Assessing household assets to understand vulnerability to HIV/Aids and climate change in the Eastern Cape, South Africa

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Declaration

This 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.

Abstract

Livelihood stressors in southern Africa, such as HIV/Aids and climate change, do not act in isolation but rather interact concurrently in complex socio-ecological systems with diverse, interrelated and compounded affects. Households experience differential vulnerability to such stressors based on contextual factors such as geographical location, income level and the gender and age of its members. Households' differential experiences of vulnerability are further defined by the households' use of their capital stocks: the human, social, natural, financial and physical capital available to the household to form livelihoods and resist the detrimental effects of a stressor. The capital stocks of 340 households were measured in two sites in the Eastern Cape, South Africa, using a household survey. These data were analysed to determine differences between the sites, households with heads of different gender and households of different income levels. Further data relating to the drivers and interactions of stressors over temporal and spatial scales, as well as the perceived value of various forms of capital by different social groups in the two sites, were collected via Participatory Learning and Action (PLA) methods including timelines, mental modelling and pair-wise ranking. Although the two sites have similar levels of income and fall within the same province, many significant differences emerged. The two sites showed different distributions of household head genders and different stressors and perceptions of vulnerability, perhaps owing to differences in their capital stocks, acting alongside the influence of culture and access on a shifting rural-urban continuum. These discrepancies further transpired to reflect crucial differential experiences along gender lines and income levels in each site. Vulnerability was often context specific, not only because of unique drivers of stress in different areas, but also because socio-economic groups and localities often had characteristics that could potentially exacerbate vulnerability, as well as characteristics that can potentially facilitate adaptive capacity. Stressors were found to have depleted multiple forms of capital over time, while new stressors were emerging, raising concerns over the most appropriate means of social protection within these contexts.

Key words: vulnerability, assets, capital stocks, livelihoods, HIV/Aids, climate change, gender, income, wealth.

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List of Abbreviations

ACCRA	Africa Climate Change Alliance
AIDS	Acquired Immune Deficiency Syndrome
ANC	African National Congress
ANOVA	Analysis of Variance
CBA	Community Based Adaptation
CBNRM	Community Based Natural Resource Management
CGE	Commission for Gender Equity
CIFOR	Centre for International Forestry Research
DEAT	Department of Environmental Affairs and Tourism
DFID	Department for International Development
ECDEDEA	Eastern Cape Department of Economic Development and Environmental Affairs
FANR	Food, Agriculture and Natural Resources
GDP	Gross Domestic Product
GEAR	Growth, Employment and Redistribution
GIS	Geographic Information System
HDI	Human Development Index
HIV	Human Immunodeficiency Virus
IDP	Integrated Development Plan
IDRC	International Development Research Centre
IIED	International Institute for Environment and Development
IPCC	Intergovernmental Panel for Climate Change
IUCN	International Union for Conservation of Nature
LAC	Local Adaptive Capacity
NCCRS	National Climate Change Response Strategy
NGO	Non-governmental Organisation
NR	Natural Resources

PEN	Poverty and Environment Network
PLA	Participatory Learning and Action
PRA	Participatory Rural Appraisal
RDP	Reconstruction and Development Program
RRA	Rapid Rural Appraisal
RSA	Republic of South Africa
SADC	South African Development Community
SLF	Sustainable Livelihoods Framework
STI	Sexually Transmitted Infection
TB	Tuberculosis
UN	United Nations
UNEP	United Nations Environment Programme
ZAR	South African Rand

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PART 1: INTRODUCTION

CHAPTER 1: STUDY RATIONALE

1.1 Introduction

1.1.1 Vulnerability and multiple, interacting stressors

Human livelihoods and wellbeing are vulnerable to multiple, interacting socio-economic and ecological stressors which can emerge from socio-ecological interrelations (Schröter, 2009; Steffen et al., 2001; Turner et al., 2003). These linked socio-ecological systems are dynamic and non-linear, and a stressor's negative effects can be compounded by feedbacks across these systems (Turner et al., 2003). For human livelihoods and wellbeing, these stressors can be social, economic or ecological, although it is increasingly recognised that natural and socio-economic systems are integrally linked (Turner et al., 2003; Holling, 2001; Shackleton & Shackleton, 2012). Livelihood stressors are increasing in frequency and intensity due to environmental changes arising from the multiple pressures humanity is exerting on the functioning of several essential earth systems (Schröter, 2009; Rockström et al., 2009). These environmental pressures are often linked to a complex and unjust globalised economy, resulting in differential and disproportionate vulnerability to stress in various geographical areas or socio-economic sectors (Faber et al., 2003; 2009; Schröter, 2009). Examples of such livelihood stressors include inequity, climate change, increased disease burden, natural resource depletion and industrial pollution (Schröter, 2009; Faber et al., 2003). Stressors are generally conceptualised as being long-term, persistent, continuous hazards on systems, which can manifest in unpredictable and irregular perturbations or shocks (King, 2011; Fussel, 2007; Casale et al., 2010).

Multiple stressors compound impacts at the household level, as responding to one stress may deplete a household's capacity to respond to additional stress, potentially creating a downward cycle of increasing vulnerability to stress (O'Brien et al., 2009). For instance, the effects of the disease HIV/Aids on a household can result in decreased food security through the combination of decreased income and productivity coupled with increased health-related expenditure, resulting in less money being spent on food (Gillepsie & Drimie, 2009a). Yet food insecurity is in itself a risk factor for the spread of HIV/Aids (Gillepsie & Drimie, 2009a). This potential for a downward spiralling cycle of reinforcing feedbacks between HIV/Aids and food security has been termed a 'new variant famine' owing to its potentially large and pervasive scale (De Waal & Whiteside, 2003). Food security can also be affected by climate variability, water scarcity, land degradation and the disruption of other ecosystem services, potentially further worsening the cycle (Godfray et al., 2010). Other stressors acting concurrently in southern Africa include political conflicts, poor governance, trade liberalisation, poverty, and other infectious disease (O'Brien et al., 2009; Shackleton & Shackleton, 2012).

A household's vulnerability to stressors, such as HIV/Aids and climate change, is heightened in the presence of other stressors. Vulnerability to these and other stressors is differentially experienced by social systems such as households, partly because a household's individual activities or livelihoods may expose and sensitise the household to various stressors, and partly because the household's resources or assets equip them with distinct means to respond to and recover from a shock (Adger & Kelly, 1999; Shackleton & Shackleton, 2012).

As stressors affect households concurrently in inter-linked and unpredictable ways, this study attempts to always consider stressors simultaneously. Furthermore, studying vulnerability to multiple stressors must not only refer to the likelihood of facing a risk or threat, but must include the system's capacity to respond in a way that minimises harm. As some stressors, such as climate variability, are predicted to worsen, responding in ways that minimise harm is a necessary component of adapting to such stressors. This study attempts to consider stressors to which households are vulnerable alongside the household's capacity to respond (their adaptive capacity), with the assumption that understanding vulnerability to increasing stress is the first step for identifying pathways for building resilience and driving adaptation. A more detailed theoretical overview of vulnerability to multiple stressors can be found in Chapter 3 of this thesis.

1.1.2 Assets and livelihoods in the context of vulnerability

Livelihoods are the means of making a living and are partly constrained by the assets that a household has or has access to (Ellis, 2000). Assets refer broadly to a range of resources available to a household and can be tangible (such as roads or fuelwood) or intangible (such as education or social support) (Rakodi, 1999). These assets can be categorised into tangible and intangible capital stocks: human capital, social capital, natural capital, financial capital and physical capital (DFID, 1999).

Assets and livelihood strategies are important considerations for understanding household and community vulnerability to multiple stressors. Assets and livelihood activities (such as fishing or farming) affect both a household's susceptibility to stress (exposure and sensitivity) and the ability of a household or individual to respond positively or to recover from the stress (adaptive capacity) (Rakodi, 1999; O Brien et al., 2009). Assets and livelihoods are also important to consider because if they are used unsustainably in response to a stress, there could be irrecoverable loss of an asset or livelihood activity (de Sherbinin et al., 2008; Frayne et al., 2012). The loss or erosion of an asset or livelihood activity could impact future exposure and ability to respond to new shocks and stressors (Gillepsie & Drimie, 2009a; de Sherbinin et al., 2008). Developing household assets is thus a valuable approach to reducing vulnerability and improving resilience to multiple stressors (Moser, 2005; Frayne et al., 2012).

Different assets have been shown to be important or useful in the face of stress or in response to a shock. For instance, the increased use of wild natural resources has been observed as a response mechanism to famine, drought and other natural disasters (de Sherbinin et al., 2008; McSweeney, 2005). As households are pushed further into poverty, they often rely more on their natural resource base – their natural capital – for household energy resources or food, or for an alternate livelihood strategy based on the sale of natural resource products (Kaschula, 2008; McGarry, 2008; Shackleton & Shackleton, 2004; Shackleton et al., 2008). Without sustainable use, such resources can be depleted beyond their minimum threshold, with implications for future use (de Sherbinin et al., 2008; McSweeney, 2005). A household facing decreasing income or increasing need for care associated with HIV/Aids, may rely on assistance from friends, relatives or community organisations – a household's 'social capital' (Gillepsie & Drimie, 2009a).

Aside from the potential for assets to be indirectly depleted through their use in response to various stressors, stressors can directly affect specific types of assets. In the case of the HIV/Aids, human capital is lost through lowered productivity and the erosion of inter-generational knowledge transfer systems (Gillepsie & Drimie, 2009a). Social capital can decline from weakened institutions and stigma associated with HIV/Aids (de Sherbinin et al., 2008). Climate change and other forms of environmental degradation weaken natural capital, and extreme weather can damage physical property (Kiker, 2000; Simatele, 2012).

The importance of assets in determining human vulnerability to multiple stressors has implications for households living in poverty (Parker & Kozel, 2007). Poverty is often considered to be synonymous with vulnerability, as impoverished households face disproportionate intensities and frequencies of shocks and stressors, while not being able to adequately respond (Drimie & Casale, 2009; O'Brien et al., 2004; Parker & Kozel, 2007). Women and girls make up a disproportionate number of the poor and marginalised due to disadvantages accruing from gender inequalities, which results in unequal access to resources and opportunities (Demetriades & Esplen, 2008; Meer, 1997). Poverty and gender are thus important considerations for understanding vulnerability.

Insufficient assets can heighten the stress felt by a household whilst stressors frequently result in a loss of assets available to a household. In this study, understanding the drivers of this cycle in relation to the assets of different socio-economic groups in different localities is seen as a prerequisite for identifying responses that would make households more capable of responding positively, and sustainably, to stressors. A more detailed conceptual framework of the role of assets and livelihoods in determining vulnerability to multiple stressors can be found in Chapter 3 of this thesis.

1.1.3 Overview of vulnerability in South Africa

South Africa is a highly unequal society, with a large proportion of its population living in conditions of escalating poverty. Amongst the population living in poverty, a disproportionate number are women, owing to gender discriminations in access to land, employment and education amongst other disadvantages (Albertyn, 2003). South Africa has a long history of vulnerability and marginalisation as most of its population were increasingly alienated from vital resources whilst exposed to multiple ecological and socio-economic stressors (see Chapter 5 for a more detailed overview). These stressors include HIV/Aids, and will increasingly include climate change.

South Africa has the largest population of people living with HIV/Aids in the world (UNAIDS, 2009), and prevalence is highest in marginalised areas (Hunter, 2007; Marks, 2002). The HIV/Aids endemic in South Africa exists in a web of additional, inter-related socio-economic and ecological stressors, such as rising unemployment and food prices, violent crime, unregulated or over-regulated markets, corruption, inefficient services, slow and ineffective land reform, industrial pollution and water scarcity (Hunter, 2007; Marks, 2002; Loevinsohn & Gillespie, 2003; Marks, 2003; Cock & Fig, 2001; Shackleton & Shackleton, 2012; DEAT, 2007).

South Africa is ordinarily an arid to semi-arid country, subject to droughts and floods, and variations in rainfall and temperature brought on by climate change are expected to exacerbate these stressed physical conditions (Taylor, 2009). The additional strain that this will place on ecosystem services has ramifications for food security, particularly in rural areas, which rely more directly on crop production, livestock, fuelwood for energy, and the harvesting of other natural resources to sustain livelihoods or as a safety net in the face of stress (Turpie et al., 2006; Shackleton et al., 2009; Shackleton & Shackleton, 2004).

The added stress of climate change on an already strained socio-ecological system raises questions about the ability of households characterised by low income levels and/or female headship to respond without causing further harm. This study thus explores HIV/Aids and climate change as two stressors in South Africa which have the potential to concurrently affect households, particularly low income or female headed households in rural areas.

1.2 *Gaps in multiple stressor vulnerability research in South Africa*

New studies of multi-stressor vulnerability are constantly emerging and highlight how climate variability, food insecurity, poverty, political instability, trade liberalisation, HIV/Aids and other infectious diseases are inter-linked concerns (e.g. IPCC, 2007; Casale et al., 2010, Drimie & Casale, 2009; O'Brien et al., 2009). It is increasingly recognised that vulnerability studies need to understand how different stresses interact with one another (O'Brien et al., 2009). A few studies exclusively consider the compounded effects of HIV/Aids and climate change acting in conjunction (UNEP/UNAIDS, 2010; Drimie & Gillespie, 2010). However, these are theoretical and literary, and

recommend vulnerability studies that are able to capture the distinct, localised causes and effects of dual vulnerability in terms of both the biophysical and socio-economic dimensions.

Such local studies are important in South Africa, where the National Climate Change Response Strategy (NCCRS), released in 2004, reflects the trend of focusing on mitigation and the technical aspects of climate change and neglecting the socio-economic (Madzwamuse, 2010). Madzawamuse (2010) highlights that while the NCCRS proposes adaptation strategies for several sectors, such as agriculture, health, biodiversity and water services, it does not consider cross-sectoral impacts or the implications for the most vulnerable sections of society. She further argues that local level coping strategies are largely undermined by government policies and institutional frameworks, compounding social vulnerability. A review of the effects of macro-economic policies on the coping and adaptation strategies of the poor is urgent (Madzwamuse, 2010). Such a review would require a better understanding of the differential vulnerability and adaptive capacity of households and communities, and the institutional constraints impacting on this capacity.

Household level vulnerability and adaptive capacity are partly defined by the household's assets (O'Brien et al., 2004; Parker & Kozel, 2007). The combined effects of climate change and HIV/Aids can reduce multiple forms of capital (UNEP/UNAIDS, 2010), but an understanding of the capital stocks of potentially vulnerable households together with processes of asset degradation can help determine how households can adapt to these stressors. While an asset-based framework has been used to identify drivers of sustainable rural growth and poverty reduction (Siegel, 2005), to analyse household livelihood strategies (Rakodi, 1999) and urban poverty reduction strategies (Moser, 1998), and to propose interventions for urban climate change adaptation (Moser, 2008; Simatele, 2012), it has been suggested that a key area of research for its application is in climate vulnerability in rural areas (Prowse & Scott, 2008). Particularly within rural areas, the combined effects of HIV/Aids and climate change can be further worsened through unequal gender relations and conditions of poverty (UNEP/UNAIDS, 2010), both of which are pertinent contextual factors in South Africa (Albertyn, 2003; Madzwamuse, 2010). While gender vulnerabilities have frequently been considered with regards to poverty and HIV/Aids within South Africa (e.g. Albertyn, 2003), further exploration into differential asset ownership and livelihood activities by different sexes needs to be considered in the context of climate change as a potential additional stressor.

As vulnerability studies are multifaceted, and incorporate inter-linked physical and ecological dynamics as well as complex societal drivers, they can benefit from a combination of research methods to analyse the environment-society nexus and to avoid approaches that are entirely positivist or constructivist but that merge the natural and social sciences (Belsky, 2002; Scoones, 1999).

