areas (Tshivhulani and Marwendo villages) in relation to household vulnerability in the face of change. In this chapter, I also provide a closer look at the socio-economic and biophysical context of the two study sites. It is also in this chapter that I outline the research design and methodological approaches used.

The three subsequent chapters (***Chapters 4, 5 and 6***) present the research findings of this study. In ***Chapter 4***, I provide profiles of the households that were interviewed and describe the current local vulnerability context in each site. ***Chapter 5*** explores the households' experience of short-term change, responses to this change, and drivers associated with such change. In ***Chapter 6***, I present the long-term changes in livelihoods and natural resources that have occurred over the past 30 years, and the drivers and impacts associated with these changes. It is also in this chapter that I take a trajectory lens in presenting the implications of the findings for the future trajectories of households.

The concluding chapter, ***Chapter 7***, provides an overarching synthesis of the thesis, merging key themes that emerge from all the foregoing chapters. It is in this chapter that I consider policy recommendations, key learnings and take-home messages.

CHAPTER TWO

SETTING THE SCENE: UNDERSTANDING LIVELIHOOD CHANGE, RESPONSES AND FUTURE TRAJECTORIES

2.1 Chapter overview

In this chapter, I present the theoretical framework of this study. The chapter begins by discussing the broader scholarly work surrounding human-environmental interactions within social-ecological systems. I then go on to conceptualise the drivers of human-environment change and their interactions, and how these can lead to shocks and stressors affecting rural communities. These drivers can also lead to positive outcomes such as new income opportunities for rural communities. I use a conceptual framework specifically developed for this research to do this. Following this, I discuss local responses to change, shocks and stressors with a particular focus on natural resources and social protection. I do this with reference to a modified version of the livelihood outcome framework developed by Dorward *et al.* (2009) and the human/livelihood and ecosystem vulnerability framework presented by Shackleton and Shackleton (2012).

It is in this chapter that key concepts and terms are defined in relation to the study. Vulnerability is conceptualised in relation to the incidences and responses to shocks and stressors resulting from change. The chapter then concludes with commentary on some of the thinking regarding future livelihood options and trajectories.

2.2 Overview and a framework for understanding human-environment change and social-ecological systems

In order to guide the design of this study and analysis of the results, a conceptual framework was developed (*Figure 2.1*). This framework provides an illustration of the key interactions and processes between global drivers of social-ecological change [*Box A, Figure 2.1*], their positive [*Box B, Figure 2.1*] and negative [*Box C, Figure 2.1*] impacts, local level change [*Box D, Figure 2.1*] and how this can result in variable livelihood outcomes [*Box E, Figure 2.1*]. This framework is embedded in theoretical discussions and principles of complex social-ecological systems and human-environment change interactions.

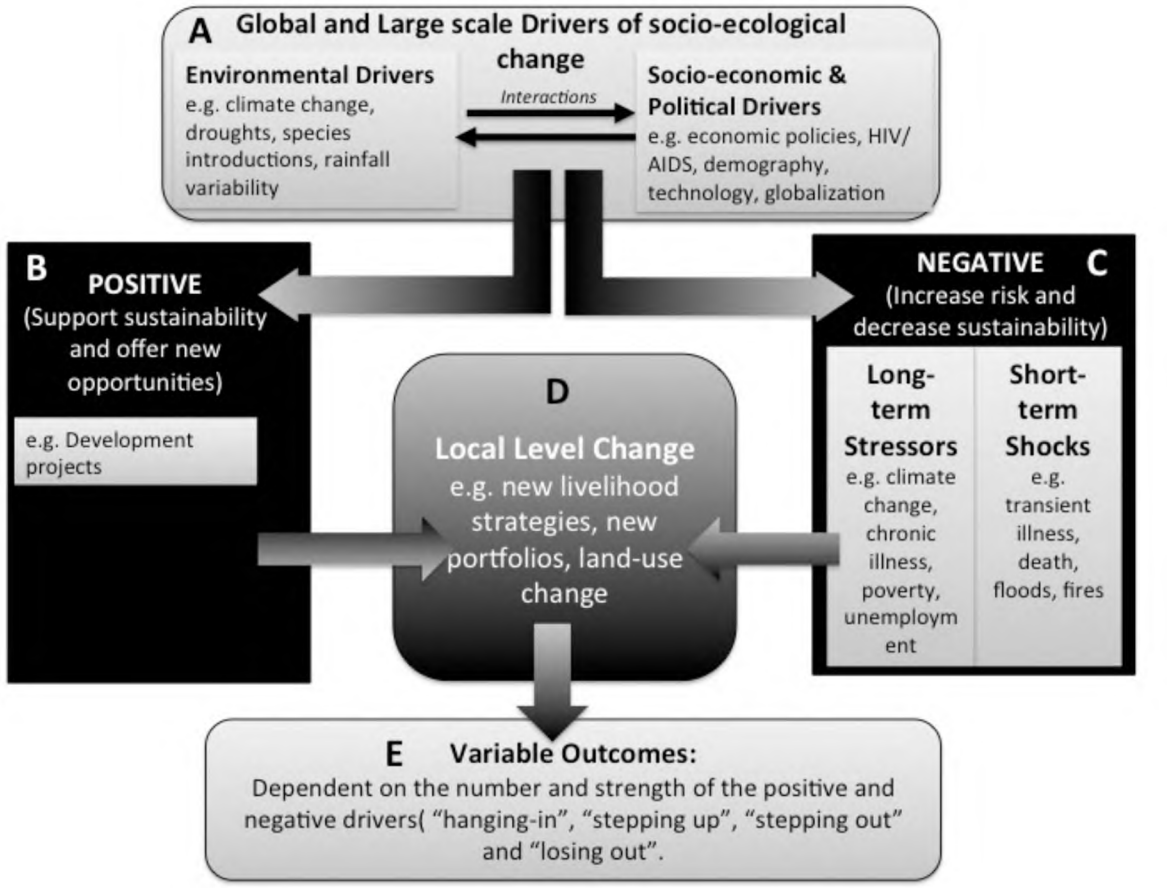

Figure 2.1 Conceptual framework linking global and large scale drivers of social-ecological change, local level change and the variable outcomes associated with the change.

The term "global change" often refers to the broad set of biophysical and socio-economic changes that are altering the functioning of the earth system (Steffen *et al.* 2006). Over the past century, increasing human influences on biophysical processes have resulted in many perceived environmental problems, hence the need to improve understanding of these processes (Anderies *et al.* 2004). Research on global change has significantly improved the understanding of the structure and function of the biosphere and human influences (Turner *et al.* 2003). Global change is more than climate change (Steffen *et al.* 2006). In essence, it refers to the remarkable change in human-environment interactions that has occurred over the last few centuries (Field and Van Aalst 2014). These changes are complex and profound (Steffen *et al.* 2006), driven by both environmental and socio-economic and political drivers [*Box A, Figure 2.1*], which often interact (*as shown by the double arrows in Box A*). This rapidly changing context presents both positive opportunities and negative risks [*Boxes B and C, Figure 2.1, discussed in Chapter 6*] to humans and ecosystems. Some of these risks include increased climate variability, greater demands and dependencies on natural resources, and market changes for commodities such as biofuels (Shackleton and Shackleton 2012).

Positive benefits (*refer to Box B, Figure 2.1*) such as road construction, rural electrification can support sustainability, reduce vulnerability and offer new opportunities for innovation and adaptation amongst rural communities (Folke 2006; Mapako and Prasad 2007; Zheng *et al.* 2014).

One important area of change relates to anthropogenic global warming [*Box A, Figure 2.1*], caused by increasing atmospheric concentrations of greenhouse gases since the mid-20th century. This has brought about many observable changes to our planet (IPCC, AR5 2013). Changing patterns in precipitation, a rise in global mean temperature, and increasing frequencies of extreme events such as flooding, drought and heat waves have, among others, so far evident (Field and Van Aalst 2014). UNEP (2009) predicts that many of these changes appear to have an immediate and strong impact on agriculture, forestry, biodiversity, human health and well-being, among others. Less developed regions such as Africa will be more adversely affected due to the continent's foremost sensitivity and low levels of adaptive capacity in its social-ecological system (IPCC, AR5 2013). Recent evidence from the IPCC, AR5 (2013) report suggests that sub-Saharan Africa in particular is likely to emerge among the regions as the most vulnerable to climate change. The report estimates agricultural losses of up to 7% of the affected countries' gross domestic product. The magnitude of such changes and their adverse effects are not uniform and certain across the globe, but have a much more negative effect projected in Africa, especially in dryland/semi-arid areas, the focus of this study (Field and Van Aalst 2014; United Nations Development Programme 2015).

Drylands cover 40% of the Earth's surface and are home to over two billion people, 90% of whom live in developing countries – this includes southern Africa (United Nations Development Programme 2015). Drylands are defined as ecosystems that have limited precipitation, with 65-70% of their populations being directly dependent on the harvest of rain-fed farming and other natural resources. Such characteristics of drylands translate into high exposure and sensitivity (*further discussed later*) to environmental and socio-economic drivers of change. Environmental drivers such as deforestation and droughts are amplified by the socio-economic challenges of these regions, which include high population growth, exceptionally high rates of poverty (83 percent), high incidences of HIV/AIDS (25 million people living with HIV, nearly 70 percent of the global total), and political instability, all of which can increase risk and vulnerability of households and ecosystems (Field and Van Aalst 2014; United Nations Development Programme 2015). As illustrated by the two-way arrows

in *Box A Figure 2.1,* environmental and socio-economic drivers continually interact (*the arrows*) and this may lead to a reinforcing downward spiral of increasing poverty, exposure to shocks and stressors, higher pressure on scarce environmental resources, and further environmental degradation (Shackleton and Shackleton 2012; Field and Van Aalst 2014; United Nations Development Programme 2015). More detail on the different parts of *Figure 2.1* is further discussed in the following sections.

2.2.1 Social-ecological system thinking

Given the previous discussion, the uncertainties associated with human-environment change create a complex system of interdependencies (Stokols *et al.* 2013), especially in dryland areas, which is explored in this study through a social-ecological system lens. The term social-ecological system (SES) refers to an ecological system intricately linked with and affected by one or more social systems, where an ecological system is defined as an interdependent system of organisms or biological units (Anderies *et al.* 2004; Stokols *et al.* 2013). Marten (2001) and Ostrom (2007) describe the behaviour of these systems as typically complex, adaptive and unpredictable, multiple, non-linear and cross-scale, with many critical feedbacks; complex in the sense that both systems have multiple parts and connections, and adaptive because they feedback into each other and adjust accordingly. A social-ecological systems approach is taken in this study because it emphasizes the "humans-in-nature" perspective in which ecosystems are integrated with human society (Resilience Alliance 2010). Like other systems, a social-ecological system is made up of many different parts that interact to form a complex entity. The systems approach is holistic because it does not focus on a detailed understanding of parts, but rather on how key components contribute to the dynamics of the whole system as illustrated in Figure 2.1 above. As a result, assessing change and vulnerability of social-ecological systems could become complex, as one would be dealing with many interacting factors.

The variety of aspects shaping human-environment change and vulnerability indicates a complexity of social, economic and ecological drivers interacting across space and time scales (Zheng *et al.* 2014). How local people respond [*Box E, Figure 2.1*] to these shocks, stressors and changes in social-ecological systems is an important focus of this study, with particular attention paid to the use of natural resources and social protection.

To develop further understanding, definitions of key concepts and terms are explained in the following sections.

2.3 Drivers of change, shocks and stressors

Understanding drivers and their interactions [*the arrows in Box A, Figure 2.1*], which may cause changes in social-ecological systems, is essential to the design of interventions that foster positive and reduce negative effects (Nielson *et al.* 2012). Changes in social-ecological systems can feed back to alter drivers; for example "changes can create new opportunities for and constraints on land use, induce institutional changes in response to perceived or anticipated resource degradation, and give rise to social effects such as changes in income inequality" (Nelson *et al.* 2006, page 2). Several studies have explored in detail changing rural livelihoods and the main drivers underlying this change (Bryceson 1999; Ellis 2005).

Following the Millennium Ecosystem Assessment (2005) terminology, a driver can be considered as any factor (natural or human-induced) that can cause a change (direct or indirect) in the structure and/or function of a social-ecological system (MEA 2005; Nelson *et al.* 2006; Field and Van Aalst 2014). In this study, drivers influence changes in both ecosystem systems and social systems, which then interact to produce changes in the social-ecological system (Field and Van Aalst 2014). Drivers of change operate at all scales (Shackleton *et al.* 2010) and can be classified as either environmental or socio-economic drivers; they may lead into either positive [*Box B*] or negative [*Box C*] livelihood and human well-being outcomes (*Figure 2.1*).

2.3.1 Environmental drivers

Environmental drivers unequivocally influence ecological systems and will result in direct changes and effects in ecosystems with implications for human well-being (Nelson 2005). Examples include climate change, species introductions/removals, changes in land use, floods, droughts, fluctuations in resource abundance, seasonal cycles of resource use and changes in access. These factors create conditions that indirectly bring challenges for human well-being, especially for rural people in dryland areas as mentioned earlier. Environmental drivers can have both positive and negative impacts [*Boxes B and C, Figure 2.1*] on the social-ecological system; although in the context of rapid global environmental change (*discussed earlier*), most of these are negative. For example, the notable increase in the frequency and severity of droughts and other weather extremes can act as negative impacts by increasing rural livelihood vulnerability, through their influence on climate sensitive natural resource-based livelihood activities (Sango and Godwell 2015).

2.3.2 Socio-economic drivers

Socio-economic drivers are generally anthropogenic in origin, usually complex and long-term. They are often linked in a non-linear way to social-ecological change and exert their influence diffusely by affecting one or more environmental drivers (Petschel-Held and Bohensky 2005; Nelson *et al.* 2006). Population growth is an important example of a socio-economic driver of change, and in many cases, it is seen as the major cause of increased demand for food, fuel wood and other ecosystem services (Nelson 2005). Technological change, another example, can have both positive and negative effects (Nelson 2005). On one hand it can increase human well-being by improving productivity or efficiency with which ecosystem goods and services are obtained [*Box B, Figure 2.1*], on the other hand, it can induce pressure on ecosystems resulting in for example land transformation [*Box C, Figure 2.1*].

2.3.3 Shocks and stressors

As mentioned and illustrated in *Figure 2.1*, the study acknowledges that these drivers of change and their interactions can either be positive or negative, and where they are negative (Box C) they can lead to shocks and stressors (De Haan 2006; De Haan and Zoomers 2003; Armitage and Johnson 2006; Nelson *et al.* 2006). Vulnerable communities, many of them residing in drylands regions, currently live with a suite of shocks and stressors affecting their livelihoods and well-being (Reid and Vogel 2006).

Rural livelihoods are subject to multiple shocks and stressors that can increase household vulnerability (Ziervogel and Calder 2003). According to Turner *et al.* (2003), a stress is a continuous or slowly increasing pressure, commonly within the range of normal variability, whereas a shock is a major spike in pressure beyond the normal range of variability in which the system operates. Shocks are generally unpredictable events such as human, crop and livestock disease epidemic, and natural events such as droughts, floods and economic turns such as the recent global recession or currency devaluation (DFID 1999). Stressors, as mentioned, tend to be ongoing, long-term and persistent (Schroter *et al.* 2009) as in the case of resource declines, seasonality issues, such as lean times, and perturbations and fluctuations within the social-ecological system. Leach *et al.* (2010) describes enduring shifts as 'stressors', whereas temporary disruptions are called 'shocks'. In addition, shocks can be idiosyncratic whilst stressors are generally common or covariant (however, there is the potential for overlap as illustrated in *Chapter 5*) with the former referring to individual risk and the latter referring to the aggregate or community-wide risk (Dercon 2002).

Living with shocks and stressors is part of daily life for the poor, especially for those living in highly variable environments such as the dryland areas of southern Africa. As already described (*see Section 2.2*) these communities are often doubly vulnerable because they tend to lack the assets, savings, insurance and alternatives essential to deal with these shocks and stressors (Shackleton *et al.* 2010). Several scholars have noted that livelihood shocks and stressors are increasing in frequency and intensity due to changes arising from multiple pressures humans are exerting on the functioning of ecosystems and link back to the discussion on global change (Turner *et al.* 2003; Schroter *et al.* 2009).

2.3.4 Interactions between environmental and socio-economic drivers of change, shocks and stressors

A key goal of this study is to explore how the various drivers of change, shocks and stressors interact to influence livelihood and ecosystem vulnerability and the interactions between these (*Figure 2.2*; Shackleton and Shackleton 2012). For example (*see Figure 2.2*), it is suggested that as rural households are exposed further to shocks and stressors, their reliance on natural resource safety-nets also tends to increase (Shackleton and Shackleton 2004). The increased reliance on natural resources can result in negative feedbacks on the ecosystem through ecosystem degradation (Shackleton and Shackleton 2012) which depletes the household natural asset base and will in turn increases household vulnerability. Thus the overall condition of the natural resource base impacts greatly on the rural households' ability to withstand any changes, especially in drylands of southern Africa, where climatic variability renders agriculture livelihoods particularly risky (United Nations Development Programme 2015).

The interactions between livelihood and ecosystem vulnerability is conceptualised using a modified version of the human/livelihood and ecosystem vulnerability framework developed by Shackleton and Shackleton (2012) in *Figure 2.2* below. This framework can be thought of as a 'zoom' into *Box D* of *Figure 2.1*. It provides a graphic presentation of the links and feedbacks between livelihood and ecosystem vulnerability as influenced by change, shocks and stressors and responses [*Boxes A and B, Figure 2.2*]. The dual result of a) livelihood stressors [*Box A, Figure 2.2*] acting directly on livelihoods, b) ecosystem stressors [*Box B, Figure 2.2*] acting directly on ecosystems, and c) peoples' responses [*Box C and E, Figure 2.2*], especially those that are natural resource based, have escalated levels of vulnerability. It is important to understand these interactions in order to identify sustainable pathways for the future.

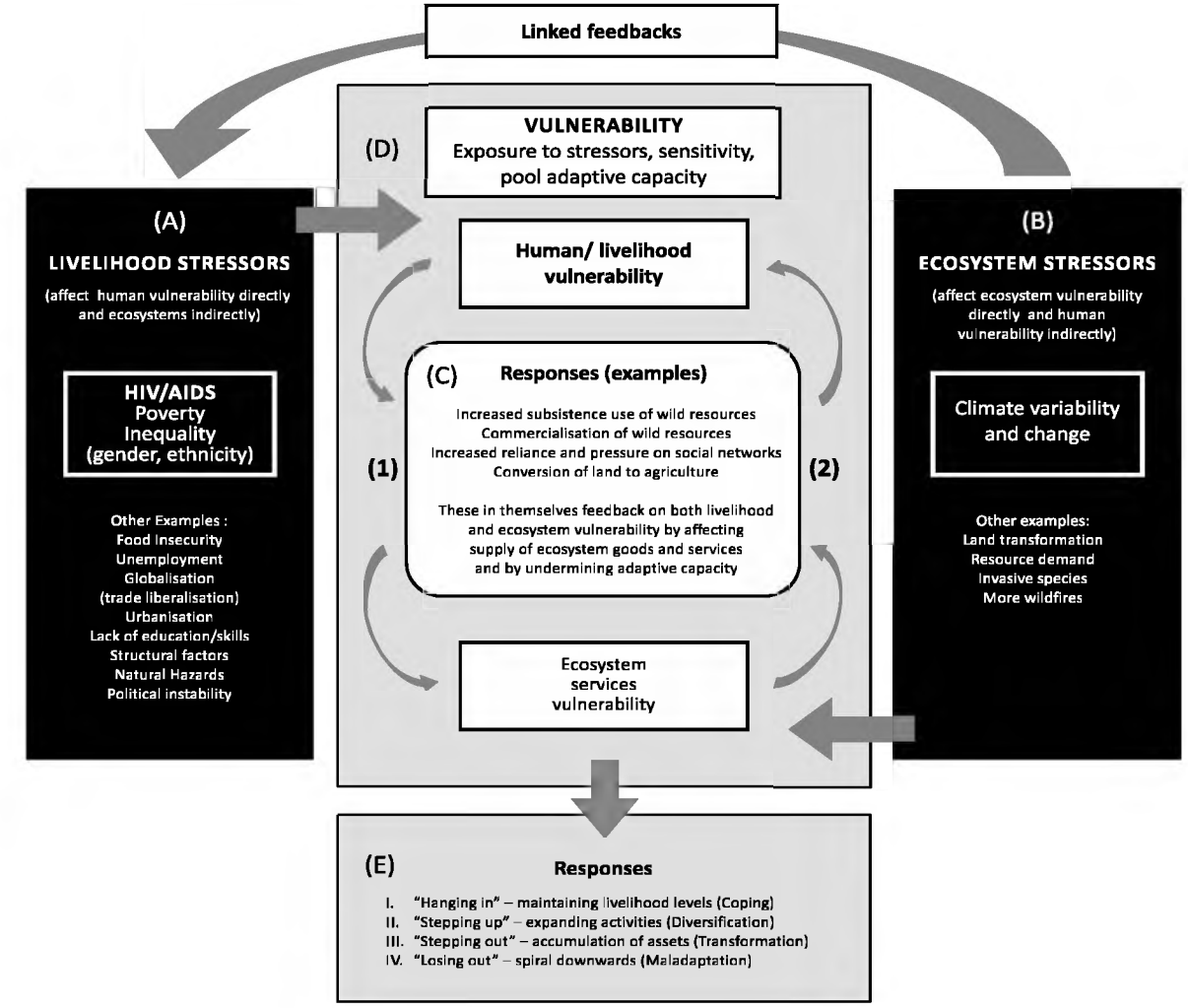

Figure 2.2 A framework of human/livelihood and ecosystem vulnerability and responses. This framework is a zoom into Box D Figure 2.1, making a connection between the two frameworks. (Adapted from: Shackleton and Shackleton 2012 and Dorward et al. 2009).

According to the Millennium Ecosystem Assessment (2005), human well-being is dependent on a sustained and adequate supply of ecosystem services, whether these are provisioning (e.g. food, fresh water), regulating (e.g. climate regulation), cultural (e.g. aesthetic value) or supporting services (e.g. nutrient cycling). The framework in *Figure 2.1* recognises that an increased reliance on natural resources [*Box C, Figure 2.2*] often has negative feedbacks on the quantity and quality of ecosystem services and goods, coupled with the impacts of other direct stressors and threats such as climate change, invasive species etc. (Shackleton and Shackleton 2012). Loss of these services through, for example, over-exploitation and unsustainable use [*Box D, Figure 2.2*] has been documented as increasing human vulnerability (Millennium Ecosystem Assessment 2005). *"This can create a mutually reinforcing feedback loop that increases human vulnerability and ecosystem degradation"* [*Box D, Figure 2.2*] (Shackleton and Shackleton 2012, page 277). That is to say, the social

and biophysical responses [*Box C, Figure 2.2*] have the ability to influence and feedback, affecting each other in such a way that a response in the human subsystem can make the biophysical subsystem more or less able to cope, and the reverse is also true (Turner *et al.* 2003). In order to avoid this "feedback loop" and "downward spiral", Shackleton and Shackleton (2012) suggest the need to build adaptive capacity of the social-ecological system. It is the role of social protection that is of particular significance to this study in counteracting the feedbacks on both livelihood and ecosystem vulnerability. A livelihoods trajectory framework proposed by Dorward *et al.* (2009) is incorporated in order to illustrate the various outcomes of change [*Box E, Figure 2.2*] that people are forced to choose between (*see Section 2.5)*.

2.4 Vulnerability and livelihoods

The concept of vulnerability is important in this study. In this study vulnerability is seen as a function of exposure and sensitivity to stresses and shocks and the capacity to cope with and recover from these shocks be they physical, social, economic or environmental (Vogel and O'Brien 2004). Exposure generally refers to the degree to which people are exposed to external hazards such as fires, droughts and floods. Sensitivity refers to how at risk people are to certain risky events, and the degree to which they will be impacted by such events, while adaptive capacity is how people are able to respond and recover from risky events (Ellis 2005). As already discussed in *Section 2.3.3*, shocks and stressors pose enormous pressures to people's livelihoods, assets and activities. This study recognises that it is not only external natural hazards (such as climate change) that are responsible for a particular form of vulnerability, but that other internal or societal variables are also important determinants of vulnerability (Chambers 1989; Christamann *et al.* 2012). External vulnerability is generated and shaped by interacting environmental (*see Section 2.3.1*) and socio-economic (*see Section 2.3.2*) drivers such as climate or conflicts (Drimie and Casale 2009). Internal vulnerability focuses mainly on households' assets and capabilities to overcome, or mitigate, the negative effects of social-ecological change. This side of vulnerability is acknowledged to be complex, contextual and dynamic (Drimie and Casale 2009).

The difference in vulnerability within and amongst households, certain groups of people (Wiegers *et al.* 2006) and particular geographic locations or socio-economic contexts is also another important aspect. Households, in particular geographic locations or socio-economic contexts, may be more vulnerable compared to others due to differences in exposure to risk and the presence or absence of social support systems and other safety-nets such as access to

natural resources (Paumgarten and Shackleton 2009). The strong variation in vulnerability by location, even though shocks and stressors as a result of global change may be common, elevates the essence of a comparative case study between two sites with contrasting socio-economic contexts.

Chambers and Conway (1992) conceptualise the notion of vulnerability as a lens to reflect on livelihoods (in Southern Africa). Chambers and Conway (1992) and Ellis (2005) define a livelihood as the capabilities, assets, and activities required for a means of living. Assets (tangible or intangible) encompass a range of resources available to a household and these can be considered as five different capital stocks, namely physical, natural, human, social, and financial capital (Department for International Development (DFID), 1999). The concept of 'livelihood' is about individuals, households or groups making a living, attempting to meet their various consumption and economic necessities, coping with uncertainties, and responding to both shocks and stressors (De Haan and Zoomers 2003).

Sustainable livelihoods must be able to cope and recover from shocks and stressors as well as maintain or improve their capabilities, both now and in the future, without undermining their asset base in order for them to be sustainable (Chambers and Conway 1992). Livelihood activities and the different types of assets can influence a household's exposure and sensitivity to shocks and stressors as well as their adaptive capacity (Rakodi 1999; O'Brien 2012). Assets are an important consideration because if they are unsustainably used in response to a stress or shock, there could be irreversible or irrecoverable loss of an asset or livelihood activity (de Sherbinin *et al.* 2008). This can affect future exposure and coping ability to new shocks and stressors that might arise (de Sherbinin *et al.* 2008). For example (*see Section 2.3.4*), use of wild natural resources has been observed as a response mechanism to droughts, and as households are pushed further into poverty they often increase their dependence on these wild natural resources (Shackleton and Shackleton 2004; Shackleton *et al.* 2008; de Sherbinin *et al.* 2008). Understanding whether unsustainable use of natural resources can lead to depletion beyond minimum thresholds, with implications for both present and future human and ecosystem vulnerability (de Sherbinin *et al.* 2008), is an important aspect in this study.

2.5 Responses to change, shocks and stressors

Households' responses to change and adversity depends on a number of factors, such as the nature of a driver, stress or shock, its duration and intensity as well as the assets (human,

natural, physical, social and financial) that households have at their disposal (Paumgarten and Shackleton, 2011). As already alluded to, a households' initial condition/state (assets, household characteristics, e.g., dependency ratios) has an influence on its vulnerability to shocks and the coping strategies available to it (Paumgarten and Shackleton, 2011; Clarke 2012). According to Del Ninno and Marini (2005), despite the fact that any household can suffer shocks and stressors, not all households have the same likelihood of recovering from the consequences of such shocks and stresses as a result of their different adaptive capacities. Generally, poor rural households have developed numerous responses to shocks and stressors, both pre-emptive and post-shock. These include coping, adaptation, transformation and maladaptation, as explained in the following sections. These responses can be thought of as "hanging-in", "stepping-up", "stepping-out" and "losing-out" respectively using Dorward *et al.'s* (2009) framework.

Dorward *et al.'s* (2009) framework [*Box E, Figure 2.2*] conceptualises people's evolving and dynamic livelihoods and their responses. Dorward *et al.* (2009) developed this framework based on the understanding that different assets and activities contribute to people's livelihood strategies. The framework involves three potential dynamics over time: 'hanging-in', 'stepping-up' and 'stepping-out'. These categorisations are used in this study to inform discussion on the different activities adopted by people in response to the drivers of social-ecological change and how this influences livelihood outcomes and future trajectories. Dorward *et al.'s* (2009) framework is modified in this study by adding a fourth category of 'losing-out' into the framework to capture livelihood erosion through, for example, the downward spiral suggested in *Figure 2.2*. Such a situation can also be thought of as maladaptation. Maladaptation is defined by IPCC as cited in Thomsen *et al.* (2012, page 2) as "any changes in natural or human systems that inadvertently increase vulnerability to climatic stimuli; an adaptation that does not succeed in reducing vulnerability but increases it instead" (*see Section 2.4.4*).

2.5.1 Coping or "Hanging-in"

Agrawal and Perrin (2009) define coping as the use of existing resources to achieve desired goals immediately after unusual or adverse conditions, aimed at securing income to meet basic needs. Coping is an array of short-term strategies adopted by households in response to crises or extreme events such as floods and droughts (Del Ninno *et al.* 2001; Berkes and Jolly 2002). In this study, coping is conceptualised in Dorward *et al.'s* (2009) framework as 'hanging-in', in which activities are concerned with maintaining current levels of wealth and

welfare in the face of shocks and stressors. In these strategies, "*assets are held and activities are engaged in to maintain livelihood levels, often in the face of adverse social-economic circumstances*" (Dorward *et al.* 2009, page 242). The emphasis here rests upon temporal survival and reactive strategies in times of crises or under constrained conditions (McDowell and Hess 2012), an important aspect in this study. Activities such as savings, delaying farming in times of uncertain weather, and stocking up of assets, which are done in anticipation of stresses and shocks, are referred to as *ex-ante* coping strategies. In contrast, *ex-post* coping strategies include borrowing, selling assets and reducing numbers of meals, which are taken after a shock or stressor (Ellis 2005).

There is growing literature that details the importance of 'safety-nets' as a means for coping or as alternative buffers against shocks and stressors. Safety-nets are transfers targeting the poor and these include: cash transfers (social grants), transfers in kind (food aid), fee waivers (free healthcare), and conditional transfers (income support in exchange for participation in work or other activities) (World Bank 2012). In addition, the use of natural resources also has an important 'cushioning effect' on shocks and stressors and therefore natural resources such as woodland products are classified as a safety-net (de Sherbinin *et al.* 2008). In this study I acknowledge that the use of natural and social protection can act as buffers to change, shocks and stressors and are therefore classified as safety-nets. Specifically, I investigated the role of safety-nets in responding to change, shocks and stressors, with a particular focus on the use or reliance on natural resources and social grants as safety-nets. The role of natural resources and social protection as safety-nets is discussed in Sections 2.4.1.1 and 2.4.1.2 respectively) and conceptualised in Figure 2.2.

2.5.1.1 Use of natural resources as a safety-net

The use and sale of natural resources (for example, fuelwood, wild vegetables, fruits, bush meat, medicinal plants) are important activities by which rural households insure themselves during times of shocks and stressors (Paumgarten 2005, Paumgarten and Shackleton 2011). Several studies have documented that the consumption and trade of natural resources enables poor households to substitute or supplement their income or food, and act as a buffer against shocks and stressors (Dovie *et al.* 2006; Paumgarten 2005; Shackleton *et al.* 2001; Shackleton and Shackleton 2004). The low availability of financial capital (such as bank savings, livestock, access to credit) generally forces poor households to rely more on social and natural capital (Niehof 2004). Campbell (2002) and Shackleton and Campbell (2007)

noted that it is the poorest households who use natural resources most extensively and most often compared to wealthier ones.

A study in the Limpopo province by Khandlhela and May (2006) explains how households were able to cope against income changes as a result of the February 2000 floods by selling firewood and thatch grass. Paumgarten and Shackleton (2011) investigated the role of non-timber forest products (NTFPs) in Dyala (in the Eastern Cape province of South Africa) and Dixie (in the Bushbuckridge in Limpopo province of South Africa) and found that 8% of the households sold NTFPs as a safety-net. Another example is in times of sicknesses, where the use of traditional medicinal plants, mostly derived from the forest, has been documented to form the basis of primary health care and is essential, as modern medicine is inaccessible for most rural people (Campbell 2002). In the event of loss of the family breadwinner, or crops from drought or disease (Cavendish 2002; Kaschula 2008; Paumgarten 2005; Shackleton *et al.* 2008), natural resources provide inexpensive alternatives to commercial goods, offering households opportunities to earn income from trade of natural resources (Dovie *et al.* 2004; Shackleton and Shackleton 2004).

The consumption and commercialisation of natural resources can occur on a regular basis, seasonally (gap filling) or in times of emergency as a 'safety-net' (Shackleton and Shackleton 2004). The 'safety-net' role played by natural resources in times of misfortune may be exhibited in the following three forms (Shackleton and Shackleton 2004):

i. The use of certain types or species of natural resources that are not normally/typically used by the household prior to the misfortune, for example, the collection of poles for building instead of purchasing commercial treated poles.
ii. Increased use or consumption of natural resources, which typically manifests itself through the substitution of purchased commodities with harvested ones, for example, increased use of firewood offsetting use of paraffin.
iii. Transitory or temporal sale of natural resources on local and regional markets, such as roadside firewood selling, woodcarving and reed mat vending.

It is these functions of natural resources that will be appraised in this study, particularly the way in which they offer a coping strategy to households experiencing change. Paumgarten and Shackleton (2011); Speranza (2010) acknowledges a mixture of evidence on the effectiveness of these safety-nets and that they can only be potentially useful in small to medium shocks, but will fall short in large shocks.