This study attempts to address these gaps by providing a localised vulnerability assessment in two communities in South Africa. The research considers multiple stressors by exploring socio-economic

factors that constrain adaptive capacity, such as income levels and gender, by using an asset-based livelihoods approach and a combination of quantitative data and participatory research methods. This thesis examines how vulnerability to multiple stressors, in particular HIV/Aids and climate change, is partly determined by household assets – their social, human, natural, physical and financial capital stocks. Assets can define, create or constrain coping strategies, livelihood options and the availability of choice, and they thereby impact on vulnerability, and thus adaptability – both to climate change, and to HIV/Aids.

1.3 Objective and key questions

In response to the need to further our understanding of compounded impacts of HIV/Aids and climate change, Rhodes University and the University of Alberta are working in partnership on a broad research project entitled, 'Vulnerability, coping and adaptation within the context of climate change and HIV/Aids in South Africa: Investigating strategies and practices to strengthen livelihoods and food security, improve health and build resilience'. Through various studies spanning Honours, Master's and Doctoral levels and a participatory component founded on social learning methodology, the project aims to improve the ability of households to adapt and respond positively to multiple stressors. While this thesis focuses on household assets and livelihoods to understand vulnerability, other researchers in this project base their studies on the variety of key aspects imbedded in this complex project title. These include a focus on the institutional capacity to respond to multiple stressors, food security and natural resource harvesting, behavioural change, coping strategies leading to adaptation, perceptions of climate change, and monitoring knowledge uptake in the two sites. Dialogue between various stakeholders is facilitated and findings in turn are used to recommend regional and national development policies that effectively address HIV/Aids and climate change.

This project focuses on two sites in the Eastern Cape. Both sites are marginalised communities with high incidence of HIV/Aids. One site is more rural, less developed and more traditional (see Chapter 2). The other is peri-urban and has a lower average rainfall. A close examination of these congruities and disparities, in conjunction with household structures, assets and livelihoods will contribute to a meaningful understanding of the complex interactions between multiple stressors, assets and livelihoods.

The broad objective of this study is to understand how capital stocks are used to create livelihoods and respond to stress within the context of HIV/Aids and climate change in order to determine differential vulnerability to these stressors. While this objective seems simple, it incorporates notions of interacting stressors, long-term change and possible constraints on livelihoods and asset use. This objective is met through responses to key questions, namely:

- What determines vulnerability in the two sites?

- What are the differences in asset portfolios between the two sites, and between different gender-headed households and households with different income levels in the two sites?
- What are the relationships between different assets?
- How are assets used and how is this use shaped by the local context?
- Which households are most vulnerable to HIV/Aids and climate change, based on their assets and livelihoods and local context?

These questions are answered through a deeper exploration of the key theoretical concepts, a detailed overview of the context based on literature, and a combination of quantitative and qualitative research methods to understand processes of asset accumulation and erosion.

1.4 Thesis structure

The exploration of vulnerability to multiple stressors in relation to household assets and livelihoods is divided into four parts in this thesis, each of which is further divided into chapters.

Part 1 is introductory, and this first chapter has broadly outlined the rationale for this thesis. Chapter 2 describes the socio-economic contexts and environmental landscapes of the two study sites.

Part 2 of this thesis focuses on methodology. The first chapter in this part, Chapter 3, explores relevant theoretical concepts, perspectives and conceptual frameworks in multiple stressor vulnerability research which are used to guide this study, with an emphasis on household livelihoods and assets. Chapter 4 describes the quantitative and qualitative methods used in this study.

Part 3 reports the results with discussion alongside these findings. Chapter 5 provides a history of vulnerability in the two study sites and broader South Africa, leading towards the present and with discussion on the implications for the future. Chapter 6 explores the present-day local vulnerability context in more depth, examining factors that create disproportionate experiences of vulnerability for different households. Chapter 7 describes the asset portfolios of households in the two sites, and those with different gendered headship structures and income levels. Chapter 8 explores how assets are used and valued amongst different socio-economic groups and localities to shape livelihoods or in response to stress.

Part 4 concludes this thesis. Chapter 9 summarises the findings in order to respond to the study's objectives and key questions before offering new, emerging concerns and research needs as well as relevant policy recommendations.

CHAPTER 2: STUDY SITES

2.1 Introduction

This chapter briefly contextualises the two study sites in terms of their geographical location, socio-economic conditions, climate and landscapes. As the two study sites – Lesseyton and Gatyana – both fall within the Eastern Cape Province of South Africa, an overview of the province's characteristics helps to contextualise the sites.

2. 2 Eastern Cape

The Eastern Cape has one of the highest unemployment rates (27.7%) and poorest education system in the country (Makiwane &Chimere-Dan, 2010). The province has low income levels, and poor basic infrastructure and service delivery, and so remains "trapped in structural poverty in all aspects of its demographic, health and socio-economic profile" (Makiwane &Chimere-Dan, 2010). Makiwane and Chimere-Dan (2010), in a population study of the province which drew from several census and survey data, highlighted additional, related trends such as: a high rate of migration of young adults out of the province, and from the eastern to the western halves; a high rate of non-marriage; and a high rate of older women taking a major responsibility of caring for children.

The province fares poorly in terms of health indicators. Amongst women attending ante-natal clinics in the Eastern Cape, HIV prevalence declined from 28.8% in 2007, to 27.6% in 2008, although these figures are still comparatively higher than more developed provinces in the country (Makiwane & Chimere-Dan, 2010). Estimates for deaths due to Aids in the province for 2006, 2007, 2008 and 2009 were 38%, 39.5%, 40.7% and 41.9% of all deaths respectively, although tuberculosis was reported as the leading underlying cause of death (Makiwane & Chimere-Dan, 2010). Other leading causes were influenza, pneumonia and intestinal infectious diseases (Makiwane & Chimere-Dan, 2010).

The Eastern Cape has been described as resembling 'two countries', owing to the starkly contrasting landscapes of the more developed western half the province compared to the former Bantustans or 'homelands' toward the eastern half, characterised by informal settlements and poorly managed, poverty-stricken small towns (Bank & Minkley, 2005; see Chapter 5). In rural areas, soil erosion and other forms of environmental degradation are common (DEAT, 2009). Climate change could exacerbate natural resource stress, while the low development indicators highlight a weak adaptive capacity. In the Eastern Cape, climate change is predicted to result in longer dry periods, shorter and more intense wet periods and increased temperature and heat waves (ECDEDEA, 2010). The Eastern Cape Climate Change Response Strategy predicts that these changes are likely to result in the reduced viability of rainfed agriculture, increased frequency of crop failure and general decline in rural

livelihoods, potentially leading to migration, urbanisation and conflict over resources (ECDEDEA, 2010).

There are a few signs of hope, however: fertility is on a declining trend, teenage pregnancy (while still alarmingly high) is declining and the province has the widest coverage of social grants and assistance, which have reached most people who are eligible (Makiwane & Chimere-Dan, 2010).

The disparities in landscape and development across the province imply that the province's borders contain a diversity of experience, and the study sites, although within the same province, are not uniform. This study was based in two sites within the Eastern Cape: Lesseyton and neighbouring peri-urban villages 10 km west of Queenstown in Lukanji Municipality, Chris Hani District, and a stretch of villages from outside Willowvale down to the coast in Mbhashe Municipality, Amathole District, known collectively as Gatyana.

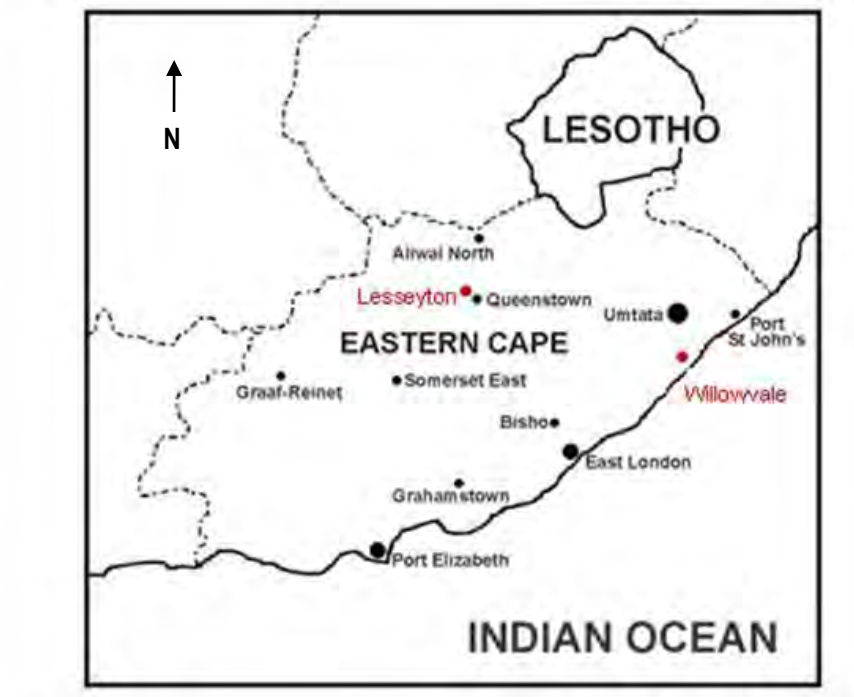

Figure 2.2: Map of the Eastern Cape showing study sites

2.3 Lesseyton and surrounds

The inland site, Lesseyton, located 10 km outside of the city Queenstown, is peri-urban. The site consists of 6 villages – Lesseyton, Zola, Ekuphumleni, iTrust Village, Toisekraal and Xuma. Queenstown was first established in 1853, and is now a busy commercial town. The settlements' recent origin (in comparison to the Gatyana site) is evidenced in the layout of the villages of densely built, square houses divided into blocks by roads (although this is not as prominent in the smaller

more rural villages further west in the site). Almost all of the houses in these villages have electricity, and new government provided houses and toilets were being built from before the onset on this research project. Most households rely on scattered community water taps. Aside from the government-provided housing development project, various development NGOs such as RuLiv and Mbumba have established livelihood development initiatives in the area.

The villages are clustered in groups and immediately surrounded by grazing land, while shrubs, aloes and small thorn trees are dominant on the adjacent hills. The area falls within the grassland biome of South Africa, and the vegetation has been further classified as Queenstown Thornveld and Tarkastad Montane Shrubland (Mucina et al., 2007). Soil erosion is evident with deep gullies along the drainage lines and on many of the surrounding hills. The area has a mean annual precipitation of between 350 and 500 mm.

Further details on the Lesseyton site derived from this study can be found throughout Part 3 (Chapters 5 – 8).

2.4 Gatyana

The coastal site, Gatyana, is rural by comparison, and is located in the former Transkei 'homeland'. This site runs from the Qora mouth at the coast to about 30 km outside of Willowvale, the nearest commercial town. This site spans several villages, namely Nakazana, Ngxaba, Ngxutyana, Qwaninga, Bojini, Bonde and Qhorha. The demarcations of the villages are not as readily apparent as in Lesseyton (although they are generally separated by main roads and rivers) and houses are scattered across the landscape, predominantly on the crests of undulating hills. Homesteads appear more traditional to isiXhosa culture, often consisting of the traditional round rondavals with thatched roofs, although newly built rondavals also have zinc roofs or are built in a more Western, angular style. Most households also have adjacent plots or gardens for cultivation and many have kraals for livestock. There is no electricity infrastructure in the study site's boundaries, although there is electricity in nearby villages closer to Willowvale. Some houses have their own generator or solar panels. Some houses have their own rainwater tank, but most still rely on scattered communal taps and occasionally the river. Unlike Lesseyton, the villages are predominantly governed by traditional structures consisting of chiefs, headmen and sub-headmen, although the area also has its own local ward councillor. People here, especially elders, generally favour more traditional attire. Gatyana still lags behind in infrastructure such as tarred roads and electricity, with marginal local markets in Willowvale. The poor roads, long distances, and general isolation from major transport routes combine to make transport costs from the study site to Willowvale comparatively expensive.

As the site runs from the coast inland it crosses two major biomes, the Indian Ocean Coastal Belt and Savanna, and has a more diverse range of vegetation types: Eastern Valley Bushveld, Bhisho

Thornveld, Transkei Coastal Belt, Southern Mistbelt Forest and Scarp Forest (Mucina et al., 2007). The area receives a mean annual rainfall of between 950 and 1100 mm.

Further details on the Gatyana site derived from this study can be found throughout section 3 (Chapters 5 – 8).

2.4 Discussion

Whilst the similarities between the two sites make them ideal for this study, their nuanced differences are also an important consideration. There are differences in rainfall patterns, leadership structures and urbanity, for example. A close examination of these congruities and disparities, in conjunction with household structures, assets and response strategies, will yield a meaningful understanding of the complexities of dual vulnerability and adaptation.

PART TWO: CONTEXTUALISATION AND METHODOLOGY

CHAPTER 3: GUIDING PERSPECTIVES, THEORETICAL CONTEXT AND CONCEPTUAL FRAMEWORKS

3.1 Introduction

The aspects shaping multiple stressor vulnerability referred to thus far indicate a number of social, economic and ecological factors interacting in complex ways. Before addressing the key objectives of this study, it is necessary to obtain a grounded understanding of the pertinent theoretical drivers of multiple stressor vulnerability and associated conceptual frameworks for vulnerability, household assets and livelihoods. This expansion of key theoretical concepts and conceptual frameworks is moreover useful for later identifying anomalies and similarities between the findings of this research and other related work.

3.2 Conceptual overview of vulnerability in relation to HIV/Aids and climate change

3.2.1 Defining vulnerability

Diverse approaches to understanding vulnerability have emerged from the natural and social sciences and the term has been used in various policy contexts referring to different systems which are exposed to differential stresses (Fussel, 2007; Schoon, 2005). The term was first used in reference to natural hazards research, but is increasingly used in other contexts such as poverty, development and livelihoods (Fussel, 2007; Schoon, 2005). With regards to poverty and rural livelihoods, vulnerability has come to encompass a combination of exposure to harm, sensitivity (or insecurity), and resilience (or ability to respond positively) to economic, environmental, social or political change, whether it is a shock, trend or seasonal cycle (Rakodi, 1999).

Vulnerability can thus generally be seen as having internal and external determinants, as conceptualised with regards to livelihoods by Chambers (1989: 1):

> "Vulnerability refers to exposure to contingencies and stress and means for coping with them. Vulnerability thus has two sides: an external side of risks, shocks and stress to which an individual or household is subject and an internal side which is the means for coping without damaging loss."

The 'internal' aspect of vulnerability, that of coping and resilience, is the least well understood as it is a complex, contextual and dynamic feature; however, certain resources and assets, whether these are economic, socio-political, infrastructural, ecological or personal, determine the capacity to manage various 'external' threats (Drimie & Casale, 2009).

'Resilience' is conceptualised as the inverse of vulnerability (Shackleton & Shackleton, 2012), and generally refers to a system's ability to remain unharmed in the face of stress. Most understandings of resilience use the definition refined by Holling (1986: 296): "the ability of a system to maintain its

structure and patterns of behaviour in the face of disturbance." Holling (1986) used this definition in relation to ecological systems, but it is frequently used to describe the resilience of social systems (Walker et al., 2006; Shackleton & Shackleton, 2012).

As "the provision of ecosystem services influences the vulnerability of society and as society affects positively or negatively the vulnerability of ecosystems" (Locatelli et al., 2008: 7), vulnerability is increasingly being conceptualised and analysed in terms of integrated and complex socio-ecological systems (Metzer et al., 2005; Steffen et al., 2004). Human wellbeing is dependent on a sustained and adequate supply of ecosystem services, whether these are provisioning services (e.g. food, fresh water), regulating services (e.g. pollination, climate regulation), cultural services (e.g. recreational and aesthetic value) or supporting services (e.g. nutrient cycling) (Millennium Ecosystem Assessment, 2005). The loss of these services through unsustainable use increases human vulnerability (Schröter, 2009; Millennium Ecosystem Assessment, 2005). A decline in ecosystem functioning thus implies not only a loss of tangible, physical resources such as fuelwood or fish, but also a loss of less tangible benefits such as clean air and water which benefit human health (Millennium Ecosystem Assessment, 2005).

When emphasis is placed on future biophysical impacts, vulnerability can be assessed as an 'end point' and mitigation and a reduction in sensitivity are viewed as appropriate responses (Kelly and Adger, 2000; O'Brien et al., 2004). When emphasis moves away from the biophysical to the social domain, vulnerability can be understood as a 'starting point'. This 'starting point' is used to determine how best to respond to climate stress to minimise future vulnerability by addressing social impediments such as marginalisation and inequality (Kelly & Adger, 2000, O'Brien et al., 2004). Under the latter approach, vulnerability is seen as almost synonymous with the inverse of 'adaptive capacity', which relates to "the capacity to modify exposure to risk associated with climate change, absorb and recover from losses stemming from climate impacts, and exploit new opportunities that arise in the process of adaptation" (Adger & Vincent, 2004). Adaptive capacity is largely determined by the 'entitlement' of individuals and groups to available resources (Adger & Kelly, 1999). However, it is increasingly being understood that 'end point' and 'starting point' conceptions of vulnerability are insufficient, and that vulnerability always rather encompasses a combination of both (Pettengell, 2010; Shackleton & Shackleton, 2012). Because vulnerability encompasses these two dimensions, it is important to analyse the context that determines people's exposure to shocks and stresses, together with their ability to respond, cope or adapt to these (O'Brien et al., 2009).

Vulnerability and contexts of poverty are closely linked: "Conditions of poverty usually result in increased vulnerability, while this same vulnerability reduces peoples' ability to improve their position, often pushing people into situations of chronic poverty" (Drimie & Casale, 2009: 29; Parker & Kozel, 2007). People living in poverty face chronic stress such as heightened food insecurity and

hunger, inadequate and/or unhygienic water supplies and lack of other basic services and infrastructure, inferior health care and education services, heightened exposure to crime and violence, and many more stressors (Parker & Kozel, 2007). At the same time as being more exposed to shocks, people living in poverty are more sensitive to the effects of shocks and stress due to an inability to manage shocks effectively without 'cushions' such as savings or insurance (Parker & Kozel, 2007). Poverty can be seen as the inverse of adaptive capacity, as adaptive capacity is a function of wealth, technology, education, information, skills, infrastructure, access to resources and stability and management capabilities (O'Brien et al., 2004). However, the two terms are different, and such an understanding of poverty risks portraying poverty and poverty reduction as apolitical and neglects that chronic poverty is socially constructed and tolerated, and institutionalised through political structures and process (Hickey & Bracking, 2005).

Women and girls make up a disproportionate number of the poor and marginalised due to disadvantages accruing from gender inequalities (Demetriades & Esplen, 2008). Women are generally disadvantaged in access to land, employment and education, and to the control they are able to exercise over these resources accruing from having less authority and involvement in household, community and national level decision making (Meer, 1997). Furthermore, women often work a 'double day' as they expected to maintain the household as well as contribute to its income (Packard, 1989).

A lack of appropriate resources contributes to vulnerability to HIV/Aids and climate change, whilst vulnerability to these stressors perpetuates conditions of poverty by degrading multiple types of assets (Eriksen & O'Brien, 2007; Whiteside, 2002). The effects of a stressor are most keenly felt in the presence of other stressors, and many stressors worsen or create further problems. Examining multiple stressors emphases the importance of the context of vulnerability, that is, the ways in which stressors interact together with the structures within households that make different households disproportionally vulnerable to different stressors (O'Brien et al., 2009).

Thus, when examining vulnerability to climate change and/or HIV/Aids, contextual factors must be taken into account, as a variety of inter-related socio-economic, political and ecological factors shape vulnerability to HIV/Aids and climate change. These include gender, food security, poverty and access and availability of resources. This study merges dichotomies of internal and external dimensions of vulnerability, and utilises the understanding that differential vulnerability stems from the distinct stressors and shocks experienced by households characterised by different socio-economic dynamics and various additional contextual factors, in conjunction with household capital stocks and livelihood activities.

3.2.2 Differential vulnerability to climate change

When applied to climate change vulnerability, exposure can be seen as an 'external' determinant of vulnerability and refers to the magnitude and duration of a climate-related event (see 3.2.1; IPCC, 2007). Different localities across the globe are already experiencing, to varying extents, changes in the frequency, seasonality and intensity of precipitation and storms, increasing surface temperatures, soil erosion, sea-level rise, changing river flows and glacial lake overflows from melting ice-caps on mountains (IPCC, 2007). Sensitivity is another 'external' component, and is the extent to which this exposure affects a system, which is determined by "the human-environmental conditions that can worsen the hazard, ameliorate the hazard or trigger an impact" (Gbetibouo &Ringler, 2009: 8).

Brody et al. (2008) outline the multitude of interactions between gender and climate change. Women often play a greater role in ensuring household food security, whether through trade, cultivation or collection. Linked to this, rural women are closely reliant on ecosystem services. Indeed, 61% of agriculturalists in South Africa are women (Ruiters & Wildschutt, 2010), they are the primary harvesters of natural resources, especially fuelwood (Shackleton et al., 2004), and they are usually responsible for the collection of water (Aggarwal et al., 2001). As primary agriculturalists and harvesters of natural resources, women are generally more directly affected by climate change induced strain on the provision of ecosystem services affecting food production and the availability of natural resources. Women's disadvantaged position in the economy and low income can diminish their ability to cope with unexpected natural disasters, as well as rising food prices. Women and girls are also more likely to die in natural disasters due to a lack of life-saving skills (such as swimming), and more likely to be harassed or abused in the disruption ensuing disasters (Brody et al., 2008).

Climate change induced health effects (such as the spread of water-borne diseases, heat-related morbidity, sanitation-related illnesses and higher rates of malnutrition) can disproportionately affect women more than men as women are often expected to care for the sick and have limited access to health care (Brody et al., 2008). Costello et al. (2009) estimate that the biggest climate change induced global human health impacts will be through the secondary effects on water, food security and extreme climatic events.

In order to understand vulnerability to climate change, this study analyses the varying extent to which households characterised by various socio-economic dynamics, such as different localities, gendered headship structures and income levels, use natural resources, together with additional contextual factors which may determine adaptive capacity to climate change. Natural resource based livelihoods are of primary concern to this study when considering climate change vulnerability. However, this study still further considers the broader implications of climate change for the South African economy and health sectors in general, thereby assuming that all households will be affected by climate change, although to varying extents.

3.2.4 Differential vulnerability to HIV/Aids

Vulnerability in the study of HIV/Aids is generally seen in terms of risk: risk behaviours, often closely linked to risk-provoking environments or attitudes (for example Campbell, 1997; Hunter, 2002). South Africa's high HIV incidence has been linked to the country's socio-political/economic context, inextricably linked to decades of racially segregationist labour, health and education policies, which have created an environment that has greatly facilitated the rapid spread of HIV/Aids (Marks, 2002; Hunter, 2007; see Chapter 5 for a more detailed history). Gillepsie and Drimie (2009a), do nevertheless discern three categories of vulnerability in relation to the trajectory of HIV and Aids: 'upstream vulnerability' refers to the risk that an individual will be exposed to and infected by HIV; 'midstream vulnerability' is the risk of contracting opportunistic infections in conjunction with HIV, while 'downstream vulnerability' refers more to household and community level impacts from Aids morbidity and mortality.

In terms of upstream vulnerability, women's biology makes women more at risk of infection than men, as women have a larger and thinner mucous membrane (IUCN, 2010). Other biophysical dimensions of upstream vulnerability include malnutrition, the inter-play with other infectious diseases (such as tuberculosis or malaria) which weaken the immune system making a person more susceptible to infection (Stillwaggon, 2010; Whiteside, 2002; Gillepsie & Drimie, 2009a). Sexual violence and unequal sexual relations also increase vulnerability to infection (Marks, 2002; Gillepsie & Drimie, 2009). Mobility and migrancy contribute to this risk by creating opportunities for sexual networking and transactions and by making people difficult to reach for preventative, care or treatment interventions (Gillepsie & Drimie, 2009a; Hunter, 2007, Drimie & Gillepsie, 2010). There are also abstract determinants of upstream vulnerability, such as heightened depression, especially amongst women and people living in poverty (Nayika, 2010); stress and perceived lack of choice (Campbell & MacPhail, 2002); and lack of knowledge and agency (Gillepsie & Drimie, 2009a).

The upstream or causal factors influencing HIV infection occur across a range of scales, as summarised by Loevinsohn and Gillespie (2007). At the level of micro-biology within hosts, factors such as the presence of other diseases, virus sub-types, viral load and malnutrition influence the chance of infection. At the micro-environment level of individuals, knowledge, autonomy, behaviour, gender and movement influence the chance of infection. At the meso-environment of communities and localised areas, violence, livelihood practices and community institutions influence the chance of infection. At the macro-environment on the scale of nations, regional disparities in wealth, infrastructure and culture influence the chance of infection.

Midstream vulnerability is primarily influenced by a lack of adequate nutrition, together with access to sanitation, care, treatment and essential services (Gillepsie & Drimie, 2009a). Even if a person has access to treatment, this treatment can be compromised, made ineffective or even harmful to a person if the medication is not, as many require, taken 'on a full stomach' (Loevinsohn & Gillespie, 2007).

Vulnerability to contracting secondary infections mirrors the 'upstream' factors mentioned above, and can further be influenced by unhealthy working or living environments which can either expose people to additional infectious diseases, place further strain on the immune system, and/or cause non-infectious health conditions (Stillwaggon, 2010; Packard, 1989; Wilkinson, 1996). Stigma, blame, denial and fear also work closely with the disease, as these drive it underground where it is harder to address by health interventions (Brandt, 1988; Møller & Erstad, 2007).

In terms of downstream vulnerability, women generally are more affected by HIV/Aids, as they are usually a household's primary caregivers and more responsible for the collection, preparation and allocation of food, whilst children bear the loss of parents (Gillepsie & Drimie, 2009a). Downstream vulnerability is largely determined by the quantity and quality of household and community assets, while the local institutional and governance context is also important (Gillepsie & Drimie, 2009a).

Loevinsohn and Gillespie (2007) summarise downstream vulnerability, or the possible effects of the HIV/Aids endemic, across multiple scales. HIV/Aids can affect the host's micro-biology in terms of nutrition and other diseases. On the micro-environment of the individual, HIV/Aids can affect assets, labour, knowledge and entitlement. At the meso-environment of the community, HIV/Aids can affect community institutions and livelihoods. At the macro-environment of nations, HIV/Aids can affect wealth distribution, trade, policies and stigma.

Households affected by HIV/Aids have higher and more specific dietary needs, and face the dual pressure of less productivity and income coupled with increasing health-related expenses, often resulting in a downward spiral of increasing stress and risk. At the household and community level, deaths of primary adults equate to a loss of labour and skills, an upset of knowledge transfer systems and a rise in orphans. Orphans are most often either taken in by relatives, most often grandparents, adding to a strain on the household's resources, or form their own child-headed households, where children frequently experience stunted growth and poor socialisation, with long term effects (Barnett & Whiteside, 2002). Many authors have made reference to the 'vicious circle' of HIV/Aids and poverty, which can operate in mutually re-enforcing cycles, as HIV/Aids depletes multiple forms of capital whilst a lack of capital increases vulnerability to HIV/Aids (Gillespie et al., 2001; Piot et al., 2007).

Women are more biologically vulnerable to HIV infection, more socially vulnerable to HIV infection, and more affected by Aids-related morbidity and mortality through their role as care-givers. Fuller (2008) links the higher prevalence of HIV/Aids amongst women to women's biomedical, socio-cultural, economic, legal, political and educational vulnerabilities. She writes:

> "African females are the worst hit by HIV/Aids, vulnerable because of their lack of access to information about health care and treatment, because in general they are less educated, because they are expected to be married and have children and to be

> caretakers for their families and the aged and the ill, and because they have limited options for employment and so tend to be economically dependent on men – who all too often are unfaithful, migratory, violent, and/or dismissive."

Women are also more susceptible to depression (Burt & Stein, 2002), which is linked to HIV/Aids in a reinforcing cycle, as depression increases risky sexual behaviours and compromises treatment regimes while affecting the immune system in general, whereas HIV/Aids increases the risk of depression through internalised sigma and low perceived self-worth (Simbayi et al., 2007). As women are generally poorer with inferior assets and lower accessibility to key resources, they are more vulnerable to not being able to cope and thus to exposure to further stressors.

Assets partly shape a household's ability to resist or recover from shocks and stressors associated with HIV/Aids, and form a key consideration in this study. However, the broader social dynamics which shape asset ownership – such as locality, gender and income inequalities – are also important household dynamics under consideration in this study.

3.2.3 Coping strategies and asset degradation

A household's assets can be both directly affected by a stressor as well as being indirectly affected through asset use in response to a stressor. The HIV/Aids pandemic depletes human capital by reducing productivity through illness, or as work is diverted to care, as well as by breaking knowledge transfer systems across generations (Loevinsohn & Gillespie, 2010). HIV/Aids affects social capital by weakening institutions, and degrading trust through associated stigma (de Sherbinin et al., 2008). Climate change can weaken natural capital by altering ecosystem services, whilst extreme weather events can damage physical capital (Simatele, 2012).

Households respond to stresses differently, with implications for their capital stocks. Adult deaths from Aids related complexes are frequently linked to a household's disposal of assets to cope with the shock (de Sherbinin et al., 2008). In the case of the disposal of assets, there can be dire consequences for future recovery (Whiteside, 2002), potentially creating a feedback loop of vulnerability as a household's capacity to cope is diminished (Gillepsie & Drimie, 2009a). This can make households more susceptible to new stresses, such as climate variability.

Coping strategies are often considered as short-term responses to immediate shocks or stresses which aim at securing income to meet basic needs (Eriksen & Silva, 2009). Some coping strategies may be harmful to the long-term wellbeing of the household. In such cases, it has been said that what might be termed 'coping' from the outside, could rather be called 'struggling' or 'surviving' by those experiencing the hardship (Whiteside, 2002; Gillepsie & Drimie, 2009). Coping strategies can also have positive results, and adaptation generally refers to more long-term positive responses. The notion of adaptation implies longer term changes in behaviour and livelihood strategies to ensure the

maintenance of food and health security for the foreseeable future in the face of changes that are yet to come (Berkes & Jolly, 2001; Drimie & Gillespie, 2010).

In response to environmental stress on livelihoods, Agrawal (2008) identifies five common coping strategies, namely mobility, storage, diversification, communal pooling and exchange. The choice of one of these responses over another, or of a certain combination of responses, depends partly on the asset base to which household has access. Mobility is usually a last resort, and is generally most common when the natural resources of an area are heavily degraded (Agrawal, 2008; de Sherbinin et al., 2008). All of these response strategies depend on institutional arrangements, and imply the use of assets in various ways, which can have negative or positive changes in the asset portfolio of the individual or household (Agrawal, 2008). The ability of institutions to influence the positive or negative outcome highlights the areas where institutions can be strengthened as a way of improving adaptive capacity by facilitating coping strategies (Agrawal, 2008).