2.5.1.2 Social protection: a public safety-net

Increasing evidence is suggesting that social protection can contribute to pro-poor growth by empowering poor households to lift themselves out of poverty and vulnerability (Davies *et al.* 2009). Given the limited capacity of poor families and communities to sustain themselves through livelihood shocks or stressors by drawing on their own resources, the case for public intervention is overwhelming, especially now in the context of growing global change (Devereux 2001). Social protection broadly refers to a range of policies and actions for the poor and vulnerable that are "meant to (i) assist individuals, households, and communities better manage risk, and (ii) provide support to the critically poor" (Holzmann and Jørgensen 2001). Social protection enhances the capacity to cope with poverty, and equips the poor and vulnerable to better manage risks and shocks (Davies *et al.* 2009). Alternatively, social protection can also be defined as 'public actions taken in response to levels of vulnerability, risk and deprivation which are deemed socially unacceptable within a given society' (Norton *et al.* 2002). Thus social protection can serve either as a 'social assistance' function – reducing the incidence or depth of chronic poverty – or a 'social insurance' function – smoothing consumption and preventing destitution (or even mortality) following transitory shocks and/or stressors (Devereux 2001).

Social protection aims to build the adaptive capacity of individuals, communities and societies and reduce vulnerability to shocks and stressors (Davies *et al.* 2009). This role is conceptualised in this study using the human/livelihood and ecosystem vulnerability framework by Shackleton and Shackleton (2012). The study seeks to explore the contribution made by social protection systems in response to change, shocks and stressors, and whether it reduces dependence on natural resource safety-nets. According to Devereux (2001), the guiding principles of social protection measures include: helping the poor to maintain access to basic social services, avoiding social exclusion, and minimising the adoption of erosive coping strategies following livelihood shocks, among others. Several examples that help achieve this may include pension schemes; health, disability, unemployment, work insurance, and child support grants; old age pensions; emergency relief (drought aid, food aid, flood relief); public works programmes and self-insurance (savings and credit) (Devereux 2011).

It is crucial to note that not all arguments for social protection are positive: neo-liberal critics of socialist systems believe that social protection is a fiscally unaffordable option, which makes no real lasting contribution to poverty reduction (World Bank 2012; Devereux 2011). Many social protection programmes are introduced reactively (too late to provide effective

social protection or to influence risk-taking behaviour), they face logistical and institutional constraints in implementation, they are often poorly targeted, and the scale and coverage of public transfers never match the extent and depth of the poverty problem (Devereux 2001). Some argue that social protection, in particular social cash transfers, will create "dependency", welfare traps and undermine the incentives to work (Davies *et al.* 2009). Social protection has also been argued against in relation to its lack of affordability. For example, South Africa invests over 3% of its national income and more than 10% of government spending on its system of social grants (Davies *et al.* 2009). The social protection that exists in both study areas is described in detail in *Chapter 3*.

2.5.2 Adaptation or "Stepping-up"

Adaptation is a continuous process, a more long-term response than coping and usually involves more extensive livelihood changes towards livelihood security and reinventing systems to better anticipate and avoid stress (Agrawal and Perrin 2009). The IPCC, AR5 (2013) report highlights adaptation as *"the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities"*. This definition is useful in this study because it conveys the dynamic nature of adaptation in relation to the social-ecological system (Thornton and Manasfi 2010). In the context of human-environment interactions, adaptation refers to a process, action or outcome in a system (household, community, sector, country) in order for the system to better cope with, manage or adjust to changing conditions, stressors, shocks, risks or opportunities (Smit and Wandel 2006). This can be conceptualised in Dorward *et al.'s* (2009) framework as 'Stepping-up' in which "*…current activities are engaged in, with investments in assets to expand these activities, in order to increase production and income to improve livelihoods"* (Dorward *et al.* 2009:242). These preventative strategies are meant to help reduce the impact of shocks and stressors when they occur. Livelihood diversification, which this study focuses on, is a typical example. It is important to note that livelihood diversification does not always mean enhanced adaptive capacity and does not always neatly fall into the "stepping-up" category as it could also be considered a coping depending on context. Diversification into natural resource use for example could have negative feedbacks on livelihoods as discussed in several sections of this thesis.

Numerous studies have shown that diversifying livelihood strategies can significantly reduce household exposure and sensitivity to shocks and stressors as well as increasing household adaptive capacity (Ellis and Biggs 2001; Ellis 2005). Diversification can assist households to

insulate themselves from environmental and economic shocks, trends and seasonality – in effect, make them less vulnerable (Ellis and Biggs 2001). It does this by reducing the risk of livelihood failure through spreading risk across more than one income source (Ellis 2005). Livelihood diversification involves creating a collection of livelihood activities with different risk attributes, such as both farming and non-farming activities (Paavola 2008), and is useful in increasing a household's response to shocks and stressors. Several recent studies revealed that, at present, rural households are not only engaged in a number of on-farm activities, but also in off-farm activities. Such multi-enterprise practices help reduce vulnerability and risk (Shackleton *et al.* 2001; Campbell 2002). A study in Zimbabwe by Campbell (2002) identified ten livelihood strategies within households based on varying degrees of agricultural production (either gardening, dryland cropping or cattle raising), non-farm activities (either trade, local employment or off-site employment) and woodland activities. Consequently, contributions to rural livelihoods include cash and remittances from urban-based family members with part-time or full-time employment, state grants such as old age or disability pensions and/or *ad hoc* trade in farm produce or natural resources. However, it is important to note that over-utilization of capital assets such as natural capital, can decrease diversification, and thus further increase household vulnerability (Shackleton and Shackleton 2002). Such a situation is often referred to as maladaptation (*see Section 2.4.4*).

2.5.3 Transformation or "Stepping-out"

Transformation involves adaptation, which is adopted on a much larger scale, is truly innovative, and induces change in behaviour and in places through shifting locations (Kates *et al.* 2012). Such transformations can be viewed as 'stepping-out' in Dorward *et al.'s* (2009) framework in which *"existing activities are engaged in to accumulate assets which in time can then provide a base or 'launch pad' for moving into different activities that have initial investment requirements leading to higher and/or more stable returns..."* (Dorward *et al.* 2009: 242). These will generally entail deliberate attempts to engineer the changes required to achieve a desired goal or outcome (O'Brien 2012; Pelling *et al.* 2014). The majority of literature surrounding transformation reveals a set of common properties common to this concept, which are useful to this research. These include strategic thinking and policy, leadership, empowerment and innovation, and catalytic, at scale and sustainable outcomes (Kates *et al.* 2012). Pelling *et al.* (2014) captures the essence of transformation in the following statement: *"Transformation is presented as opening adaptive possibilities for organisations or individuals, either forced by systems failure or chosen in anticipation of*

collapse and movement to a novel social-ecological systems state". Examples of transformative strategies include distress migration due to drought, and planned resettlement as a result of rising sea-levels and new livelihood activities (Field and Van Aalst 2014). Radical shifts, completely new ways of doing things, directional turns or step changes in normative and technical aspects of culture or development (Pelling *et al.* 2014) are important aspects of transformation in which this study is interested.

2.5.4 Maladaptation or "Losing-out"

According to Martin and Kate (2008), households adopt coping strategies in a predictable manner to trade-off short-term consumption needs against longer-term viability and once the less damaging options are exhausted, they tend to adopt adverse coping and survival strategies. Poor households can be driven deeper into poverty as a result of lack of assets, and many of the "trade-offs" feedback to further exacerbate household vulnerability. Such adverse coping strategies often include the liquidation of important welfare assets, reduction in consumption with potentially irreversible effects (reducing meals and dietary variation per day, avoiding essential medication expenditures, withdrawing children from school), adoption of risky behaviours that undermine trust and social standing (theft, sex work) (Clark 2012) or overexploitation of natural resources. These strategies have outcomes that positively increase vulnerability, undermining long-term adaptive capacity and this is referred to as 'maladaptation' (Barnett and O'Neill 2010). For this reason, a dynamic perspective on the Dorward 2009 framework is taken - and the framework is extended to include maladaptive processes that lead to 'losing-out'.

2.6 Thinking into the future: Livelihood trajectories

Given the changes, shocks, stressors and people's responses described above, this study culminates by exploring the thoughts into the future using a livelihood trajectory lens and the variable outcomes proposed by Dorward and colleagues (2009) [*Box E, Figure 2.1*]. Livelihood trajectories are the result of the changing ways in which individuals construct a livelihood over time (Murray 2002). According to De Haan and Zoomers (2003), a livelihood trajectory approach allows the investigation of an individual household's "strategic behaviour that is embedded in a historical repertoire and social differentiation" and in the perceptions of risk. The life history (an individual's own 'story' of their changing livelihoods- constructed by oneself albeit not under conditions of their own choosing) becomes a central concept and component of the research methodology (De Haan and Zoomers 2003). The study conceptualised livelihood trajectories and their possible outcomes using Dorward (2009)

framework and the human/livelihood and ecosystem vulnerability framework of Shackleton and Shackleton (2012).

2.7 Conclusion

This chapter, by pulling together all the different dimensions of human-environmental change and social-ecological systems, provides an integrated theoretical and conceptual framing for my study and a basis for analysing and interpreting my results. It demonstrates the complex nature of change and the often seemingly intractable challenges related to coping and adapting to this change in the dryland areas of southern Africa. It also however outlines how, no matter how poor, there are ways to respond to change and that some change may even be positive. Thus, through an understanding of the impacts of drivers of change (both positive and negative), and shocks and stressors on livelihood activities (changing assets: natural and physical) and outcomes (*Figures 2.1 and 2.2*), this thesis aims to investigate local level change, assessing the implications of human and ecosystem vulnerability into the future. This requires employing a combination of both qualitative and quantitative methods, which is discussed in-depth in Chapter 3.

CHAPTER THREE

STUDY CONTEXT, SITES AND METHODS

3.1 Chapter overview

In this chapter, I describe the two study sites in terms of their geographical location, socio-economic conditions, biophysical conditions and the main challenges they face. The methodological approach for this study takes into account specifically the role of natural resources and social protection in responding to change, shocks and stressors and the impacts on livelihoods and ecosystem vulnerability. A mixed method approach that drew from both qualitative and quantitative data sources as well as secondary information was applied and the methods are described in detail.

3.2 Selection of study sites, commonalities and differences

This study was conducted in two purposefully (*see Section 3.5.1*) selected small villages, namely Tshivhulani village (in the Limpopo Province of South Africa) and Marwendo village (in the Manicaland Province of Zimbabwe). Attempts were made to choose sites with similar biophysical characteristics; for example, both sites fall within the semi-arid (that is, 'dryland') regions of sub-Saharan Africa. Drylands (arid, semi-arid and dry sub-humid areas) are defined as areas where precipitation is scarce and typically more or less unpredictable, temperatures are high, humidity is low and soils generally contain small amounts of organic matter (Reynolds *et al.* 2007). These and other biophysical features have profound socio-economic implications, which exacerbate the feedbacks between poverty, environmental decline and long-term vulnerability (MEA 2005). In addition, household-level livelihoods in these regions are largely dependent on natural resources and this close dependency on environments imposes a greater challenge if the coupling becomes dysfunctional (Fraser *et al.* 2011).

The differences between the two study areas were largely socio-economic; for example, proximity to urban areas, government policies, and access to social protection. This study design thus allowed examination of the similarities and differences in the sites, in relation to household structure and composition, livelihood changes, response strategies to change and future trajectories. Further details are provided in the sections that follow.

Both villages are reasonably small (366 to 645 households), allowing for a sample to be drawn for the household survey that is large enough to be a true representation of each village

(*see Table 3.1*). The demographics of the villages show similarities and differences as reflected in the profile of household survey respondents. In terms of residency of the household head, a similar percentage of household heads were found to be respondents in both sites; i.e., 76% of the respondents in Marwendo village were household heads, whereas 78% were household heads in Tshivhulani village. There was a larger percentage of female-headed households amongst respondents in Tshivhulani (54%) than in Marwendo (29%) village. These numbers could be a reflection of the degree to which males move from the household in search of employment in nearby towns (Campbell 2002). Tshivhulani village is located some 10 km from the nearest town (Thohoyandou), whereas Marwendo village is located 40 km from the nearest town (Chipinge). The respondents who were not household heads were either spouses or the oldest member of the family willing to take part in the survey. The average age of respondents was 50 years in Tshivhulani and 47 years in Marwendo. Thus, it can be argued that the majority of the respondents who took part in the survey had some knowledge about the biophysical, socio-economic and cultural changes in their communities over the last 30 years, and the impacts of these changes on livelihood and ecosystem conditions (Nielson and Reenberg 2010).

Table 3. 1 General characteristics of the villages and profile of respondents

Village	**Tshivhulani (South Africa)**	**Marwendo (Zimbabwe)**
Number of households	645	366
Number of households interviewed (number of in-depth life history interviews)	80 (9)	80 (9)
Household heads interviewed (%)	78	76
Average age of respondents	50	47
Gender of respondents (%)	Male 46	Male 71
	Female 54	Female 29
Dominant ethnic composition	Venda	Ndau
Water source	Piped water	River present/ boreholes
Transportation	Gravel road	Gravel road, close to the main highway
Market access	Very easy	Fairly easy
Electricity	Yes	Yes/only few households
Distance to the nearest town	Less than 10 km	40 km

Source: Households surveys

3.3 General overview of the Limpopo Province, South Africa, with a focus on Thulamela local Municipality and Tshivhulani village

3.3.1 Location

The Limpopo province is 123 600 km^2 in extent, and is bordered by Mozambique to the east, Zimbabwe to the north, Botswana to the west and the South African provinces of Gauteng, Mpumalanga and the North West. According to Statistics South Africa (2003), the province has approximately 5.3 million people and is 89% rural. Limpopo is divided into five district municipalities, of which Vhembe District located in the extreme north, adjacent to the Zimbabwe border, features in this study. Vhembe district, approximately 184 km north of Polokwane, is divided into four local municipalities, of which the study site (Tshivhulani village) is in Thulamela Local Municipality.

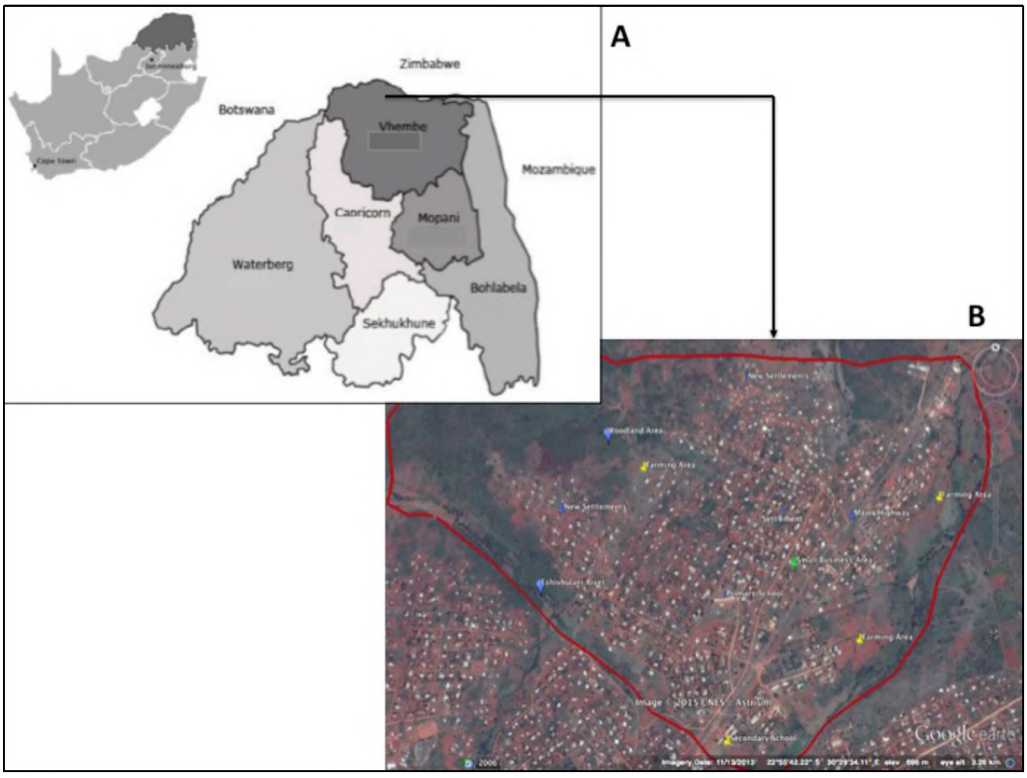

Figure 3.1 Location of Tshivhulani village: A- Limpopo Province districts; B- Google Earth image of Tshivhulani village and its surroundings (22°55'46" S 30°29'40" E). The village boundary is marked with a red line.

3.3.2 Biophysical context

The Limpopo province falls within the Savanna Biome, and is largely semi-arid in the western part, where Vhembe district is located. The average rainfall of 334-423 mm is characterised by high variability, with a coefficient of variation of 35-40% (Schulze and

Maharaj 1997). Even during the rainy season, the rainfall is usually patchy and mid-season droughts, which frequently damage crops, are common in the district (Schulze and Maharaj 1997). This is a serious constraint in the province and district. Mean annual temperature is 20^0C. Total monthly rainfall (period 1998-2012) is presented below (*Figure 3.2*), as published on the CSAG Climate Information Platform website (www.cip.csag.uct.ac.za). The information is useful in identifying particular climate events such as droughts and floods, as well as observing long-term trends and variability. Over this period, total monthly rainfall reveals that the average annual rainfall is decreasing and highly variable. Such climate variability and change raises vulnerability and increases exposure to villagers in Tshivhulani village (*see Chapters 4-6*).

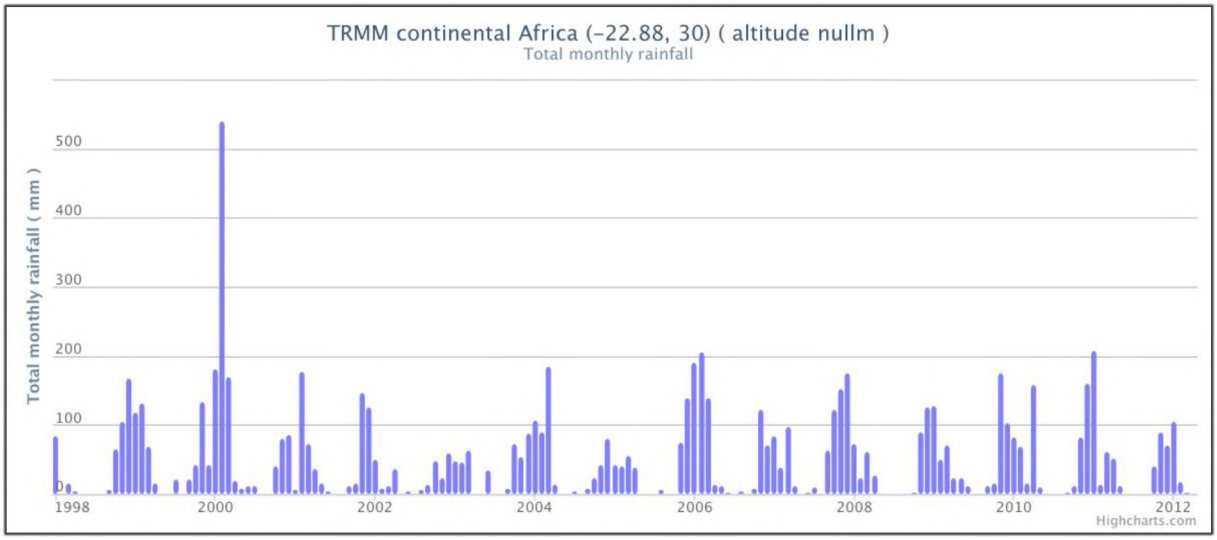

Figure 3.2 Total monthly rainfall (1998-2012) for TRMM continental Africa (-20.12, 32). The coordinates represent Tshivhulani village as shown on the Google Earth image (Source: www.cip.csag.uct.ac.za)

The soils are largely reddish or brown, sandstone and quartzite, conglomerate, basalt, tuff, shale and siltstone of the Soutpansberg Group (Mucina and Rutherford 2006). The vegetation falls in the Savanna Biome as mentioned above and is classified as Soutpansberg mountain bush-veld (Mucina and Rutherford 2006), and is characteristically heavily impacted by overgrazing, wood-collecting and slash-culture and faming activities. Common trees found include *Acacia karoo, Berchemia zeyheri, Combretum molle, Kirkia acuminata* among others.

3.3.3 Socio-economic context

A large proportion of the population in Limpopo province is confined to the former homeland areas, as determined by the previous settlement and urbanisation patterns of the apartheid

regime. Thulamela Local Municipality has a population size of 618 462 with 47.7% of the entire Vhembe district living in tribal areas of this local municipality (Statistics South Africa 2011). The unemployment rate is 43.8% with an average household size of 3.9. The majority (87.2%) of the households have electricity for lighting and access to piped water operated by Local Municipalities. The provision of piped water was a major development in the village and is discussed in Chapter 6. Access to services, as well as trade centres is relatively easy in Tshivhulani village because of gravel roads in the village making transportation of goods and services readily possible (*see Table 3.1*).

Many households rely on subsistence farming, the collection of firewood and other natural resources (wild fruits, vegetables), government grants and remittances from migrant workers (Statistics South Africa 2011). Agricultural households generally engage in more than one agriculture activity including livestock, poultry, and maize and vegetable production. This is due to the inequalities of the past in terms of resource distribution and allocation. The Thulamela Local Municipality's economic growth potential is agriculture (commercial and subsistence) and eco-tourism based (Statistics South Africa 2011). Apart from Thohoyandou, Vhembe district is largely rural under communal occupation (Ramudzuli and Horn 2014). As is the case in other areas in the Limpopo Province, widespread poverty and unemployment are characteristic of the rural communities in this area (Statistics South Africa 2003). This emphasises the need for social grants (Nedombeloni and Oyekale 2015).

3.3.3.1 Social protection schemes

The Social Assistance Act (2004) makes the national government of South Africa responsible for social security grants through the newly formed South Africa Social Security Agency (SASSA), responsible for administering social assistance (Pauw and Mncube 2007). South Africa has developed an extensive social assistance system aimed at providing income support to the vulnerable and eligible poor individuals, mostly children under the age of 18 by 2010, and elderly and disabled people (Woolard 2003; Pauw and Mncube 2007; Eyal and Woolard 2011). *Table 3.2* below briefly outlines the existing social assistance programs.

Table 3. 2 Forms of social protection/ support that benefited households in the village

Type of social assistance	Source	Beneficiary
Social Old Age Pensions	Government/State	A means-tested benefit payable to people of retirement age or older. Retirement age is defined as 65 years (males) and 60 years (females) and the maximum monthly value in 2015 was R1350.
Disability Grants	Government/State	A means-tested benefit subject to a medical eligibility criterion. The maximum monthly value in 2015 was R1350. Applicants must not be in receipt of another social grant or cared for in a State Institution and must be aged 18 or older.
Child Grants	Government/State	Introduced in 1998 with the intention of providing social assistance to children in need. Initially covered children under the age of 7 years but extended in 2005 to children under the age of 14 years. The maximum monthly value in 2015 was R315.
Care dependency grant	Government/State	Payable for children under the age of 18 years, in permanent homecare and suffering from severe mental or physical disability. The value of the grant is R1350.
Foster care grant	Government/State	Provided when a court with relevant jurisdiction is satisfied that a child needs foster care. The value is R850.

Source: Pauw and Mncube (2007), the figures were updated to current ones.

The impact of social grants, for instance the old age pension, in mitigating poverty at the household level has been widely documented (Pauw and Mncube 2007). Pensions are a significant and reliable source of income, which can lead to household security, contribute towards food security and have a noteworthy effect on reducing poverty (Woolard 2003; Pauw and Mncube 2007; Eyal and Woolard 2011). The number of children receiving the child grant increased by 5.9 million, from less than one million in 2001 to about 6.8 million in 2006 (Pauw and Mncube 2007). Such an increase was mainly due to an increasing take-up rate and extension of the eligibility age of the grant to children up to 18 years old. *Table 3.3* below shows social grants recipients' statistics relating to Thulamela Local Municipality - update April 2012. Social grants have become increasingly important, as these are often pooled within households, resulting in high levels of reliance on them (*see Chapter 4;* Shackleton and Luckert 2015).

Table 3. 3 Social grants recipients' statistics relating to Thulamela Local Municipality (Integrated Development Plan review 2012)

Social Grants Recipients (% of population) in Thulamela Local Municipality	
Child support grant	140,900 (22.3%)
Old age pension	42,309 (6.7%)
Disability grant	10,752 (1.7%)
Institutions	3,700 (0.6%)
Care dependency grant	2,428 (0.4%)
Multiple social grants	385 (0.1%)
Social relief	155 (0.0%)
Foster care grant	70 (0.0%)
Grant in aid	23 (0.0%)

Source: www.gaffney.co.za

3.3.4 Main challenges

South Africa has the largest economy in Africa; however, in 1994 democratic South Africa inherited an economy characterised by a highly unequal income distribution created during the apartheid era (Maepa *et al.* 2014). The apartheid South Africa created unfavourable conditions for the well-being of black people and post-apartheid South Africa is faced with widespread poverty and inequality. According to Misra-Dexter and February (2010), South Africa is facing challenges that include unemployment, homelessness, landlessness, lack of basic services, HIV/AIDS, food insecurity and high levels of violence and crime. HIV/AIDS has reduced life expectancy and growth rate (1.33% to 1.1%) resulting in a decline of the adult workforce (Quinn *et al.* 2011; Statistics South Africa 2011). Thulamela Local Municipality reflects all these characteristics. Additionally, climate change predictions for South Africa show that climate will become increasingly unpredictable in the future, exposing people, especially those in dryland areas like Tshivhulani village, to a host of challenges dominated by water scarcity (Quinn *et al.* 2011).

3.4 General overview of the Manicaland Province, Zimbabwe, with a focus on Chipinge rural District and Marwendo village

3.4.1 Location

The Manicaland province is 35 844 km^2 in extent, and is bordered by Mashonaland East Province to the north, Mozambique to the east, Masvingo province to the south and Midlands province to the west. According to Zimbabwe Statistics (2012), the province is home to approximately 1.8 million people. The province is subdivided into seven rural districts and three town councils. The study was conducted in the lowveld of Chipinge rural District in the Manicaland Province. The District is located in southeastern Zimbabwe, close to the

international border with Mozambique. Its main town is Chipinge, located about 170 km by road south of Mutare, with an estimated population of 25 675 (Zimbabwe Statistics 2012). Chipinge rural District is where the study site of Marwendo village is located. Marwendo village is in Tanganda Halt, which lies approximately 42 kilometres north-west of Chipinge town.

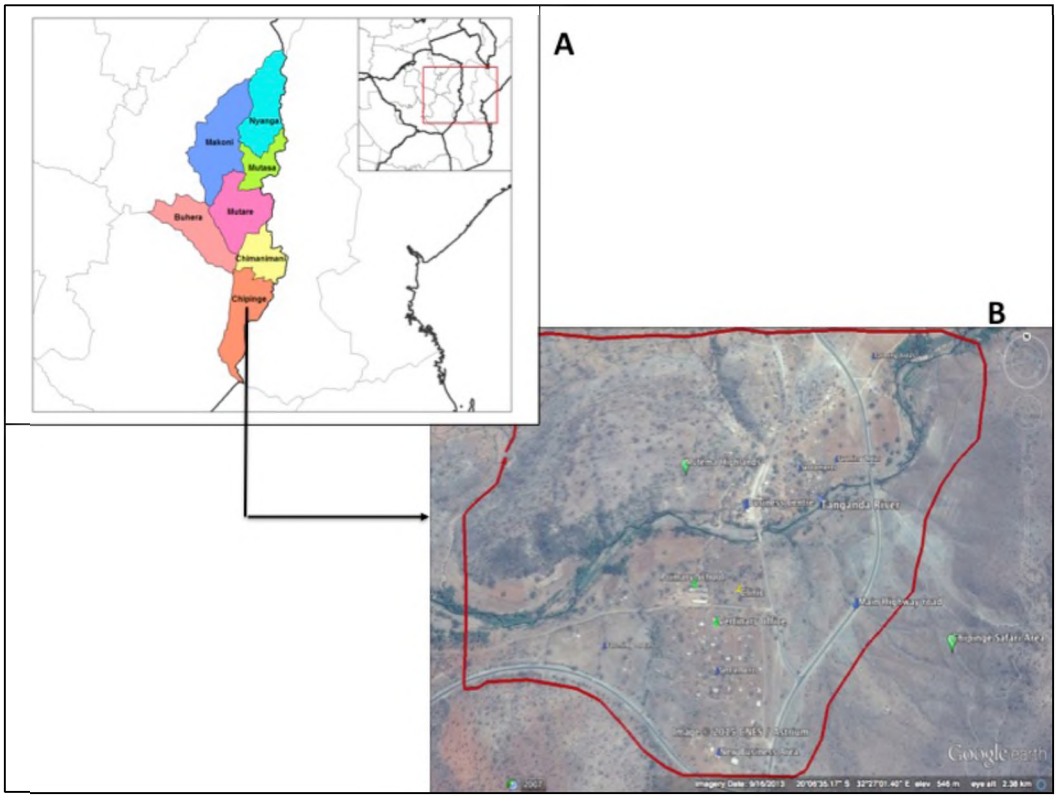

Figure 3.3 Location of Marwendo village: A- Manicaland Province districts; B- Google Earth image of Marwendo village and its surroundings (20°6'28" S 32°27'3" E). The village boundary is marked in red.

3.4.2 Biophysical context

Zimbabwe is divided into five agro-ecological regions characterised by a decrease in rainfall and agriculture potential from Region I to Region V. The study area lies in Region IV, a semi-extensive farming region that is characterised by low rainfall and periodical seasonal droughts and severe dry spells (Vincent and Thomas, 1960). Three climatic seasons that can be recognized in Marwendo village are: hot and wet (November to March), cool and dry (April to July), and hot and dry (August to October). The village is at 700 m altitude, with a mean annual rainfall of 450 mm. The rainfall is characterised by considerable spatial and temporal variability marked by shifts in onset of rains and increases in proportion of low

rainfall years. The hottest month is October, with a mean temperature of 32^0C, while the coldest month is July, with a mean temperature of 15^0C.

Total monthly rainfall statistics (period 1998-2012) are presented in *Figure 3.4*, as published on the CSAG Climate Information Platform website (www.cip.csag.uct.ac.za). As mentioned earlier, this information is useful in identifying particular climate events such as droughts and floods, as well as observing long-term trends and variability. For example, the year 2000 saw the country experiencing serious floods as illustrated by a sharp peak in monthly rainfall in that year. The total monthly rainfall records over this period (1998-2012) show a decline in total monthly rainfall, supporting observations by respondents describing a general decline in precipitation during the last decades, as well as greater rainfall variability and increased drought frequencies. Such climate variability and change raises vulnerability and increases exposure of villagers in Marwendo village (*see Chapters 4-6*).

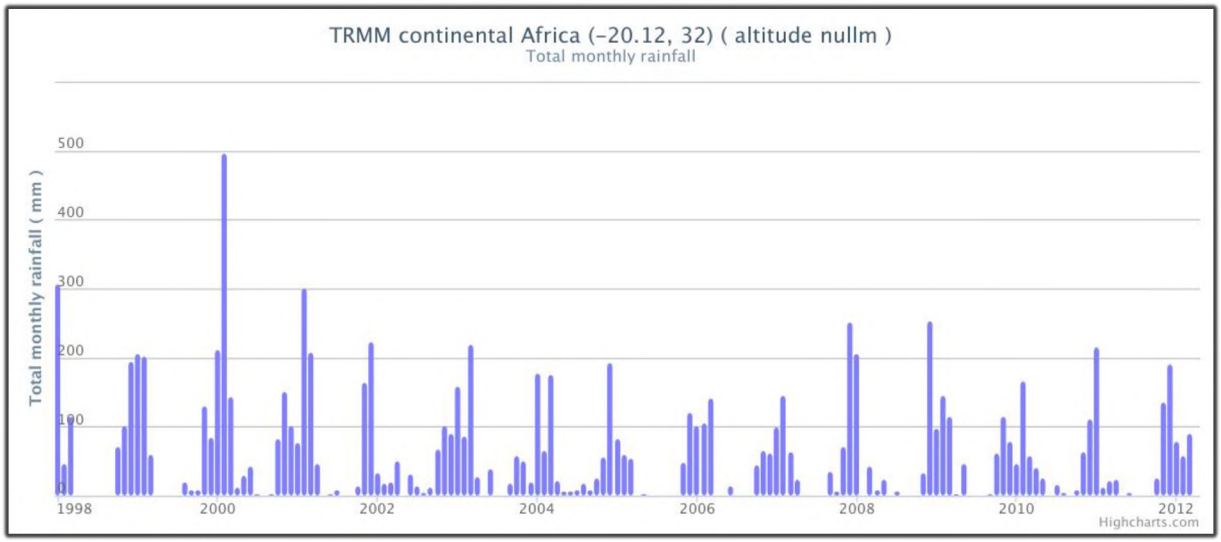

Figure 3.4 Total monthly rainfall (1998-2012) for TRMM continental Africa (-20.12, 32). The coordinates represent Marwendo village as shown on the Google Earth image (Source: www.cip.csag.uct.ac.za)

The soil is largely derived from granitic-gneissic rocks that give rise to predominantly sandy soil characterised by very low water holding capacity, low pH, low fertility and high deficiencies in nitrogen, phosphorus and sulphur (Grant 1981). The most extensive vegetation type in the village is open Mopane woodland and *Acacia-Combretum* woodland. The vegetation is typical of semi-arid regions with dominant species such as Baobab (*Adansonia digitata*), Mopane (*Colophospermum*), *Acacia, Terminalia*, and *Combretum* present. The

grass cover in the village has been heavily affected by overgrazing and bush encroachment (Maroyi 2012).