There is a growing body of scholarship that details the important 'cushioning effect' of natural resources to cope with morbidity or mortality in a household, whether these are used an alternative source of income or as a replacement for purchased goods (de Sherninin et al., 2008). Natural resource dependence has also been observed as a response mechanism to famine, drought and other natural disasters (de Sherbinin et al., 2008; McSweeney, 2005). As households are pushed further into poverty, they often rely more on their natural resource base as this offers 'free' resources (Kaschula, 2008; McGarry, 2008).

Stressors increase the strain on household finances, limiting the outcomes households can achieve and steering households to become worse off, particularly those already lacking resources (de Sherbinin et al., 2008). Households can fall back on their capital stocks in various ways, with immediate or distant consequences. For instance, children might be taken out of school to help with either formal or household labour; however, this immediate increase in human capital, in the form of a labouring body, has negative implications for future human capital, in terms of education, which could place the household in a worse-off position at a later stage. Physical capital may be sold off and financial capital may be spent. Social capital may decline when social networks are over-stretched. Over-exploitation of natural resources affects the availability of this resource for future generations (de Sherbinin et al., 2008). The extent to which various household assets are directly or indirectly affected by a shock or stressor is an indication of that asset's vulnerability or resilience (Frayne et al., 2012).

While all coping strategies make use of household assets in various ways, the use of assets needs to result in the net improvement of the household's ability to respond to stress in order for the household to become less vulnerable. In order to contribute to understandings of multiple stressor vulnerability in South Africa, this study links assets to actual and possible coping strategies, and how these are employed by households characterised by different socio-economic dynamics.

3.2.5 Adaptation, resilience, development and sustainability

Identifying the drivers of vulnerability, together with ideal response strategies to overcome shocks and stresses, is an important step to identifying pathways for building resilience and adaptive capacity (see 3.2.1 above; Walker et al., 2006; Shackleton & Shackleton, 2012). Eriksen and O'Brien (2007) emphasise the need for 'sustainable adaptation measures' that address the areas of over-lap between climate vulnerability and poverty – and, it should be added, HIV/Aids and other stressors. The need to address HIV/Aids, climate change and poverty through improved adaptive capacity equates to the need for equitable, sustainable development that works with ecological systems to improve quality of life. The interactions between multiple stressors highlight the need for holistic interventions and forms of development.

Sustainable development has accrued multiple interpretations. The concept was conceived at the Brundtland Commission in 1987, as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Faber & McCarthy, 2003) Sustainable development has since generally been expanded to include notions of longitudinal social equity, ecological integrity and economic stability (Faber & McCarthy, 2003; Turner et al., 1994). Distinctions have arisen between 'weak' and 'strong' sustainability. Weak sustainability is an extension of neoclassical welfare economics with the added requirement of non-declining utility, or the maintenance of the total aggregate stock of man-made, human and natural capital over time (Neumayer, 2010). Weak sustainability thus assumes that natural capital is substitutable, providing that total aggregate stocks are maintained, and so is often seen as focusing on the 'economic' tier, at the possible expense of the social and ecological tiers (Neumayer, 2010; Turner et al., 1994). In contrast, strong sustainability is premised on the idea that prolonged consumption and income is dependent on ecological capital, which is to say that natural capital is thus non-substitutable (Neumayer, 2010; Turner et al., 1994). Interpretations of how to achieve strong sustainability vary between preserving natural capital in economic value terms versus preserving the biophysical stocks of certain 'critical' natural resources (Neumayer, 2010).

As it is increasingly recognised that, owing to complexities in socio-ecological systems, our future is highly uncertain, understandings of sustainability frequently incorporate the need to preserve safe minimum standards of different types of capital, while allowing for flexibility in relative proportions (Folke et al., 2002; Neumayer, 2010; Frayne et al., 2012). Sustainability and adaptive capacity thereby become maintaining an ability to cope with and adapt to novel situations, without losing the availability of options necessary for an uncertain future (Folke et al., 2002; Neumayer, 2010). Similarly, Anand and Sen (2000) argue that substitutability between types of resources implies that sustainable development is not about leaving behind a particular resource, but the generalised capacity to produce wellbeing, particularly as we do not know what the exact needs of the future will be.

Focusing on development beyond measures such as income or utility, and rather towards human freedoms and capabilities by improving health and education, would be achieving the attainment on wellbeing as an end, while also a means to safe-guarding similar goals in the future (Anand & Sen, 2000).

Development is frequently unsustainable, resulting in socially inequitable benefits and disproportionate harm, often alongside irreversible damage to several key earth systems (Faber et al., 2003; Rockström et al., 2009; Schröter, 2009). Similarly, 'maladaptation' refers to changes in practice in response to stress that impact adversely on or increase the vulnerability of other systems, sectors or social groups (Barnett & O'Neill, 2009).

As assets may be vulnerable or resilient to specific or multiple stressors, either directly or indirectly through their use in response to the stressor (see 3.2.4 above), asset-based adaptation is increasingly seen as a viable long-term response strategy, particularly to climate change (Moser, 2005; Frayne et al., 2012). As households with more and more diverse assets are considered less vulnerable, while greater asset-depletion leads to greater vulnerability (Moser, 1998), adaptation and resilience may involve building household and community assets (Moser, 1998; Moser, 2005; Frayne et al., 2012). There is increasing emphasis on the need to re-orientate social protection measures away from income or consumption towards asset-building or productive social safety nets, as a means to alleviate poverty and reduce vulnerability (Moser, 2005; Devereux, 2002).

Sustainable development and adaptation can also be applied to households and their development and use of assets. As suggested, sustainable asset use implies that assets are not depleted beyond the threshold of a safe minimum standard of an asset stock, without which a household may be vulnerable to future stress. Such an understanding has helped guide the analysis of household capital stocks in the context of multiple stressor vulnerability in this study.

3.3 Recognising complexity: Using a complex socio-ecological systems perspective

In this study, a complex socio-ecological systems perspective provides a way to think about multiple interacting stressors, particularly HIV/Aids and climate change, which interact across socio-ecological boundaries. The variety of aspects shaping vulnerability to HIV/Aids and climate change indicate a complexity of social, economic and ecological factors interacting across scales of time and space. Such an understanding requires a guiding perspective that is broad in scope and dynamic, such as a complex socio-ecological systems perspective.

Complexity theory is the post-modern scientific paradigm that arose as an alternative to the Newtonian, positivist, linear approaches which characterised scientific understandings in the

modernist era. In contrast, complexity is the acceptance of interrelated, ever-changing, unpredictable structures and processes embedded across temporal and spatial scales (Capra, 1997).

Human systems (i.e. socio-economic systems) are embedded in environmental systems (i.e. ecosystems), and vice-versa, and these systems are vulnerable to changes in each other (Turner et al., 2003; Holling, 2001). Such systems can also be adaptive. A complex adaptive system is one characterised by nested hierarchies (semi-autonomous levels or scales that influence adjacent levels), subject to cross-scale interactions and feedback loops, which move through adaptive cycles (Holling, 2001; Folke et al., 2002). Adaptive cycles are characterised by the slow accumulation and transformation of resources, thereby increasing the system's connectedness and rigidity in control, making it susceptible to external changes which swing the adaptive system into a new process of reorganisation and innovation in response to the change, which stabilises, repeating the cycle (Holling, 2001). The process of reorganisation can trigger the collapse or growth of adjacent, nested hierarchies or systems, based on their ability either to innovate or to 'remember' (Holling, 2001). Sustainability, and sustainable development, is thus not a state, but a continuous process of innovation in response to change (Holling, 2001; Folke et al., 2002).

A key feature of complex socio-ecological systems is uncertainty, given the multitude of variables and non-linear dynamics (Capra, 1997; Folke et al., 2002). Uncertainty has implications for sustainability, as a system needs to maintain its ability to reconfigure in the face of novel changes in adjacent nested hierarchies without a decline in the system's critical functions (Folke et al., 2002)

In this study, household capital stocks form the main key variables under analysis, but they are still understood to be nested in broader structures and processes. Climate change and HIV/Aids both impact on community and household capital stocks, either directly, or through the use of assets in response to these stressors. While they remain nested in other influencing natural and social systems, assets and livelihoods can still offer useful insights into the extent that households are capable of responding to stressors such as HIV/Aids and climate change.

In this study, household's capital stocks can be seen as structures, while capital flows – or asset usage – can be seen as processes. These household asset structures and processes are embedded in larger structures and processes at the communal, local, national and global levels, while themselves being made up of individual components. These broader structures and processes shape how socio-ecological stressors, such as HIV/Aids and climate change, can affect a household's assets, while the household's sensitivity and capacity to respond to these stressors is also determined by their assets. At the same time, a household's vulnerable or resilient state affects higher levels of socio-ecological systems.

3.4 The Sustainable Livelihood Framework as a guiding framework for this study

3.4.1 Introduction

Understanding livelihood activities and related capital stocks has been emphasised above (see 3.2 and 3.3) as a potentially useful approach to understanding multiple stressor vulnerability. Thus, a more detailed exploration of the relevant dynamics surrounding livelihoods is needed, and for this, one of the most widely utilised related frameworks, the Sustainable Livelihoods Framework (Figure 3.4.1), offers a useful starting point which can be integrated with the theoretical discussions and guiding perspective of socio-ecological systems described above (3.2 and 3.3).

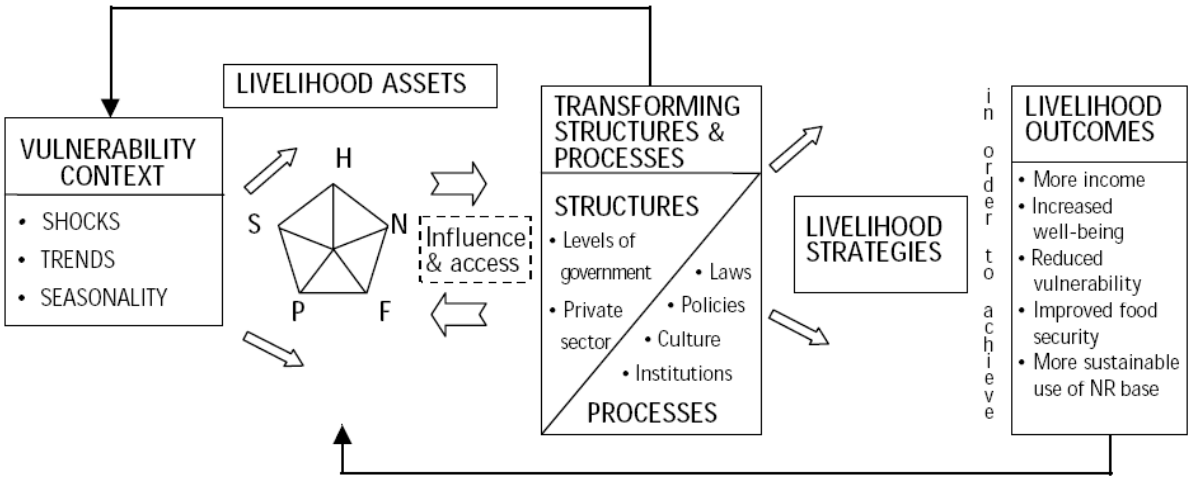

Figure 3.4.1: The Sustainable Livelihoods Framework (DFID, 1999)

The Sustainable Livelihoods Framework (SLF) views livelihoods as a means of making a living to achieve wellbeing (DFID, 1999). A livelihood comprises "the assets (natural, physical, human, financial and social capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household" (Ellis, 2000; DFID, 1999). A livelihood is further considered sustainable "when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base" (Carney, 1998: 4 quoted in Rakodi, 1999). Assets are determinants of livelihoods, as they can shape the choices available to and capabilities of an individual or household. But the choices and capabilities of a household are further constrained by the vulnerability context and by institutional structures and processes which can be facilitating or debilitating in the creation of livelihoods (Figure 3.4.1).

Given the exploration of key theoretical terms (see 3.2 and 3.3 above), the Sustainable Livelihoods Framework needs to be altered and extended in a variety of ways to take into account the dynamics of HIV/Aids and climate change. For a start, it is worth emphasising that the SLF is an idealised depiction of livelihoods, not a depiction of reality. While it may arguably be useful to aim towards, it is not useful to understanding real lived experience. One area that would need adjustment to portray

reality is the potential for the outcomes from unsustainable livelihood strategies to feed back into the vulnerability context. An example of this in the context of HIV/Aids could be a livelihood based on transactional sex (Hunter, 2007, 2010), or the unsustainable overharvesting of natural resources (McGarry & Shackleton, 2009; King, 2011).

3.4.2 Vulnerability context

The vulnerability context in DFID's Sustainable Livelihoods Framework similarly needs to be adjusted before being appropriated by this study. In relation to HIV/Aids, this context needs to be understood in terms of vulnerability to infection and to morbidity and mortality, i.e. 'upstream', 'midstream' and 'downstream' vulnerability (Gillespie & Drimie, 2009a). It also needs to consider that vulnerability to HIV/Aids is determined by a variety of factors across scales, from the level of microbiology, to the individual, to communities and nations (Loevinsohn & Gillespie, 2007). HIV/Aids is part of a web of inter-related multiple stressors, together with climate change. Furthermore, while the vulnerability context is influenced or mediated by transforming structures and processes (Figure 3.4.1), these structures and processes should also be conceptualised as being influenced by the vulnerability context. For instance, HIV/Aids related morbidity and mortality affects community institutions, and extends to affect the national and global levels (Loevinsohn & Gillespie, 2007).

In the conceptualisation of the vulnerability context employed by this study, stressors (including HIV/Aids and climate change in particular) are understood as being long-term, persistent, continuous hazards on systems (King, 2011; Fussel, 2007; Casale et al., 2007). Shocks are conceptualised as unpredictable and irregular perturbations, such as sudden illness, crime or extreme weather events, which manifest from stressors (King, 2011; Fussel, 2007; Casale et al., 2007).

Lastly, the vulnerability context depicted in the SLF (Figure 3.4.1) expresses vulnerability as exposure and does not consider adaptive capacity. The directional relationship between the vulnerability context and livelihood assets should thus be conceptualised as bi-directional, as vulnerability is mediated by adaptive capacity which is partly defined by livelihoods and assets (Chambers, 1989; Drimie & Casale, 2009).

3.4.3 Capital and assets

Livelihood assets need to be conceptualised in relation to their use within the context of HIV/Aids and climate change. The terms 'assets', 'capital' and 'resources' are fairly interchangeable in this study, although strictly speaking there are nuances between these terms. In this study, assets are considered as the individual components that collectively form a capital stock; thus, for example, knowledge is an asset that is a part of human capital and a car is an asset that forms part of physical capital. The

different forms of capital and assets are considered to be 'stocks', which are used – and often depleted – to derive income, or a 'flow' of capital (Marcouiller & Deller, 1996; Kraev, 2002). Similarly, flows of capital can be transformed into stocks, such as through the purchasing of farming or other equipment. A 'fund' of capital refers to benefits or flows being derived from a form of capital, with no deletion of its stock (Kraev, 2002).

Different studies identify different types of assets and capital: Moser (1998) uses labour, human capital, productive assets, household relations and social capital to develop an asset-vulnerability index; Rakodi (1999) analyses the importance of physical, financial, human, social and political capital for vulnerability reduction amongst the urban poor; Bebbington (1999) considers produced, human, natural, social and cultural capital in relation to capabilities and rural livelihoods; while Siegel (2005) distinguishes productive assets (natural, human, physical and financial capital), social assets (social and political networks and institutional capacity) and locational assets (access, distance and agro-ecological zone). In this thesis, household assets will be divided into human, financial, natural, physical and social capital according to the Sustainable Livelihoods Framework (Figure 1).