3.4.3 Socio-economic context

The population (1 752 698) of Manicaland province is mostly rural with only 17% found in urban areas, though every district has an urban area (Zimbabwe Statistics 2012). The 2011/12 Poverty Income and Consumption Survey (PICES) estimated a 76% headcount of poor rural households in Zimbabwe. Interestingly, 81% of households use wood for cooking with only 37% having access to electricity. Chipinge rural District has a population size of 298 841, 53.8% of which are women, and lies in the Lowveld Livelihood Zone of Zimbabwe.

The characteristically poor and erratic rainfall (*see Section 3.3.3*) in the study area translates into marginalised potential for crop production, although livestock production is a viable option. Most of the households in the Marwendo village have permanently arable fields, mainly located some walking distance from the homesteads. Agriculture is dominated by cereal production for household consumption and is the key livelihood activity for the majority of Zimbabwe's rural population (Zimbabwe Vulnerability Assessment Committee 2013). Drought-tolerant small grains (sorghum and millet) are better suited for the dry conditions found in the village, though maize is the preferred staple and groundnuts offer a good cash return. Due to frequent droughts (*see Chapters 5 and 6*), the village experiences frequent food shortages and relies on drought relief schemes. Livestock production, mainly cattle and goats, is also important and is characterised by a constant upward pressure on livestock numbers coupled with regulation of herd sizes by frequent droughts (*see Chapter 6*).

Traditional beliefs in the village are still prevalent, although some people practice Christianity. The village is located on the edge of the Mutema Highlands (Maroyi 2012), thus the residents in the village rely heavily on natural resources obtained from these highlands. The poorest families harvest construction poles, firewood and fencing materials, as well as their daily food and medicine. Cash and in-kind remittances primarily from South Africa have become an increasingly important source of household income. The significantly high levels of poverty, low levels of economic activity coupled with poor quality of land available, and non-farm activities such as seasonal casual work, petty trading and the sale of handicrafts, have become important sources of income in the village (*see Chapter 6*). Despite these challenges, however, in most rural areas, there is surprisingly little change to basic

livelihood patterns, as rural livelihoods have remained predominantly that of smallholder subsistence farmers (Maroyi 2011; Maroyi 2012).

3.4.3.1 Social protection schemes

The government, non-governmental organisations and even individuals' have implemented several forms of social support as households struggle to survive. Mtapuri (2012) notes that since the late '80s and early '90s social safety-nets have been widely used in Zimbabwe to ameliorate the negative effects of droughts and floods in the form of humanitarian or drought relief assistance. Once the Ministry of Public Service and Social Welfare started realising the deepening poverty due to challenges the country has been facing since the beginning of the new millennium (Mtapuri 2012), a number of social safety-nets have been put into operation to help the poor. However, given the magnitude of the challenges, it is apparent that these support mechanisms are narrow in scope and very much limited in their coverage as shown in *Table 3.4*.

Table 3. 4 Forms of social protection/ support that benefit households in the village

Type of social protection	Source	Beneficiary
Crop inputs	Action Faim	42 kg pack of hybrid crop inputs, mainly maize and small grains. Main targets are the sick and elderly.
	Government's 'Operation Maguta' programme	Households receiving 20 kg hybrid maize seed
	Oxfam	Targeted households receiving 10 kg maize seed
	SEDAP/Christian Care	10 kg maize seed, mainly small grains
Cash payments	World Vision	Programme designed to pay Z$3000 monthly to all widows
	Government's BEAM (Basic Education Assistance Module) programme	Launched in 2001 for community-based targeting and selection of the most needy children (orphans and vulnerable); full support with school fees and levies
	The National Social Security Authority (NSSA)	The scheme was introduced by the government of Zimbabwe to cater for the workforce's social insurance. It runs the Pensions and Other Benefits Scheme (POBS)
	Local churches and church-affiliated groups	Clothing donations, fees paid to vulnerable children
	War Victims Compensation	This compensation Act came into effect in 1980, to provide compensation for injuries or death of persons

		caused by the liberation war. It is based on the realization that war injuries impair claimants' capacity to earn income.
	Government's Department of Social Welfare - Free food distribution	Introduced in 1995 to cushion vulnerable groups from drought-induced food shortages. Later re-designed as *Food-for-work* in which beneficiaries worked on community projects in return for food
Grain (food) hand-outs	Child supplementary feeding programme (CSFP)	Introduced in 1982 and expanded in 1992, it provides daily supplementary meal of maize, beans, groundnuts and oil to all children less than five years of age in drought-stricken areas
	Christian Care	A package of beans, barley, cooking oil and salt distributed to households

Source: Scoones (1996), Devereux (2001)

3.4.4 Main challenges

In recent years, Zimbabwe has suffered serious socio-economic, biophysical and political challenges, and these have threatened the livelihood of most Zimbabweans, especially the rural people, rendering them vulnerable. The successive droughts (for example, 1997/98, 2001/02, 2004/05 and 2006/7 and 2014/2015) and unprecedented cyclones (Eline in 2000 and Japhet in 2003), the HIV/AIDS pandemic, and a shrinking economy (between 2000 and 2008), all combined to create challenges. According to Mukwada (2012), Zimbabwe has experienced socio-economic woes characterised by a shrinking economy, hyperinflation, high interest rates, the burden of failure of the structural adjustment programme, HIV/AIDS and drought. Land degradation, mainly due to deforestation, overgrazing and soil erosion, is also a major challenge in Zimbabwe as natural resource-based activities provide the foundation for the majority of rural livelihoods.

In addition, the persistent political crises have increased vulnerability of poor rural people (Mukwada 2012). Farm invasions, which started in 2000, also contributed to increased vulnerability due to disruption of commercial agriculture and resulting in food shortages (Mukwada 2012). During this period, poverty levels grew markedly leading to an increased dependence on natural resource exploitation (Mugara 2007). This period also corresponded with temperature increases, erratic rainfall patterns and recurrent drought, all of which exacerbated suffering, especially for people living in rural areas, who constitute approximately 62% of the population (Brown *et al.* 2012).

The cumulative effect of economic and political decline and recurrence of drought creates multiple stresses that render livelihoods of Zimbabweans vulnerable especially the rural poor in Chipinge District. However, the introduction of the multi-currency system in February 2009 helped to stabilise the economy. Since its inception, some signs of recovery have been evident, notably consumer goods being available in retail outlets (Zimbabwe Vulnerability Assessment Committee 2013).

3.5 Methods

3.5.1 Research approach: Mixed methods

Studies exploring human-environment interactions in relation to change often encounter methodological and analytic problems that are difficult to solve using familiar scientific procedures (Turner *et al.* 2003, Schroter *et al.* 2009). For such cases, using only one data source is inadequate, as this would provide an incomplete understanding of the research problem especially when there is a need to generalize exploratory findings (Creswell and Clark 2007). Thus, a combination of methods and approaches is required to gain an in-depth understanding of the multitude of factors interacting across complex social-ecological systems (*see Chapter 2 Section 2.1*; O'Brien 2012). Mixed methods approaches are increasingly important given the complexity of the global change and limited knowledge culminating in uncertainty (Creswell and Clark 2007). A combination of qualitative and quantitative methods was applied in this study in order to integrate, triangulate and complement research findings. Quantitative approaches seek to give statistical rigour while qualitative approaches give detail, which is crucial (Newing 2010) to understanding complex social-ecological systems. The research is based on the core assumption that a mixed methods approach results in a more complete understanding of the research problem than either approach alone (Creswell and Clark 2007).

In this research, quantitative data collection is useful for exploring and examining household structure and composition, current vulnerability context, experience of shocks and stressors, response strategies employed, and livelihood changes and their drivers. Qualitative methods are useful in understanding long-term changes (that is, over the past 30 years), multiple shocks and stressors that may have affected the households/village in the past, as well as changes in terms of livelihood options, coping mechanisms and ecological dynamics. For instance, the "what" questions (e.g. what shocks and stressors and how severe, what physical assets and how have they changed) may be answered quantitatively, but unravelling the

"why" and "how" questions may require a rigorous application of qualitative approaches and methods. The methods employed for this study take into account particularly the role of natural resources and social grants in aiding households to respond to change, shocks and stressors. In addition, these methods collectively provide the material necessary to apply the conceptual thinking in human/livelihood and ecosystem vulnerability and Dorward *et al.* (2009) frameworks within which this research is rooted.

3.5.2 Household surveys

Individual household surveys were carried out in both villages; these were in the form of structured questionnaires consisting of specific questions from which quantifiable data were extracted (Newing 2010). A total of 160 households (80 in each village) were interviewed. Prior knowledge of the Marwendo village made it easy to identify households and the use of a local translator in Tshivhulani village ensured smooth flow of the surveys. All the questionnaires were administered in the preferred local language of the respondent, namely Venda in Tshivhulani village and Shona in Marwendo village.

3.5.2.1 Household selection and identification

Individual households were randomly selected using freely downloadable Google Earth software, where random points were generated using the *Cruise tool* following Fries's (2013) method (*see Appendix 1 for step-by step procedure*). The *Cruise* functions allow one to enter the number of points required; 80 random points were generated from each map site. These points were then displayed on a Google earth map, printed out in colour and taken to the field. During fieldwork, the household nearest to the GPS point was selected for the study and if not available or not willing to take part, the next closest willing household was used.

3.5.2.2 Data collection and survey design

In Tshivhulani village, data were collected with the help of a trained local assistant who acted as a translator. In Marwendo village, a local trained assistant was also used although no translation was required since the researcher was conversant with the local language. The household head where possible was interviewed, however other members of the household were free to take part if available and interested. In the event that the household head was not available, the spouse or the next most senior member of the household was interviewed. See *Appendix 3* for a detailed household interview survey questionaire.

The questionnaire was divided into four sections, *see Table 3.5*:

- Section A: General information, income, assets, livestock and farming activities.
- Section B: Shocks, stressors and local responses.
- Section C: Woodland cover and/or natural resource use.
- Section D: Implications and future concerns.

Table 3.5 Dimensions covered in the household questionaire

Sections	Category	Data
A	General household information	-Head of household -Period of stay in the village -Household size -Gender and age of household members -Education levels -Occupation -Major income sources, estimated monthly income, changes in income sources -Assets -Livestock and farming activities
B	Shocks, stressors and local responses	-Experience of shocks and stressors, frequency -List response strategies -Hardest shocks to recover - Reliance on natural resources and/or social grants/welfare
C	Woodland cover and/or natural resource use	-Perceptions of the state of natural resources -Changes and trends -Drivers of change if any -Impact of changes (positive and negative)
D	Implications and future concerns.	-Comparisons of the overal standard of living -Perceptions about the future -Changes with regard to current livelihoods -Current and future concerns

Section A involved obtaining basic information about the household that could help in describing the current vulnerability context, for example, demographic characteristics of the household (e.g. household size, period lived in the village, education and other information of about employed individuals in the household), as well as information on major income sources, physical assets, and livestock and farming activities. Respondents were asked to state their major income source from amongst all their income streams and to estimate the monthly monetary contribution of the major income source. Specific questions were included to gain information on changes that have occurred in the major income source, physical assets, livestock numbers, size of fields/garden and the reasons for the changes. Data on

remittances and social grants/welfare for each household were collected by asking whether respondents receive any remittances (cash or kind) and type and number of social grants/welfare.

Section B mainly focused on experiences of change, that is, long- (past 30 years) and short-term shocks and stressors, perceptions of causes and impacts of such changes upon livelihoods, the natural environment and socio-cultural aspects of life. A predetermined list of shocks and stressors, which was created through background reading of literature and other studies (*see Section 3.5.7*), was presented to the respondents. The respondents had to answer systematically whether or not they had experienced the shock or stressor. Allowance was made for respondents to add to the list when they felt that not all stressors or shocks were covered. Some questions were included to gain information on the worst shocks experienced, impacts on household functioning and frequency of shocks and stressors. This section also covered the local responses to shocks and stressors with a particular emphasis on the role of natural resources and social protection as safety-nets.

Section C covered the perceptions of the state of natural resources over the last 30 years, whether they have changed and if so, the drivers of such changes. Questions also included the impacts of changes in natural resources on household livelihoods. Both negative and positive impacts were captured in the questions. Information with regard to trends in rainfall, temperature, drought frequency, pasture availability, woodland cover, water availability, and NTFP availability, among others, over the past 30 years was also obtained.

Finally, Section D sought information with regard to current and future concerns of the household.

3.5.2.3 Data capture and analysis

Data collected from the household interviews largely comprised of quantitative data. Microsoft Excel was used to capture and organise data prior to being imported into the Statistical Package for the Social Sciences (SPSS version 21). SPSS was used to analyse patterns and compare differences exhibited by variables between the two sites. The data were disaggregated by site in order to compare results and in some cases look for any significant differences between the two sites. Frequency counts, mean percentages, and ranked responses of key variables for each site are presented in a number of graphs, pie charts and tables. Pearson's Chi-square tests (χ^2) were used to establish if the distribution of responses was significantly different between the two study sites, and thus determine whether there were

any location effects. In case of continuous data, one-way ANOVA procedures were used to test for location effects. All statistical significance was set at the 5% level of significance. A homogeneity test of variances was first performed prior to analysis using the Levene's test, and if homogeneity was not attained, non-parametric Mann-Whitney and Kruskal-Wallis tests were used.

3.5.3 Focus group discussions and Participatory Learning and Action (PLA)

According to Dawson *et al.* (1993), focus groups are formally constituted, structured groups of people assembled together to discuss and address a specific issue. They often provide a wealth of data on a variety of community beliefs, ideas or perceptions as the participants have the opportunity to interact with and to challenge each other (Dawson *et al.* 1993). Participatory Learning Action (PLA) techniques were employed during focus group discussions in investigating the local context and way of life (Chambers 2008) and enabling a holistic view of people's livelihoods (Tiani *et al.* 2015). Such an approach is meant to empower local people by giving them the platform to express and enhance their knowledge and take action (Chambers 2008). Participatory approaches aim to "encompass the complexities of people's lives, starting with their understanding of the situation, their information and factors such as local knowledge, past experience, skills, household composition according to gender and age, and existing coping mechanisms" (Tiani *et al.* 2015). In PLA, the researcher assumes the responsibility of facilitating the learning process and takes cognisance of local knowledge and capacity (Chambers 2008). The use of participatory exercises provided context-specific qualitative data as perceived and experienced by local communities.

In each study site, one focus group was identified with 8-12 members in their 50s and 60s, based on their considerable knowledge and experience of environmental issues and their understanding of the past. Purposive sampling (*see Section 3.5.2*) was used in selecting the participants. In each focus group, efforts were made to ensure equal representation of both females and males. Generally, local traditional leaders or chiefs with vast knowledge of the population and its constituents selected the participants for the participatory exercises. The inclusion of elderly people in the focus group discussions made it possible to go back at least two generations in time (Nielson and Reenberg 2010; Tiani *et al.* 2015). The cooperation with local leadership or chiefs in selection could be considered as a pitfall in the data collection process, as the process was not fully independent in this respect. However, care

was taken that the participants selected were largely a true representative of different ethnic groups and socio-economic profiles in the respective study areas (Tiani *et al.* 2015).

In the village, all the selected participants were first gathered for general introductions and discussion about the purpose of the study. Thereafter participants were asked to recall and generate detailed discussion and creative insights and ideas about woodland cover issues, biophysical, socio-economic and cultural changes and their impacts on livelihood conditions (Nielsen and Reenberg 2010). Various participatory methods, such as timelines, ranking and participatory mapping were used to collect qualitative data. The use of participatory approaches was aimed at encompassing the complexities of people's lives and understanding multiple risks that may have affected the villages in the past, as well as the process of change in terms of coping strategies, and ecological dynamics (degradation or maintenance of woodland resources) (Tiani *et al.* 2015).

3.5.3.1 Ranking exercise

Ranking was used to determine the relative importance attached to various livelihood activities and environmental attributes that had been identified by the participants. This prioritised opinions in terms of preferences and magnitudes from a list of items. Key issues or objects were placed in order of significance. For example, to ascertain how dependence on NTFPs has affected woodland cover, people were asked to list activities relating to natural resources that they felt were impacting on woodland cover. From the list, activity ranking was carried out to see the order of significance of each activity.

3.5.3.2 Timelines

Timelines provide insight into time-related events and represent the chronology of major remembered events, and their approximate dates, within a community (Chambers and Conway 1992). Timelines with chronologies of livelihood changes, woodland cover changes, responses with particular emphasis on NTFPs, and access to social support over the 30-year period were drawn up and together analysed with the local people. These were useful in constructing the human-environmental timelines.

Chains of events were constructed out of the participants' narratives to establish a coupled human-environment timeline going back over the past 30 years (Nielson and Reenberg 2010; Zheng *et al.* 2014). The use of this participatory exercise was meant to provide detailed context-specific quantitative and qualitative data as perceived by the local communities, helping to draw trends in natural resource use, cover and factors affecting its quality in local

context from a historical (Tiani *et al.* 2015) and community perspective. That is, uncovering *(i)* general events in the village, *(ii)* when certain livelihood strategies (constraints and opportunities) were initiated, and *(iii)* when certain biophysical, political and socio-economic events took place (Nielson and Reenberg 2010; Zheng *et al.* 2014).

3.5.4 Life histories interviews

Past and present trends in livelihoods and ecosystems are particularly important to this study and one way to generate this information is to ask people about their past. In this case, life history interviews were employed along with personal life narratives giving the platform for participants to express meaning rather than simple story telling (Haynes 2010). The life history interviews were treated as unstructured interviews that use conversation to collect data (Newing 2010) rather than the more structured household surveys. Questions in life history interviews can range from an initial broadly posed request for respondents to describe their lives to specific follow-up questions or probes the structure of the "life-stories" (Atkinson 1998).

3.5.4.1 Household selection

A similar approach to that of focus group discussions in selecting the participants for the life history was adopted in which the traditional local leaders or chiefs were generally involved in the process. In each study area, 10 households were selected to participate in the life history interviews. The selection criteria for the life history interviews targeted the most elderly people in the community. The interviews were recorded and field notes were taken during the course of the recording. The interviews were later transcribed and translated into English with the help of a translator (for Tshivhulani). Following the explanation of the life history guide, the respondents were asked to tell their "life stories" in whichever way they felt comfortable and to describe notable events that they believe defined their experience (Zheng *et al.* 2014).

To facilitate the story telling, interview questions based on the following major 'themes' were used to guide the interview: livelihood changes (general household information, personal narrative of respondent's life from growing up to present, village's history and any changes that occurred since their arrival, hardships experienced, major causes of hardships); local responses to key changes, shocks and stressors faced (particular focus on the role of social protection and use of natural resources) and finally a look into the future (major concerns into the future for the household and the community).

3.5.4.2 Limitations

The major limitation was that some of the participants became distracted during the narration and tended to deviate from the themes related to the research. Lengthy responses were also a common challenge especially in trying to uncover the key themes. In such scenarios, I had to play a pivotal role in bringing back the narration to the desired course of the research. This would sometimes involve pausing the recording and explaining again the areas to be covered. Some participants unwilling to give full details of their life history, or forgetting important events in their lives, were also limitations. This was often countered by allowing other family members, at most two, to join the interview as observers, and assist with detail where necessary.

3.5.4.3 Interpreting the life history interviews

Once the life history interviews were recorded, the audio recordings were transcribed as part of mechanically processing the qualitative interviews (Newing 2010) and coding was used for thematic analysis. Coding involves grouping data into different major themes obtained from sub-themes refined to make inferences about the data (Gibbs 2007; Teddlie and Tashakkori 2009). Textural analysis software called Nvivo 10, as well as manual techniques, were used to run the coding in the theme analysis process. Code systems were created using the categories of change (long- and short-term), responses (emphasis on natural and social protection) and future implications for livelihood sustainability.

3.5.5 Transect walks

One transect walk was carried out in each study area with 5-10 members (both male and female) recruited from the community. This involved direct observation, questioning, listening, discussing and learning about woodland resources, biophysical indicators and livelihood impacts in the area. The transect walks sought to understand the availability and quality of woodland resources in the community. Attributes of the various woodland resources in the area were observed and recorded; these included main uses of forest/tree products from each area, types of users (e.g., men, women, children, community outsiders, etc.), vegetation type including structure, species, and the relative abundance/scarcity of the species, distance/ time indicators to collection of woodland resources (NTFPs), land use, and woodland shrinking and/or patchiness.

3.5.6 Secondary sources

According to Hox and Boeije (2005), secondary sources of data are data collected by others, not specifically for the research question at hand. The secondary sources largely consisted of other published historical or anthropological studies in southern Africa, government reports, newspaper articles, national surveys and other public statistics records. These proved invaluable in providing background historical context and insights into the changes, trends, shocks and stressors that impact on local rural people. Secondary sources of information were also useful in drawing up a list of shocks and stressors and local responses, which was then presented to respondents during interviews (*see Chapter 5*). The secondary sources were also useful in interpreting, explaining and guiding discussion on the coupled human-environmental timelines (Nielson and Reenberg 2010; Zheng *et al.* 2014; *see Chapter 6*).

3.6 Ethical considerations

The research was carried out in accordance with the Rhodes University Ethical Standards guidelines and only commenced once the Department of Environmental Science's Ethical Committee had approved the proposal. Prior to any contact with the local people, the study and its objectives were introduced to the local traditional leaders, ward councillors and any other relevant local authorities, to explain the purpose of the research. Once clearance from the traditional leaders and relevant authorities had been granted, individuals were approached for participation. Throughout the study, I observed ethical awareness and stringently upheld the principles of ethical research conduct (Mosberg and Eriksen 2015). These principles included acquiring informed consent from interviewees, avoiding invasion of privacy, avoiding deception of research participants, and treating information provided by respondents confidentially (Nielsen *et al.* 2012). All respondents in this study are kept anonymous for their protection and pseudonyms were used to gaurantee anonymity.

CHAPTER FOUR

HOUSEHOLD CHARACTERISTICS AND CURRENT VULNERABILITY CONTEXT WITHIN THE STUDY SITES

4.1 Chapter overview

In this first results chapter I explore the current livelihood portfolios and the physical and natural assets of the interviewed households in the two sites. The chapter is built on the rationale that in order to understand the impacts of change, trends, shocks and stressors, and local responses, it is important to understand the current context of households' livelihoods and adaptive capacity and consequently their vulnerability. In addition, the contextual conditions as explained in *Chapter 3, Section 3*, and their interactions with housesholds' current characteristics all contribute to shape vulnerability. The results and discussion within this chapter are based upon objective number one (*see Chapter 1, Section 1.3*), namely to consider the current vulnerability context of the two study sites, and the following research questions are addressed as part of this:

- What is the existing context of households' livelihoods in the two study areas and how vulnerable are they?
- What, if any, are the changes in livelihoods and assets that might have occurred?

This chapter draws its data mainly from the household surveys as well as focus group discussions, and the results are presented and discussed at the same time. I start with an overview of the households interviewed, move on to their livelihood characteristics and finish by considering key livelihood assets. This sets the scene for discussion of the results in the chapters that follow.

4.2 Profile of households and current context

4.2.1 Household structure and composition

The household structure and composition of the sampled population in the two study areas are presented in Table 4.1 below. It was found that the households in Marwendo village comprised an average of six members per household, while in Tshivhulani it was five members per household. The two study sites had the same average number of dependents of three per household. This illustrates that most households are smaller than they were in the past, which has both positive and negative implications – on the plus side, there are less

people to support on the usually low incomes of these rural households, whereas a drawback is a lack of labour for farming and other livelihood activities and a constraint on diversification. Using household-level panel data from a representative sample of households in Southern Mali, Abdulai and CroleRees (2001) found that poor and small households have limited opportunities in non-cropping activities and non-farm work, and hence are less diversified.

Table 4. 1 Composition and demographics of interviewed households in Marwendo and Tshivhulani villages

Variable		Tshivhulani (South Africa)	Marwendo (Zimbabwe)	χ^2-Test/ ANOVA
Sample size		80	80	-
Average household size		5± 0.25	6±0.40	-
Average number of dependants		3±0.19	3±0.28	-
Number of years the householder has lived in the village (%)	Less than 10 years	34	16	-
	10-30 years	11	33	
	Since childhood	55	51	
Education level of household members (%)	None	50	14	**
	Primary	11	49	
	Secondary	33	34	
	College/Tertiary	6	3	

*** level of significance is p<0.05; Mean (±SE)*

4.2.2 Education level of household members

Education is an important measure of human capital within households especially in contemporary times. There was a significant difference in the level of education amongst household members between the two study areas (χ^2=45.3, df=3, p<0.05) (*Table 4.1*). It was found that Tshivhulani village had the lowest level of education among its household members, with 50% of the household members having achieved 'no education' and only 33% having reached secondary education (*Table 4.1*). A total of 33% of family members had post-primary school education. The high percentage of respondents with no education at all in Tshivhulani village reflects findings by Beinart (2012), that the legacy of apartheid is still evident in rural communities throughout South Africa. The elderly in the village mentioned that very few of them were afforded the opportunity for education or were forced to leave school at a very tender age. This was also apparent in a study by Stadler (2012) in the Eastern Cape province of South Africa.

In contrast, it was found that 14% in Marwendo village had not achieved any level of education, and 49% had reached primary level education. The strong drive in education provisioning for all by the government of Zimbabwe after attaining independence in 1980 (Campbell 2002), is reflected in the high percentage of people having attained primary school education. In addition, most respondents in Marwendo village stressed the importance of sending their children to school despite the economic hardships, as it is seen as a long-term benefit and is highly valued. The results resonate with findings by Campbell (2002) who found that many households go the extra mile to invest in the education of their children (paying school fees, uniforms, stationery). One female respondent remarked during the survey that:

> *"...sending my children to school gives me hope for a brighter future. At least my first-born daughter is a teacher and she can take care of herself and myself as well. I work very hard and eat from hand to mouth in order to send my children to school...gives me the will to live..." [Female Respondent in Marwendo village].*

This is an interesting quote as it clearly showed how education is valued in the village. However, the number of family members with post-secondary school is extremely low in Marwendo village (3%). Many of the respondents noted that the lack of employment in the country has acted as a discouragement to going to school especially for tertiary level education. One young female respondent in Marwendo village was quoted:

> *"...waste of time...waste of time.... waste of resources" [Female Respondent in Marwendo village].*

The comments above illustrate that such discouragement in going for tertiary level education has also resulted in high unemployment, making people more reliant on informal employment (*see Table 4.2*). This makes most households more susceptible to existing vulnerabilities as well as to future shocks they might face.

4.2.3 Number of years the householder has lived in the village

The number of years people have lived in Tshivhulani and Marwendo village differed significantly between the two sites (χ^2=17.6, df=2, $p<0.05$). In both sites, the percentage of respondents who had lived in the village since childhood was higher (Tshivhulani 55%; Marwendo 51%) than the percentage of respondents who had lived there for less than 10 years (Tshivhulani 34%; Marwendo 16%) (*Table 4.1*). These results suggest that local

knowledge and past experiences of shocks and stressors could contribute to dealing with new changes and impacts, thus affecting the overall household vulnerability to current and future changes.

4.3 Characteristics of household livelihoods

4.3.1 Major income sources

The results clearly show that households in both villages have mixed sources of income with variation in the major source across the study areas. The difference generally lies in the absolute contribution of each income source rather than its presence or absence. There was a significant difference between the two study areas and the major income source (χ^2=67.5, df=6, $p<0.05$). The general pattern for both sites is that all the households interviewed have some sources of income that involve off-farm activities, covering a wide range of activities.

The predominant income source in both villages is informal employment (Tshivhulani village 40% and Marwendo village 44%). Informal employment was defined as all other income-generating activities with a regular income or wage other than those from the government and private sector. These informal activities were mainly in the form of small home industries such as brick moulding, carving, brewing traditional beer [*Box 4.1*], thatching, fixing bicycles/implements, welding (*see Chapter 6*), carpentry and trading in second-hand clothes. *Box 4.1* illustrates the importance of a small informal home industry as a major source of income in Tshivhulani village. Such a highly variable, volatile and insecure source of income can make people susceptible to existing vulnerabilities, shocks and stressors especially in Marwendo village.

The contribution of social grants combined (pensions, child grants and disability grants) is seen by 39% of households in Tshivhulani as their main income source, with the majority of households receiving social grants (83%). Social grants are crucial in contributing to, among others, food security and children's education, although high levels of reliance on these have been created (Shackleton and Luckert 2015). Social grants therefore may help to reduce vulnerability in the village. The high percentage of female-headed households (*see Chapter 3, Table 3.1*) in Tshivhulani village could explain the significant contribution of social grants as a major source of income. Unlike farming, pensioners were very common in Tshivhulani village (23%) compared to Marwendo village. The state old age grant s (R1350) offers a very significant amount (Shackleton and Luckert 2015) of money to recipients, to such an extent that some households depend solely on this as a source of income. The state old age grant

reflects the minimum wage and is received every month; it is therefore a reliable source of income, compared to subsistence farming in Marwendo village, making the households in Tshivhulani village less vulnerable. Similar results were also found in studies in the Eastern Cape province of South Africa (Eyal and Woolard 2011; Clark 2012).

The distance to the nearest town or urban area is expected to have a strong influence on the overall household's livelihood portfolio, its major income source and its employment status. Tshivhulani village, being located very near to a town (about 10 km from Thohoyandou, *see Chapter 3, Table 3.1*), had a higher percentage (20%) of households dependant on formal employment as their main source of income, compared to Marwendo village.

Tshivhulani village has a higher average monthly income compared to Marwendo village (*Table 4.2*), probably as a result of most households having some form of social grant. The significantly low monthly income in Marwendo village is typical of households in semi-arid areas in Africa, where financial capital in the form of cash is severely constrained (Mortimore 1998). This again shapes differential vulnerability between the two study areas with households in Marwendo village being more vulnerable due to less financial capital and lower monthly incomes, and the lack of social grants to ensure at least some cash income.

Table 4. 2 Major income sources of respondent's household in Tshivhulani and Marwendo villages

Variable		**Tshivhulani (South Africa)**	**Marwendo (Zimbabwe)**	**χ^2-Test/ ANOVA**
Households' major income source %	Informal employment	40	44	
	Pensions	26	5	
	Other Social Grants/ Social Welfare	13	0	**
	Remittances	1	8	
	Subsistence Farming	0	24	
	Commercialisation of NR	0	9	
	Formal Employment	20	11	
Average monthly income earned		R 2 186±97.97	R 1060±120.1	**
Receive Social grants/ Social Welfare %	Yes	83	3	**
	No	17	97	

*** level of significance is $p<0.05$; Mean (±SE)*

Box 4.1. Mrs A- selling traditional beer in Tshivhulani village

My name is Mrs A. I was born in a small village called Mukula. My mother passed away many years ago, and her name was Elelwani. When the time was right for me to be married, I found myself a husband by the name of Musiana, who has already passed on. That is when I moved from Mukula Village to Tshivhulani village. My husband was born and bred in Tshivhulani and his mother Mushathama passed away a few years ago. I have given birth to children of which some have already passed on.

I was not working when I gave birth to my first-born; I only had a small *shebeen* where I sold traditional beer. Even now, I still brew and sell traditional beer in order to sustain a living.

In Marwendo village, subsistence farming is acknowledged by 24% of the households to be the second most important major income source (*Table 4.2*). This finding is consistent with work done by Campbell (2002) in Zimbabwe, who found that subsistence farming plays a crucial role in food security, though contributing less than a quarter of total household income. Such livelihood practice is natural resource based and climate sensitive, and as such, the vulnerability of most households in the village may increase in the future, given an expected increased exposure to extreme events induced by harsh climate projections.

Commercialisation of natural resources was also an important source of income in Marwendo village with 9% of respondents indicating it as their main source of income. The ready availability of natural resources such as wild fruits and firewood in the Mutema highlands (Maroyi 2012) could help explain this contribution of natural resources (*see Chapter 3*). Such use and sale of natural resources has been noted as an important livelihood strategy in most rural communities (Paumgarten 2005; Takasaki 2010; Paumgarten and Shackleton 2011; *see Chapter 3*). The fact that there were no respondents in Tshivhulani village relying on commercialisation of natural resources as a major source of income supports the notion of Clark (2012) and Mosberg and Erikson (2015) that households in different geographical locations with contrasting socio-economic environments can have marked differences in vulnerabilities and livelihood strategies available to them. This could be due to the availability of social grants, as recipients may not need to be involved in commercialisation of natural resources as a full-time income-generating activity, although some may be, but not as a major income source. This concurs with findings by Shackleton and Luckert (2015) that other income sources tend to decline with increasing reliance on social protection.

Remittances (in the form of cash and kind) were also noted to be a main source of household income by 8% of the respondents in Marwendo village. Many of the households that were interviewed have one or more of their members in paid employment in cities or on commercial farms and some are based in South Africa, so even if not a main source of income it is important in income diversification.

Box 4.2. Mrs P- Remittances in Marwendo village

Mrs P was widowed in 2000. Prior to his death, her husband was at one stage a migrant worker in Mutare, but his low-paying job could not allow him to purchase many assets. Nowadays Mrs P's two sons (Timothy and Taurayi) and daughter (Sharayi) are city-based and gainfully employed. The children are very much committed to sending remittances, groceries and payment of school fees for their siblings and other close relatives. The sons also financed the purchase of cattle and in 2010/11, she had 10 cattle making her less dependent on other households for draft power. Her daughter and one of her sons fully financed the construction of a modern asbestos house. During the 2002 drought, the children would send grain and other groceries.

The above case [*Box 4.2*] illustrates the strong links and obligations between rural-based households and urban-based households through remittances, where the flow of cash and kind helps to minimise the vulnerability of households and strengthens their capacities in the face of multiple stressors. During focus group, the migration to South Africa was generally suggested to have been increasing over the past years, in response to the current economic hardships in Zimbabwe. One female participant in her 70s remarked to the audience:

> *".... our children and grandchildren have all migrated to South Africa (Joni)...they live a good life better than here in the village...last year during the Christmas holiday they all came for a holiday and brought with them plenty of groceries and money...I am very confident that if the situation in our country changes for the better all my children will come back to stay in their country... Home is always best but at the moment there is nothing that they can do but work outside the country". [Female Respondent in Marwendo village]*

However, most of the respondents in Marwendo village were very optimistic that if the situation improves people would flock back to the village. According to Campbell (2002), the remitter can be the household head or in most cases the sons (to a lesser extent daughters), which was also generally exhibited in this study. Remitted amounts were generally said to be

large enough to cover major purchases, and this reduced the vulnerability of households. Although remittances are a better source of income (Campbell 2002), they tend to be not consistent nor continuous. In some cases, households may fail to receive remittances for two or three months and this can leave them susceptible to short-term shocks and stressors.

4.3.2 Employment status

The level of employment was also used as a useful indicator of comparative vulnerability between the two sites. A high unemployment rate of 70% in Marwendo village (*Figure 4.1*) makes the households susceptible to both existing and future shocks and stressors. In contrast, only 41% were unemployed in Tshivhulani village. Interestingly, 3% mentioned farming as a form of employment in Marwendo village, whereas none of the respondents mentioned farming in Tshivhulani village. As mentioned earlier, the reliance on climate sensitive livelihoods such as farming can contribute to increased vulnerability in Marwendo village compared to Tshivhulani village.

The lack of farming as a form of employment in Tshivhulani can also be explained by the decrease in agrarian-dominated livelihoods and increasing reliance on off-farm income generating livelihood strategies observed in other studies throughout South Africa (Shackleton and Luckert 2015; Stadler 2012; Quinn *et al.* 2011). In a study in Lesseyton and Gatyana in the Eastern Cape province of South Africa by Clark (2012), cultivation formed only 1% and 3% respectively of the total household income, coinciding with the increase in reliance on social protection.

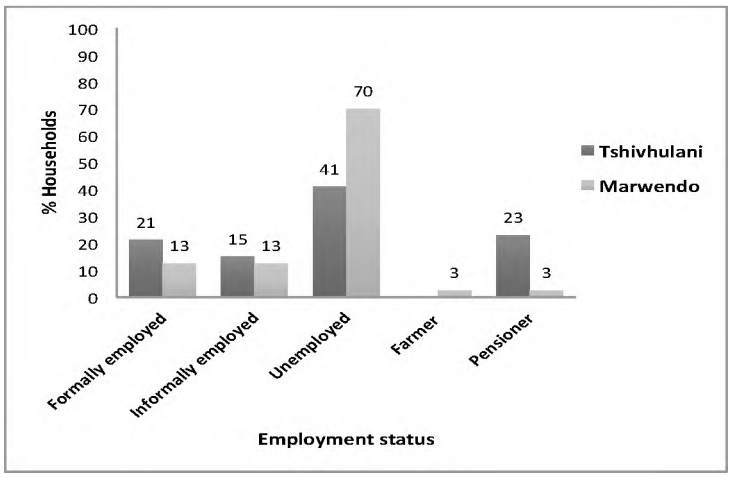

Figure 4. 1 Comparison of employment status of households in Marwendo and Tshivhulani villages

4.4 Household Assets

4.4.1 Aspects of households' physical assets

The average number of physical assets per household and the selling of these assets was also a useful indicator of vulnerability between the two study sites. Results show that the average number of physical assets was the same in the two study areas. However, 60% of the respondents in Tshivhulani did manage to purchase assets in the last 5-10 years compared to 47% in Marwendo village. Household physical assets included implements such as solar panels, televisions, paraffin stoves, radios, and wheelbarrows.

A noteworthy finding was that in total, 40% of the households in Marwendo village were forced to sell their physical assets in the last 5-10 years, whereas only 8% sold their physical assets in Tshivhulani village. This is a strong indicator of the lack of any social protection in Marwendo village, forcing households to sell their physical assets in response to shocks and stressors. Such maladaptive or "losing-out" strategies lead to a reinforcing of the downward spiral of increasing asset erosion, higher pressure on environmental resources [*see Box 5.2 Chapter 5; Figure 6.2 Chapter 6*], increasing poverty and further environmental degradation (Shackleton and Shackleton 2012; United Nations Development Programme 2015). The major themes that came out as reasons for disposing of physical assets were: need to buy food and pay school fees, response to shocks (death, sickness) and expensive events (*Table 4.3*). All the households that sold their assets in Tshivhulani village alluded to the need to buy food as the major reason.

Table 4. 3 Comparison of aspects of households' physical assets between the two villages

Variable		Tshivhulani	Marwendo
Average number of assets per household		5±0.23	5±0.42
Asset purchases in the last 5-10 years (%)	Yes	60	47
	No	40	53
Asset sales in the last 5-10 years (%)	Yes	8	40
	No	92	60
Reasons for asset sales (%)	Food	100	38
	Fees	0	25
	Death/other shocks	0	16
	Expensive events	0	21
Asset base from childhood (%)	Increasing	46	16
	Stay much the same	46	35
	Decreasing	8	49

The majority of households in Tshivhulani village agreed that their asset base had been increasing over the past 30 years. This could be due to the availability of cash income from social grants. In contrast, most households in Marwendo village noted a decrease in the total asset base, and a combination of factors such as being forced to sell due to economic hardships, or death of a breadwinner, were noted as the cause for the decrease. Social protection (*as explained in Chapter 3*) is aimed at providing income support to the eligible poor and vulnerable individuals, mostly the elderly, people with disabilities and children under the age of 18 (Pauw and Mncube 2007). The absence of such a pronounced social protection system in Marwendo village means that asset erosion is inevitable in the face of shocks and stressors, rendering most households vulnerable.

In terms of reliance on purchased goods (over the past 5-10 years), the majority of households in both sites agreed that they relied more on purchased goods than crops from the garden/fields (*Figure 4.2*). This reliance can be a result of a number of factors such as low and erratic rainfall patterns, droughts that have affected yields, thereby discouraging farmers to farm, and the scarcity of wild natural resources. In Marwendo village, the reliance on purchased goods can also be attributed to the dollarization of the economy, which managed to stabilise the economy with the consumer price index decreasing substantially (Sikwila 2013). Respondents in both sites also mentioned cultural erosion as another factor leading to less cropping and more reliance on purchased goods. However, such a livelihood option has rendered hardships in the lives of a majority of households especially in Marwendo village

(*Figure 4.2*) primarily as a result of scarcity of income. One respondent was quoted as saying:

> "*…kana usina mari hauna upenyu…*" meaning *"if you do not have money you do not have a life".*

This clearly shows that financial constraints are forcing some people in the village to live a life full of hardships. These findings are consistent with Clark (2012), who also found that the current high reliance on purchased food and other goods is perceived to be damaging due to the increased need for (scarce) income. In addition, for households located in isolated rural areas far from urban areas, local supplies are costly (Shackleton and Luckert 2015) with Marwendo village being no exception (*see Chapter 3*).

However, mixed responses were observed in Tshivhulani village with 49% of households agreeing that their lives were made a little easier by relying more on purchased goods due to availability of cash from social grants. As alluded to earlier, social grants provide a regular source of income pooled within the household and are important to food security as illustrated by the narrative below:

> *"The whole family survives on a state old age grant from our grandmother whom we stay with... no-one in the family is employed formally ... the other three grandchildren in the family also receive child support grants... We normally use this money to buy food and clothes... If our grandmother were to pass on it will be very difficult for the family to survive because next year one of the grandchildren will be too old to be eligible for the child support grant" [Female Respondent in Tshivhulani village].*

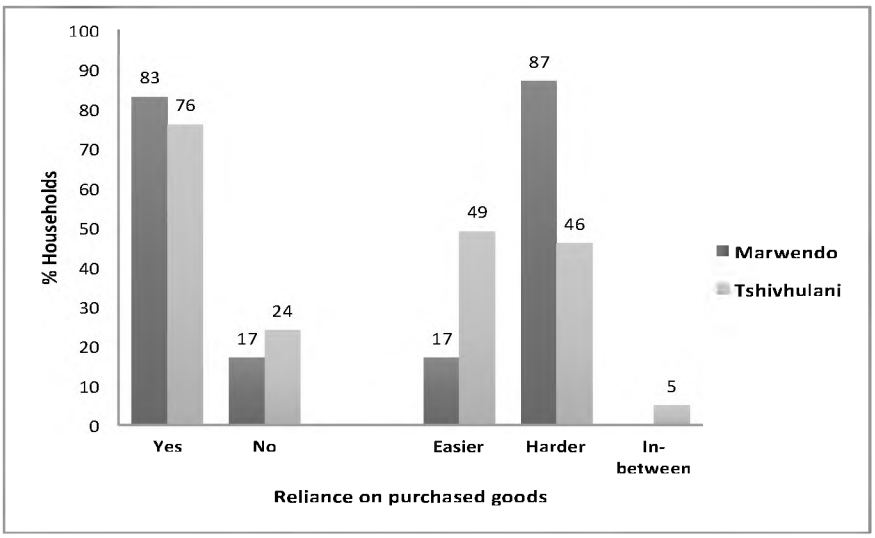

Figure 4. 2 Comparison of the percentage of households relying on purchased goods and perceptions how this reliance on purchased goods rather than on harvested natural resources/crops from gardens/fields amongst respondents in Marwendo and Tshivhulani village has made their lives "easier", "harder" or "in-between".

4.4.2 Natural capital

4.4.2.1 Livestock production

Livestock was generally agreed in all villages to constitute an important wealth store for households. There are significance differences ($p<0.05$) between the two study sites regarding livestock ownership, number of livestock, and indication of changes in livestock numbers, livestock sales and frequency of sales. The results show that 86% of households in Marwendo own livestock compared to 31% in Tshivhulani village (*Table 4.4*).

The majority of households in Marwendo village (85%) indicated that their livestock numbers had changed over the last 5-10 years, compared to 26% in Tshivhulani village (*see Chapter 6*). Livestock numbers were said to have decreased significantly over this period (*Table 4.4*), with the majority (72%) in Marwendo village mentioning a decrease in livestock numbers compared to only 19% in Tshivhulani village. The decrease in livestock numbers was particularly precarious in Marwendo village, especially for those households who depend on livestock as their primary livelihood. The results are echoed in a study by Mosberg and Eriksen (2015) in the semi-arid area of Kitui Country in Kenya, where livestock dependent households were affected by cash shortages, food scarcity and malnutrition as a result of droughts.

The participants in focus group discussions in Tshivhulani village ranked land pressure as the major driver of decreasing livestock numbers as a result of land being used for new

settlements, with consequent loss in valuable grazing area and woodlands (*see Chapter 6*). In contrast, erratic rainfalls, death/diseases of livestock and droughts were identified during focus group discussions in Marwendo as drivers of decreasing livestock numbers. One respondent explained how he ended up losing most of his livestock:

> *"As the head of the family and in line with our culture, it's every man's ambition to accumulate wealth through acquiring livestock, especially cattle...By the late 1980s I had a herd of 19 cattle, but 12 perished during the infamous 1992 drought...I started again to rebuild my stock using money from my piece jobs. By 2000, I had significantly recovered....but again the 2002 drought struck and coupled with Foot and Mouth disease my herd was severely affected... Now I remain with 5 cattle" [Male Respondent in Marwendo village].*

The impact of droughts on livestock numbers is also well documented in a study within two different social-ecological drylands of rural Botswana over a period of 30 years by Sallu *et al.* (2010). The results revealed that prolonged droughts in 1980 resulted in limited grazing and fodder for pastoralism leading to a significant reduction in livestock numbers. Contrary to Scoones (1996), the proportion of land being converted to farmland was not mentioned as resulting in loss of grazing area and decrease in livestock number.

The vulnerability of people in Marwendo village is also exhibited in the high proportion of households selling livestock (60%), with a significant difference (χ^2=27.6, df=2, $p<0.05$) between the two sites (*Table 4.4*). The comments above show that many households were unable to restock their livestock numbers after losing them. Mosberg and Eriksen (2015) also reported that farmers in Kenya were unable to rebuild capital and assets such as livestock after being eroded by droughts. The major reasons that came out for selling livestock was the need for cash income to buy food and pay school fees, and to recover from a shock such as death of a family member, and expensive events, among others.

4.4.2.2 Land for crop production

Land, coupled with other inputs, was also emphasised as part of the natural capital crucial to sustaining rural livelihoods in both villages, consistent with Campbell (2002). In Marwendo village, croplands comprised of mainly a field (usually large and at some distance from the homestead) and a garden. The gardens varied from small plots around the homesteads to large gardens near the perennial Tanganda River, and/or artificial boreholes in community

gardens. In Tshivhulani village, croplands mostly included small plots around homesteads and large fields some distance from homesteads.

The proportion of households owning gardens was not significantly different between the two sites, whereas that of owning fields was significantly different (*Table 4.4*). The majority (97%) of households owned fields in Tshivhulani compared to 66% in Marwendo village (*Table 4.4*). Interestingly, in Marwendo village, a lower percentage ownership of cropland and lower average number of gardens and fields was recorded (68% had fields and 65% had gardens), though subsistence farming contributes more significantly to household income than in Tshivhulani village and is a major income source for some (*Table 4.2*). In-depth livelihood interviews and focus group discussions in Marwendo village suggested that the recent ban by the Environmental Management Agency (EMA), forbidding villagers to have gardens along natural water sources (that is, Tanganda River that flows through the village) meant that most gardens were abandoned. In Tshivhulani village, focus groups suggested that although people were still holding on to their fields, very few were actively involved in cropping year in and year out. This was evident during the transect walks where large areas of abandoned or unused arable fields were a common feature, especially those in distant areas. These findings also resonated with work by Andrew and Fox (2004), Shackleton and Shackleton (2002) and Shackleton and Luckert (2015). In a study in Gutyana, Eastern Cape province of South Africa, by Shackleton Shackleton (2002), the interviewed farmers had abandoned farming on distant fields, which also again coincides with increased reliance on social protection as mentioned earlier. One participant in the focus group explained:

> *"...we still hold on to my field...this is our family inheritance.... we take pride in the fact that we have a piece of land to our name although we do not crop in it year in and year out...it still remains our asset.... we have a small garden in our yard where we mainly grow vegetables mainly for consumption. The home gardens are very much easier to maintain as compared to distant fields...we can easily water and weed them with very little labour required" [Male Respondent in Tshivhulani village].*

The above sentiments support findings by Shackleton *et al.* (2001) that home gardens are much smaller in size than arable fields and many households have them as they are easily accessible. The greater number of gardens in Tshivhulani village can be a reflection of a shift from fields to manageable homestead gardens. This is in line with a study by Andrew and

Fox (2004) in the Transkei, who found that changes in arable land is in fact a shift from fields to homestead gardens.

Table 4. 4 Differences between land use and livestock ownership

Variable	Tshivhulani (South Africa)	Marwendo (Zimbabwe)	Significance (One-way ANOVA/ X^2 test
Households having gardens (%)	66	64	*ns*
Mean number of gardens	0.66 ± 0.053	0.78±0.087	*ns*
Households owning fields (%)	97	69	**
Total number of fields	0.98 ± 0.018	0.74 ± 0.066	**
Fallow land left (%)	46	28	**
Livestock ownership (%)	31	86	**
Mean number of livestock	2.78 ± 0.594	9.9 5 ± 1.054	**
Perceptions of changes in livestock numbers (%)	26	85	**
Change type (%)- Decreasing	15	72	**
Livestock sales (%)	19	60	**
Frequency of livestock sales (%)- Increasing	5	22	**

*ns= $p > 0.05$; ** level of significance $p<0.05$; Mean (±SE)*

A greater percentage of households in Tshivhulani village (46%) have been leaving cultivated areas fallow in the last 5-10 years compared to Marwendo village, with a statistical significant difference between the two sites (*Table 4.4*). This triangulates findings in *Table 4.2*, in which no respondents in Tshivhulani village mentioned subsistence farming as a major source of income. Some studies have shown that field abandonment has been happening over several decades and is seen as social-ecological transformation or "stepping-out" (Hebinck and Lent 2007).

Most respondents in Marwendo village alluded to erratic rainfalls (41%) and poor soils (27%) as the major reasons why they were leaving land fallow. However, in Tshivhulani, the reasons for fallowing were mainly insufficient cash to purchase inputs (59%) and poor soils (31%). The encroachment of pioneer woody vegetation into fallow land was mentioned as occurring if the land was left fallow for a number of subsequent years. This can act as a barrier to cultivation (Shackleton and Luckert 2015) as it can be costly or labour intensive to de-stump and clear the fallow land prior to cultivation.

During the focus group discussions in both sites, it was generally agreed that the sizes of fields are decreasing and this was due to new settlements (mostly in Tshivhulani village), poor soils, erratic rainfalls, low crop yields and a general shift to off-farm activities. The impoverished soils meant that most households were only concentrating on smaller fields where they would invest in agriculture inputs such as fertilisers and drought-tolerant small grain seeds. A general shift to off-farm activities resulted in less labour being available for farm operations and thus the field sizes were reduced so as not to strain the limited labour available. This could be as a result of smaller household sizes as mentioned earlier. To some households especially in Tshivhulani village this resulted in abandonment of fields completely.

4.5 Perceptions of vulnerability

To establish the household's own perceptions of their vulnerability, respondents were asked how important it is to have as many members of their household involved in different income sources. In addition, they were asked to state what they thought the social status of their household was in comparison to the rest of the community. Just over half of households in Tshivhulani village (59%) alluded to the importance of having many members of their household working in different kinds of income generating activities, compared to 44% in Marwendo village (*Table 4.3*).

With regards to their well-being, most households regarded themselves as either average or below the other households in their village (*Table 4.3*). Most people in Tshivhulani village perceived themselves to be in the middle, which could be linked to people receiving social grants. In contrast, 46% in Marwendo village perceived themselves below the social status quo, where most households are in the same socio-economic position.

Table 4. 5 Respondents' perceived importance of many household members and social status

Variable		Tshivhulani	Marwendo
Importance of many members (%)	Very important	59	44
	Important	20	34
	Neutral	17	10
	Not important	4	8
	Not important at all	0	4
Well-being (%)	Above	0	8
	Middle	36	32
	Below	33	46
	Don't know	31	14

NB. i) The importance of many members in the household doing different jobs. ii) Well-being of the household considered by asking how well off the household thought they were in comparison to their neighbours.

4.6 Conclusion

This chapter was guided by the rationale that examining households' current context and the changes that might have taken place could contribute to understanding vulnerability and households' exposure to shocks and stressors (*discussed in the preceding Chapter*). The impacts of a country that is/has experienced socio-economic hardships characterised by a shrinking economy, hyperinflation, high rates of interests, the burden of failed structural adjustment, and persistent political crises, among others, is evident in Marwendo village. The high levels of informal employment, high unemployment, commercialisation of natural resources, high dependency on remittances and need to sell assets is reflective of this. In contrast, the legacy of apartheid is still evident within the Tshivhulani village, with relatively high unemployment, high dependency on social grants and low levels of education. This offers a strong indication that contextual conditions and their interaction with household characteristics contribute to shaping vulnerability.

The relatively high dependency on natural resources and subsistence farming mostly in Marwendo village is a common feature in rural communities in the dryland areas of southern Africa. The decreasing trend in subsistence farming in both study areas has the potential to contribute to food insecurity in most households. However, the pronounced social protection system in South Africa (83% of households interviewed were receiving social grants), helps contribute to food security and thus reduces household vulnerability.

The result of households relying more on purchased goods, which has, in some cases, made their lives harder due to scarcity of disposable cash income and the lack of income for other needs such as health, increases exposure to shocks and stressors for households in Marwendo village compared to Tshivhulani village. Thus the maintenance of small-scale farming systems, or at least some form of food self-reliance, is key for food security and reducing vulnerability to future climate change (Shackleton and Luckert 2015).

The households in both study areas pursue diversified livelihood strategies for income generation, not only from an economy that encourages numerous activities (South Africa) but also from an environment where the economic choices are limited (Zimbabwe). The evidence within the two study sites suggests weak adaptive capacity in both sites, and higher exposure to change and in particular, climate change within Marwendo village compared to Tshivhulani village.

CHAPTER FIVE

SHORT-TERM SHOCKS AND STRESSORS: IMPACTS AND RESPONSES

5.1 Chapter overview

In this chapter I seek to address objective number two (*see Chapter 1, Section 1.3*), namely to identify contemporary short-term shocks and stressors and understand local responses to these, with an emphasis on the relative contributions of natural resource-based safety-nets and state-supported social grants. I divided the chapter into two parts. In the first part, I present the short-term shocks and stressors [*Box C in the conceptual framework of this study, Figure 2.1*] that have been experienced by households in the two study sites. The following research questions are addressed as part of this:

- What short-term shocks and stressors are households in the two study sites experiencing and how frequently do they occur?
- What are the perceived impacts of these on household livelihoods and vulnerability?

In the second part of the chapter, I seek to understand the local responses [*Box D, Figure 2.1*] to these trends, shocks and stressors. In the analysis of the results, I specifically consider the relative contributions of natural resource-based and social protection coping strategies and safety-nets. The following research questions are addressed:

- How are households responding and what role do woodland resources and social protection play?

The sources of data for this chapter were provided from the household survey, which identified the shocks and stressors to which households had been exposed, a ranking exercise held with focus groups in Tshivhulani and Marwendo villages, as well as from in-depth life history interviews. The use of the mixed method approach (*Chapter 3*) taken in this chapter not only provided different insights and depths of understanding, but also proved useful in the triangulation of findings. The results in this chapter are presented simultaneously with the discussion.

5.2 Exposure to shocks and stressors

5.2.1 Types of shocks and stressors registered by households in the last five years

The respondents were asked to indicate, from a predetermined list of 20 items (with an allowance for the respondent to add additional shocks or stressors to the list), which shocks and stressors they had experienced in the last five years. All households interviewed in the survey were affected by at least three or more of the listed shocks, thus the proportion of households affected by shocks and stressors over the last 5 years is 100% in both villages (*Table 5.1*).

The results reflect that most households in Marwendo village were affected by multiple shocks and stressors, with 78% mentioning more than five shocks in the last 5 years, compared to 46% in Tshivhulani (*Table 5.1*). This difference between the two sites is significant. These findings are consistent with work by Paumgarten (2005), who found that from a sample of one hundred households in South Africa, all the households had experienced at least one shock over the two-year period under study. Other studies in Africa (Dercon and Krishnan 2000; Dercon 2002) have also found that a fairly broad set of shocks has been experienced in this region. For example, Dercon (2002) found that rural households in Ethiopia were exposed to a variety of shocks and stressors including harvest failure due to droughts, loss of assets, floods and other climate events.

Table 5. 1 Comparison of shock incidences in the last five years

Variables		**Tshivhulani (South Africa)**	**Marwendo (Zimbabwe)**	χ^2**-Test**
Households affected by shocks and stressors (%)		80 100	80 100	-
Most number of shocks and stressors experienced (%)	Three Four Five More than five	29 16 9 46	5 5 12 78	**

***p<0.05 level of significance between the two study sites. The shocks experienced were determined from a predetermined list (with the possibility of respondents adding additional shocks or stressor to the list)*

Climate related shocks and stressors emerged as those most commonly experienced within the two study sites, especially droughts, rainfall variability and strong winds. The loss of soil fertility was another commonly mentioned stressor. Survey results show that droughts (99%) and rainfall variability (95%) were the crisis events most experienced by households in

Marwendo village, whereas strong winds (93%), droughts (70%) and rainfall variability (70%) were cited in Tshivhulani village (*Figure 5.1*). This is substantiated by future climate predictions of high climate variability and change in Africa, particularly in dryland areas (*as discussed in Chapter 3*). Several households in Tshivhulani village (93%) mentioned severe strong winds, which resulted in destruction of property, loss of assets and damage to roofing material among others, while only 31% cited strong winds as a key stressor in Marwendo village. These climate-related shocks and stressors are covariate risks that affect all members of the community resulting in similar experiences. However, in a review article on poor households' use of risk-management and risk-coping strategies, Dercon (2002) found that the impacts of covariate shocks might vary depending on the household's assets and the nature of their built structures.

Inflation (81%) was commonly mentioned as a stressor only in Marwendo village. Several people during the survey mentioned that they are still recovering from the period of hyperinflation and currency instability that began in the late 1990s in Zimbabwe (Hanke and Kwok 2009). The height of inflation was felt between 2008 and 2009, and at its peak, mid-November 2008, the inflation rate was estimated at 79.6 billion percent (Hanke and Kwok 2009). Most villagers mentioned that during the height of inflation, basic commodities such as maize meal, bread, wheat flour, cooking oil and sugar were in short supply and when available they were priced beyond the reach of many. These results are similar to work done by Mukwada (2012) in the Mufurudzi resettlement scheme, who found that drought, economic and political crises generated multiple stressors beyond the coping ability of many villagers.

Livestock diseases and death, loss of assets, expensive events and illnesses were also commonly mentioned shocks and stressors experienced in both study sites. Livestock diseases/death were cited more frequently in Marwendo village (58%), compared to 21% in Tshivhulani village. Generally, these shocks and stressors are idiosyncratic risks that only affect a particular individual or household (Dercon 2002). These findings are similar to those from a three-period panel data set on Ethiopia that revealed that most of the shocks experienced by households showed both idiosyncratic and covariate risk features (Dercon and Krishnan 2000). Shocks and stressors related to subsistence farming were more commonly mentioned in Marwendo village than Tshivhulani, indicating that subsistence farming is still very important to households in Marwendo village. The reliance on climate-sensitive livelihoods in Marwendo village makes most households more vulnerable compared to

households in Tshivhulani village as discussed in *Chapter 4*. Shocks and stressors mentioned included loss of soil fertility (71%), loss of grazing land (58%), crop pests/diseases (50%) and crop failures (36%). The figures for Tshivhulani were loss of soil fertility (33%), loss of grazing land (8%), crop pests/diseases (3%) and crop failures (0%).

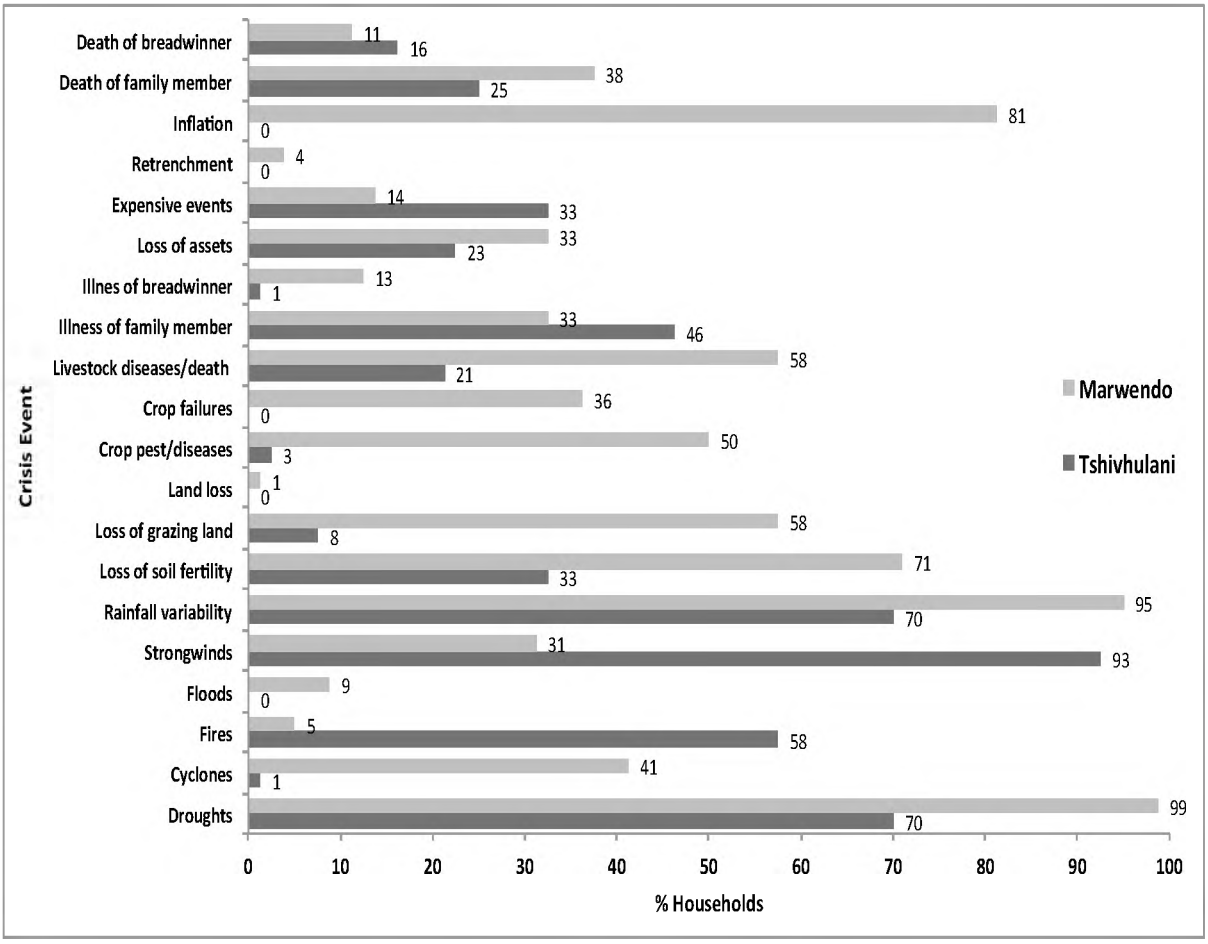

Figure 5. 1 Shocks and stressors experienced in Tshivhulani and Marwendo villages in the last five years

5.2.2 Life history interviews: Narratives emphasising the general shocks and stressors experienced among life history respondents

The survey results were triangulated with the life history results. During life history interviews, health-related shocks and stressors such as the death of a family member, or having to look after a sick or disabled family member, were frequently mentioned themes in both of the study sites (*Tshivhulani HH40, HH1, HH65 and Marwendo HH3*). Death of a family member, death of a breadwinner and serious illness of a family member were generally associated with HIV/AIDS in both villages. In one household (*Table 5.2 Marwendo HH 40*), the pandemic claimed the household head and their spouse, leaving the children as

the only remaining members of the household. In other cases, it was the young productive household members that died, often leaving behind ageing members of the household to take care of orphans. The results resonate with work done by Hunter *et al.* (2009) using data from Agincourt Health and Demographic Surveillance Site in rural South Africa, indicating high HIV/AIDS mortality in prime-age adults.

In addition, corroborating the household survey, inflation (*Marwendo HH3*), droughts and poor crop yields (*Marwendo HH2*) were frequently mentioned (*Table 5.2 Marwendo HH 40*). Thus, many of the shocks and stressors, which emerged from the life history narratives, recap the most mentioned shocks and stressors shown in Figure 5.2. These interviews also show that households experience "double exposure" as more than one shock or stressor affects most households. For example, for HH1 in Tshivhulani village (*Table 5.2*), the death of the mother and husband was coupled with loss of arable plots/land, doubly affecting the household's ability to cope while eroding its adaptive capacity.

Table 5. 2 Life history interview narratives of the general shocks and stressors experienced among the respondents

Households	Theme: Types of shocks and stressors
Tshivhulani HH 40 Female	My husband and my first-born passed away few years ago. My three grandchildren passed on and I had to bury them.
Tshivhulani HH 1	My mother passed away many years ago. When the time was right for me to be married I got married, but my husband also passed away. I have given birth to children of which some of them have passed on. At first, my husband was working in reefs, then he loses his job and came back home. I used to have a big ploughing plot but now other people, in need of building new houses (as the population is growing in our community), have taken the plot.
Tshivhulani HH 42	The other challenge that I encountered was when my wife's younger sister moved in to stay with us as she lost her parents, but we managed to support her. The plot we used to plough has been taken by people who are building the new houses, resulting in us having no place to plough anymore.
Tshivhulani HH 65	Things are tough as a result of lack of jobs. In 2004, my young brother passed away and we used community money and money we got from funeral cover to bury him.
Marwendo HH 2	Mother-in-law died in 2008, hardships started. Poor crop yields meant abandoning farming. It also meant planting less of the maize crop since this is susceptible to droughts.

Marwendo HH 1	Resettlement of people in grazing areas, less grazing for our livestock. Inflation really affected us, all our money was lost in the banks, and things become so hard. Migration of people into our village, leading to scarcity of firewood. Affected also by violent rains, crop failures and NGO support dwindling.
Marwendo HH 3	Death of my husband caused our family to fall into poverty together with droughts. I am now sick because I was forced to carry heavy things, walk long distances to make ends meet. Inflation pulled us into poverty, banks closed with our money.
Marwendo HH 4	Droughts have affected us greatly, livestock death and diseases. We experienced fires for the last four consecutive years, which has contributed to fuel wood scarcity. I used to work in white farms but lost my job when the white farmer went away. Our family survived from porridge during inflation period. Erratic rains have reduced our forest cover.

Note: The underlined words or phrases emphasise the particular shocks and stressors that were mentioned by the respondents during the life history interviews.

5.2.3 Hardest shocks and stressors from which to recover

In addition to indicating the range of shocks and stressors experienced, respondents were also asked to rank the single hardest shock to recover from or respond to (*Figure 5.2*). The distribution of responses in the two pie charts below reveals interesting insights, with respondents in Tshivhulani village mentioning a range of shocks and stressors with no single one being dominant, as compared to Marwendo village where 59% of respondents mentioned drought as the worst stressor.

A total of ten different shocks were mentioned by households in the Tshivhulani village as being the hardest from which to recover (*Figure 5.2 A*). Internal or idiosyncratic shocks and stressors relating to human health and family were mentioned more often than others, that is, death of a family member (19%), death of a breadwinner (16%), serious illness of a family member (16%), loss of assets (13%) and illness of the breadwinner (1%). These contributed to 61% in total of the responses in Tshivhulani village. The financial constraints associated with the health-related shocks and stressors can put households under a lot of pressure thus making it hard to recover from the impacts.