Human capital represents the skills, knowledge, health status and ability to labour of household members (DFID, 1999). The assets that make up human capital – particularly health, education and ability – are generally seen as being the outcomes to which livelihoods aspire, and as necessary assets to command other assets and use them to their advantage (DFID, 1999; Sen, 1997). This raises questions about whether human capital can be sacrificed – or substituted – for other forms of capital (Sen, 2007; Anand & Sen, 2000). The different components of human capital are also interlinked: good health facilitates learning and decision making, whilst knowledge of good health practices is more likely to actualise them (Kalichman et al., 2000). Human capital is lost in the HIV/Aids endemic, as health and productivity decline, while good health literacy overcomes barriers to managing the disease (Kalichman et al., 2000).

Financial capital comprises the financial resources available to households whether for consumption or production; it includes stocks of capital such as liquid assets, savings and credit or loans, and regular inflows of money such as salaries, remittances and pensions (DFID, 1999). Financial capital is the most easily exchanged of capital, and can be used to directly benefit wellbeing through improving food security or paying school fees, or through purchasing production equipment. A surplus of financial capital allows for investment and savings, while a deficit can lead to interest-bearing debt.

Natural capital refers to the natural resources and services from which people can derive benefit (DFID, 1999). Natural capital can thus refer to regulatory, supporting or provisioning ecosystem services (MA, 2005), as each is linked to the attainment of wellbeing, whether implicitly, such as through the health benefits derived from clean air, or through manipulation, such as the harvesting of natural resources for processing and sale or consumption. Natural capital has been increasingly

highlighted as a vital asset for climate change adaptation and poverty alleviation (e.g. UNEP, 2010) and natural resources can be vital safety nets during adverse times (Shackleton & Shackleton, 2004). The heightened use of natural resources has been observed and studied in households affected by HIV/Aids (Kaschula, 2008; McGarry, 2008).

Physical capital generally refers to manufactured assets and services, and so refers to infrastructure (transport, shelter, water, energy and communications) together with production equipment and tools which support access to or the functionality of other capital stocks (DFID, 1999). For example, transportation and infrastructure facilitates access to clinics, schools and markets; communication infrastructure and equipment facilitates the spread of knowledge and information; whilst a lack of water or electricity provision means that much time will be spent on the non-productive activities of resource collection, thereby affecting health and income. Climate change may potentially damage physical capital through extreme weather events.

Social capital has a broad variety of definitions and interpretations. Social capital conceptualisations generally contain both structural (group membership and networks) and cognitive (trust, reciprocity and solidarity, formal and informal rules) dimensions (Pronyk et al., 2004; Adler, 2002). Social capital is commonly defined as 'the rules, norms, obligations, reciprocity and trust embedded in social relations, social structures, and society's institutional arrangements, which enable its members to achieve their individual and community objectives' (Narayan, 1997: 50, taken from Rakodi, 1999: 317). Social capital has been divided into bonding (internal ties) and bridging (external ties) forms of social capital which can in turn be strong or weak (Bodin & Crona, 2009; Woolcock & Narayan, 2002; Adler, 2002). The sub-category of bridging social capital has been expanded to include 'linking' social capital, which refers to vertical relationships between social groups, such as between different social classes (Pelling & High, 2005). Rakodi (1999) notes that exclusion from political or decision-making processes is related to the relationships between people and institutions, and so she suggests 'political capital' as a necessary component of livelihood analyses. Bebbington (1999) suggests that cultural capital is distinct, although reliant on social capital, but cannot and should not be quantified although its importance should be recognised. Using these understandings, cultural capital, pertaining to cultural norms and institutions, and political capital, pertaining to decision-making structures, can fall under the category of social capital.

As social capital is so broadly defined to incorporate just about anything pertaining to social life – from politics to economic transactions – the concept has been criticised as being too vague and over-applied to be of any use in transformative approaches (Fine, 2010). The applicability of social capital conceptualisations in relation to understanding HIV/Aids and climate change is similarly vague. Using different interpretations of what the concept refers to, social capital has been seen as an important tool for climate change adaptation (Adger, 2003; Jones, 2010; Pelling and High, 2005;

Agrawal, 2008). However, social capital may not always have positive outcomes (Woolcock, 2002; Adler, 2002) and can reduce or enhance risk to HIV infection depending on the nature of group membership (Pronyk et al., 2008). In this study, social capital is conceptualised as having three main components: structural (i.e. social networks and group memberships), cognitive (basic trust and group coherence), and political (decision-making). These three tiers will be explored in order to see whether they constitute meaningful interpretations of social capital that can be useful in understanding vulnerability to climate change and/or HIV/Aids.

Vulnerability to HIV/Aids and climate change is influenced by the quality and quantity of household assets and different types of capital have been highlighted as being valuable adaptation tools, while the loss of productive assets has severe consequences for vulnerability. An asset-based conceptualisation is also valuable as many components of household capitals are, to varying extents, common pool, such as certain physical, natural and social assets. As community-based adaptation (CBA) and natural resource management (CBNRM) are increasingly being understood as valuable and effective tools for coping with change (IIED, 2009), a deeper understanding of the role of assets in shaping or eradicating vulnerability will highlight what asset management strategies require community action, what responses require household action, and where external organisations or the state need to assist.

Furthermore, an asset-based approach is particularly useful for understanding vulnerability to multiple stressors acting concurrently. While climate change may primarily affect natural capital (through changes in ecosystem functioning) and physical capital (through damage caused by extreme climatic events), this will affect the functionality of other asset types (see 3.2.2 and 3.2.4). While HIV/Aids primarily erodes human capital (through the loss of labour and knowledge transfer systems) and social capital (through a breakdown in social cohesion) this affects the functionality of other assets (see 3.2.3 and 3.2.4). An asset-based framework for understanding and analysing vulnerability is useful for examining exposure to stress/ors, effects of stress/ors and responses to stress/ors.

It is also important to note here that livelihoods are not only shaped by the resources that people have access to, but also by individual and personal preferences, beliefs and the availability of choice – namely, their capabilities.

3.4.4 Access and capabilities

Bebbington (1999: 2022) proposes that ‘access’ to different types of resources could be “the most critical resource of all” and further emphasises the importance of social capital in relationships and transactions with regards to the market, the state and civil society, as these three institutions can play a large role in governing ‘entitlement’, and thus wellbeing (Bebbington, 1999; Sen, 1981). Adger (2003) relates the importance of social relations in governing access to understanding climate change

adaptation, as both public and private institutions have a role in natural resource management and climate change adaptation. Agrawal (2008) expands on the importance of the structures of the state, market and civil society in livelihood adaptation to climate change as they determine livelihood, coping and adaptation strategies.

Access is also mediated by what Siegel (2005) distinguishes as an asset in its own right: locational assets, comprising the access to infrastructure and services, distance from urban centres, and the quality of the agro-ecological zone. Consequently, both geographical location and mediatory social relations define choices and the way that assets can be intensified or a range of assets can be fully diversified.

An individual's options and choices can be limited in societies that are unequal or hierarchal, where government is ineffective in delivering services or implementing development policies, or where markets that facilitate development are absent, or out of reach, highlighting that particular external structures, namely the state, the market and civil society, are also important determinants of livelihood options (Bebbington, 1999). Livelihoods and assets, together with HIV/Aids and climate change, are further influenced by processes such as policies, laws, and values that define and are defined by structures of the state, market and civil society (Bebbington, 1999). In the SLF (Figure 3.4.1), transforming structures and processes should be expanded to include these three domains.

Scoones (2009) argues that the main failing of the livelihoods framework is that those using it fail to connect local perspectives to broader contextual factors. Scoones (2009) argues that while local- or micro- level perspectives speak of politics and power, this is not an adequate link to the broader macro-level structures and processes that define opportunities and constraints, and the "processes of marginalisation, dispossession, accumulation and differentiation" (Scoones, 2009: 16). This concern with political dynamics implies an adjacent concern with scale, moving beyond the local to the linkages with the global.

3.4.5 Nested hierarchies and scales

While the SLF recognises transforming structures and processes (Figure 3.4.1), which are integral to a complex systems perspective (see 3.3), it does not adequately portray that these are present and operational across multiple scales from the individual, to the household, community, regional, national and global levels. While each of these scales is its own system or hierarchy, they are nested within one another, and influenced by changes within adjacent systems, while influencing these themselves (see 3.3).

In application, the livelihoods framework is often essentially a 'bottom-up' perspective that analyses how resources are used at the local level, and so risks neglecting possible determinants from the

national or global level (Knutsson & Ostwald, 2006). Scales beyond the household have already been shown in relation to HIV/Aids, where vulnerability to infection is influenced by a variety of factors across scales, whilst the disease has multiple effects across scales (Loevinsohn & Gillespie, 2007). Focusing solely at the household level runs the risk of placing undue emphasis in the wrong place, and of positing households as both the problem and solution to their own vulnerability, when vulnerability could primarily emerge from drivers such as the market, the state or civil society (Kamat, 2004; Bebbington, 1999). By including 'macro-' and 'mega-environments, the study is less likely to be undermined by a limited perspective, lest these are important factors shaping vulnerability. Moreover, incorporating an analysis of multiple scales is also important to help inform policy, as policy is formed on a higher level than household.

Conceptualisations of nested hierarchies in complex adaptive systems emphasise the need to consider temporal dimensions, as the pace of change is different in different scales (Holling, 2001). Temporal scales are necessary to have a deeper understanding of a current context, as well as a necessary consideration for understanding sustainability (Folke et al., 2002). Related to this, Knutsson and Ostwald (2006) argue that the SLF is purely conceptual, not analytical, and offers a checklist of factors which are often measured as a 'snapshot' study (usually over a year) thereby neglecting to adequately measure the changes and/or processes that are a key feature to the framework.

3.4.6 Sustainability

A temporal dimension is vital for this framework if a livelihood is to be sustainable (Folke et al., 2002). The concepts of sustainable development and sustainable adaptation measures are based on balancing the short- and long-term social, economic and environmental impacts of an action (Eriksen & O'Brien, 2007). To its credence, these three elements are represented in the SLF in the form of social, financial and natural capital, although these are only represented on the household level (Figure 3.4.1). The SLF fails to adequately incorporate the long-term time-frame implicit in achieving an understanding of true sustainability.

Different types of capital are closely linked and specific assets can only be productive in a given context or in conjunction with other, often specific, assets. Furthermore, a notable lack or absence of any type of capital can cause a decline in any other. This refers to the complementary of capital, when the value of one capital increases or decreases as consequence of the increasing/decreasing value of another capital (Knutsson & Ostwald, 2006). For example, a lack of natural capital, in the form of a degraded and polluted environment, can lead to sickness and ill-health: the loss of human capital. This in turn can impact an individual's ability to work, thus hampering the earning of financial capital, which could be exchanged in any number of ways. Related to this, McGarry (2008) highlights how the 'threshold' of the worth of a capital stock, in this case, the use of wild foods by children affected by HIV/Aids, declines if the burden of the disease reaches a critical point: if human capital is too

severely compromised. Similarly, the 'Micawber threshold' refers to the theoretical level of capital stocks needed by a household to avoid coping strategies which may trap the household in a vulnerable state (Prowse and Scott, 2008). In adaptive systems, this would be referred to as a 'poverty trap' where a system's diversity and potential has been eroded (Holling, 2001).

Achieving the strong sustainability of livelihoods thus implicitly implies maintaining safe minimum standards of assets, and of not depleting the stocks of critical – or non-substitutable – assets or capital stocks while allowing for flexibility as a mechanism to respond to uncertainty and change (Folke et al., 2000; Neumayer, 2010). Some assets have been identified as being critical or non-substitutable to achieving wellbeing (e.g. Anand & Sen, 2000). However, other assets may be 'critical' in other, specific contexts. Flexibility is needed as a household is nested in broader changing and unpredictable socio-ecological systems and a household's ability to use assets to create livelihoods may be facilitated or constrained by dynamics operating at other scales.

It is worth remembering that capital is ambiguous in this framework (see 3.4.3). As an economic term, 'capital' implies that substitution between forms of capital, or at least complimentary, should always be possible (Knutsson & Ostwald, 2006; Scoones, 1998; see also Adler et al., 2002; Woolcock, 2001 for similar analyses of social capital). However, a lot of what is considered as capital in this framework is intrinsically valuable beyond its utility to individual welfare as prescribed by conventional economics; for example "the value of social relationships or a newly born baby cannot simply be substituted for money or a piece of land" (Knutsson &Ostwald, 2006). As suggested above, most attributes of human capital – good health, education, happiness – are ends unto themselves, as well as being necessary for commanding other types of capital. Similarly, the commoditisation of natural resources has also raised debate on the ethics of placing economic value on an intrinsically valuable entity (e.g. Ghilarov, 2003). Costanza and Folke (1997) move beyond the intrinsic versus utility value dichotomy, and suggest that a new valuation system with the goal of achieving sustainability would not be based solely on economic utility, but would further incorporate the value of social equity and ecological integrity.

3.5 Applying the frameworks in this study

While complexity theory and its application are constantly refined, it risks not actually being useful in practice. This is partly due to overcomplicating a system or overwhelming understandings of it with entities that are not equally relevant, or, almost paradoxically, over-simplifying the system in an attempt to understand it (Holling, 2001). While broader processes and structures may facilitate or constrain household asset use and livelihoods (see 3.4.5), it is not feasible to adequately explore their impact on households due to time and financial constraints. Effort is, however, still taken to explore historical factors driving the present-day local vulnerability context as well as interactions between key stressors in the two study sites in order to understand how these affect household assets.

Vulnerability is understood as arising from interactions between and the effects of multiple stressors (see 1.1.1 and 3.2.1), although emphasis is placed on HIV/Aids (see 3.2.3) and climate change (see 3.2.2).

This contextual back-drop helps to explain the study's primarily focus: the household capital stocks and livelihood activities that are employed within this context (see 3.2.4 and 3.4.3). Keeping the broader context in mind helps to add explanation as to why certain assets or livelihoods are more vulnerable to multiple stressors, what motivates choice in decisions around livelihoods, and the extent to which households are able to respond positively to multiple stressors. Thus, the 'internal' and 'external' dimensions of vulnerability are considered simultaneously in this study, as these are integrally linked (see 3.2.2 and 3.4.2).

While assets are a main focal point in this study, it is recognised that asset use is also constrained by differential rights of access. Access is considered in this study peripherally through comparisons between sites and between gender headship types and income quartiles. Site comparisons relate to differential 'locational' rights of access to markets, urban centres, services, natural resources and other context-specific facets influencing access (Siegel, 2005). Gender headship and income level comparisons consider socio-political or socio-economic rights of access, as the lack of political power and subsequent marginalisation of certain groups, particularly women and low-income households, is a contributing factor to their vulnerability (see 3.2; Scoones, 2009).

The multitude of factors interacting across complex socio-ecological systems, as well as the limits of complexity thinking, necessitate a transdisciplinary approach which combines qualitative and quantitative methods, and which is pragmatic and transformative. A more detailed analysis of how methods are used to understand assets and livelihoods in the context of multiple-stressor vulnerability, together with the limitations of these methods, is presented in the following chapter of this Part (Chapter 4).

CHAPTER 4: METHODS

4.1 Introduction

4.1.1. Mixed methods approach

As the conceptual frameworks adopted by this research incorporate a multitude of factors interacting across complex socio-economic systems, a combination of methods and approaches are required to gain a better understanding of differential vulnerability (see Chapter 3; O'Brien et al., 2009; Pohl, 2010; Belsky, 2002).