Furthermore, few respondents in Tshivhulani village mentioned external/covariate shocks and stressors (droughts, strong winds, and rainfall variability). For example, only 17% of

respondents mentioned droughts as the hardest shock from which to recover. The availability of cash from social grants and the low incidence of arable farming, as noted in Chapter 4, can offer an explanation as to why droughts (external shocks in particular) were not mentioned by many respondents. People are able to purchase goods during drought periods using social grants income. According to Dercon (2002), the availability of formal or informal insurance transfers, in this case social grants from outside the community, are necessary to deal with covariate shocks and stressors, because if everyone is affected the risk cannot be shared.

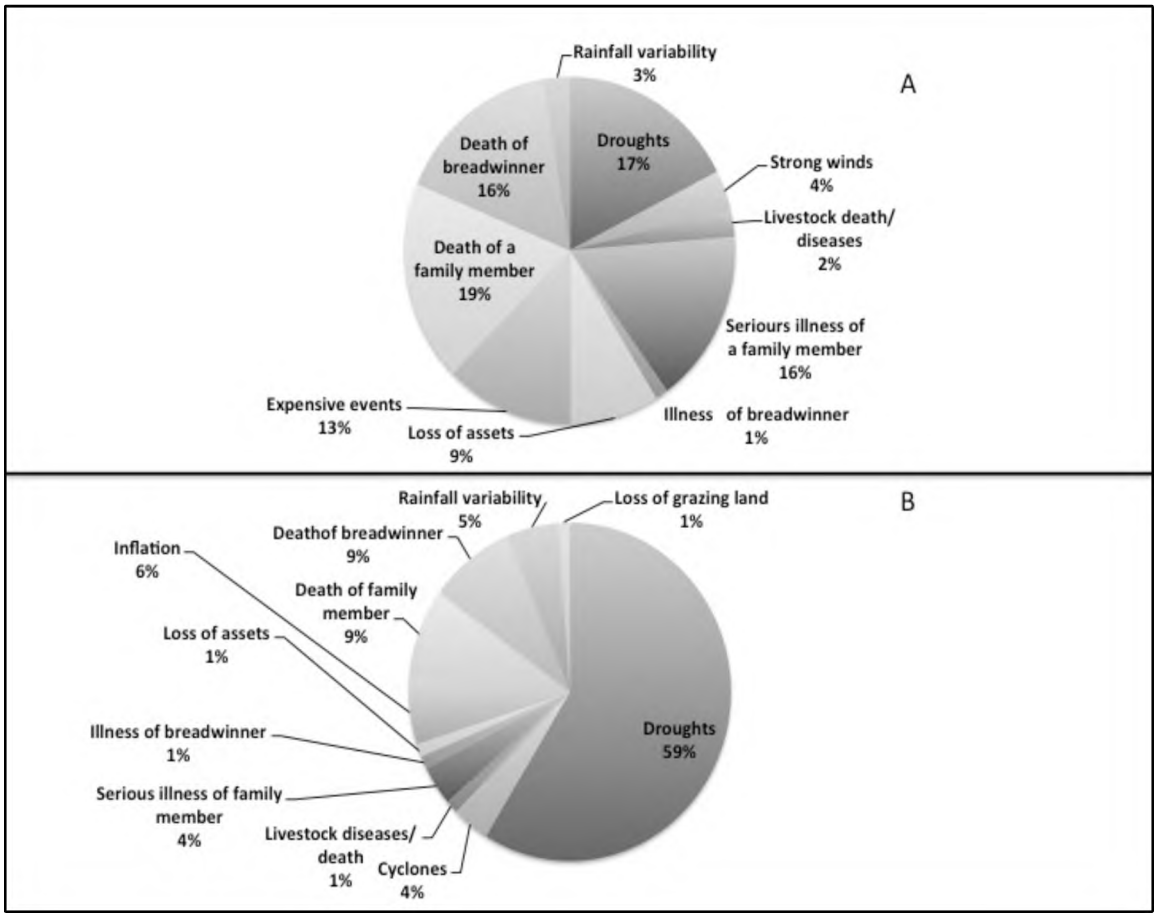

Figure 5. 2 Comparison of the hardest shocks from which to recover in the two villages (Tshivhulani A and Marwendo B)

A total of eleven shocks were mentioned in Marwendo village to be very hard to recover from, with over two-thirds of the respondents mentioning covariate/external shocks and stressors (droughts, cyclones, loss of grazing land, rainfall variability and inflation) as the worst to recover from (*Figure 5.2 B*). The majority (59%) mentioned droughts as the worst; one respondent narrated during the survey that:

> *"...During drought years, our family struggles to have a decent meal...struggles to find grazing for our livestock...struggles to send children to school. We basically*

struggle in all walks of life. It's difficult times for us...only God knows how I managed to survive past all these drought years that have hit our village..." [Household 69, Marwendo Village].

Such deep sentiments support the skewed distribution of external shocks and stressors being hardest to recover from, with droughts being the one most mentioned. The reliance on subsistence farming, increasingly unreliable rainfall, low monthly incomes earned and death of livestock could offer an explanation as to why droughts were considered one of the hardest to recover from in this site. In addition, the lack of pronounced formal insurance transfers through, for example, social grants (as in Tshivhulani) makes it very hard for households to recover. In a study carried out in Mufurudzi resettlement scheme in Zimbabwe, Mukwada (2012) echoes the above findings that external/covariate shocks and stressors such as drought as well as economic and political crises generated stressors from which many villagers found it extremely difficult to recover.

In contrast to Tshivulani, in Marwendo village, internal/idiosyncratic shocks and stressors were mentioned by fewer respondents (25% in total), and these were loss of assets (1%), illness of breadwinner (1%), livestock diseases/death (1%), illness of family member 4%, death of family member (9%) and death of breadwinner (9%).

5.2.4 Changes in frequency of shock and stressors experienced

The respondents were asked what had happened to the frequency of shocks and stressors they had been experiencing over a long-term period (past 30 years). The majority of the respondents in both sites perceived these to have been increasing (Figure 5.3). This perception of increasing frequency of shocks and stressors is significantly (χ^2=12.80, df=2, $p<0.05$) higher in Marwendo village, with 65% of respondents mentioning an increasing frequency compared to 51% in Tshivhulani village.

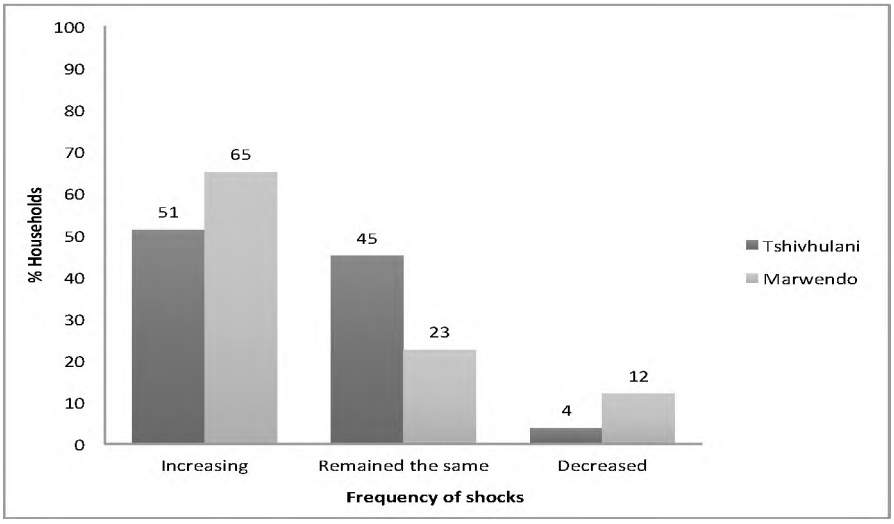

Figure 5. 3 Changes in frequency of shocks experienced over the last thirty years ($p<0.05$).

To substantiate this, respondents were further asked to rank the major short-term shock and stressors that they perceived to have been increasing over the long-term period (past 30 years). Interestingly, but not surprisingly given the historical rainfall data in Figure 3.2 and Figure 3.4 in Chapter 3, climate-related shocks and stressors appeared to be the ones increasing that households in both villages mentioned. Droughts (88%) was the major shock that most of the households felt had been increasing over the past 30 years in Marwendo village. In Tshivhulani village, 49% of the households ranked rainfall variability as the major stressor that had been increasing over this period. The results *(Figure 5.4)* suggest that climate-related shocks are critical issues facing households in both sites. In a study by Mosberg and Eriksen (2015) in Kenya, informants also reported localised rainfall variability, general decline in precipitation in the last decade, as well as increased frequency and intensity of droughts as major shocks and stressors. One could argue that this provides evidence of already felt impacts of global climate change.

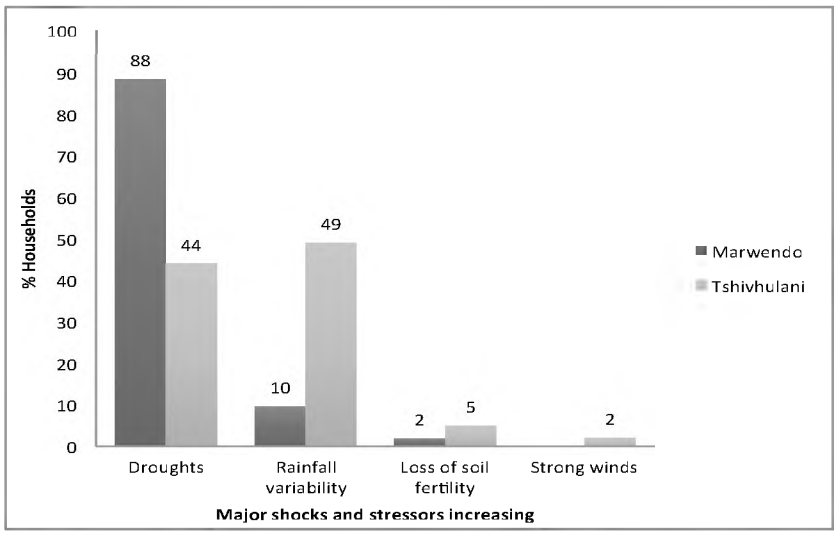

Figure 5. 4 Comparison of major shocks increasing in frequency

5.3 Household responses to particular shocks and stressors

Respondents were asked to indicate from a list of 25 responses that were created from background research of the literature and existing studies (*see Chapter 3, Section 3.5.3.2*), the responses they had adopted to the shocks and stressors identified in Section 5.2. Such an approach helped to reveal the role of natural resources and/or social grants as a means to respond as well as other adaptive strategies. The modified Dorward *et al.* (2009) typology of livelihood outcomes (*Chapter 2, Figure 2.2*) is used to frame the discussion of local responses to shocks and stressors in terms of their outcomes.

5.3.1 Common response strategies employed by households

Households acted in numerous ways to respond to shocks and stressors that they faced, as shown in *Appendix 2* and *Figure 5.5.* Other studies have also shown that rural households draw on a diverse array of strategies to procure a living and to respond to shocks and stressors (Shackleton *et al.* (2001); Quinn *et al.* (2011)).

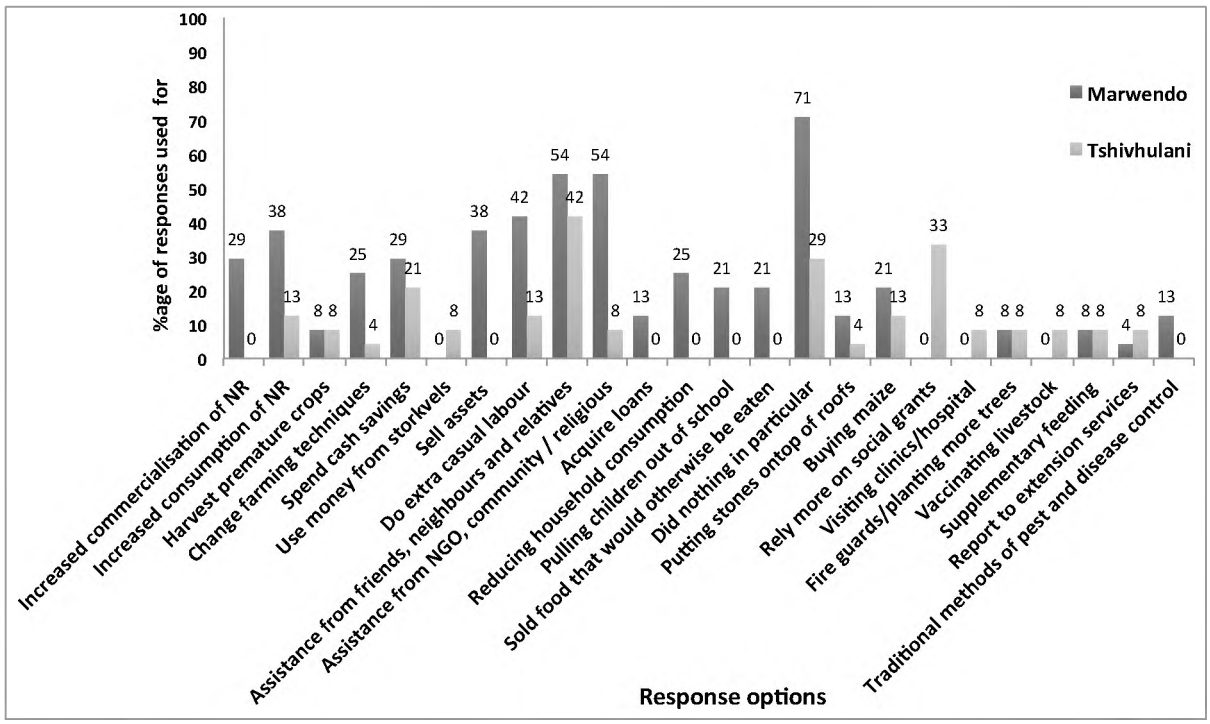

Figure 5. 5 Total percentage of shocks and stressors activating a response. The table provides a summary of the table in Appendix 2 showing responses to particular shocks and stressors experienced in the two study areas

Most of the households show multiple responses to one shock and some responses are applied across a range of shocks (*Appendix 2*). For example, drought had 13 different responses in Marwendo village and nine different responses in Tshivhulani village. The change in farming techniques, as an example of a response strategy, was adopted in response to seven different shocks in Marwendo village and to five different shocks in Tshivhulani village. Some of the response strategies employed by households in both study sites are common irrespective of the different location and characteristics of the shock experienced, similar to findings by Maxwell *et al.* (1999) in which the study sought to measure the frequency and severity of coping strategies.

The most commonly employed response in Marwendo village was that most of the respondents resorted to bearing the effect of different types of shocks and stressors (that is, doing nothing or making no attempts to modify their livelihoods, or enhance their capacity to cope). For instance, in response to land loss, all the respondents said they did nothing about it, similarly with fires (75%), floods (86%), loss of grazing land (54%,) and retrenchment (34%) among others (*Appendix 2*). The respondents indicated that they employed this 'response' to conditions that they deemed inevitable. The decision to 'do nothing' in response

to shocks, especially in Marwendo village, reflects the low adaptive capacity of most of the households in the village due to asset erosion as noted in *Chapter 4*.

The next most common response strategies in Marwendo village were getting assistance from non-governmental organisations (NGOs), religious organisations or from friends, neighbours and relatives. These response strategies were employed in response to 54% (each) of the shocks and stressors that the households faced (*Table 5.5*). Assistance from NGOs was most common as a response to droughts (24%), cyclone (24%), fires (24%), and inflation (17%), among others, that is external shocks and stressors. NGOs that were mentioned included Christian Care, SEDAP, and Action Faim. The assistance was in the form of food handouts, food for work (*see Chapter 3, Table 3.2 and Chapter 6*). One respondent mentioned during the household survey:

> *"Our family received overwhelming support from 'maDonor' (*meaning donors*)...the support was in the form of cooking oil, maize, and porridge. Not only did they give us food to eat, PLAN International paid and is still paying school fees for my two children. When I lost my husband, I thought things were going to be very tough for me but the donors have made a huge difference in my life and my family..[Female widow Respondent-Marwendo village]*

As mentioned above seeking assistance from friends, neighbours and relatives was also cited as a response strategy to shocks and stressors in Marwendo village. This was employed in response to 54% of the shocks and stressors experienced (*Figure 5.5 and Appendix 2*). Risk sharing through assistance from friends, neighbours and relatives was noted as an important strategy especially for idiosyncratic shocks and stressors such as death of a family member (77%) and death of a breadwinner (89%). Assistance was mainly in the form of cash and in kind (e.g. food) and labour sharing (exchanges and pooling) and acted as crucial safety-nets for affected households in Marwendo village. A study by Takasaki (2010) in rural Fiji echoes the findings of this study, specifically that informal risk sharing is an important strategy amongst poor communities.

Changing farming techniques was also noted in Marwendo village. This was employed against 25% of the shocks and stressors experienced. There was evidence in the village of households adjusting their farming practices, especially in response to climate-related shocks and stressors such as rainfall variability (26%) and crop failures (21%), as well as loss of soil fertility (46%). Some of the changes that were generally agreed by respondents were the

adoption of conservation farming, use of inorganic fertilisers, and planting drought-tolerant small grains as opposed to maize (*see Chapter 6*). The changes in farming practices were largely seen as coping strategies (such as use of inorganic fertilisers), whereas adoption of conservation farming and crop diversification was seen as adaptation.

Maladaptive response strategies were common in Marwendo village and these included selling foods that would otherwise be eaten, pulling children out of school, acquiring loans, selling assets and reducing household consumption (*Figure 5.5 and Appendix 2*). Such response strategies do not provide long-lasting solutions to vulnerability of most households in the village, as noted also by their future concerns (*see Chapter 6*). Most households in Marwendo village mentioned that basic commodities such as maize meal, cooking oil, bread, salt, and sugar were in short supply, forcing them to reduce their meals per day. Reducing household consumption for example, could result in malnutrition especially for young children and thus create future health costs, but can help temporarily to relieve stress. Pulling children out of school means children do not acquire knowledge and skills needed for the formal job market. These strategies are maladaptive in the sense that they are unsuitable, asset eroding, and unproductive and in the long-term could increase exposure to shocks and stressors (*see Chapter 2*; Quinn *et al.* 2011). With limited adaptive capacity and high sensitivity, as discussed earlier, such maladaptive responses render most households in Marwendo village vulnerable and contribute to setting them on a "losing-out" livelihood pathway (*see Chapter 6 and 7*).

In contrast, the most common response in Tshivhulani village was to seek assistance from relatives, friends and neighbours and was used to respond to 42% of the shocks and stressors experienced. Seeking assistance from family, friends and neighbours was mainly in response to cyclones (100%), expensive events (57%), death of a family member (45%), illness (30%), strong winds (23%) and fires (17%). Seeking assistance was employed in response to both covariate and idiosyncratic shocks and stressors. Other studies have also shown the importance of transfers within family, relatives and neighbours (Clark 2012; Cox and Fafchamps 2008). These transfers were generally emphasised during the focus groups, and explained as a risk- sharing mechanism that in the end could help to strengthen family ties. This is consistent with the work of Cox and Fafchamps (2008). As mentioned earlier, Devereux (2001) however argues that such a form of response is an effective mechanism when dealing with idiosyncratic shocks though ineffective in dealing with widespread shocks.

This is of concern, as it is likely that the impacts of climate change will continue to escalate in the future.

The reliance on social grants was also mentioned as an important strategy and was employed in response to 33% of the shocks and stressors that households experienced in Tshivhulani village. Reliance on social grants was mainly in response to drought (33%), rainfall variability (30%), strong winds (20%) and loss of soil fertility (15%). As mentioned earlier, the reliability and consistent flow of income from social grants makes this a common response strategy against shocks and stressors. The grants thus act to ameliorate the impacts of many shocks and stressors, but they are not available to all households and so as a safety-net they are unevenly distributed, resulting in greater vulnerability of some households (*see Chapter 3*).

Maladaptive response strategies were not common in Tshivhulani village as compared to Marwendo village, as noted above. This finding can imply that social protection can reduce negative impacts of trends, shocks and stressors, and asset erosion, and help increase adaptive capacity of households (*see Chapter 6 and 7*).

Doing nothing in response to a shock or stressor was also common in Tshivhulani village with a total tally of seven, across the shocks and stressors. This form of response was mainly common in response to fires (61%), strong winds (35%) and loss of assets (33%). In these circumstances, the respondents felt that they could not do anything to reduce or stop themselves from being affected.

The reliance on natural resources was also noted in the two villages, with a more pronounced consumption and commercialisation of natural resources in Marwendo compared to Tshivhulani village (*Figure 5.5 and Appendix 2*). The different socio-economic conditions (*see Chapter 3*) of Marwendo and Tshivhulani village resulted in different response strategies in terms of utilisation of natural resources as safety-nets.

5.3.2 Safety-net dimensions in response to common shocks and stressors

To understand the role of natural resources and social grants as safety-nets in responding to shocks and stressors, respondents were asked if they depended or relied on them. The contribution of natural resources in responding to shocks and stressors was either exhibited through increased commercialisation and/or consumption.

5.3.2.1 Contribution of natural resources in response to shocks and stressors

In both villages, increased consumption of natural resources in response to shocks and stressors was noted. In Marwendo village, increased consumption of natural resources was employed in response to 38% of the shocks and stressors experienced (*Table 5.5*). This increased consumption was commonly adopted in response to droughts (11%), loss of soil fertility (5%), rainfall variability (4%), crop failures (10%) and crop diseases (10%). In Tshivhulani village, increased consumption of natural resources was employed in response to only 13% of the shocks and stressors experienced and these were droughts (5%), loss of soil fertility (15%) and rainfall variability (13%).

A noteworthy finding from the results is that out of all the households interviewed in Tshivhulani village, none of them mentioned an increase in commercialisation of natural resources in response to shocks and stressors. Increased commercialisation of natural resources was only mentioned in Marwendo village in response to 29% of shocks and stressors experienced. This was mainly in response to biophysical-related shocks and stressors (cyclones 9%, loss of soil fertility 7%, rainfall variability 5%, and droughts) and economic-related (inflation 6%). A comparison between the two study sites shows that the safety-net dimension of natural resources was more pronounced in Marwendo village than Tshivhulani village. As explained earlier in *Chapter 2, Section 2.4.1.1*, natural resources play a crucial role in responding to shocks and stressors, especially in these dryland areas of southern and eastern Africa, which are highly vulnerable, and with limited adaptive capacity (Speranza 2010), although it is important to consider this in relation to other responses (*see end of this section*).

In Marwendo village, the use of traditional medicinal plants (used in response to 13% of shocks and stressors experienced) for livestock diseases (22%), crop diseases (18%) and illness of a family member (4%) also reinforces the contribution of natural resources in response to shocks and stressors (*Figure 5.5 and Appendix 2*). One life history interview indicated that most poor households could not afford modern healthcare or vaccines for livestock and relied mostly on herb-based medication or visiting the local traditional healers:

> *"Due to lack of money to pay at the local clinic, we normally consult our traditional healer whenever there is serious illness in the family. Sometimes we just use traditional medicines obtained from different parts of trees such as Muodza [Philenoptera violacea], Mukute [Syzygium spp]. to treat ailments, which include*

colds, headaches, toothaches and stomachaches, among others. This has so far worked because it helps save money" (Life history respondent 3 Marwendo village).

These findings are consistent with work done by Shackleton and Shackleton (2002), who found that across rural communities of southern Africa, natural resources do play a crucial role in sustaining livelihoods by either income provisioning or supplementing households' needs. Respondents in Marwendo village mentioned extensive use of the baobab fruits to make porridge during times of droughts and economic hardships:

"Our baobab trees became our source of food and money. We had to resort to pounding baobab fruits to make porridge to feed ourselves as well as selling the fruits on the sides of main highway...this substituted for buying maize meal to make porridge. We used maize meal only to cook sadza (staple meal) once a day or even once in two days. (Life history respondent 2 Marwendo village).

This shows that natural resources provide an important safety-net function in times of adversity to the rural poor, especially the vulnerable households in Marwendo village. These offer cheaper and readily available alternatives to purchased goods during times of adversity (Hunter *et al.* 2009).

Respondents in Marwendo village further mentioned that the 'need to survive' has increasingly resulted in harvesting and commercialisation of woodland products (*Figure 5.5*) to provide a much-needed source of income. Findings from the in-depth life history interviews suggest temporal changes that have seen more households turning to woodland resources, sometimes against the community norms given the prevailing harsh economic situation in the country. Cases such as that presented in Box 5.1 were once said to be uncommon in the village, but now there are many cases and forms of sale of woodland products. It is important to note that the distances to collection of natural resources such as firewood was said to be increasing, reflecting woodland changes.

Box 5.1 Ms M - Firewood and wild fruits vendor in Marwendo village

Ms M was born in 1973 in a family of six living with her father in Marwendo village. In 1999, her mother died after a long sickness, leaving her with her ailing father. This forced her to drop out of school when she was doing her second year in secondary school. This was because there was no more money for her school fees in order for her to continue with her education.

Ms M was forced to leave the village in search of employment in order to take care of her father. She found work as a house-girl in Chipinge town where she worked for a year. However, due to the worsening condition of her father she was forced to come back to the village to take care of him. She has always been living from hand to mouth in order to take care of her father to such an extent that she has never had the chance to get married.

In order to stabilise and sustain a living, Ms M sells firewood and wild fruits, especially the Muuyu [Baobab] fruits [*Adansonia digitata*]. The fruits are freely gathered from the wild and she sells them on the main highway. She collects firewood from the nearby mountains and sells it locally to food outlets in the growth-point and to other individual households. She used to carry most the firewood by head and deliver the bundles to her customers, where she would do at least three trips a day. Nowadays she uses a scotch cart, which she borrows from her uncle who lives adjacent to their home because the distance to the collection point has now increased. A scotch cart of firewood sells for between $20 and $50 depending on the customer.

However, she fears that with the rate at which woodlands are disappearing it will be almost impossible to continue with her small income-generating business.

However, it is crucial to consider the use of natural resources as safety-nets in relation to other response strategies employed by households in both study sites. In Tshivhulani village, the increased consumption of natural resources ranks fifth in terms of the total percentage of responses it is used for, whereas the twofold contribution of natural resources in Marwendo village ranks second (*Figure 5.5*). The ready availability of natural resources in Marwendo village (from the Mutema highlands and the Chipinge Safari Area, see Google Earth image in *Chapter 3*) means that households can choose different response strategies based on available assets and the context they find themselves in. This echoes the findings by Quinn *et al.* (2011) in rural semi-arid Sekhukhune District in South Africa, who showed how households adopt different response strategies based on their available assets, priorities and the context in which they find themselves.

5.3.2.2 Contribution of social grants in response to shocks and stressors

As mentioned earlier, the contribution of social grants in response to shocks and stressors was only noted in Tshivhulani village (used in response to 42% of the shocks and stressors experienced) in response to droughts (33%), rainfall variability (30%), loss of soil fertility

(15%), death of breadwinner (8%), loss of assets (6%), strong winds (5%), expensive events (4%), and fires (2%). This clearly shows the importance of social grants to households in times of adversities, both internal and external. One respondent was quoted during the interview as saying:

> *"Mundende ndi wone vhutshilo hanga nga tshiphinga tsha ndala" which is directly translated as, "Social grant is my life in times of hunger. I get my grant money every month which makes it easier for me to plan and do a budget" [Female Respondent in Tshivhulani village].*

Social grants provide a permanent source of income (*see Chapter 3*) but in difficult times also provide a safety-net to protect households from sinking deeper into vulnerability, poverty and asset erosion (*see Figure 2.2 Chapter 2 and discussed in Chapter 4*). As noted in Table 4.2 in Chapter 4, many households in Tshivhulani village receive social grants (83%) and these grants make up a significant major income source (39%). Thus the safety-net provided by social grants in Tshivhulani village has contributed to a reduced dependence on natural resources, as the commercialisation aspect of natural resources has diminished. Social grants can therefore address the short-term consequences of droughts and rainfall variability by reducing dependence on natural resources and in so doing also help improve rural livelihoods. However, overreliance on these sources of income has potential serious consequences for households, as for example, children grow too old to qualify for grants, or elderly members die (Quinn *et al.* 2011). Grants therefore initially reduce vulnerability but may not be a sustainable long-term strategy.

From the results above it is possible to imply that the use of natural resource-based responses is complementary to social protection ones. It is mainly because most of the people in Tshivhulani receive social grants which provide them with cash (*see Chapter 4, Table 4.2*), that they have resorted to an increased consumption of natural resources in response to shocks and stressors. However, with no pronounced social protection in Marwendo village, the two dimensions of natural resource-based responses are adopted, namely increased consumption and commercialisation.

The responses to shocks and stressors, as shown in the two sites, are usually negotiated at the household level and may result in several responses contributing to an overall household strategy. This strategy often involves a range of activities such as selling traditional beer [*Box 4.1*], migration, accessing grants (mentioned earlier), brick moulding (*Figure 6.2, Chapter 6*),

and remittances [*Box 4.2*], among others, which are engaged in by individuals within the household (Quinn *et al.* 2011).

5.3.3 Livelihood diversification "stepping-up"

In addition to specific responses mentioned above (*Figure 5.6 and Appendix 2*), respondents were asked whether they believed income or livelihood diversification was an important risk aversion strategy. The results reveal that there was a significant difference in the perception of the importance of income or livelihood diversification (χ^2=26.13, df=1, p<0.05) between the two villages with a high percentage of respondents in Marwendo village indicating the importance. Despite the limited opportunities and socio-economic challenges (*as discussed in Chapter 3*), the majority of respondents in Marwendo village (80%) recognised the importance of income/livelihood diversification (*Figure 5.5*). The significantly high proportion of respondents engaging in income diversification strategies in Marwendo village concurs with the notion that diversification of livelihoods is an important indicator or variable in assessing the impact of crisis events and the ability of households to cope (Ellis 2005; De Haan 2006). The majority of households in Marwendo village (78%) experienced more than five shocks (*see Table 5.1*).

In Tshivhulani village, respondents indicated that in most cases, different members of the family assumed different roles, with less labour force being devoted to farming activities and this has resulted in less dependency on rain-fed farming, consistent with findings by Quinn *et al.* (2011) in semi-arid South Africa. Coupled with dependence on social grants, most respondents recognised that livelihood diversification helps households to strengthen their adaptive capacity in the face of shocks and stressors by alternating between various livelihood activities. These findings concur with work done by Mutenje *et al.* (2010) in southeast Zimbabwe. The households in Marwendo village generally agreed that they were pursuing diversified livelihood strategies to varying degrees not only to avert risks but also from within an environment with limited economic choices, echoing findings by Moyo (2006) in rural Zimbabwe in which the sampled households where diversifying livelihoods in an environment with limited opportunities.

During the focus group discussions, it was emphasised that although a majority of households have diversified their livelihoods in Marwendo village, some households strongly believe that they are struggling to diversify their livelihoods. This was generally attributed to household composition and structure, such as lack of a husband and/or children, small households and

female-headed households. This is similar to findings by Mutenje et al. (2010), who found that livelihood strategies employed by households and individuals in rural communities are shaped by human, natural and physical capital available to them. According to Frost *et al.* (2007), most households are severely impeded by the small size of their income and capital assets. In addition, newcomers face stiff competition from those households that are well established and fully committed to that particular livelihood activity (Campbell 2002), for example brick moulding in Marwendo village.

In contrast, only 45% of the respondents in Tshivhulani village (*Figure 5.6*) believed income/livelihood diversification was an important risk aversion strategy. The smaller proportion of households supporting diversification in Tshivhulani could be attributed to access to social grants. This is supported by the notion of a "cycle of dependency" described by Kofinas and Chapin (2009), in which dependency on external support such as social grants narrows the livelihood portfolio. The narrowing of livelihood portfolios as a result of reliance on social grants was also documented by Clark (2012) and Shackleton and Luckert (2015) in the Eastern Cape Province of South Africa.

Figure 5. 6 Comparison of the importance of income or livelihood diversification as a risk aversion strategy (χ^2=26.13, df=1, p<0.05)

5.3.3.1 Types of income/livelihood diversification strategies

Respondents were asked to rank the top most important types of income or livelihood diversification strategies their household was mainly engaged in (*Table 5.3*). The results show six common strategies in Marwendo village compared to three in Tshivhulani village.

Just over half (51%) of households in Tshivhulani village were engaged in small-scale income generating businesses. These included running small spaza shops (an informal convenience shop) and selling traditional beer [*Box 4.1*], among others. The higher proportion of small income-generating businesses in Tshivhulani village was suggested to be closely linked to social grants (pooled within the household) being received by most of the households. During the focus group discussions, most people mentioned that social grants offer a reliable income source, which can allow households to engage in small income-generating business. In one case, a respondent diversified their activities by venturing into brewing and selling traditional beer because social grants offers them a fallback in situations when sales are low. The second most common diversification strategy in Tshivhulani village was seeking jobs locally, and with the village being located near a town, this was a viable option (*see Table 3.1 Chapter 3*). This strategy was agreed to be successful and has contributed to reduced reliance on highly sensitive rain-fed farming.

In contrast, 32% of households in Marwendo village were engaged in selling of wild natural resources such as firewood [*Box 5.2*], thatch grass and wild fruits such as baobab. Reliance on natural resources, especially in the context of global change, can be maladaptive if harvesting is unsustainable. For instance, members of households are now forced to walk longer distances in search of firewood which can affect their health or affect income due to scarcity of natural resources (*see Chapter 6*), leading to asset erosion (*see Chapter 4 and 5*) and increased vulnerability to future shocks and stressors. As discussed in Chapter 2, increasing reliance on natural resources often has negative feedbacks on the capacity of ecosystems to deliver these services (*Box B, Figure 2.1*), affecting human well-being indirectly, creating a mutually reinforcing feedback loop that increases human vulnerability and natural resource degradation (Shackleton and Shackleton 2012).

Small income-generating businesses (26%) such as cross-border trading, bicycle repairs and selling second-hand clothes, among others, were also a common diversification strategy. Small income-generating businesses were generally agreed to have been promoted by the advent of electricity in the village through the Rural Electrification programme (*see Section 6.2.1.3 Chapter 6*). During the focus group discussions, the participants emphasised that although diversification has been practiced before, the recent economic pressures coupled with dollarization (*see Chapter 6*) have forced people to intensify this strategy. This was evidenced by the burgeoning of brick moulding (*Figure 6.2 Chapter 6*) in the village, with 13% of respondents involved. However, major concerns were raised over the long-term

sustainability of brick moulding due to its contribution as a major driver of deforestation and siltation as it is practised along the banks of the Tanganda River. It could thus be viewed as maladaption.

Migration was another livelihood diversification strategy increasingly pursued by households in Marwendo village with 24% appreciating its importance especially under crisis conditions such as drought and economic hardships. Diversifying sources of income through migration can result in "stepping-out" as it can lead to improved rural livelihoods and asset accumulation. In the case of Mr T in Marwendo village [*Box 5.2*], the family has increased its assets and income (both cash and kind) through migration (remittances), as well as improved its capacity to respond to shocks and stressors.

Box 5.2 Mr T (Marwendo village)- Migration

Mr T was born in 1983 and things were very tough for him when he was growing up. He was forced to do hard jobs as a child working in cotton fields in ARDA Chisumbanje and Tea fields in Tanganda Tea Company. Due to the hardships that he was facing together with his family, he decided to "border-jump" to South Africa in 2000 in search of job opportunities. Despite the associated risks, it was worth it since he had no employment in the village. Recently his two brothers have dropped out of school and have joined him in South Africa, working in the gold mines. He and his brothers send remittances in the form of cash or kind (groceries, clothes and building material). Recently they managed to build a two-bedroomed flat with asbestos roofing material. To them this has been a great improvement for their family. They reckon that since migrating to South Africa, their lives have changed for the better.

The results clearly show that respondents in both study sites have diversified their livelihoods into off-farm activities as a means of risk aversion as well as to alleviate poverty. Most respondents were able to respond to multiple shocks and stressors and emphasised that diversification of assets and incomes into off-farm activities is usually less labour intensive, uses less capital and has low entry barriers. Work done by Reenberg and Fog (1995) and Reardon and Vosti (1995) concur with the findings of this study. Assessment of the precise income contribution by off-farm livelihood strategies was not possible in this study, and according to Nielson *et al.* (2012), it is difficult to ascertain due to lack of accountability and secrecy over earnings.

Table 5. 3 Comparison of income diversification strategies

Diversification strategy	Tshivhulani (%)	Marwendo (%)
Small income-generating business	51	26
Seeking jobs locally (e.g. work for development projects, food for work)	25	2
Seeking jobs outside the village/Migration	24	25
Selling wild natural resources/cultivated products	-	32
Saving societies/clubs	-	3
Brick moulding	-	12

NB. Ranking of the top most income/livelihood diversification options available

Diversification can however cause maladaptation, i.e. "losing-out", if strategies are unsustainable, or can increase exposure to shocks and stressors (Quinn *et al.* 2011) such as in the case of the increased brick moulding in Marwendo village (*see Chapter 6*).

5.4 Conclusion

This chapter set out to identify the key short-term shocks and stressors that the households in the two villages had experienced, the local responses to these, and, through life history interviews, how these shocks and stressors act as drivers of change, impacting on households. The results clearly demonstrate that households in different locations and with different socio-economic characteristics experience and respond to shocks and stressors in different ways.

The multiple shocks and stressors experienced can interact across scale in complex ways, with all the households in both study sites experiencing at least three or more shocks and stressors over the last five years. Climate-related shocks and stressors (particularly droughts) were frequently experienced by respondents in both sites. The life history interviews revealed death- and illness-related shocks and stressors as a major focus among the interviewees. The different methods used in this study revealed different insights into the experience and impacts of shocks and stressors. This again puts emphasis on the importance of the mixed methods approach (*as discussed in Chapter 3*) in unearthing the key shocks and stressors affecting households.

The results show an even distribution of hardest shocks to recover from in Tshivhulani village, whereas drought was the dominant hardest shock to recover from in Marwendo village. The majority of the shocks affected the household functioning (especially income

sources), with migration being dominant in Marwendo village, again affecting household functioning by reducing labour.

The last section provided the local responses to the identified shocks and stressors presented. The matrix table (*see Appendix 2*) shows multiple response strategies to a particular shock or stressor identified. The reliance on social transfers (seeking assistance from family, relatives or neighbours, and social grants) in Tshivhulani village proved to be a very important response strategy for coping with stressors and shocks. In Marwendo village, maladaptive response strategies (*see Section 5.4.1*) such as pulling children out of school, were more common, with the majority of the respondents resorting to 'doing nothing' in the face of shocks and stressors. Mostly reactive response strategies were common in both villages, which suggests very little or no planning at all for long-term adaptation except for livelihood diversification strategies (*see Section 5.4.3*). The use of natural resources was common in Marwendo village with an increased consumption in Tshivhulani village being mentioned. Reliance on natural resources in response to shocks and stressors in Tshivhulani village was complemented by social protection in the form of pensions, child grants and disability grants. There is no doubt that social protection in the form of social grants has helped improve adaptive capacity and reduce vulnerability to shocks and stressors within Tshivhulani village. There was a high dependency on social grants, where pensions, child grants and disability grants comprised a significant part of households' major income (*see Chapters 3 and 4*). However, what this means for future adaptive capacity is less clear.

CHAPTER SIX

EXPLORING LONG-TERM LIVELIHOOD AND NATURAL RESOURCE CHANGE: IMPLICATIONS AND FUTURE TRAJECTORIES

6.1 Chapter overview

In this chapter, I explore the dynamics of livelihoods and natural resource change over the past 30 years within the two study sites. In doing so, I divide the chapter into two parts. The first part addresses objective three, namely to examine long-term trends and changes (positive and negative) in the two study sites over a period of 30 years and the drivers behind these (*see Chapter 1, section 1.3*). This is achieved through in-depth analysis of the long-term changes in livelihoods and natural resources and the key drivers [*see Box A, Figure 2.1*] associated with such changes. Data were drawn from in-depth life history interviews, focus group discussions, secondary data sources and transects walks. Coupled human-environmental timelines (Nielsen and Reenberg 2010; Zheng *et al.* 2014) were constructed to examine the local level changes [*see Box D, Figure 2.1*] that have occurred, highlighting the co-evolution of livelihoods and natural resources and major socio-economic, technological and policy events. Livelihood changes are understood in the context of these changes that constitute both opportunities and constraints [*see Box B and C, Figure 2.1*].

Thus, the following research questions are addressed:

- How have livelihoods and woodland resources in the two sites changed over the last 30 years?
- What drivers, at different times, have influenced livelihood and natural resource change within the two villages?
- How does this long-term change interact with contemporary shocks and stressors, and impact vulnerability?

In the second part of this chapter I sought to address objective four, namely to consider the implications of the findings for future livelihood trajectories in the two study sites. The following research questions are addressed:

- What are the peoples' concerns regarding their future?
- What do the findings suggest in terms of future livelihoods?

- What role has, or could, social protection play in reducing vulnerability to change and shocks?

I again present and discuss the results simultaneously in this chapter.

6.2 Coupled human-environmental timelines

The coupled human-environmental timelines that are presented in *Figure 6.1* and *Figure 6.2* use information from the focus group discussions, historical records and from transect walks that were conducted in each of the study sites, as mentioned earlier. The aim is to present and summarise the main events and trends over the last 30 years from the perspective of exposure to environmental, social, economic and political drivers of change [*Box A, Figure 2.1*], and the local response strategies [*Box D, Figure 2.1*] adopted by villagers in response to these changes. The timelines cover the period from 1980 to present and were divided into three distinct decadal periods: *(i)* Period 1: 1980 to 1989, *(ii)* Period 2*:* 1990 to 1999 and *(iii)* Period 3: 2000 to present. The selected features in *Figure 6.1* and *Figure 6.2* are not exhaustive, but contains key drivers and events averaged out across the focus groups and transect walks, as well as those most relevant to the subject of this study (*see* Nielson and Reenberg 2010).

6.2.1 Period 1: 1980 to 1989

In Marwendo village, the early 1980s saw an increase in the population of the village, as shown by a concentrated and thicker line (*see Figure 6.1*) that gradually continued to grow. The focus group participants generally agreed that this was as a result of an influx of refugees from neighbouring Mozambique. These refugees were fleeing the Matsangaissa anti-communist rebel group who had sparked war in their country (Fauvet 1984). For some villagers the refugees were welcomed as they provided a relatively cheaper source of labour than the local residents did, as narrated by one of the focus group participants:

> *"...I was able to hire one of the refugees (Arushia).... I provided him with a place to put his head, food to eat every day...in return Arushia (the hired refugee) would help me with herding my cattle and farming.. By then I had a large herd of cattle before the 1992 drought wiped out all of them...these friends of ours, 'maputukezi' meaning 'Portuguese refugees', were very obedient and trustworthy and this made it easier for us to live with them like family.... After the war in their country, it was sad for me and*

family to see him go as he was now part of our family" [Mr KK, male respondent in Marwendo village].

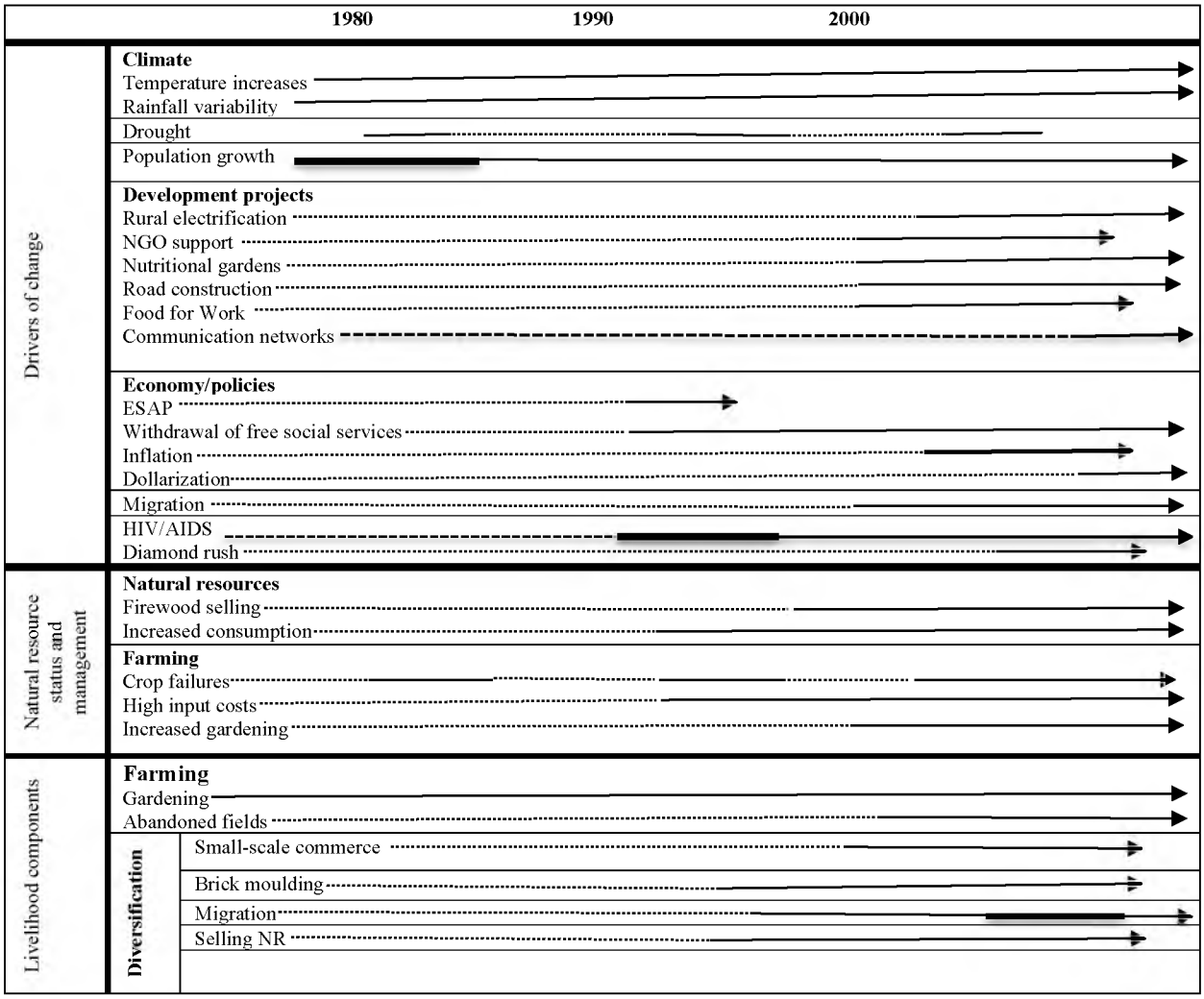

Figure 6. 1 Coupled human-environmental timeline of Marwendo village, based on focus group discussions and complemented by transects walks, life history interviews and secondary sources of information.

NOTE: The diagram illustrates a coupled human-environmental time-line for main key drivers and events behind livelihood and ecosystem changes in Marwendo village. It shows the temporal correspondence between a) underlying drivers of change, such as economic/policy factors, development/ technological advancements and climate factors; b) the natural resource status and impacts; and c) implications for livelihood components. The solid line shows the point in time when the driver was noted to have impacts on livelihoods or natural resources, while the dotted lines show its absence at that particular point in time. Sources: Zheng et al. (2014)

There were also prolonged periods of drought coupled with increasing temperatures in the early 1980s, specifically the 1982/83 growing season as shown by a solid line in Figure 6.1, and this was said to have impacts on farming and livestock (*see Chapter 5*). The focus group participants agreed that the 1982/83 drought resulted in death of livestock and massive crop

failures in the village. Most households who had livestock were forced to sell their livestock during the drought, both to generate income and as a key precautionary strategy against further loss of livestock. The effect of the 1982/83 drought was also documented by Mushongah and Scoones (2012), in a study that sought to explore the changing livelihood strategies among rural livelihoods in southern Zimbabwe. The drought decimated crop production and caused large livestock mortalities, resonating with the findings of this study.

Similarly, in Tshivhulani village, the early 1980s also saw a sharp increase in the population as shown by the thicker line in Figure 6.2, thereafter it gradually slows down throughout the period as shown by the continuous line. The increase in population was generally attributed to high birth rates in the village. It was in the same period (early 1980s) that the village experienced drought, which resulted in extensive death of livestock, due to lack of grazing areas and increased incidence of diseases. Some of the cattle owners were forced to relocate their livestock to other areas where they could find pastures. Others were forced to increase their livestock sales in order to cope. The high livestock mortality that was recorded in the village created multiple problems for the livelihoods of agro-pastoral households. Livestock provide an array of functions for the household economy: nutrition (meat, milk), draft power (transport, ploughing), and their role in marriage contracts, manure and sales. The drought was said to be the reason why most of the households no longer had any livestock as they failed to restock after the death of their livestock. The decline of livestock numbers, increased incidences of diseases and death of livestock as a result of droughts is similar to findings by Speranza (2010) in Makueni District in Kenya. This study by Speranza (2010) found that drought is a major driver of changes in livestock production through its impacts on ecological conditions, especially on pasture growth and quality, and water resource availability. The death of livestock in Tshivhulani was mentioned throughout the periods though the extreme death of livestock coincided with drought years (*see thick lines in Figure 6.2*)

Another significant driver of change in this period in Tshivhulani village was said to have occurred around 1985. This was the provision by the government of piped drinking water (clean and easily accessible) for the people in the village. The water facilities installed substantially relieved the drought stress on people and crops. This was an important development as it also spared villagers from fetching water from unprotected sources and paved the way for small home gardens for improved nutrition as explained by a female participant:

"We used to wake up very early in the morning to go and fetch water...but now it is very easy since we have tapped water inside our yard. We even have a small garden where we grow our green vegetables because the water is readily available. Piped water has made our lives easier..." [Female participant in Tshivhulani village].

This injection of change in behaviour and livelihood strategies as a result of the opportunity created with the provision of tapped water could be seen as providing opportunity for "stepping-out' (Dorward *et al.* 2009). The provision of piped water was also emphasised by participants during the focus group as having relieved drought stress on people, crops in their gardens, and livestock. This finding resonates well with studies documenting how adaptation to climate variability and change has benefited from rural development by building adaptive capacity and reducing risk (Reid and Vogel 2006; Ziervogel and Taylor 2008; Zheng *et al.* 2014).

6.2.2 Period 2: 1990 to 1999

For Marwendo village, the 1990s were a period of economic turmoil (*Figure 6.1*). This period saw the adoption by the government of Zimbabwe of the Economic Structural Adjustment Programme (ESAP), designed by the International Monetary Fund (IMF) and World Bank. The smallholding farmers in the village explained that ESAP resulted in them becoming less well-off due to rising input costs, higher costs of services (e.g. health care, education), and lower output prices and reduced remittances from urban areas as people lost their jobs. These findings reflect those of Scoones (1996); Cavendish (2002), Campbell (2002) and Mushongah and Scoones (2012). The ESAP policy of 1991 saw massive retrenchment of the labour force, particularly in industries and civil service (Mushongah and Scoones 2012). This had serious negative repercussions on the economy of the country and made rural people worse off, especially in the context of global change, as one respondent shared:

"I lost my job after the company I was working for had to retrench workers. I was forced to come back to the village where I started to plough the land. From the day I lost my job, things have never been the same, eating from hand to mouth" [Male participant, Marwendo village].

The above sentiment clearly shows that chronic under-employment and increases in unemployment meant that rural communal areas had to endure much of the strain. The poor and marginalised residents of communal areas such as Marwendo village were undoubtedly

affected by ESAP, rendering them more vulnerable to shocks and stressors as noted in *Chapter 5*. In addition, most participants agreed that it was during this time that HIV/AIDS was becoming a serious problem further forcing the downward spiral of increasing poverty in the village. Most households can be said to have "lost-out" during this period (*see Chapter 2*). The HIV/AIDS epidemic hit the rural populations hard and peaked in the late 1990s, as shown by the thick line in *Figure 6.1,* with major effects on household structures, gender relations and labour. According to Feeney (2001), Zimbabwe experienced a huge increase in adult mortality from the mid-1980s to the mid-1990s, essentially due to HIV/AIDS, given the timing and age pattern.

It was also during this period that the currency of the country became very unstable and this was coupled with extreme drought in 1992. This had devastating effects on farming and livestock, similar the early 1980s drought. Most of the participants said they lost most of their livestock due to drought and farming began to be less favoured by most households due to frequent crop failures, low yields and unreliable rainfalls. It was generally agreed that the 1992 drought was the worst recorded in their living memory and this is in line with findings by Maphosa (1994) in a study on the lessons from the 1992 drought in Zimbabwe. Most of the respondents explained that their food security was severely threatened by the 1992 drought and resulted in virtually no harvests from their fields. The drought was said to be so severe that water reserves in the village were depleted and even safe drinking water was inadequate, let alone water for livestock. Virtually all the participants agreed that for most of the year (February-December) 1992, they lived from hand to mouth, that is, food was consumed as soon as it became available. One positive lesson learnt from the 1992 drought was that most of the villagers were able to appreciate that the growing of small grain cereals (e.g. sorghum and millet) was ideal for their marginal soils and rainfall. In the event of a drought, drought-tolerant small grain cereals can yield some food for subsistence compared to maize, which can be totally destroyed (Maphosa 1994). Such changes in farming practices can contribute to decreasing vulnerability for those households dependent on subsistence farming in the village.

Despite the 1992 drought, many of the participants in Marwendo village agreed that they continue to grow crops and keep livestock despite the setbacks. Quinn *et al.* (2011) also found that although farming is becoming increasingly threatened by harsher weather conditions, it is still a very important and much-practiced livelihood strategy. There is generally a sense of an increasing level of vulnerability in the farming systems in the village

such that in the near future it is likely that further severe climatic events may result in profound effects on crop and livestock production and food security in the village. *Figure 6.1* gives a sense that drought years have been occurring at ten-year intervals.

Another significant change in Marwendo village was observed in the late 1990s, which saw the withdrawal of free education and the introduction of school fees for secondary schooling (*as shown in Figure 6.1*). This presented a major challenge to rural poor people in the village as most of the respondents faced difficulties in paying the school fees. This resulted in withdrawal of children from school. Such response strategies can be classified as maladaptation (*as discussed in Chapter 5*), that is, erosion of human capital. This rolling back of government services also included withdrawal of free health care, agricultural extension and veterinary services (Frost *et al.* 2007). The removal of subsidies for seeds and fertilisers, coupled with the healthcare burden, seriously affected subsistence farming in the village. This set most households in Marwendo village on a "losing-out" livelihood pathway [*see Box E, Figure 2.1*].

In Tshivhulani village as well, the early 1990s saw the village being hit by a serious drought, which was regarded by the focus group participants as an important natural disaster in economic, social and environmental terms. The 1991/92 drought had a negative impact on villagers in Tshivhulani village through reduced rain-fed crop yields, reduction in the capacity of rangelands to support grazing and lack of drinking water for livestock as well as a high prevalence of livestock pests and diseases. Focus group participants in Tshivhulani admitted that livestock and crop diseases can occur at any time of the year, but they maintained that the high prevalence of pests and diseases occurred during the drought. Similarly, in a study by Speranza (2010), in the semi-arid area of Makueni District in Kenya, a high prevalence of pests and diseases was perceived by households during the 1999/2000 drought.

Another dominant driver of livelihood change during this period was the end of apartheid in South Africa in 1994. It was generally agreed that there were improvements in basic infrastructure investments such as water and sanitations systems, electricity lines, roads and other services provided at municipal level. Rural electrification during this period played a significant role in livelihood changes in the village. Since 1999 (when the whole village had electricity), most households have resorted to the use of electricity, as it is faster and cleaner, though the use of firewood is still very common. The advent of electricity facilitated the flow

of information through radio and television broadcast. In addition, the electrification in Tshivhulani village allowed households to diversify their income by engaging in backyard small industries such as welding (*see Figure 6.2*):

> *"It is better in our village with electricity. I started my welding business in the village repairing and making a wide array of things. Since I am no longer much into farming, my welding business has helped me and my family to survive... My eldest son helps with welding and marketing our products. Since there are not many people involved in this kind of work, everyone in the village comes to us...For now I continue with welding" [Male Respondent in Tshivhulani village].*

In the above respondent's case, diversification of this household's livelihood activities is a strategy that is both opportunistic and reactive. The respondent's choice to diversify is an example of a coping strategy of dealing with fewer options and creating (potentially) an opportunity with the access to electricity. As illustrated by the comments above, livelihood strategies are the product of the interaction between choice and constraint (Start and Johnson 2004). According to Start and Johnson (2004), constraints may act to limit choice; in this case, prior unavailability of electricity limited the option of engaging in a welding business for the respondent above.

6.2.3 Period 3: 2000 to present

In Marwendo village, one major aspect that was notable in this period was that inflation peaked in the years 2008 and 2009. People felt desperate as captured in the following quote:

> *"...only left for God to decide the fate of peoples' lives... It was very hard for me and my family to even buy a loaf of bread 'mari yaisatenga' meaning 'money could not buy anything' during these difficult times...the prices of goods and services would change more than three times a day" [Female participant].*

The inflationary trends adversely affected the purchasing power of households. In the end, it was said that consumers rejected the Zimbabwean dollar and a foreign currency black market thrived. This period meant loss of income for investment in productive assets such as livestock, household health, education and household food security for most of the villagers. It was during this period that the villagers extensively expanded their livelihoods in order to increase income sources and sustain a living (*as discussed in Chapter 5*). Since the turn of the year 2000 and in the context of global change, most households have been increasingly

involved in the commercialisation of garden produce (tomatoes, vegetables and onions) and forest products (firewood, wild fruits, and thatch grass), brick moulding (*see Figure 6.1*), seeking casual labour, and migration in search of employment. As mentioned in *Chapter 4*, the imposition of a ban on cultivation along the riverbanks meant other households were forced to abandon their gardens, affecting their income sources and rendering them more vulnerable.

During this period, some local livelihood strategies were linked to the arrival of development projects through Non-Governmental Organisation (NGO) operations, and these included the establishment of a community garden, nutrition garden, women's savings clubs, gully reclamation, and road construction projects. Thus, external assistance from NGOs acted as another prominent driver of livelihood change. Most of the development projects that were initiated in Marwendo village focused on improving rural livelihoods and adapting to the changing climate conditions. Interestingly, a majority of the households in the village admitted to having adopted new strategies such as conservation farming and drip-system irrigation technology. These technologies have been very useful in negotiating livelihoods through the changing climatic conditions and deteriorating crop yields (*see Chapter 5, Section 5.4.1*). In 2002, an NGO (Christian Care) introduced community vegetable nutritional gardens, which led to improved nutrition, and substantial income increases through selling the produce. In addition, such development projects presented opportunities for the local residents to be provided with *"food-for-work"* employment opportunities through maintaining roads and gully reclamation projects. Road maintenance and construction was said to have increased accessibility in the village, supporting easier movement of garden produce and facilitating commercial activities in the village. The role of NGOs in triggering livelihood change was also noted in a study by Zheng *et al.* (2014) within three different social-ecological systems in Lijiang, Yunnan. In this study, a local NGO introduced fruit tree plantation projects, which led to substantial income increases.

Another important aspect that was noted later during this period in Marwendo village was the dollarization of the economy, that is, the introduction of the United States dollar as the official currency in Zimbabwe, in April 2009. Most respondents agreed that this stabilised the prices of goods and services as well as making them more available. The consumer goods that were in short supply between 2000 and 2008 became more readily available. These findings are consistent with findings by Sikwila (2013) in a study that examined the economic impact of the introduction of the dollarization on Zimbabwe's economy. The

results by Sikwila (2013) showed that dollarization positively affected the country's economy.

The advent of electricity in 2009 was a noteworthy positive driver of livelihood change. This came as a result of the government recognising that rural electrification is a major pillar in enhancing socio-economic development in rural areas, which includes the Marwendo village. This rural electrification programme mainly targeted the growth points, however those households closer to the grid lines benefited as well. The workshop participants acknowledged an increase in enterprise as a result of electrification, suggesting that such a development contributes immensely to an increase in rural enterprise opportunities as already shown for Tshivhulani village and, in Zimbabwe, by Mapako and Prasad (2007). The case study by Mapako and Prasad (2007) was carried out in south-west Zimbabwe in Matebeleland South where 73 small enterprises were surveyed. For 69% of respondents in the study the rural electrification programme was beneficial, although it required improvement to upgrade its slow pace and selective coverage. Despite the positives noted above as a result of rural electrification, several negatives were also noted as result of this programme. The majority of the focus group participants emphasised the associated high costs, slow progress, selective reach to households, increased crime activity and power cuts as some of the negative perceptions associated with the electrification programme. Mapako and Prasad (2007) also found several perceived negative aspects of the rural electrification programme in a survey in south-west Zimbabwe and these included high costs (25%), power cuts (14%), and not reaching everyone (8%), among others.

Migration [*Box 5.2*] into neighbouring South Africa in search of jobs was noted to have increased around 2008/9 (*see thick line in Figure 6.1*) as most young men saw it as the most efficient way to earn money needed to get married (pay *lobola*- bride price). These are similar findings to a study by Nielson and Reenberg (2010) in the Sahel in which non-climate factors such as the growing need for a young man to pay a bride-price, acted as an incentive to migrate. The increased small-scale commercial activities were also attributed to the *"Chiadzwa Diamond Rush"* (a period when people were rushing to Chiadzwa diamond mines to engage in illegal diamond mining) which injected cash into the village economy as some of the closed shops and bottle stores opened up again. However, far-reaching moral and cultural implications were also said to have been felt in the village as a result of the diamond rush with villagers noting an increase in crime, school dropouts and teenage pregnancies in the village. Such consequences inevitably result in increased vulnerability in the village. The

diamonds were discovered in early 2006 in Chiadzwa, a communal area located in Marange, Zimbabwe (Nyamunda and Mukwambo 2012), less than 150 km from Marwendo village.

The recent advent of mobile network boosters (around 2012) in the village was mentioned to have facilitated communication flow to Marwendo village through mobile communication and mobile money transfers, among other services that come with mobile phone networking. These infrastructure improvements could help increase the range of available livelihood options, which is seen as an important element of adaptation at the household level (Zheng *et al.* 2014).

In Tshivhulani village, major highlighted changes included strong winds (*see Figure 6.2*), which destroyed houses (*as discussed in Chapter 5*), and veld fires, which destroyed vegetation during the early 2000s. It is during this period that the site saw an increase in land transformation, with new settlement areas (*as illustrated by the thick line in Figure 6.2*) being formed. Most of the fields, gardens and orchards were cleared to pave way for new settlements. More recently, significant drivers of change included the construction of RDP houses and toilets to improve sanitation in the village (*Figure 6.2*). Not only did this provide decent accommodation for the villagers but also provided much-needed employment opportunities as the locals were hired to work as construction workers.

The 2000 flood was also a key event, which resulted in loss of property (dwellings collapsed) and damage of infrastructure such as roads. The severe flooding was said to have occurred in the first two weeks of February 2000 as many respondents had clear memories of what really happened. Households acted in different ways in response to floods, as is shown in *Chapter 5*. Migration was noted during the focus group to have been employed as coping strategy. This is consistent with findings by Khandlhela and May (2006) in an evaluation of household vulnerability after the 2000 flood in two communities of Limpopo Province (South Africa), who found that households who had lost their housing structure, relocated to relatives' homes.

In 2002, the village experienced droughts, which caused severe hunger and dragged people into deep poverty. As a result of droughts, unreliable rainfall and limited farming areas, most villagers in Tshivhulani village generally noted that farming was no longer regarded as an option in the village as most of the respondents had abandoned their fields. The rain season was described by all focus groups as becoming increasingly unpredictable, and coupled with high temperatures (*as shown by the continuous lines throughout the periods in Figure 6.2*),

these unfavourable prevailing weather conditions resulted in a significant livelihood change to mostly off-farm activities. The timeline (*Figure 6.2, thick line showing introduction of child grants*) indicates that social grants became a very important part of villagers' income profile (*see Chapter 4*) as the cash was used to buy food and other basic necessities, as mentioned in the previous chapters. The majority of the focus group participants acknowledged that social protection in the form of grants had helped them out of extreme poverty and increased households' income levels. These findings are consistent with findings by Davies *et al.* (2009) in a study that sought to examine the opportunities for linking climate change adaptation, disaster risk reduction and social protection. The evidence from this study by Davies *et al.* (2009), suggested that social protection measures could limit damages from shocks and stressors though would be insufficient in the longer term. In a study by Shackleton and Luckert (2015) in the Eastern Cape of South Africa, they found that livelihoods in the communal areas are on new trajectories with social grants making up well over half of the household income. It was suggested by respondents and has been noted in other studies (e.g. Shackleton and Luckert 2015) that reliance on social grants was one of the reasons why there is a general decline in farming activities.

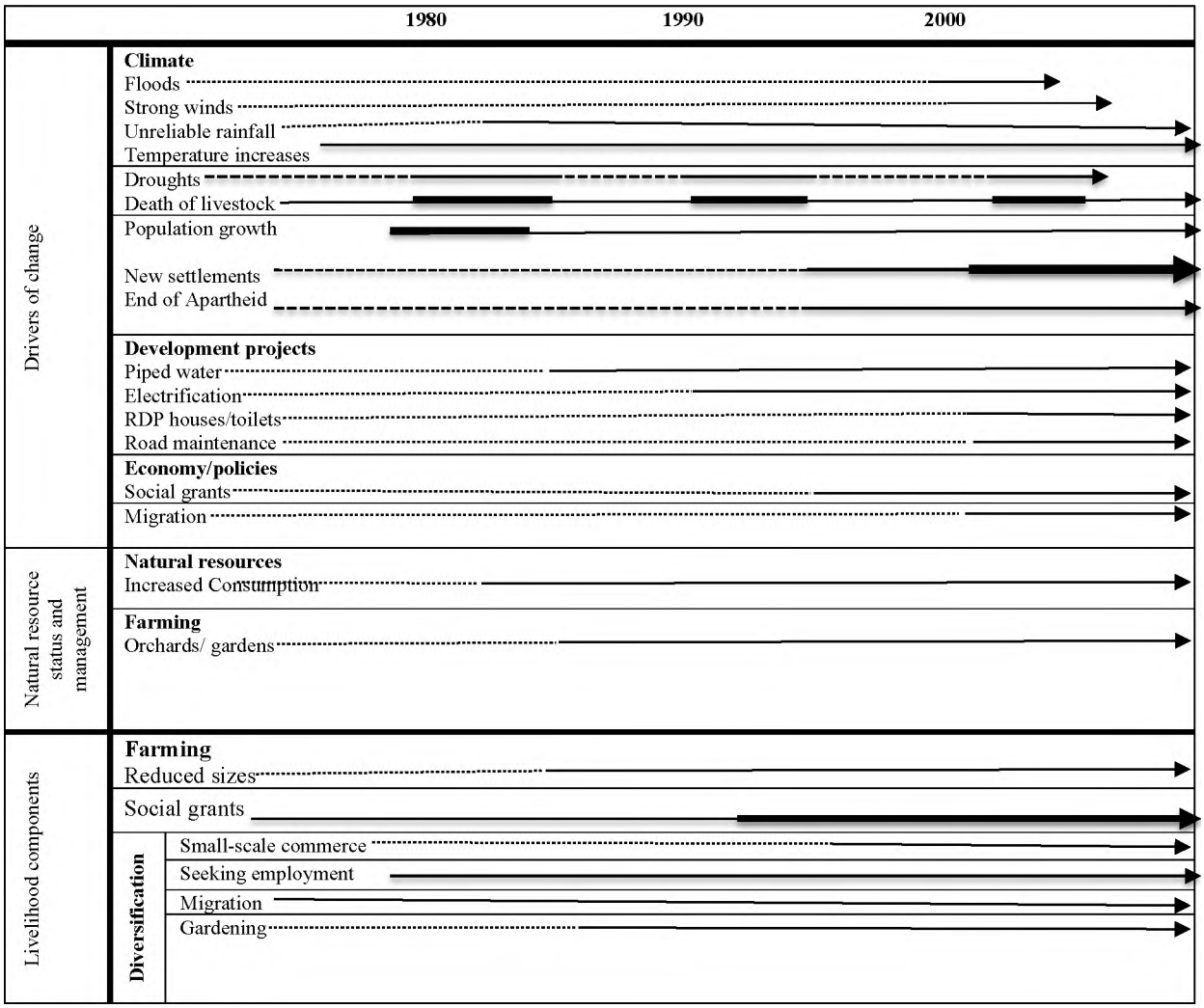

Figure 6. 2 Figure 6.2 Coupled human-environmental timeline of Tshivhulani village, based on focus group discussions and complemented by transects walks, life history interviews and secondary sources of information.