The value of multiple methods and a transdisciplinary approach is increasingly recognised in sustainability research, given the complexity of the systems involved and the limits of knowledge giving rise to uncertainty (Hirsh Hadorn et al., 2006). The necessity of incorporating results derived from a combination of qualitative and quantitative methods is increasingly being applied, particularly in research around poverty and poverty reduction (Shaffer, 2007; Howe & McKay, 2007; Sharp, 2007). Sharp (2007:277) argues that incorporating qualitative contextual information derived from participatory methods is "indispensible", as this highlights areas that could need further analytical focus and helps discern findings that are important to the context of the research. Understanding the context of research is similarly also important when considering vulnerability (O'Brien et al., 2009).

While it is unfeasible for a single research project to be entirely transdisciplinary, incorporating key transdisciplinary concepts are possible. These include using participatory research as well as attempting to transcend disciplinary boundaries in order to take diverse perspectives of complex socially relevant issues into account, and to link abstract and case-specific knowledge (Pohl, 2010).

Quantitative data collection is useful for measuring and examining household capital stocks, but is limited in this research in explaining the flows of household resources, given the short time-frame of the study. Qualitative participatory methods are thus used to add a temporal dimension, and to understand motivations for choice, perceptions and personal values. Literary desktop research of secondary sources is useful for developing the temporal dimension, and for analysing the complexity inherent in competing disciplinary and policy-oriented interpretations of a context. More than one method was incorporated into each chapter of this thesis for a fuller understanding of these complexities.

4.1.2 Household survey

Quantitative data was derived from household baseline and quarterly surveys (see Appendix 1 for the baseline survey and Appendix 2 for the quarterly survey). The surveys were compiled through several iterations with researchers associated with the project from Rhodes University and the University of

Alberta (see 1.3). Many of the questions in the survey, particularly in the quarterly survey, were based on questions drawn from the PEN prototype questionnaire (CIFOR, 2008).

Questions relating to human, physical, natural, financial, and social capital were integrated into the baseline survey, together with questions around recent shocks and responses, and food security, climate change and HIV/Aids perceptions. The quarterly survey primarily measured seasonal variations in income, use of natural resources, agricultural production and expenditure. These data were disaggregated by site, by income quartiles and by the gender of the household head as these divisions were considered important in studying vulnerability to multiple stressors such as HIV/Aids and climate change (see Chapter 1 and 3).

Microsoft Excel (2007), SPSS (16.0) and R (2.13.0) were used to manage and analyse data derived from the survey.

4.1.3 Participatory Methods

Various terms to describe participatory research have emerged over the past few decades, along with subtle differences in approach or method: from Rapid Rural Appraisal (RRA) in the mid 1970s, to Participatory Rural Appraisal (PRA) in the early 1990s, and more recently, Participatory Learning and Action (PLA), with a variety of additional nuanced approaches across this development. Broadly, this cluster is characterised by the use of methods that are highly qualitative, visual and tangible, usually performed with a small group of people. These approaches change the role of the researcher to that of facilitator, and recognise and emphasise local knowledge and capacity (Chambers, 2007). While PLA methodologies are increasingly used and esteemed (Chambers, 2007), they have also elicited much criticism (e.g. Cooke & Kothari, 2001). Often, they are seen as a means to validate or triangulate quantitative data, although this view perhaps neglects the theoretical ideologies which posit PLA not only as a tool set for the researcher to learn, but as an empowering process for those whose knowledge is being used (Leal, 2010).

Participatory methods were used in this study to elicit a more qualitative understanding of drivers of vulnerability and processes of asset use. A number of PLA techniques were used to add contextual information that the data obtained through the survey could not readily reveal, particularly around processes of change, attitudes and behaviour. Timelines, mental maps and asset ranking were used in this study to augment quantitative data, not merely to validate it. When pertinent, groups met separately along generational and gendered lines to better understand any differences in experiences, perceptions and values.

These workshops were entirely voluntary; participants were not remunerated but were provided with refreshments and meals. These exercises were undertaken with a fully bilingual (*isiXhosa* and English) facilitator, and were recorded.

4.1.4 Literary desktop research of secondary sources

Literary desktop research was used to add an historical perspective to the vulnerability context in South Africa. This historical perspective is important to understand the temporal scale of vulnerability (see 3.4 and 3.4.5). This history also elicits different perspectives across multiple disciplines in the humanities and social sciences: from anthropology, geography, history, politics and sociology. As concepts and perspectives of vulnerability predominate from the ecological or natural sciences (Fussel, 2007; Schoon, 2005), these multiple perspectives contribute to understanding the complexity of vulnerability within social systems to broaden the socio-ecological vulnerability perspective. Incorporating competing perspectives across disciplinary and policy-oriented lines also contributes to understanding the shift away from positivist scientific research approaches towards an appreciation of the researcher's role and influence in transdisciplinary research (Belsky, 2002; Maasen & Lieven, 2006).

4.2 Survey design

4.2.1 HIV/Aids proxy indicators

HIV/Aids proxy indicators were integrated into the household survey to assess the household's differential vulnerability to the effects of HIV/Aids. For ethical reasons, it is not permissible to ask a household to divulge their HIV status, and so these proxy indicators were used. These proxy indicators were developed by the SADC FANR Vulnerability Assessment Committee (2003) and have been used successfully by several postgraduate students from Rhodes University (Kaschula, 2008; McGarry, 2008; Weyer, 2011). The indicators do not accurately measure HIV/Aids prevalence, but rather determine household vulnerability to the effects of HIV/Aids (SADC FANR Vulnerability Assessment Committee, 2003) by measuring the presence of characteristics that mimic characteristics of an HIV/Aids affected household. It is worth emphasising that those households which meet these proxy indicators may or may not be affected by HIV/Aids, but rather share characteristics of households which are.

The five proxy indicators are: the presence in the household of chronic illness (at least three consecutive months) of a person aged between 0–59 years, the presence of chronic illness of a person aged between 0–59 years and receiving free treatment, a death in the previous two years in the household of someone between the age of 0 and 59 years, a death in the previous two years in the household of someone between the age of 0 and 59 years who experienced at least three months of chronic illness before death, and the presence of children under 19 years with both parents deceased.

In previous studies (e.g. Kaschula, 2009; McGarry, 2008) the count of met proxy indicators was used to categorise the household as either affected or non-affected. In this study these proxy indicators were used differently to categorise households into four different experiences of HIV/Aids, as described in more detail in Chapter 6 (see 6.1.3).

4.2.2 Types of data for capital stocks

Questions relating to each of the five capital stocks (as per the Sustainable Livelihoods Framework – see 3.4) were included in the questionnaire to form the basis of this research (Appendix 1). Questions relating to human capital included health status, employment status, education and additional skills for each member of the household, together with demographical information such as age and sex. For social capital, participants were asked about household group membership and leadership within formal and informal community organisations and groups, whether the household would be able to get free assistance in a range of affairs, participation in community decision making, and trust and social cohesion (used in Kaschula, 2008). For physical capital, the survey recorded the size of the homestead and the building materials used in the building, ownership and sale value of large household items, and access to water and electricity. Natural capital measures included ownership of land for cultivation and grazing, and the use of and access to various natural resources. Finally, financial capital was measured through the amount of savings or debt, and whether the household had access to credit. For further details on these questions and how these data were analysed, see 7.1.3.

Each set of measures for the five types of capital also included at least one question that attempted to measure change over the previous ten years in a core aspect of that capital (see 8.1.3 for details).

4.2.3 Perceptions, shocks, stressors and responses

The surveys also recorded food security and climate change perceptions, the incidence of various shocks, stresses and related responses, and subjective enumerator assessments of the household's wellbeing (Appendix 1). Specific aspects from these sections were useful for this study.

The incidence of shocks and stresses across the two sites together with food security and climate change impact perceptions were used to contribute to understandings of differential vulnerability (see 6.1.3 for details). Enumerator assessments of the household's psychological wellbeing were used as an aspect of human capital (see 7.1.3 for details). The various ways in which a household responded if they had experienced a shock or stress were used to help understand asset use (see 8.1.3 for details).

4.2.4 Quarterly income in cash and kind

The household's income in cash and in kind over the previous three months was recorded in a quarterly survey (Appendix 2). This section was largely derived from the PEN prototype

questionnaire (CIFOR, 2008). Cash income from permanent and casual employment, self-employment, government grants and remittances were all recorded, together with sales from crops and livestock products and services. Agricultural yields of crops and livestock products and services used by the household were recorded, together with costs incurred through agricultural and livestock production and maintenance. Collection, sales and purchasing of various natural resources over the previous three months was also recorded. Lastly, households were asked to recount their regular monthly expenses (such as groceries, insurance policies and transport) as well as any unusual expenses over the previous three months (such as school fees, medical bills or clothing).

As part of the broader research project between Rhodes University and the University of Alberta, this quarterly survey was repeated three times after intervals of six months each time to capture seasonal change. For this study, only data from the first interval was used.

4.3 Survey implementation

4.3.1 Sampling strategy

Aerial photography, dating from 2003, was used to select households to be interviewed. GIS software (Arc View 4) was used to superimpose a boundary around the sites and to randomly select areas to be interviewed. This boundary was the approximate equivalent to 100 m from the edge-most houses, to allow for any new housing that might have been built since the photographs were taken. In Lesseyton, boundaries were drawn around the six villages. In Gatyana, where houses can be remote and difficult to access, the boundary was drawn around populated areas that fell within approximately 1 km of the main roads from Gatyana down to the coast. The boundary in Gatyana thereby did not necessarily incorporate whole villages, which are not readily discernible in this site (see 2.4). Numbered grids, equivalent to 200 m x 200 m for Gatyana, and 100 m x 100 m for the more densely populated Lesseyton, were superimposed over the imagery and random numbers were generated to select grid-blocks. The north-most available household in a randomly selected grid block was first approached to be interviewed. If no household fell within a selected grid block, the closest household was interviewed. Should a household not wish to take part or was repeatedly not available, the nearest available neighbouring household was approached. A hundred and seventy households from each site (340 in total) were selected to ensure that, should there be dropouts for subsequent quarterly surveys, the desired target of 150 households from each site would still be met. Subsequently, data from 170 households from each of site, totally 340, were used in this thesis.

4.3.2 Data Collection

The survey was piloted in both sites in November 2010. A few adjustments were made, and the final version was administered in the Lesseyton site in late January into February 2011 and in Gatyana

from late February into early March 2011. One enumerator from each site and two others from Grahamstown, all fluent in English and *isiXhosa*, and proficient in Maths, were hired to assist in the survey process. Prior to going into the sites with the survey these enumerators received four days training which included research ethics, an overview of the key concerns being researched, in-depth breakdown of each question, and a trial run of administering the survey in Grahamstown households. Interviewees were first explained the purpose of the research, what participation would entail, their rights to refuse to participate, and their anonymity before signing a consent form, in accordance with Rhodes University's policy on ethical research. Completed surveys were reviewed for quality at the end of each day during the survey process.

4.4 Disaggregating data by key groups

4.4.1 Sites

For site comparisons, data from all the villages in each respective site were combined. Often, only site comparisons were made when applicable or when further disaggregation would not be statistically viable. Otherwise, where feasible, data was further disaggregated and analysed by the gender of the household head and by income quartiles (described below) to elicit nuances in these household types within each site.

4.4.2 Gender

The gender of the household head has frequently been used in livelihood analyses to make comparisons between male- and female-headed households (Appleton, 1996; Chudgar, 2011). Many authors also distinguish between de facto and de jure household heads, to emphasise the different roles that household members can play in decision-making within household (Fisher et al., 2010, Menton et al., 2010; Varley, 1996). Male- and female-headed household dichotomies are thus often insufficient because of different decision-making capacities arising from household dynamics, gender- and generational power relations (Varley, 1996; Fuwa, 2000). Gender-based household headship types were thus expanded in this research beyond male and female divisions, to elicit a more nuanced understanding of household authority gender dynamics.

The gender of household headship groups were based on the sex and age of the adults in the household, with an adult being classified as anyone over the age of 18 (the age where the South African government child grant stops and a person can legally vote, amongst other rights). These groups were: households with only male adults, male headed households with adult female/s (i.e. households headed by a man but with at least one adult female in the house), female headed households with adult male/s (i.e. households headed by a woman but with at least one male adult in the house) and households with only female adults.

4.4.4 Income

Income quartiles were based on the household's total monthly income in cash and in kind. Wealth categories have frequently been used to make comparisons between groups that are differentially affected by poverty (Paumgarten & Shackleton, 2009; Shackleton & Shackleton, 2006). Wealth categories have been defined in a number of ways, from local perceptions of wealth (Paumgarten & Shackleton, 2009) to the number of grants, employment and cattle of a household (Shackleton & Shackleton, 2006). In this research, 'income quartiles' have been used to categorise households differentially affected by poverty. Income quartiles refer to the flow of household resources in a fixed period, rather than the household's stocks of any particular capital (Kraev, 2002).

Income or livelihood portfolios were developed for each household, combining their income in cash and in kind derived from formal, casual and self-employment; grants; additional government support; remittances; crop production; livestock products and services; and natural resource harvesting. This data was derived from the quarterly survey (Appendix 2).

Monetary values for yields and natural resource harvests were developed. In the survey, households were asked to estimate the local monetary value of their crop yields, livestock products or services, and natural resource harvests. As there were very few households selling such items, these varied between households, with many households simply responding that they did not know the value. To calculate the value of these produced or harvested goods, the mean value of the provided estimates in each site was applied to all harvests of that product for that site. Where a product was only reported to have been harvested by a few households, and where none of those households reported an estimated monetary value, that item was omitted from calculations.

When wages were unknown or otherwise missing, the mean monthly wage from a similar category of work within the site was applied. For example, if a teacher's salary was unknown, the mean monthly wage of other teachers within the site was applied to that household.

Households' total monthly incomes were calculated and households were split into quartiles, irrespective of site. Combining all households irrespective of site before splitting households into quartiles was used as a means of assessing distributions of poverty-afflicted households in each site (Chapter 6). As the differences in income quartile distribution in each site were nearly identical and not significant, these quartiles were used in subsequent comparisons (Chapter 7 and 8). These income quartiles range from R0.00 to R3480.37 per quarter for the lowest income quartile, from R3354.85 to R6106.08 per quarter for the low income quartile, from R6179.03 to R9600.78 per quarter for the moderate income quartile, and from R9617.31 to R54 074.36 per quarter for the high income quarter. There is thus only around, on average, R1000 difference in monthly income between the first three income quartiles, whist households in the high quartile can earn over 15 times that of those in the

lowest quartile. A full breakdown of income sources and the values derived from these can be found in Chapter 8.

4.6 Combining methods in results chapters

Each results chapter in this thesis drew from a combination of methods to incorporate a variety of approaches and knowledge types in an attempt to understand vulnerability in a complex socio-economic system (see 3. 3; Hirsh Haddorn et al., 2006; O'Brien et al., 2009).

Chapter 5 explores the historical context of vulnerability in South Africa to emphasise how vulnerability is defined by temporal scales operating across socio-ecological systems (see 3.3). This chapter combines PLA timelines describing historical changes in the two study sites with literary desktop research of secondary sources for a broader history of contextual factors driving vulnerability in South Africa. More detailed descriptions of these approaches and methods can be found in Chapter 5.

Chapter 6 uses a combination of PLA and survey data analysis to capture distinct vulnerabilities of different socio-economic groups. This chapter considers how vulnerability is defined by multiple drivers operating at different spatial scales (Chapter 3) using mental models and problem trees, and data derived from the household survey to define and consider the distribution of gender headship types and income groups, the different shocks and stressors experienced by different groups and their perceptions of aspects relating to vulnerability. Further details on the PLA methods and statistical analysis of the survey data can be found in Chapter 6.