NOTE: The diagram illustrates a coupled human-environmental time-line for main key drivers and events behind livelihood and ecosystem changes in Tshivhulani village. It shows the temporal correspondence between a) underlying drivers of change, such as economic/policy factors, development/ technological advancements and climate factors; b) the natural resource status and impacts; and c) implications for livelihood components. The solid line shows the point in time when the driver was noted to have impacts on livelihoods or natural resources, while the dotted lines show its absence at that particular point in time. Sources: Nielson and Reenberg (2010); Zheng et al. (2014)

6.3 Natural resource changes

6.3.1 Perceptions of the state of natural resources

In order to understand and generate insights on changes in the natural resource base from a historical perspective, household survey data was used (*see Chapter 3*). The respondents were asked to describe the state of the natural resource base over three time periods: *(i)* 30 years ago, *(ii)* 5-10 years ago and *(iii)* 5 years ago. In addition, respondents were also asked to state the key drivers associated with the change (if any), as well as the time when these took place. This information together with the focus group discussions was also useful in constructing the human-environmental timelines above (*Figure 6.1 and 6.2*). The results for each study site are shown in Figure 6.3.

In both study sites, generally residents perceived the state of natural resources to have deteriorated over the past 30 years (*Figures 6.3 and 6.4*).

The majority of the respondents in Marwendo village stated that forest cover (95%), water sources (85%), forest diversity (97%), wild fruits (100%), wild animals (100%) and grass cover (92%) have decreased compared to 30 years ago. In terms of wild animals, for example, the elderly participants in the focus group discussions recalled times when there used to be an abundance of small antelopes and other small mammals such as scrub hares. According to narratives of the elders, all that remains is the baboons and monkeys, which are, because of the growing wild food scarcity, increasingly encroaching onto crop fields and the main highway that passes through the village. This has also further threatened the declining crop yields and domestic small livestock such as chickens and goats in the village. These results are consistent with the work done by Campbell (2002), who also noted a marked change in woodland cover in the communal lands of southern Chivi, which is located approximately 300 km from Marwendo village.

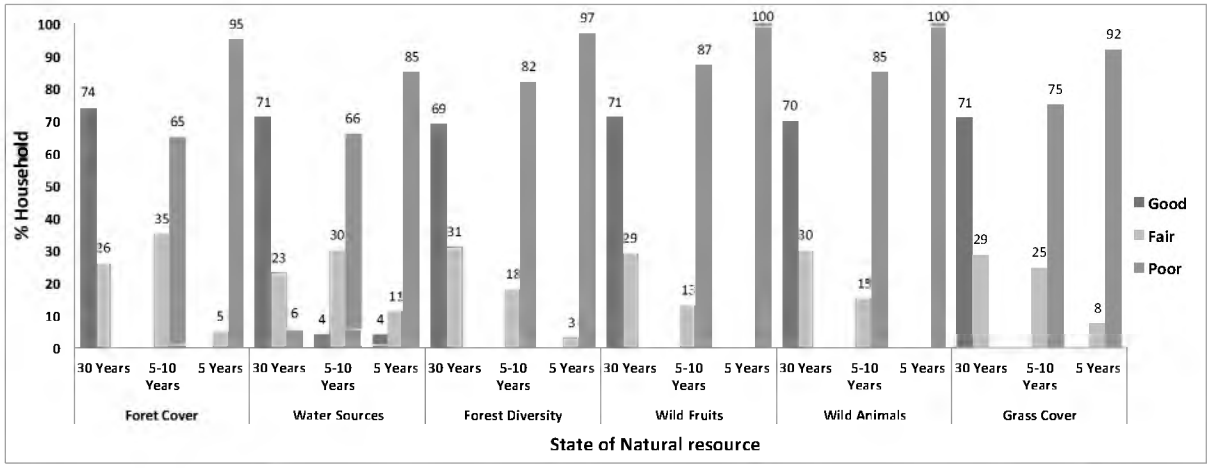

Figure 6. 3 State of natural resource base in Marwendo village over the past 30 years

Similarly, the majority of the respondents in Tshivhulani village also perceived that forest cover (92%), water sources (93%), forest diversity (98%), wild fruits (100%), wild animals (100%) and grass cover (97%) have decreased compared to 30 years ago. For water sources, most of the households (93%) agreed that generally speaking, all the water sources (river, ponds, wells) in the village now hold less water. The vast majority (92%) stated that the vegetation had been degraded, but a few also stated that recovery was taking place, especially for wild fruits and shrubs. In terms of traditional wild fruits, which used to be abundant, these are perceived to be now very scarce and many species that provide fruits have been said to have now disappeared from the local agro-ecological systems.

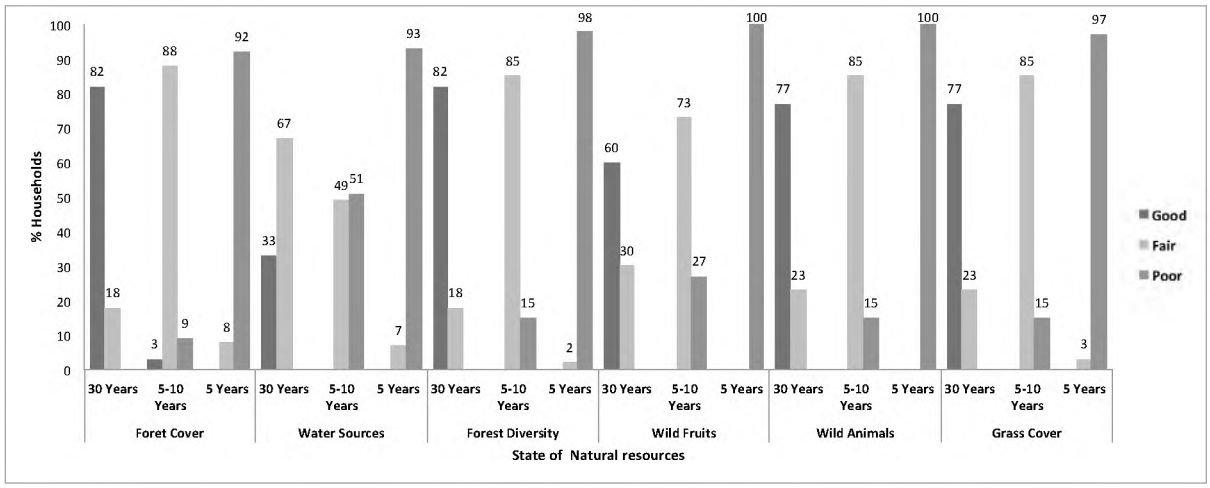

Figure 6. 4 State of natural resources in Tshivhulani village over the past 30 years

Results in Figures 6.3 and 6.4 show that the majority of respondents in both sites perceived their natural resources to have worsened over the past years. The greatest natural resource challenges in both villages are loss of forest/woodland cover, decrease in forest/woodland

diversity, decreasing water availability and increasing soil erosion. There was general agreement in both study areas that the natural resources have become degraded, with soils becoming less fertile.

6.3.2 Drivers of ecosystem change

In order to identify the drivers behind the changes in ecosystems, the respondents were asked to state the causes for the changes that they had observed in their surrounding natural resources (*see Chapter 3*). This was an open-ended question, which allowed the respondents to say whatever they thought was behind the changes.

The majority of the drivers that were mentioned were anthropogenic in origin, meaning that the communities were realising their role in the changes in ecosystems that they were experiencing. The main drivers in this category were: deforestation (driven by need for firewood), new settlements/stands, overhunting/harvesting, brick moulding, fires (mostly human caused), cultivation, hardships/survival, rubbish disposals/pollution, and siltation (*Table 6.1*). Other drivers mentioned were droughts, rainfall variability and floods. For the purpose of discussion, the drivers can be separated into three main groups: land transformation/pressure (new settlements, deforestation, brick moulding cultivation, fires, rubbish disposals/pollution, siltation), climate- related drivers (rainfall variability, droughts and floods) and socio-economic (hardships/survival).

Table 6. 1 Comparison of the drivers of ecosystem change in Marwendo and Tshivhulani villages

Natural resource	Drivers of change	Marwendo % (Zimbabwe)	Tshivhulani % (South Africa)
Forest Cover	New settlements/ stands	3	78
	Deforestation	60	22
	Brick moulding	4	-
	Hardships/ survival	3	-
	Rainfall variability	15	-
	Droughts	15	-
Soil erosion	New settlements/ stands	1	70
	Deforestation	34	-
	Cultivation	11	30
	Brick moulding	8	-
	Droughts	3	-
	Rainfall variability	4	-
	Floods	39	-
Water Sources	Rubbish disposal/pollution	3	70
	Deforestation	3	-
	Siltation	10	-
	Droughts	14	-
	Rainfall variability	44	-
	Cultivation	26	30
Forest Diversity	New settlements/ stands	15	23
	Deforestation	41	67
	Fires	3	-
	Overharvesting	2	10
	Brick moulding	4	-
	Droughts	30	-
	Rainfall variability	5	-
Wild Fruits	New settlements/ stands	3	11
	Deforestation	18	56
	Overharvesting	31	33
	Brick moulding	11	-
	Hardships/ survival	4	-
	Droughts	30	-
	Rainfall variability	3	-
Wild Animals	New settlements/ stands	-	15
	Deforestation	5	20
	Overharvesting	62	65
	Fires	3	-
	Droughts	10	-
Grass Cover	Deforestation	8	11
	Fires	37	70
	Overharvesting	5	4
	Droughts	27	-
	Rainfall variability	23	-
	New settlements/ stands	-	15

6.3.2.1 Land transformation

Respondents in both sites generally agreed that land transformation is the most significant driver of natural resource change, which manifests through new settlements, deforestation (as driven by fuelwood consumption and selling), brick moulding (only in Marwendo village), cultivation, fires, rubbish disposals/pollution and siltation. Campbell (2002) in a study in two communal lands of southern Zimbabwe, also found that land transformations is probably the most important driver of ecosystem change in that area as evidenced by the shrinking sizes of forests and increase in patchiness.

Land transformation was also tied to increasing populations in the villages, forcing clearance of forest and woodland for new settlements. The study revealed a possible linkage between population growth and natural resource change, although this is still frequently debated (Mbow *et al.* 2008). Along with a rising population comes a shortage of employment in the formal sector, and villagers (especially in Marwendo) are forced to engage in brick moulding and firewood selling [*Box 5.2*], which ultimately leads to destruction of forest cover and diversity, as discussed below.

The sprouting of new settlements in Tshivhulani village was noted as the major driver of natural resource change in the village, with 70% of the respondents attributing the loss of forest cover in the village to this driver. In contrast, in Marwendo village new settlements (3%) were not mentioned as a major driver of woodland cover change. The new settlements in Tshivhulani village, as shown in *Figure 6.5*, were said to be random and unplanned. This has also seriously resulted in siltation of the river that feeds the village. One respondent highlighted:

> *"...the people in our village just settle wherever they want...our 'Bafuwi' (meaning traditional leader) has lost control over the allocation of stands for people to stay. Long time ago it used to be in the hands of the 'Bafuwi', which means that it was organised. Today people have settled themselves near water sources, polluting them and cutting down trees. No wonder we do not have enough water to drink. At this rate, I fear that my grandchildren will not live to see the river flow as it used to. When it rains, all the loose soils are dragged into the river, now it hardly flows throughout the year...something should be done surely with these new settlements that are all over the village..." [72 year-old Female Respondent in Tshivhulani village].*

Figure 6. 5 New settlements in Tshivhulani village have been noted as one of the major drivers of natural resource change in the village (Photo by Current Masunungure).

In both study areas, deforestation (as driven by fuelwood consumption and selling) was indicated as another major contributor of land transformation and was associated with implications such as changes in the availability of woodland goods, the erosion of the ecosystems' capacity to provide ecosystem services, e.g., control of local micro-climate, and soil conservation. In Marwendo village, 60% of the respondents indicated that deforestation had resulted in loss of forest cover, with 56% in Tshivhulani village attributing loss of wild fruits to deforestation.

Overharvesting of natural resources such as thatch grass, firewood, wild fruits and wild animals was mentioned as a key driver of change in wild animal populations (62% in Marwendo and 65% in Tshivhulani village) and wild fruits (31% in Marwendo and 33% in Tshivhulani village) as shown in *Table 6.1*.

These results were also echoed during transect walks in which selected and willing members of the two communities participated (*see Chapter 3, Section 3.1.5*). In both villages, transect walks revealed that the distance to collection of firewood had increased as the villagers are now forced to walk greater distances in search of firewood. In the same way, a case study in Chivi in Zimbabwe by Vermeulen *et al.* (2000) revealed that firewood collection trips were now taking longer than before, from two hours to more than two hours in a space of five years. In Marwendo village, one respondent was quoted as saying:

"We wake up very early before sunrise in search of firewood and only come back in the afternoon. This leaves little time to do other household chores and at the same time is affecting our health." [Female respondent in Marwendo village].

In Marwendo village, brick moulding was also mentioned as a driver of change in forest/woodland cover (4%), soil erosion (8%) and species diversity (3%). Brick moulding has resulted in a high consumption of firewood in Marwendo village, as it demands high volumes of firewood. Brick moulding is now widespread along the perennial Tanganda River and is practiced throughout the year. Brick moulding has provided a viable livelihood option and coping strategy for most households in Marwendo village as they use available natural resources. Transect walks indicated an upsurge in the number of people now involved in brick moulding, accompanied by synchronous rural population growth, further adding pressure on woodlands. This illustrates that households draw upon assets and resources that they have access to in order to cope with or adapt to stressors through engaging in various forms of self-employment (Adger and Vincent 2005). Preferred species for firewood are now being sourced very far away outside communal lands. These findings echoes similar findings by Frost *et al.* (2007) in communal areas of Zimbabwe.

During the transect walk, key species such as *Colophospermum mopane* and *Afzelia quanzensis* were noted to be disappearing at a rapid rate. This was also attributed to brick moulding, increased demand for construction of houses as the population increases, and new settlements. It is important to note that the scarcity of key species was also attributed to the high temperatures and little rainfall being received affecting the regeneration of these very important trees. Lack of regeneration of dominant species as a result of over-exploitation was also noted by Campbell (2002) in Romwe village, resulting from an upsurge in woodcarving. This depletion of woody biomass stocks creates a threat to vital income-earning opportunities (Frost *et al.* 2007), as the woodland products are important to the community members providing 9% in cash value (*see Chapter 5, Table 5.2*).

Figure 6. 6 Brick moulding kiln ready for sale in Marwendo village. The lack of employment and high population has resulted in a large increase in brick moulding in Marwendo village (Photo by Current Masunungure)

NOTE: Such kilns are now a common sight along the Tanganda River with preferred species for burning now being sourced far away. This has resulted also in massive siltation in the Tanganda River as all the loose soils are washed into the river during the rainy season

6.3.2.2 Climate-related drivers

Interestingly, rainfall, a key resource in semi-arid areas (Campbell 2002), was only mentioned as a key driver of change in Marwendo village. Changes in water sources (44%), grass cover (23%), forest cover (15%), forest diversity (5%), soil erosion (4%) and wild fruits (3%), were all attributed to rainfall variability in the village. The timing of the first rains, the amount of rain, its distribution in the season, and the time the rains stop were noted to be crucial for healthy ecosystems and natural resource availability in the village, echoing similar findings by Campbell (2002) and Frost *et al.* (2007) in semi-arid mixed farming areas of Zimbabwe. The disappearance of key species (*Section 6.3.2.1*) and their slow regeneration was also attributed to the increasing rainfall variability as mentioned during the transect walks. In contrast, none of the respondents in Tshivhulani village identified rainfall variability as an important driver of natural resource change in the village. This can possibly be explained by the findings discussed earlier, where most households in Marwendo village are still very dependent on natural resources and farming compared to those in Tshivhulani village.

In addition to rainfall variability, droughts were also stated to be important drivers of natural resource change in Marwendo village. Changes in wild fruits (30%), forest diversity (30%), grass cover (27%), forest cover (15%) and wild animals (10%) were attributed to droughts experienced in the village. The impacts of droughts on the natural resource base can be either direct or indirect. Direct effects include reduction of forest diversity as a result of the death of drought-prone tree species and slow regeneration as discussed earlier. Indirect effects include the influence of coping strategies that people employed during drought years. For example, as a result of droughts more people in Marwendo engaged in brick moulding, an enterprise that consumes a lot of firewood. This will ultimately affect the natural resource base. As explained in *Chapter 2*, the increased reliance on natural resources can result in negative feedbacks on the ecosystem (*see Figure 2.2*; Shackleton and Shackleton 2012), which in turn can erode the very natural resource based safety-nets that they are dependent on. This will in turn increase household vulnerability through, for example, asset erosion as explained in *Chapter 4*.

6.3.2.3 Socio-economic drivers

Many fewer households in Marwendo village mentioned the 'need to survive hardships' they faced as a driver of natural resource change. Amongst those that did, the 'need to survive' was noted as a driver of changes in wild fruits (4%) and forest cover (3%). Survival was linked to the economic hardships that the villagers faced and the limited options available in the village. The need to survive through hardships was often coupled with overharvesting of natural resources. Over harvesting/hunting of wild animals (62%) meant that there were virtually no large wild animals left within the vicinity of the village. However, none of these above factors were mentioned in Tshivhulani village. The rural households in Marwendo village were more confronted with 'double exposure,' forcing them to adjust to socio-economic drivers of change at the same time as climate-related drivers of change.

These results highlight the complex nature of ecosystem change and the fact that multiple drivers acting together result in what we see today. They also demonstrate the linkages between livelihoods and ecosystem services and the feedbacks between them. This complex situation was recognised by the focus group participants.

6.4 Past, present and future concerns and trajectories

6.4.1 Overall standard of living

The majority of respondents in Marwendo village (72%) agreed that their lives were better 30 years ago or during their childhood compared to over the last five years with 86% saying their lives have worsened (*Figure 6.6*). As illustrated in the human-environment timeline in *Figure 6.1,* very few positive drivers of change were recorded in *Period 3* of the timeline for Marwendo village. This finding is supported by the earlier results on shocks and stressors experienced in the village (*see Section 5.2*). Shocks and stressors such as economic hardships and extreme climate events such as droughts were said to have worsened the lives of many people in the village. The withdrawal of free health care and free education as noted earlier could also offer a reason as to why the majority of respondents in Marwendo village said their lives had worsened. Nyazema (2010) found that the decline in health and education provisioning was dramatic especially in the quality of rural service provision, with Marwendo village no exception. Furthermore, the continuous erosion of physical and natural assets as mentioned in *Chapters 4 and 5* coupled with inability to rebuild assets and capital, translates into a worsened life for most villagers in Marwendo village.

In contrast, in Tshivhulani village, 60% of the respondents said that their lives have become better in the last 5-10 years. This coincides with the increase in social grants, which are described by Shackleton and Luckert (2015) as creating a window of opportunity, as well as various developments in the village as described earlier (*see Figure 6.2*). The grants were said to be crucial in contributing to food security and children's education, thus improving people's lives. This creation of a window of opportunity through social grants can support livelihood diversification and could result in "stepping-out" (Dorward *et al.* 2009; *see Chapter 2, Section 2.4.3*). In addition, the infrastructure improvements in the village (electricity, piped water, rural development houses, and road construction) have facilitated access to the town, markets and information, thereby increasing the range of available livelihood options and thus improving people's lives, consistent with findings by Zheng *et al.* (2014) in Lijiang northwest of Yunnan. Studies from elsewhere in the world have also documented how general rural development can help improve the overall standard of people lives (Finan and Nelson 2001; Tschakert 2007, Su *et al.* 2012).

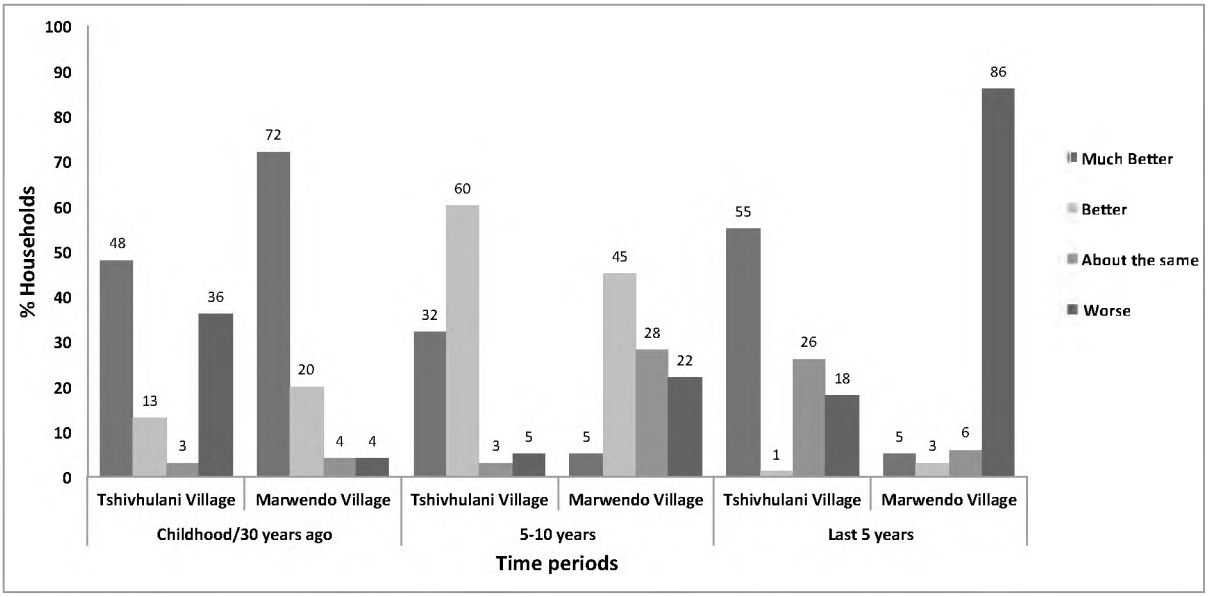

Figure 6. 7 Comparison of the households' overall standard of living

6.4.2 General Concerns

In Marwendo village, the major concerns mentioned by respondents were the persisting unemployment, droughts, hunger, poverty and economic hardships. The interviewees in the life history interviews (*see Table 6.2*) and the focus groups emphasised the economic trends such as inflation and dollarization, which affected the price of goods and services and the cost of living, as also illustrated in the coupled human-environment timeline (*Figure 6.1*).

Respondents in Marwendo village also generally expressed concerns that the current trends in increasing temperature and decreasing precipitation would continue or even increase in the future (*see continuous lines in human-environment timelines in Figure 6.1*). Intensified weather extremes, more frequent droughts and dry spells, and more crop failures, were anticipated in the near future. Most of the respondents, especially the elderly, were concerned that subsistence farming will become increasingly threatened by rainfall variability (*Table 6.2*), making it more difficult to sustain livelihoods. This will likely lead to "losing-out" (*see Chapter 2 Section 2.4.4*). Interestingly and consistent with previous results, villagers consistently spoke of the deteriorating natural resources (e.g. forests, medicinal plants, wild animals, *see Table 6.2*) as a further concern in the village. However, such concerns about deteriorating natural resources seem to contradict some of their current livelihood practices such as brick moulding (*see Figure 6.6*), which were strongly perceived as having detrimental environmental impacts. Nevertheless, such an activity was seen as a coping strategy to socio-economic drivers of change that often result in shocks and stressors at the household level as mentioned before. These results concur with the findings that adaptation

and stressors are entangled (McDowell and Hess 2012) within social-ecological systems (*see Chapter 2*) through feedback mechanisms (*see Figure 2.2, Chapter 2*). The feedback mechanism is further exacerbated by the climate variability of drylands ecosystems (United Nations Development Programme 2015).

Table 6. 2 Narratives from life histories indicating the general concerns of people in Marwendo village

Narratives from life histories in Marwendo village
"The lack of employment opportunities in our village is a major concern especially for our children who are in school"
"I am worried that my children will not be able to see the *Mukamba* tree (*Afzelia quanzensis*) as this has been seriously overharvested in the village"
"The forests are now very far away from the village. This forces us to wake up very early in the morning to go looking for firewood. The scarcity of firewood is a major concern in the village now as very few houses have electricity"
"We foresee an increased change in the weather patterns, especially with rainfall and temperature. Our river is never full throughout the year. Most of us fear that it may dry up in the near future...my greatest concern is food security for my family"
"I foresee more frequent droughts hitting our village, worse than the 1992 one. We are most likely to continue to struggle to feed ourselves"

In Tshivhulani village, there has been a shift in the main concerns in the villagers' lives over the past 30 years. According to focus group and life history interviews, previously food scarcity and poverty were the major concerns, whereas now social grants have helped to address these, coupled with the end of the apartheid era (*see Figure 6.2*). The education and future of children was ranked as the major concern for most of the villagers. A better life with better opportunities was generally hoped for by most of the families. Many of the life history interviewees stressed how they were hoping for a better life for their children as shown by the narratives in *Table 6.3*.

Table 6. 3 Narratives from life histories indicating the general concerns of people in Tshivhulani village

Narratives from life histories
"If my children do well in their education, I foresee a better future, as they will be able to take care of me when I am old, as well as their own children"
"I am looking forward to a better future for my children and grandchildren"
"My main concern is a better life for my children...I wish my children can live a better life than the one I lived"
"I am unemployed...I don't want my children to live the way I have lived…I am concerned about the future of my children…they should live a life that is better than mine"

6.4.3 A look into the future

The majority of the households in Tshivhulani village (55%) were very optimistic that their future would be better (*Figure 6.8*). In general, living standards for most of the people in Tshivhulani village have improved over the last 30 years (as witnessed by the shift in people's main concerns above from basic necessities such as food to issues such as education, *Table 6.3*). A better future ahead can also be anticipated due to several positive changes that created opportunities for most households in Tshivhulani village, as noted in the human-environment timeline (*see Section 6.2, Figure 6.2*). However, 44% of the households had mixed optimism about their future (unknown- 26% and dark- 18%).

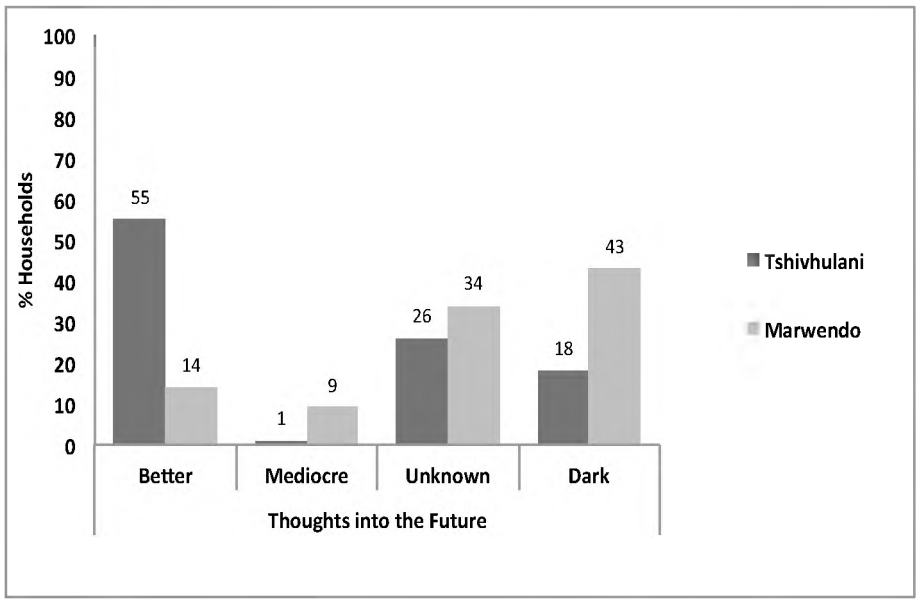

Figure 6. 8 Comparison of the thoughts into the future in the two villages categorised into "better", "mediocre", "unknown" and "dark/worse"

On the contrary, 43% of households in Marwendo village (*Figure 6.8*) were very pessimistic about their future and another 34% of households were unsure of how their future will turn out. This is due mainly to climate-related shocks (*see Chapter 5*) and economic hardships noted in the human-environment timelines. These shocks and stressors combined to erode the household and community asset base for most households, who perceived a dark future ahead. Their capacity to accumulate ("stepping-out") or diversify ("stepping-up") existing activities as a form of adaptation to change, was said to be very much curtailed. These households in Marwendo village could be characterised as "losing-out" (*see Chapter 2*). It could therefore be argued that households in Marwendo village are facing further vulnerability and the scenario pointed out in the conceptual framework of a downward spiral (*Chapter 2, Figure 2.2*) could apply, unless there is major support and new livelihood opportunities provided for these people.

A few households (14%) in Marwendo village were very positive about their future. These could include households that managed to diversify their income sources to include off-farm activities, or those who were receiving remittances from their children or relatives.

6.5 Conclusion

The aim of this chapter was to explore the dynamics of livelihood and ecosystem change as a result of both socio-economic and environmental drivers and their interactions [*Box A, Figure 2.1*] and the implications of this change, including future concerns of the villagers. The

results show that considerable changes in livelihoods and ecosystems have taken place in Tshivhulani and Marwendo villages over the past 30 years. This study demonstrates that generic rural development and livelihood enhancement initiatives such as rural electrification and road construction can strengthen local people's capacity to respond to shocks and stressors and reduce their vulnerability. Thus, the observed synergies between coping or adaptation to shocks and stressors, and development, supports the emerging process of 'mainstreaming' adaptation and integrating it with development issues.

The households in both villages have been able to adopt a wide variety of response strategies, including livelihood diversification and to some extent migration as responses to socio-economic and political influences. It is important to note that although villagers have also experienced climate-related shocks and stressors mainly in terms of increasing temperatures, rainfall variability and droughts, these have not necessarily functioned as the predominant driver of livelihood changes. The observed changes especially in Tshivhulani village have reduced the overall vulnerability of people and together with rural development has led to the increased adaptive capacity of communities, despite increasing exposure to shocks and stressors such as climate change (Zheng *et al.* 2014).

The results show that changes in woodland resources is a complex issue linked to not only climate variability and change, but also social and economic conditions, and thus historical data is essential in order to obtain a complete picture of current and historical changes (Mbow *et al.* 2008). Land transformation and climate factors proved dominant in driving the perceived historical changes in natural resources, but other factors such as the socio-economic factors were also important especially in Marwendo village. According to Mbow *et al.* (2008) and Geist and Lambin (2002) this multiplicity of drivers of natural resource change is well known in African societies and at local level, as demonstrated in this study.

CHAPTER SEVEN

THE ROLE OF NATURAL RESOURCES AND SOCIAL PROTECTION: SYNTHESIS, IMPLICATIONS AND CONCLUSIONS

7.1 Chapter overview

Given that many of the findings from this study are already discussed and synthesised in Chapters 4, 5 and 6, in this final chapter I seek to address the overarching propositions, which were drawn from theory and other research that guided this research, namely:

I. The ongoing and rapid change, from global to local level, is increasing shocks, level of stress and vulnerability amongst natural-resource dependant households in dryland areas of southern Africa.

II. As a result, households are diversifying their livelihood strategies, turning to accessible safety-nets such as the use and sale of natural resources.

III. Such use is affecting the natural resource base with potential negative feedbacks on livelihoods, coping and adaptive choices, and future trajectories, although forms of social protection, such as social grants, can reduce negative impacts and increase adaptive capacity.

This is done by considering the wider implications of the study findings, including what they mean within the current discourse and debate on human-environmental change (*Chapters 1 and 2*). In the first part of this chapter, I seek to bring together and summarise the key empirical findings and theoretical discussions found in this study, with particular reference to the first proposition posed for this study. To assist in this, I have developed a simplified, conceptual framework (*Figure 7.1*) that highlights the key issues and variables that need to be considered to understand the impacts of the ongoing and rapid changes at the local level.

In the second part of this chapter, I pay particular attention to proposition II and in the final section, I focus on proposition III, particularly the role of social protection in reducing the negative impacts of change and increasing adaptive capacity.

This synthesis provides the background to then lead into a more practical consideration of the implications of the findings for future livelihoods, policy, local institutional capacity building and rural development, both in dryland areas of southern Africa and globally.

7.2 The ongoing and rapid change: impacts on rural households

In the introduction (*Chapter 1, Section 1.3*) to this study, it was proposed that:

- The ongoing and rapid change, from global to local level, is increasing shocks, level of stress and vulnerability amongst natural-resource dependant households in dryland areas of southern Africa.

The results from the two study sites show this proposition to be largely true, although some positive changes [*Box B, Figure 2.1*] were experienced, which helped to improve the adaptive capacity of the households (*Chapter 6*). This study has demonstrated that the majority of natural-resource dependant households are facing multiple shocks and stressors (*see Box C, Figure 2.1; Chapter 5*), which sometimes work in synergy with one another, cumulatively affecting these households. Particularly in Marwendo village, the trends, shocks and stressors experienced have resulted in a very rapid increase in household vulnerability and asset erosion, as well as concerns for the future (*vertical Arrows in Figure 7.1*). These are projected to have a very high impact on households (*as shown by the red colour in Figure 7.1*) with the exception of 'future concerns' with high impact on households (*brown colour*).

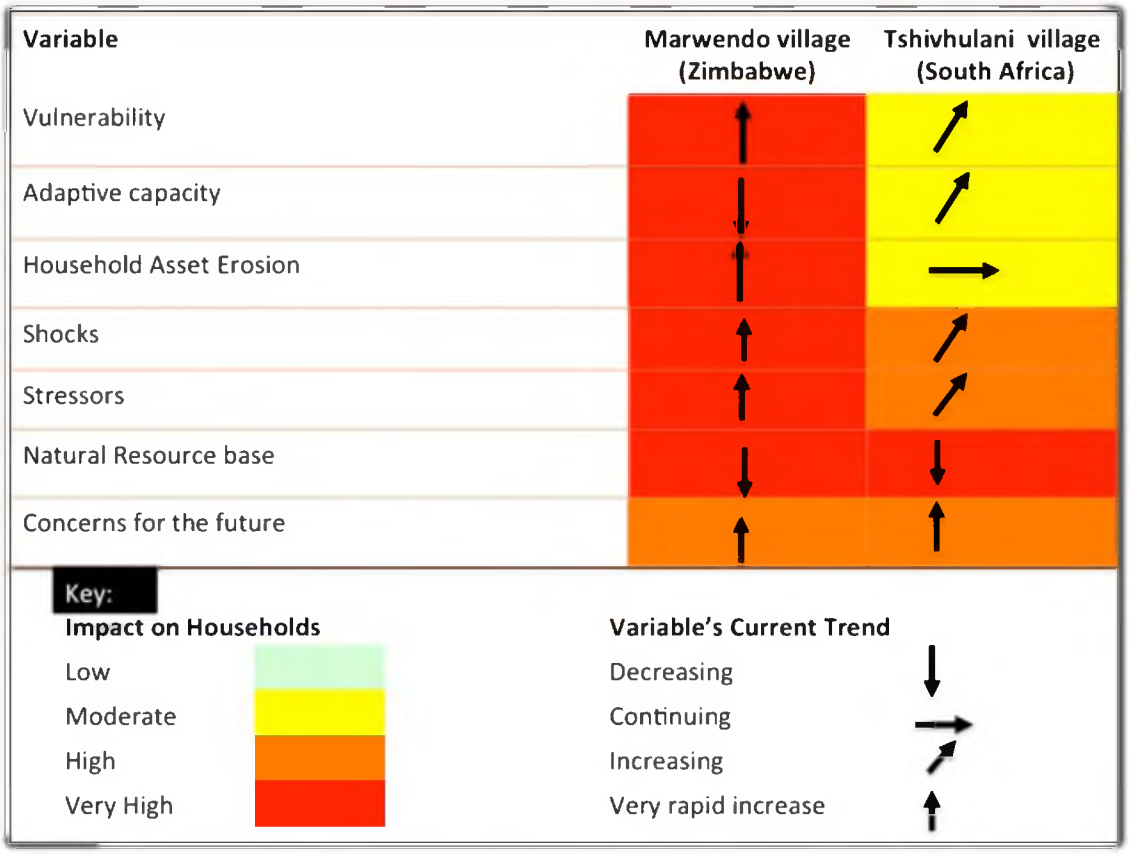

Figure 7. 1 Comparison of the main drivers of change in livelihoods and ecosystems in the two villages

NOTE: The coloured cells indicate impact of each variable on households in each village over the past 30 years. High impact means that over the last 30 years the particular variable has significantly affected the household livelihood system; low impact indicates that it has little influence on the livelihood system in the study area. The arrows indicate the trend in the variable. Horizontal arrows indicate continuation of the current level of the impact; diagonal and vertical arrows indicate progressively increasing trends in impact. (Adapted from: Millennium Ecosystem Assessment 2005).

Positive changes [*Box B, Figure 2.1*] such as rural electrification, rural development houses, piped water and road construction, among others, were noted to strengthen the adaptive capacity of the local people in the face of shocks and stressors (*see Chapter 6*). These observable changes are expected to lead to increased adaptive capacities of the communities by offering new opportunities for innovation and adaptation (Zheng *et al.* 2014). However, as noted earlier, due to high asset erosion, lack of a social protection system and current socio-economic turmoil in Zimbabwe, the positive changes in Marwendo village are outweighed by the negative changes, as shown by the very rapid increase in vulnerability (*vertical arrow, Figure 7.1*). In contrast, the positive changes coupled with the cushioning effect of social grants, have resulted in improved adaptive capacity, despite a decreasing natural resource base in Tshivhulani village (*diagonal increasing arrow in Figure 7.1*).

7.3 The role of safety-nets in reducing vulnerability to change, shocks and stressors: natural resources and social protection

7.3.1 Use and sale of natural resources

Evidence from this study supports the second proposition that was posed for this study, namely:

> II. As a result (of ongoing and rapid change), households are diversifying their livelihood strategies, turning to accessible safety-nets such as the use and sale of natural resources.

The study uncovered the importance of natural resource use and sale as a livelihood strategy and safety-net used by rural communities (*Box 5.1, Chapter 5*; Takasaki 2010; Paumgarten and Shackleton 2011). It was evident within the study sites, particularly in Marwendo village, that households made use of natural resources (*Chapters 4, 5 and 6*). In Chapter 6, several households mentioned collecting and harvesting more natural resources and taking a longer time to collect natural resources due to longer distances being travelled. In some cases, particularly in Marwendo village, households supplemented their income requirements by the commercialisation of natural resources, with 9% of the households mentioning the sale of natural resources as their major income source (*Table 4.2, Chapter 4*). Thus, it could be argued that, as a result of the ongoing and rapid change, some households, particularly those with few assets, no jobs and no social protection, are turning to accessible natural resources as safety-nets, particularly so in Marwendo village compared to Tshivhulani village.

However, such reliance on climate-sensitive livelihoods could explain the rapid increase and high impact on households regarding vulnerability and asset erosion (*as mentioned earlier, Figure 7.1*) in Marwendo village. The results suggest that the reliance on natural resources in both study sites has resulted in a decrease in the natural resource base (*vertical arrows pointing downwards in Figure 7.1*). As mentioned in Chapter 2 and illustrated in Figure 2.2, such increased reliance on natural resources often has negative feedbacks on the quantity and quality of ecosystem services and goods (Shackleton and Shackleton 2012), creating a mutually reinforcing feedback loop that increases human vulnerability and ecosystem degradation.

7.3.2 Social protection: grants

The results from this study show that proposition III is largely true, namely:

> III. Such use is affecting the natural resource base with potential negative feedbacks on livelihoods, coping and adaptive choices, and future trajectories, although forms of social

protection, such as social grants, can reduce negative impacts and increase adaptive capacity.

The main emphasis here was showing that forms of social protection such as social grants could reduce the negative impacts and increase adaptive capacity. Several studies have emphasised the positive benefits of social protection in alleviating poverty within households in rural communities (Davies *et al.* 2009; Ndlovu 2012). There was a high dependency on social grants in Tshivhulani village, where the combined social grants were the major income sources for most of the households (*Chapter 4, Table 4.2*). With a more pronounced social protection system in South Africa (*Chapter 3, Table 3.1*), it is evident that social grants play a pivotal role in reducing vulnerability and stabilising household income. With 83% of households receiving social grants, the results show that the overall household vulnerability in Tshivhulani village is moderate with a steady increase (*as depicted by the diagonal arrow, Figure 7.1*) with moderate impact on households (*yellow colour, Figure 7.1*), compared to Marwendo village. The social grants received by the households are pooled within the household to contribute to food security and thus reduce vulnerability and strengthen adaptive capacity (*diagonal increasing arrow*). With 41% unemployment (*see Figure 4.1, Chapter 4*) in Tshivhulani village, the evidence suggests that social grants have played a pivotal role in reducing household vulnerability and asset erosion, and strengthening adaptive capacity (*see Figure 7.1*) by increasing household income levels, compared to Marwendo village. This emphasises the important function social protection has of providing a safety-net, thus agreeing with the third proposition posed for this study.

Evidence from this study also supports the widely held view by other studies (Devereux 2011; Devereux 2001) that a social grants system can encourage maladaptive behaviour that can have severe consequences for the household as children get older or as elderly members die and the grant ceases to be available (Quinn *et al.* 2011). In addition, in the current rural context, particularly Marwendo village (*see Chapter 4*) which is characterised by poverty and a host of socio-economic challenges (*see Section 3.3.4, Chapter 3*), formal strategies such as the social grant system is unlikely to be a long-term solution, thus calling for promotion of more informal methods readily available, such as natural resource use and sale. Whilst this seems to be a viable option, it is clear that action needs to be taken to regulate and manage all forms of natural resource use.

7.4 Future for dryland regions of southern Africa: lessons and implication from the study

7.4.1 Natural resource management

This study has demonstrated that with the ongoing and rapid change, which often results in increasing shocks, levels of stress and vulnerability, local communities are likely to increase their dependency on natural resources. However, such increased dependency on natural resources was noted to be depleting the natural resource base (*see Figure 7.1*). This therefore calls for sustainability-driven policies that can successfully link natural capital and adaptation strategies. This may be best achieved by the strengthening of local institutions, capacity building of local communities to best manage their own resources, and extension support systems for community-based natural resource management. According to Shackleton and Shackleton (2012), 'breaking the cycle of mutually reinforcing human and ecosystem vulnerability' may involve learning 'how best people learn, use knowledge, take action and change their practices'.

Furthermore, with farming declining in both study sites, this suggests a need to introduce policies that seek to re-establish agrarian livelihoods in these villages and other rural communities in the drylands of Africa. The re-establishment of agrarian livelihoods should be part of a livelihood diversification strategy to address food security issues. However, given rising climate variability and change, climate smart farming techniques such as conservation agriculture have to be implemented in order to avoid communities being caught in what Cumming *et al.* (2014) call a "green trap". A more nuanced perspective is needed that will require a full consideration and a suite of approaches to avoid counter productivity of policy implementation (Shackleton and Luckert 2015). Additional efforts such as engaging with extension officers, NGOs and local government officials, who can assist in leading long-term community projects such as nutritional gardens, can foster self-sustenance. Capacity building through knowledge and skills development training workshops that introduce communities to conservation farming, sustainable harvesting of natural resources, rainwater harvesting and storage, and principles of sustainable land-use system, among others, should be promoted. A study by Zheng *et al.* (2014) showed how the government extension service in Wuzubi village and the villagers themselves played a significant role in livelihood changes. These included specialized potato and rapeseed cultivation, which brought huge economic returns,

and this change was a combination of the villagers' own initiatives and the activities of an agricultural science station.

In addition, the control of resettlement of residents in the village, controls on resource access and use by the villagers, environmental education, subsidies for conservation investment by the villagers (for example those practicing conservation farming), and non-farm income growth is greatly recommended (Speranza 2010; Mushongah and Scoones 2012; Roden *et al.* 2016). Such interventions should seek to address 'underlying development needs, assist in poverty alleviation and build on existing activities and practices, as well as introducing new adaptive strategies' (Shackleton *et al.* 2010).

7.4.2 Social protection

The system of social protection is highly contentious as noted earlier and in Chapter 4, but despite the negative criticism, there are also many benefits of this system (Devereux 2001; Davies *et al.* 2009; Devereux 2011). Drawing on the different benefits of social protection, as mentioned in Chapters 3, 4 and 5, the following question was raised for this study: what role has, or could, social protection play in adapting to change or short-term shocks and stressors. It has already been argued that in the context of the ongoing and rapid change, increased adaptive capacity can be achieved through 'adaptive social protection' (Davies *et al.* 2009). Adaptive social protection emphasises strengthening poor peoples' resilience and transforming their lives through "stepping out" to adapt to the ongoing change. There is therefore a need to adopt adaptive social protection that aims to understand the root causes of poverty while targeting the most vulnerable to change, trends shocks and stressors.

In the context of the ongoing and rapid change, adaptive social protection policies should aim at the longer-term perspective, taking into account the changing nature of change, shocks and stressors (Davies *et al.* 2009).

In addition, social protection policies should take into account local and more traditional safety-nets by constantly engaging with the local people at grassroots level, to develop a more comprehensive adaptive social protection system (Triegaardt 2005). Tibesigwa *et al.* (2015) notes that very little has been done to 'capture, utilise and promote these opportunities', especially in sub-Saharan Africa.

7.4.3 Social and community capital

The findings of this study show that social and community capital played an important role within Marwendo and Tshivhulani villages with regard to responses to change, shocks and stressors (*see Chapters 5 and 6*). There is therefore a need to promote sustainability of these more informal methods readily available in resources-poor settings in southern Africa and even beyond. Social support networks, such as group membership and interactions, need to be fostered at the community level to improve the reliability and effectiveness of social and community capital as a response strategy. To achieve sustainability, there is a need to develop policies that target existing relationships, which are characterised by a culture of strong ties, helping to reduce the negative effects of informal social capital on vulnerable households (Tibesigwa *et al.* 2015). Such negative effects often manifest in trade-off between giving and receiving assistance and the household's welfare (Tibesigwa *et al.* 2015).

7.5 Concluding remarks

The study has illustrated the dynamic nature of vulnerability. Some current livelihood practices, for example farming and commercialization of natural resource products, especially in Marwendo village, are natural resource-based and climate-sensitive. As discussed earlier (*see Section 7.3.2*), other practices such as the high reliance on social grants in Tshivhulani village can have severe consequences for the household (Quinn *et al.* 2011). As such, vulnerability of communities in both study areas might increase in the future (with Marwendo village being worse-off, *see Figure 7.1*) considering increased exposure induced by change, shocks and stressors and the remaining susceptibility of presently pursued livelihoods. In general, I therefore advocate for advancing robust and resilient development policies that promote and give specific attention to sustainable livelihood development that aligns with multiple pathways to sustainability (Leach *et al.* 2010) and emphasizing economic returns without introducing potential negative ecological consequences (Zheng *et al.* 2014).

As a closing note, I would like to quote a thought-provoking statement on ecosystem services by Millennium Ecosystem Assessment (2005): "Any progress achieved in addressing the Millennium Development Goals of poverty and hunger eradication and environmental sustainability is unlikely to be sustained if most ecosystem services on which humanity relies continue to be degraded". This is a challenge that I hope I have unveiled in this study, and is

a matter that all of us working at the human-environment change interface need to keep at the forefront of our thinking and analysis.

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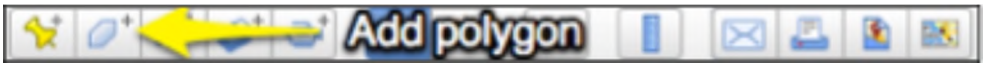
APPENDICES

APPENDIX 1:

Generating random points (Cruise tool)

If you are planning your sampling design for your fieldwork there are tools available that can create random or grid points. This tool uses the same website as previously. It creates random points in a way that you specify. We can then display them on Google Earth, or use another tool to convert those points to a format suitable to upload to your handheld GPS unit.

- Click on *Add Polygon* to create a polygon.



- On the *Places* sidebar *right-click* your polygon and choose *Save Place As...*
- Enter a filename and location to save, and save as .kml.
- Now go to http://extension.unh.edu/kmlTools/index.cfm
- Click *Choose File* to upload your saved .kml file.
- Enter a description and press *Submit.*
- Under the *Cruise* function, enter how many points you want to create. You can have them generated as a *Grid* (equally spaced throughout your polygon) or *Random* (randomly spaced throughout your polygon, with a minimum spacing that you specify).
- Click on the *Cruise* button. A new screen will pop up with your points. Save as .kml as before.

- Import the new file with your random points into Google Earth; it should now appear in the *Places* sidebar.
- On the *Places* sidebar *right-click* your polygon and choose *Save Place As.*
- The Google Earth image with the GPS points is printed out and used in the field to identify the selected households.

APPENDIX 2

Comparison of multiple responses to shocks and stressors in Tshivhulani village and Marwendo village. Grey shaded areas represent Marwendo village and non-shaded areas Tshivhulani village.

% Households	Increased commercialisation of NR	Increased consumption of NR	Harvest premature crops	Change farming techniques	Spend cash savings	Use money from storkvels	Sell assets	Do extra casual labour	Assistance from friends, neighbours and relatives	Assistance from NGO, community / religious organisation	Acquire loans	Reducing household consumption	Pulling children out of school	Sold food that would otherwise be eaten	Did nothing in particular	Putting stones on top of roofs	Buying maize	Rely more on social grants	Burial society	Visiting clinics/hospital	Fire guards / Plant more trees	Vaccinating livestock	Supplementary feeding	Report to extension services	Traditional methods of pest and disease
Droughts	3	11		4	3		10	19	6	24		6	1	3	4		6								
		5	5		11			9	20						2		13	33					2		
Cyclones	9	6					6	9	18	24				6	18	4									
									100																
Fires										25					75										
									17						61			2			20				
Floods												14			86										

Strong winds					4		4		12	8					20	52								
					7				23						35	20		5			9			
Crop pest/diseases	3	10	5	3					8	3					30							20		3	18
																						100			
Crop failures		10	6	21				14	3	7					28		3							3	3
Livestock diseases/ death		2						2		4	2				22	3						39		4	22
															24							76			
Illness of family member							12		57	4										23					4
					8				30											62					
Illness of breadwinner									40	10										50					
																				100					
Loss of assets					4		22	8	12	12	4			4	30		4								
					17			11	33						33			6							
Expensive events									91						9										
					35	4			57									4							
Retrenchment								33						33	34										

Inflation	6	6			2		20	14	15	17		8	2	2	8										
Death of family member					3		7		77	3		3			7										
									45	5									50						
Death of breadwinner					11				89																
									8	8								8	76						
Land loss															100										
Rainfall variability	5	4		26	1		7	9	1	8		1	1		26		11								
		13	13			2		4	4						14		20	30							
Loss of soil fertility	7	5		46				7		5		2	2		24		2								
		15		5	12										15		18	15							
Loss of grazing land	4	4		2			2	2					2		54								30		
																							100		
Total Tallies	7	9	2	6	7	0	9	10	13	13	3	6	5	5	17	3	5	0	0	2	0	2	1	3	3
	0	3	2	1	5	2	0	3	10	2	0	0	0	0	7	1	3	8	2	2	2	2	2	0	0

APPENDIX 3

HOUSEHOLD INTERVIEW FORM

CONTROL INFORMATION

DATE:	
QUESTIONAIRE NUMBER:	
VILLAGE NAME:	
HOUSEHOLD CODE:	
HOUSEHOLD NAME:	
HOUSEHOLD GPS COORDINATES:	
CONTACT PHONE NUMBER:	
STARTING TIME:	**FINISHING TIME:**

A.1 GENERAL INFORMATION

1. Is the Respondent the Household Head? **[ ]**
   Yes.....1 No.....2

2.1 If No, what is the Respondent's relationship to Household Head? .....

3. How long has the household lived here? If possible the actual number of years. **[ ]**
   Less than 10 years.....1 10-30 years.....2 Since childhood.....3

4. If less than 10 years, where did the household live before? **[ ]**
   In the same VIDCO.....1 In another VIDCO.....2 In another Ward.....3
   In another Rural District.....4 In an Urban District.....5

5. Household size (total)……

HH member [First Name]- mark the HH head*	Gender M/F	Age (Specify age or date of birth)	R/ship to HH Head	Marital Status	Education/ training	Occupation (detail job type)

Codes:
Gender: Male.....1 Female.....2
Relation to HH Head: Spouse...1 Parent...2 Parent-in-law.....3 Grandparent....4 Non-relative...5 Son/Daughter...6 Brother/Sister.....7 Nephew/niece.....8 Grandchild.....9 Daughter-in-law ...10
Marital Status: Married….1 Divorced……2 Widowed…..3 Never married…..4
Education: None.....1 Primary.....2 Senior Secondary.....3College/Diploma.....4 Degree.....5 Other (specify).....6
Occupation: Formally employed….1 Informally ..2 Unemployed..3 Self….4 Farmer… 5 Pensioner…..6 At school…...7 Under 6years..8

6. How important do you think it is to have as many members of your household working different types of jobs, so that you rely on many sources of income and food, rather than just one? **[ ]**
   Very important…..1 Important……2 Neutral……3 Not important……4 Not at all important……5

A.2 INCOME

1. List the most important sources of income and estimated income per month in the **TABLE** that follows. For each income source, assign a **RANK** according to importance for the household on a scale of 1-5. (e.g. Self-employment, pensions, remittances, farming, social welfare, use of natural resources/ NTFP's, sale of NR, jobs (either full-time or part-time), community assistance).

2. Have you noticed any **CHANGE** in each of the listed income sources over the past 5-10 years*?

3. What are the **REASONS** associated with such changes?**

Income source	No.	Estimated Income per month	Rank (1-5)	Changes in income sources*	Reasons for change**

Code:
Changes in income sources*: Increased.....1 The same.....2 Decreased.....3
Ranking: Least important….1 Very important…..5

4. If the household receives (listed above) income from social welfare (child and disability), pensions, or remittances, please indicate how important they are to you and your household are:

Child grants	
Disability grants	
Pension	
Remittances	

Extremely important (completely dependent) ……. 1
Important (largely dependent)……..2
Neutral (equally dependent on it and other HH income……3
Unimportant (depend very little on it)……..4
Not important at all (do not depend on it at all)…… 5

5. What would be the biggest risks to you and your household if your household did lose its income from social welafare/remittances ticked above? Tick where applicable:

Ability to purchase food and other basic necessities	
Paying school fees/education	
Treatment and care	
No electricity (if available)	
Other:	

6. How does what you can buy with your income source now compare with that when you were a child? **[ ]**

Increasing ..... 1 Stay much the same……..2 Decreasing……3

7. In comparison to the rest of the households in your community, how well of/wealthy would you rate your household? **[ ]**

Above…..1 Middle…..2 Below…… Don't know……4

8. Have you and your household ever tried to diversify/expand your income sources to reduce the risk of easily losing your income? [ ]

Yes……1 No……2

8.1 If answer is yes, please explain:

_____

_____

A.3 ASSETS

1. Does the household own any of the following assets and how many (where applicable)?

	Yes/ No	Numbers
Paraffin stove		
Gas stove		
Solar panel		
TV		
Radio		
Electricity		
Scotch cart		
Plough		
Planters		
Harrows		
Knapsack Spray		
Wheelbarrow		
Hoes		
Other:		
Other:		

3. In the last 5-10 years, have you and your household been able to purchase any assets? [ ]

Yes……1 No……2

3.1 If yes, state the source/s of income to purchase the assets:

_____

_____

4. In the last 5-10 years, has your household had to sell any of the above assets to cover household expenses or recover from a shock? [ ]

Yes……1 No……2

4.1 If yes, explain which assets and why they sold them:

_____

_____

_____

2. Looking back over from childhood/past 30years, do you think that your HH's total assets and wealth are? [ ]

Increasing ……1 Stay much the same……2 Decreasing……3

2.1 If decreasing, what is it? Explain and list:

_____

_____

_____

A.4 LIVESTOCK AND FARMING ACTIVITIES

A.4.1 LIVESTOCK

1. Does your household own any livestock? [ ]
   Yes……1 No……2

1.1 If yes, please indicate how many:

Animal	Number	Animal	Number
Cattle		Sheep	
Goats		Chickens	
Donkey		Pigs	

2. Have there be any changes in the livestock numbers (decreasing/increasing*) over the past 5-10 years? [ ]
   Yes……1 No……2 *Circle applicable

2.1 What do you think are the causes of the changes in livestock numbers? State reasons:

_____

_____

3. Does your household ever sell any livestock? [ ]
   Yes……1 No……2

3.2 If yes, list the animals normally sold in order of most sold to least sold:

_____

_____

3.3 Why does your household sell livestock? (e.g. need money for school fees, recover from a shock)

_____

_____

3.3 Compared to your childhood/past 30 years, what has happened to the frequency of selling the livestock mentioned above? [ ]
   Increasing……1 Stay much the same……2 Decreasing……3

4. Do you have access to grazing land? [ ]
   Yes.....1 No.....2

4.1 Generally, what is the condition of the grazing lands for your livestock [ ]
   Very Good.....1 Adequate.....3 Very Poor.....5
   Good.....2 Poor.....4

4.2 Is the grazing land better, the same or worse than childhood/30 years ago? [ ]
   Better.....1 Same.....2 Worse.....3

A.4.2 FARMING ACTIVITIES

1. Tick where applicable in the table below:

	Yes	No	If yes, how many

Does your household have a garden			
Does your household have a field			

2. Have you ever left any land fallow in the last 5-10 years? [ ]

Yes……1 No…..2

2.1 If Yes, what are the reasons for leaving land fallow? [ ]

Insufficient draught power.....1
Insufficient labour.....2
Insufficient cash to purchase inputs...3
For grazing livestock.....4
Land left to rest.....6
Land is poor quality.....7
Other (specify).....8

2.2 Compared with your childhood/30 years ago, is the amount of land left fallow? [ ]

Greater.....1 Smaller.....2 Unchanged.....3

3. Compared to your childhood/past 30 years, what has happened to the size of the field/garden that you crop? [ ]

Increasing……1 Stay much the same……2 Decreasing……3

3.1 How has this affected your household? Tick.

Seek extra employment/casual labour locally	
Seek extra employment/casual labour in nearby town	
Seek assistance from friends, relatives and neighbours	
Harvest and use more natural resources	
Relying more on social grants	
Use own livestock for food	
Sell natural resources(wild fruits, firewood)	
Sell assets	
Other:	
Other:	

B. LINKING SHORT TERM SHOCKS, STRESSORS AND RESPONSES

1. Over the past 5-10 years, have you ever been affected by more than one shock at a time? [ ]

Yes……1 No……2

2. If yes, what is the most number of shocks you have experienced? [ ]

Two……1 Three……2 Four……3 More than four……4

3. Please tick if your household has experienced any of the following: last 5 years and 5- 10 years#

3.1 Link a particular stress/ shock to a particular response that you would undertake**

CRISIS EVENT		Time periods#				Severity *	How did you cope with the event**
		Last 5 years		5-10 years			
		YES	NO	YES	NO		
SHOCKS:							
Natural disasters	Droughts						
	Cyclones,						
	Fires						
	Floods						
	Strong winds						
Crop pests and diseases							
Crop failures							
Livestock diseases/death							
Serious illness of a family (high medical costs)							
Illness/injury of the main breadwinner							
Loss of assets (e.g. heavy rains flooding houses and destroying furniture)							
Expensive event (e.g. Easter, traditional ceremonies, Easter, weddings)							
Retrenchment							
Inflation- increases in cost of basic commodities							
Death of a family member							
Death of breadwinner							
Land loss (land reform, expropriation)							
Other:							
Other:							
STRESSORS:							
Rainfall variability							
Loss of soil fertility							
Loss of grazing land							
Other:							

Codes:
Severity*: 0= no crisis; 1= minor; 2= moderate; 3= severe
Coping**:

1. Sell more natural or wild products (honey, fuel wood, thatching grass, charcoal)
2. Relying heavily on NTFPs (e.g. eat more bush meat if they cannot afford bush meat, use more fuel wood)
3. Harvest more agriculture products- cultivating more crops
4. Harvested premature crops
5. Changed farming/agriculture techniques e.g. planting crops that require less water in dry seasons, planting crops with higher nutritional value than staple
6. Spend cash savings or retirement money
7. Adopt foster children to claim child grants
8. Use money from stokvels/ saving schemes
9. Sell assets e.g. livestock, land
10. Do extra casual labour work or self-employment initiatives
11. Assistance from friends, neighbours and relatives
12. Assistance from NGO, community organisation, religious organisation, or similar
13. Get loan from money lender, credit association, bank etc.
14. Tried to reduce HH consumption (food and/ goods)- changing diets to include foods not normally eaten
15. Pulling children out of school to either help in the HH, look for work, save on school fees
16. Sold food that would otherwise be used for HH consumption
17. Rented out land or rooms
18. Did nothing in particular

4. From the shocks that you ticked above, which 3 shocks were the hardest to recover/ respond to?

1.	2.	3.

5. Of the shocks you ticked above, have any of them caused you and your household to change your way of living (livelihood change)? **[ ]**

Yes…..1 No….2

5.1 If yes, please how and what happened:

_____

_____

_____

_____

6. Over the last 30 years, what has happened to the shocks you have experienced? **[ ]**

Increasing……1 Remained the same…..2 Decreased….3

6.1 If increasing, which are the major ones that have been increasing in frequency?

_____

_____

7. Over the last 30 years, has your household received any government support for any of the crises you experienced? e.g. drought relief programs. **[ ]**

Yes…..1 No….2

7.1 If yes, what kind of support have you received? Explain/List:

_____

_____

7.2 Is this support changing through time? **[ ]**

Increasing……1 Remained the same…..2 Decreased….3

7.3 What support have you received over the past 5 years/recently? Explain/List:

_____

_____

8. If ticked in the coping appraisal, how much does your household rely on natural resources for their coping strategy and livelihood? **[ ]**

Heavy reliance…1 Some reliance….2 Not very much…3 None……4

8.1 How does your household's reliance on natural resources compare in the time periods below in terms of increasing, the same or decreasing reliance?*

Yes……1 No……2

Time period	**Reliance***		
	Increasing	**The same**	**Decreasing**
30 years/childhood			
10 years			
Last 5 years			

8.2 Please tick the typical natural resources that your household relies on for food, and other needs:

Natural resource	**Past**		**Now**	
	Collect	**Buy**	**Collect**	**Buy**
Firewood				
Wild fruits				
Wild vegetables				
Wild meat				
Wild fish				
Medicinal plants				
Edible insects				
Plant fibres for roofing or weaving mats, baskets				
Honey				
Mushrooms				
Wooden poles for fencing				
Other:				

8.3 How does time to walk to collect natural resources compare with that of 30 years ago? **[ ]**

Increased…..1 Decreased……2 Remains unchanged……3

8.3.1 If answer is (1), how has this impacted on your household? Explain:

8.4 In the event of a crisis, would you use more natural resources/wild foods and less purchased goods as cost-saving alternative? **[ ]**

Yes…..1 No….2

9. If ticked in the coping appraisal, how important are social welfare (child, disability, pensions) in responding to crisis events:

	Child grants	**Disability grants**	**Pensions**

1. Extremely important (completely dependent)			
2. Important (largely important)			
3. Neutral (equally dependant on it plus other coping strategy)			
4. Unimportant (depend very little on it)			
5. Not important at all (do not depend on it)			

9.1 Receiving social welfare has resulted in: (tick where applicable)

Reduced dependency on natural resources	
No change in dependency on natural resources	
Reduced farming activities	
No change in farming activities	
Other:	

10. If ticked in the coping appraisal, please tick in the table below, the responses which apply to your farming practices and coping strategies. Over the past 5 years, 5-10 years have you:

10.1 For each of the changes noted above, what are the possible drivers/causes that have resulted in the changing farming practices**?

Actions and responses	**Last 5 years**		**5-10 years**		**Drivers of change****
	Yes	**No**	**Yes**	**No**	
1. Increased the size of your garden or field					
2. Decreased the size of your garden or field					
3. Reduce use of fertilizers/pesticides to save money					
4. New/unplanned method					
5. Labour sharing and assets					
6. Crop diversification					
7. Given up farming					
8. Other:					
9. Other:					

11.1 Over the 5-10 years, does your household rely more on purchased goods from the nearest town/shop now instead of crops from gardens/fields? **[ ]**

Yes……1 No……..2

11.2 Has this made life easier or harder for your household? **[ ]**

Easier……..1 Harder……..2

11.3 Please explain why:

_____

_____

_____

_____

C. WOODLAND COVER/NATURAL RESOURCE USE

1. Describe the state of natural resources listed in the table below over the three time periods*.
2. If they are any changes, what do you think are the key drivers or causes of such change***?

Natural resource	State*			Change**	Drivers***
	30 Years back	5-10 years	Last 5 years		
Forest Cover					
Soil Erosion					
Water Sources					
Forest Diversity					
Wild Fruits					
Wild Animals					
Grass Cover					
Others:					

State*: Good.....1 Fair.....2 Poor.....3
Change**: Improved.....1 Unchanged.....2 Worsened.....3

2.1 When did the major changes in forest/woodland cover happen? Specify the exact year or time period.

_____

_____

2.2 Where you affected by the changes above? **[ ]**
Yes.....1 No……2

2.2.1 If yes, explain in what ways: (e.g. social aspects of life, household income or assets)

_____

_____

_____

3. Are they any changes that have helped your livelihoods? e.g. development projects, roads **[ ]**
Yes.....1 No……2

3.1 If yes, explain:

_____

_____

C. IMPLICATIONS AND FUTURE TRAJECTORIES

1. How would you compare your household's overall standard of living in the time periods provided in the table below?

Childhood/30years ago	
5-10 years ago	
Last 5 years	

Much Better.....1 About the same.....3 Much Worse.....5 Better.....2 Worse.....4

2. What does the future hold for you?

_____

_____

_____

3. Do you plan any changes regarding?

Farming practice	

Subsistence activities	
Natural resource use	
Others	

Yes…..1 No…….2

3.1 If yes, give reasons:

_____

_____

_____

4. What would it take to realise the intended plan?

_____

_____

_____

THE END…….THANK YOU VERY MUCH