Chapter 7 also combines survey data analysis with PLA methods to consider processes of asset accumulation and loss. Human, social, physical, financial, and natural capital stocks were analysed in turn. The capital stocks were disaggregated by the different defined groups (sites, gender and income) to show differences in amounts of assets and to highlight links between assets within each capital type. PLA exercises described different gender and site understandings of the links between types of capital and the perceived worth of different assets. A more detailed account of the types of data and statistical tests used to analyse household capital stocks, together with a more detailed description of the PLA methods employed, can be found in Chapter 7.

Chapter 8 combines data analysis with PLA methods to describe how assets are used and valued within different localities and socio-economic contexts in order to understand processes of asset accumulation and loss. Participatory ranking combined with coping responses and changes in the stocks of different capital types amongst the groups of site, gender of household headship and income levels elicit a deeper understanding of processes and flows of capital. A more detailed overview of the PLA methods and the data analysed for this interpretation can be found in Chapter 8.

4.7 Limitations of methods

4.7.1 Participatory limitations

Participatory Learning and Action (PLA) techniques have raised a number of ethical and methodological concerns. For instance, participant anonymity cannot be guaranteed in group setting which runs the risk of either receiving false contributions from the participants or having participants stigmatised by their peers for their responses (Manzo & Brightbill, 2007). Collective decisions run the risk of being influenced by group dynamics such as 'risky shift' (group members take more risky stances than they would have as individuals), the 'Abilene Paradox' (group members wrongly second-guess what they think other group members think), 'groupthink' (in-group dynamics lead to bad or wrong decisions) and coercive persuasion (group members are manipulated to certain outcomes) (Cooke & Kathari, 2001).

Participatory processes are by nature unpredictable and varied between different communities and sub-sets. People may be inhibited to interact and share their thoughts and engage in the activities, or enthusiasm for the project could be lost over time.

The concerns discussed above were considered throughout the PLA processes and effort was made in each exercise to emphasise open participation.

An emerging limitation of participatory research was the repeated difficulty in achieving sufficient attendance to focus group meetings. Meetings were often postponed and rearranged when there were too few participants. This highlights how these methods are only possible with people's willingness to participate.

4.7.2 Household survey limitations

As with all surveys, there were concerns that only interviewing one household member will produce unreliable results, especially with regards to the income and the personal information and activities of the other household members (Fisher et al., 2010; Menton et al., 2010). There were also concerns around accurate recall by interviewees, a loss of interest if the interview process became too long, or how slight alterations in the wording of questions can change responses (see Fisher et al., 2010). It was thought the large sample (n = 340) would help ameliorate these problems and participatory methods (see above) would also help identify incongruities. These problems are still considered throughout analysis as a potential limitation of this study.

PART 3: RESULTS AND DISCUSSION

CHAPTER 5: HISTORICAL PERSPECTIVES OF VULNERABILITY IN SOUTH AFRICA AND THE TWO STUDY SITES

5.1 Introduction

5.1.1 The relevance of historical perspectives for vulnerability research

Different nested aspects of socio-ecological systems operate at different temporal dimensions, where the pace of change can vary according to the scale (Turner et al. 2003; Holling, 2001; see Chapter 3). A temporal dimension is necessary in order to have a deeper understanding of current contexts of vulnerability, to reduce the risks of an inanimate 'snapshot' analysis, and to help assess the origins of present-day vulnerability (Chapter 3; Knutsson & Ostwald, 2006).

A temporal dimension is thus important for a study adopting a complex systems perspective, such as this thesis (Chapter 3). Complexity thinking originated and still predominates in the natural and ecological sciences (Fussel, 2007; Schoon, 2005) but the concept is increasingly being adopted by social sciences to understand vulnerability, as there is growing recognition of the links between social and ecological systems (Turner et al. 2003; Metzer et al., 2005; Steffen et al., 2004). Complexity thinking is also increasingly being recognised as valuable to social sciences in general, asides from vulnerability research (Mathews et al., 1999; Scoones, 1999). Historical perspectives are increasingly seen as an important component of understanding social-environmental interactions (Scoones, 1999).

The rise in environmental consciousness and recognition of the ways in which social and ecological systems mutually affect one another led to the rise in environmental themes and understandings in historical writings (Carruthers, 2002; Nell, 2004). In South African historical narratives, vulnerability has generally been posited as arising from social systems; the 'environment' has largely been absent in these reflections (Carruthers, 2002; Nell, 2004). Historical narratives which link human vulnerability to environmental causes have been rare in the past (Steyn, 1999; Nell, 2004). However, socio-ecological links drawing from South Africa's history have emerged (Percival & Homer-Dixon, 1998; Hanlon, 2010; Giannecchini, 2007). In these narratives, access and availability of resources emerges as key to understanding present day human vulnerability in South Africa when assessing the country's history.

In climate change adaption research, understanding the past, particularly in under-developed areas, has been highlighted as a valuable tool for assessing pathways for adaptation, based on historical coping and adaptive responses (Adger et al., 2003; Vincent, 2007). This suggestion raises debate around the limits of adaptation in South Africa, given the historically deeply-entrenched nature of vulnerability in the country. This debate further contributes to on-going debates relating to justice, development and the role of social protection in South Africa.

5.1.2 Rationale and key questions

This thesis attempts to understand how capital stocks are used to create livelihoods and respond to stress within the context of HIV/Aids and climate change (Chapters 1 and 3). This broad objective implies an initial understanding of how the historical context has shaped asset availability and use, to create the current context. This chapter contributes to answering the question - what defines or shapes vulnerability in the two sites - by adding a temporal dimension.

This question can be elaborated to incorporate the following additional questions:

1.) What are the origins of vulnerability in the two sites?

2.) How has the past influenced current vulnerability in the two sites?

3.) Are there different understandings of the historical vulnerability context?

To answer Questions 1 and 2, this chapter further contextualises the study sites and study objective by briefly exploring South Africa's past to help describe its present state, with particular emphasis on the relevance of this history to rural assets and livelihoods. The history of changes in access to South Africa's natural resources runs alongside the country's rapid industrialisation and draws in concerns around the environment, health, disease, agriculture, land and food security and various politically or ideologically motivated decisions of its ruling elite. This historical overview of the origins of vulnerability and the related impacts on livelihoods, where possible and/or appropriate, focuses discussion around the Eastern Cape, where this study's sites are based. One of these sites used to be part of the former 'homeland' of the Transkei, which now forms part of the Eastern Cape, and so trends within the Transkei are frequently discussed.

This historical interpretation begins with accounts by elderly and youth detailing historical changes in each of the two sites derived through PLA. This allows for a comparison between important aspects addressed by literature and those addressed by participants. Participant's accounts also contribute to furthering our understanding of vulnerability in the two sites, as new emphases that do not dominate the literary histories emerge and are explored. Looking at different interpretations of the past through different localities, generations and disciplines answers Question 3.

5.1.3 Methods

a) Participatory historical change timelines by the elderly

Historical timelines are a common PLA exercise, and are an effective tool for analysing the underlying drivers of vulnerability (Warrick, 2009) and have frequently been used to understand vulnerability to climate change (Christian Aid, 2009; Kelman et al., 2009; Bunce et al., 2010). Timelines can track climatic, technological or social change, and are flexible to suit the research needs (Bunce et al., 2010).

For this study, the historical timeline was adjusted to record incremental changes in key areas of interest that related to the study. These areas of interest were the main livelihood or source of income in the area, weather or extreme weather events, population density, land use, main health concerns, general mood or atmosphere, and gender relations. These areas of interest were discussed in reference to the site by looking at what participants knew about the days before they were born, and incrementally by decades from mid twentieth century to present.

In Lesseyton, this group consisted of two elderly women and three elderly men, all of whom had grown up in the area. Owing to general difficulties in participation in meetings and workshops in Gatyana, this group was much smaller, and comprised of two men and one woman, all of whom had been born in the area.

The group in Gatyana recalled their grandparents' days, the 1960s, the 1970s, the 1980s, the 1990s and the 2000s. For the Lesseyton group, in order to get a better idea of the distant past and the pace of change, participants recalled their grandparent's grandparents' days (i.e. what they had heard or understood about that time), their childhood, and then the 1970s, 1980s, 1990s and 2000s.

b) Participatory identification of past, present and future problems by youth

In each site, high schools were visited after school hours to meet with a class of Grade 11 learners. In Lesseyton, 10 girls and 10 boys took part in the discussion. In Gatyana learners were eager to take part, and 53 learners of mixed gender crowded into a classroom.

Learners were asked to list and discuss past problems, causes to these problems and common responses, then present problems, causes and responses, and based on this, to think of what future problems, causes and responses there might be.

c) Trends in literature: South Africa's past, present and future vulnerability

Desktop research was used to detail the origins of present-day socio-ecological vulnerability in South Africa. This covered Dutch and British colonisation of the land, to the era of segregation, to Apartheid and post-Apartheid, before introducing climate change as a future stressor contributing to the South African vulnerability context.

Across this history, pertinent academic and policy debates emerged. In particular, the complexity of social systems within socio-ecological systems became most apparent through the historiography of HIV/Aids discourse and academic writing in South Africa. As the importance of availability and access to a variety of different assets to support productive, sustainable livelihoods and reduce vulnerability becomes evident across this history, on-going debates relating to justice, development and social protection in South Africa enter as a key concern.

5.2 Results: Perspectives of historical change in the two sites

5.2.1 Participatory historical change timelines by the elderly

It becomes immediately apparent that the elderly in both sites perceived that their situation has generally worsened towards the present day, whereas the past was romanticised as peaceful, beautiful, happy and comparatively disease free (Tables 5.2.1 a and b). The romanticisation of the past is often reported amongst the elderly (Gupta, 2011), although that is not to disregard their view that life was generally better in the days of their childhood.

Interestingly, the elders in Gatyana lamented the declining population in their area over time, while in Lesseyton elders complained about the increasing population. Both sites show a progression to the present that includes the decline in the dominance of agricultural activities towards a dependence on grants; increasing disease burden as new diseases appear (e.g. high blood pressure, HIV/Aids) and old ones become more prevalent and incurable (e.g. tuberculosis); worsening weather; degrading land; and escalating violence. Both groups described the apartheid laws as being disruptive to agrarian livelihoods and to family structures through designation of land, forced removals or influx and labour laws.

The two different sites yielded slightly different emphases in the descriptions of the historical context for present-day vulnerability. The elderly in both sites expressed the decline in farming, although to different extents. In Lesseyton, farming for food had largely stopped, and this was mostly attributed to crime (as fences and cattle were stolen), land degradation and over-population. In Gatyana, while farming had reportedly declined the implication was that most households still tried to work the land. When asked about the changing land use, the elderly in Gatyana placed more emphasis on the forest than the group in Lesseyton. This could be an indication of the relatively more abundant forest in Gatyana compared to Lesseyton, of the higher cultural importance placed on the forest in Gatyana, and/or of the relatively higher importance of the forest for Gatyana residents owing to a lack of electricity and other services (see Chapter 7 for more detail). The elderly in Gatyana lamented the decline in traditional land management practices and institutions which they felt was a cause for deteriorating land quality.

The increase in population in Lesseyton, and decline in population in Gatyana, supports trends observed in a provincial study which noted migration from the eastern, rural areas towards the western half of the country, where the province is characterised by more developed cities and towns (Makiwane & Chimere-Dan, 2010). The decline in agrarian activities as a dominant livelihood type and the increasing reliance on external sources of income has been observed in other studies in the province and the country as a whole (see 2.2 below; Hebinck & van Averbeke, 2007; Andrew et al.,

Table 5.2.1 a: Historical changes in Lesseyton as expressed by a group of elders

	Main livelihood/ source of income	Extreme weather	Main health concerns	Population	Land	General mood	Gender roles	Additional comments
2000s	Living is hard – no farming. Crime – people steal fences and cattle. GRANTS AND PENSIONS	A lot different to the past. Drought and snow are a lot worse.	More diseases than in the past and all worse because they are incurable. Diseases caused by people migrating in.	More people coming in	Very bad. The land is bare. Cannot farm because of crime and over-population	Elders not happy, only the youth are happy because of the rights they are benefitting from. The youth do crime.	All workers today – all have the same role today	Youth do drugs and alcohol, go to taverns. Crime and rape coming into community from outsiders. We are scared in our homes
1990s	Forced removals – 1990s. Lots of poverty. Farming largely stopped – fences stolen. Working.	Normal weather. Strong wind, like a tornado one time	TB. High blood pressure. Arthritis. Ulcers. Diabetes.	Population grows	The land is not fertile because of overharvesting and over-use	Stress – households are separated and have to live in designated areas. Yards and land divided and more people coming in.	Lose land and cattle. Youth violent and disobedient	
1980s	The same as before	Normal weather	TB and diabetes	People grows	The land is still fertile	Not happy. Too much violence.	Men and women had same roles as today	
1970s	Men and some women away at work, sending money home. Working and farming for livelihood	A lot of snow	TB because of too many people in a small space	People coming in from elsewhere – growing population. About ¼ as many compared to now.	Still fertile and the bush is healthy	Happy – no crime, you can even sleep outside	Men look after land and cattle, women stay at home.	
Child-hood	Farming cattle and crops – did not buy any food	Floods destroyed farming and cattle. Drought in early 1940s	Measles	Less than a ¼ the number of people compared to now	More fertile than today. A lot of bush and animals to hunt	Very happy. Even people in Queenstown would come and visit	Men look after cattle and crops, women stay at home, cook and look after children	
Grand-parents	Farming for food	1933 – a terrible drought followed by snow	Skin rash, typhoid fever, especially after the war in 1918	Only 80 people (in villages across from Lesseyton) and 32 in Lesseyton	This was a very beautiful land. Queen Victoria came to see it, it was so beautiful.	This was a land of pastors and missionaries so there was a lot of peace	Men look after cattle, sheep and crops, women stay at home, cook and look after children	Land expanded. Toisekraal was a farm

Table 5.2.1 b: Historical changes in Gatyana as expressed by a group of elders

	Main livelihood/ source of income	Extreme weather	Main health concerns	Population	Land	General mood	Gender roles	Additional comments
2000s	Government grants - still trying to work the fields & livestock	Tributaries dried out. Strong winds and unbearable heat.	HIV/Aids – getting stronger and stronger. Diabetes. Arthritis. TB. High blood pressure. ALL INCURABLE. Young people dying.	Decreased a lot due to HIV/Aids. People dying. Young couples are dying and leaving young children. Urban migration so houses are empty.	Forest is gone – no more control /management. Cutting down forest because not employed	Violence. Murder – no reason, just cruelty. Jealousy. No hope.	Cannot discipline children anymore – get arrested. Fighting, conflict and disrespect. Laws making women unmanageable.	Government and freedom causing change. Laws changed people's behaviour, no more respect
1990s	Pass laws scrapped. People get more work. Things improved for people with education. Still farming, but struggling, much less livestock	Good weather	More diseases (than before). Throat and cervical cancer. TB – always. Livestock diseases – inflicted intentionally?	About half as many people as before	Forest beginning to disappear	People angry, lots of fights, stock theft, burglary.	A lot of disrespect. Divorce becomes common. Women don't want to be obedient. Govt deals with marital problems. Is it because of freedom?	
1980s	Working away from home, generally as labourers	Good weather. One drought – many cattle died	Cholera. Beginning of diseases. Mad cattle. Govt officials still coming in	Still lots of people. People scattered around	People still happy with the forest	Mood changes to unhappy – because people are scattered.	Better than now	
1970s	Forced to go to work – govt forced cattle numbers down. Two month contracts. Afrikaaners beat workers	Good, reliable weather	Start seeing medical doctors. TB. Gonorrhoea. Epilepsy. Livestock still as before	Still as many people as in the 1960s	Still lots of forest, as in the past. Houses on hilltops used to be fields	Still happy compared to now	Still the same as in the past	1976: Transkei gets independence. Apartheid getting much worse
1960s	Started experiencing poverty. Had to find work – laws and restrictions. Still had fields and gardens.	Good, reliable rains	White people come in with medicines for livestock and people but everyone gets sicker afterwards	Lots of people, more than today	Same as below	Mood starting to change – feel abused. Life is getting difficult	Same roles as in the past. A lot of respect between husband and wife	Riots
Grand-parents	Imifino (wild spinach). Livestock. Maize. If a household did not have cattle, the community would help. Healthy food.	Good rain throughout the year – sometimes you couldn't cross the river. Drought not common.	No diseases for livestock – very healthy. Occasional fevers – would go to forest, pick medicine, and get better	More people than now. Lots of elders still having children. People had great, great grandparents alive.	Forests managed. Thicker than today. More than 3xas much forest as today	Very happy. No anger.	Woman manages the household and children. If difficulties, consults husband. Man looks after livestock and crops.	Most people want to go back to this time

2003; Alber & Hart, 2009). These trends are confirmed in the livelihood portfolios of these sites (Chapter 8).

Both groups also expressively disapproved of the youth, who were seen as disobedient and protected by too many rights. Disapproval of the youth was worse in Lesseyton, where the youth reportedly did drugs and crime and drank too much alcohol in local taverns. In Gatyana, more emphasis was placed on the disobedience of women than of children; although this may have been because men dominated this particular group. Traditional Xhosa culture maintains strict patriarchy and seniority principles, but such norms are becoming increasing context dependent and are less strict in urbanised settings compared to rural areas (Rudwick, 2008). The emphasis placed on youth both in these groups and in other workshops (e.g. see 6.2) strongly emphasised the need to understand a youth perspective (see 5.2.2). The greater emphasis placed in the disapproval of women in Gatyana frequently emerged in studies of changing rural livelihoods in the Eastern Cape. It has been linked to tensions that arose from male migration, particularly in rural areas, as woman remained the men's link to the homestead. This dependence on the women, together with income-earning initiatives she might undertake while her husband was away, challenged the man's authority and patriarchy (Hebinck & van Averbeke, 2007).

Many of the key concerns identified by the elderly highlight linkages across socio-ecological systems and how strain is compounded through multiple stressors acting at once. For instance, crime and overpopulation, coupled with already infertile land, renders farming very difficult (Table 6.2.1 a).

Both groups repeatedly mention tuberculosis (TB) as being a major health problem in the area for several decades. TB frequently emerges in South African health histories where it is frequently associated with poor working conditions on mines and general over-crowded living spaces (see 5.3 below). TB is a major risk-factor for HIV/Aids in South Africa, particularly as strains are becoming drug-resistant or 'incurable' (Bates et al., 2004). This re-enforcing relationship is worsened when stigma towards HIV/Aids is transferred onto TB 'as a marker for HIV' as the two are closely linked in South Africa (Møller & Erstad, 2007). This compromises TB treatment, with subsequent implications for HIV/Aids, and vice-versa (Møller & Erstad, 2007).

The elders' tendency to critique rights and freedoms has implications for the role of indigenous knowledge in development. The preservation of indigenous knowledge, value systems and traditional cultures are seen vital components of sustainable development (van Kerkhoff & Lebel, 2006), yet development rests heavily on the promotion of human rights (Manzo, 2003; Demin & Zhengai, 2008; see 6.6.2).

5.2.2 Participatory identification of past, present and future problems by youth

The youth identified many of the problems and trends that were identified by the elderly, although new concerns were raised reflecting their age-group and interests.

In Lesseyton, the youth's descriptions of problems in the past were the lack of electricity, education and quality employment (Table 5.2.2 a). While the area now had electricity, new social and environmental problems had emerged from the lack of employment and education, such as crime, substance abuse, teenage pregnancy, health problems, water shortages and pollution. The group felt that these problems would only get worse. Overall the main emphases for causes were a lack of education and responsible behaviour, and the tendency to respond to problems with conflict and apportioning blame. Of concern is the identification of prostitution as a response to problems in the area (notably unemployment). Transactional sex as a form of livelihood or as a coping strategy is increasingly emerging within marginalised urban settlements in South Africa, and has severe implications for HIV/Aids (Hunter, 2007; Hunter, 2010). Female sex workers vulnerability to HIV/Aids is heightened through multiple sexual partners, their frequent lack of agency in negotiating condom use, and discrimination by health care officials (see 6.2.2; Scambler & Paoli, 2008).

Table 5.2.2 a: Past, present and future problems, youth in Lesseyton

	Problems	**Causes**	**Responses**
Past	No electricity Not educated Low income	Service delivery Low education level = low income	Look for employment Sell livestock
Present	Not enough water Unemployment Health problems Crime – murder, rape Unhealthy environment (litter, animals) Substance abuse Lack of information – distance Teenage pregnancy	Lack of education Theft of taps Dumping in the bush - Unclear access rights to dumping site Drugs and alcohol - Lack of recreation - Peer pressure - Media Ignorance Unemployment	Jojo tanks Sell vegetables, sew clothes and other self-employment Prostitution Community punish criminals Contraception Use school library People clean up area CONFLICT AS A RESPONSE IS NOT WORKING
Future	The same problems as present, but worse	Youth abusing drugs and alcohol Youth setting bad example for peers Leaders are corrupt and selfish	Knowledge sharing - Guest speakers - Evening classes - Community library - Adults should start this Leaders should be more educated so they take issues seriously Recreational activities More police and police stations More community skills-based programmes Environmental regulations Elderly supervision for youth Employ more nurses Street committees

The group of youth in Lesseyton imagined idealised responses to address future problems. These focused on education and better governance: knowledge sharing, skills training, better educated leaders, environmental regulations, street committees, more police and more supervision for youth. They also suggested improving healthcare by employing more nurses and having more recreational activities for youth to participate in.

In Gatyana, the youth identified the lack of rights, education, transport and forced marriages as problems of the past arising principally from Apartheid and the lack of money (Table 5.2.2 b). Present day problems mostly revolved around inadequate services – schooling, recreational facilities, electricity, roads and water – and also included crime and a decline in farming. The group anticipated that these problems would be worse in the future, and that teenage pregnancies would also continue to rise. The group felt that corruption, poverty, lack of education and lack of discipline (or consequences to a person's actions) were the main causes of present and future problems.

Table 5.2.2 b: Past, present and future problems, youth in Gatyana

	Problems	**Causes**	**Responses**
Past	No education Transport Forced marriage No rights	Children working, doing domestic duties No money for transport Wanting money for marriages Apartheid	Electricity Stronger and more policing No bail for arrests – harsher consequences More trained/qualified teachers Government should provide agricultural support Government should regulate child grants
Present	Inadequate school and recreational facilities, teachers No electricity Service delivery and roads Walk far for water Livestock theft Violence and crime Farming less People are judgmental Lack of information, e.g. for bursaries	Corruption in school - No money Corruption in municipality No water tanks and dams Poverty = theft Substance abuse - Lack of education	
Future	Violence and crime No farming No proper schools Teenage pregnancy increase	Government failing to deliver Lack of discipline - Democracy No consequences to crime	

The group of youth in Gatyana thought of idealised responses needed to address present and future problems. These included the provision of electricity, improved policing services and harsher punishments for criminals, more qualified teachers, agricultural support and government regulations of child grants (to discourage abuse of child grants).

The youth in Lesseyton did not mention farming at all, whereas the group in Gatyana felt that the present-day decline in farming was a problem which was aggravated by livestock theft and a lack of agricultural support. A decline in the perceived value of farming amongst youth in other urban areas in the Eastern Cape has been reported elsewhere, where the youth perceived food gardening as old fashioned and thus undesirable, as it was easier to purchase food and so cash incomes are seen as more desirable (Møller, 2005; Aliber & Hart, 2009). Møller (2005) suggests that this failure in the intergenerational transfer of values toward food gardening has implications for sustainable community development, as many development practitioners emphasise the importance of community and homestead gardens for food security and wellbeing. The general decline in farming as a dominant livelihood in rural areas in South Africa (see also 5.2.1) can also been attributed to migrant labour and children attending school, which decreases the amount of labour available to a household (Andrew & Fox, 2004). The cause aside, the resulting disconnect from the land and decline in the perceived value of homestead farming results in the potential loss of multiple benefits. These benefits include communal ethics relating to farming, and other social and cultural benefits (Andrew & Fox, 2004, see 6.2.1), reinforced ownership and entitlement rights (Timmermans, 2004), the supplementation towards incomes and food security, and providing a possible safety net (Hendriks, 2003; Aliber & Hart, 2009; Hebinck & Lent, 2007).

The youth in general in Lesseyton received a lot of criticism from the elderly group, who described the youth as destructive, undisciplined and abusive of alcohol and drugs (see 5.1.2). The Lesseyton group of youth also readily identified the problem of alcohol and substance abuse amongst their peers, and felt that aside from media and peer pressure and the lack of recreational activities, supervision from the elderly was inefficient. The group of Lesseyton youth felt that more knowledge sharing, guidance and recreational activities would help problems of substance abuse as well as that of teenage pregnancies. However, the Lesseyton group felt that the leadership in the area – both the formal authorities and the adults in general – were dismissive of this need when it was raised by the youth. These trends, together with the general perception amongst the youth of a hopeless future, their own general lack of empowerment and poor adult role models are in line with findings of youth in marginalised communities elsewhere in the country (Campbell & MacPhail, 2002), and emphasise the need to incorporate youth in community development.

Both youth groups placed a strong emphasis on education, schooling and knowledge, whereas these themes were largely absent from both elderly groups' timelines. Knowledge and agency are important aspects in HIV prevention strategies, which counter-act the negative behaviours arising from not being able to imagine a bright, hopeful future (Campbell & MacPhail, 2002).

5.3 South Africa's past, present and future vulnerability context

5.3.1 Introduction

South Africa is a country of stark contrasts as much in its landscapes as in its socioeconomic indicators. Discrepancies in rights of access to quality natural resources and health care have featured across its history, shaping current access to these resources with consequences for present-day livelihoods and the HIV/Aids endemic. While driven partly by racial supremacist ideologies of the ruling class for over a century, these discrepancies are largely understood as being classist and derived from the capitalist expansion of the country's industrialisation processes (Davies et al., 1985). The history of wealth accumulation for the white minority of the country is inextricable from the history of deprivation of its majority black population, whether in rural areas, urban housing or informal settlements (Davies et al., 1985; Bank & Minkley, 2005). This exploration shows the disproportionate rights of access and opportunities, and the erosion of institutional capacity and of multiple forms of communal and private/personal assets.

Today South Africa has one of the highest rates of HIV/Aids infection on the continent (UNAIDS, 2009). Yet South Africa is comparatively well developed, with a higher GDP per capita than many other countries with far lower rates of infection, and the best health and economic infrastructure on the continent (Obi et al., 2006; Thornton, 2008; Hunter, 2010). However, it is also a country of inequality, with a GINI coefficient of 0.67 (RSA, 2009). While South Africa's HDI has generally been higher than most other countries on the continent (Obi et al. 2006), is has been suggested the decline in the index from 1990 to 2005 can be attributed to a decrease in life expectancy resulting from HIV/Aids (SAIRC, 2011). To try to understand the HIV/Aids epidemic in South Africa and its links to socio-ecological vulnerability, it is useful to provide an historical overview that incorporates socioeconomic, political, biological, anthropological, psychosocial and geographical perspectives.

The slow and inadequate rate at which South Africa is currently transforming to redress historically-rooted vulnerability and create a resilient society has implications for future stresses and uncertainty, particularly when considering climate change.

5.3.2 The Past: Dutch (1652 – 1800) and British (1800 – 1910) Colonisation

Before colonial settlement in South Africa, use of the land and its resources differed according to climate and vegetation. Pastoralism combined with hunting and gathering was more predominant on the dryer, sparser western half of the country, while more settled agriculture and animal husbandry was more common on the wetter eastern side (Hall, 1987). The area now the Eastern Cape was dominated by isiXhosa speaking agro-pastoralists from around the fifteenth century when they gained control of the area from Khoisan pastoralists (Ainslie, 2002). The amaXhosa kept cattle mainly as a medium of wealth and exchange, cultivated sorghum amongst other crops, while hunting wild game and collecting wild edible plants (Ainslie, 2002).

This way of life was disrupted when land, and especially scarce, valuable water sources were increasingly appropriated by colonial settlers after the arrival of the Dutch East India Company in 1652 (Guelke & Shell, 1992). The arrival of the 1820 (British) settlers facilitated the spread of permanent European farming eastwards into the fertile grazing lands controlled by the amaXhosa. The frequent clashes between the two groups and use of violence and warfare saw homesteads and fields burnt, cattle stolen or killed and land occupied. This upset amaXhosa political power structures and alienated people from their land, forcing them to work on farms or rent land from colonial farmers with increasingly limited rights. Slaves were brought to Cape from west Africa, Mozambique, India and Indonesia from 1654, while most ancestors of the country's present day Indian population were brought to Natal from 1859 to work on sugar plantations.

Particularly around the Cape Colony, many employers paid workers in addictive, previously unencountered substances such as alcohol and tobacco, making them dependent (Gordon, 1996). This 'dop' system – the practice of paying farm workers alcohol as part of their wages – has continued through to today with health impacts, as well as increasing the risk of occupational hazards, and with broader social implications of marginalisation and discrimination (London, 2009).

The discovery of diamonds in 1868 and gold in 1886 further drove land alienation and indentured labour for the mines through coercive legislation on land access and production and various taxes. The new dense concentrations of people working in mines and the rapidly developing towns around them, coupled with the growing impoverishment in rural areas, had implications for health and wellbeing across social spheres (Anderson & Marks, 1989).

Colonial authorities primarily responded to outbreaks of disease – such as syphilis, smallpox or bubonic plague –when these diseases threatened white towns (i.e. when they might move from rural areas). The response was usually through increased segregation measures, not by responding to poor housing, low wages, inadequate water supplies and sanitation, or the disproportionate allocation of health resources (Anderson & Marks, 1989). Perceived differences in physiology to account for disease was used to justify segregation and 'white paternalism', in a similar way to how malnutrition was accounted for through differences in farming practices to justify the appropriation of land (Wylie, 2001).

Aside from the danger of physical injury, mine workers had a high incidence of respiratory diseases such as miners' phthisis, tuberculosis and pneumonia (Anderson & Marks, 1989). The effects of disease went beyond the individual and infected families back home. The high rate of tuberculosis amongst black mineworkers was explained through cultural, then racial, determinants to avoid costly reforms on poor nutrition, overcrowded housing and lack of sanitation facilities on the mines (Packard, 1987). When these conditions were improved, it was only to stem the high mortality rates threatening the mines' production and out of concern for white mine workers, particularly those

coming in from the UK who quickly became ill. Health costs were still largely externalised as mine-owners took no responsibility for the worker once away from the mine, nor for his family (Packard, 1987).

In terms of vulnerability, this period in South African history featured diseases associated with poverty, with epidemics of syphilis, tuberculosis and cholera, augmented with a highly fragmented and disproportionate health care system (Coovadia et al., 2009). The rapid transition from an economy based on agriculture to an industrial economy and the accompanied centralisation of land ownership took place "virtually overnight" (Davies et al., 1985) whereas the same transition took several centuries in Europe (Wylie, 2001). The loss of agriculturally-based livelihoods and related food insecurity coupled with increased health burden from increasing urbanisation and the transportation of disease to rural areas upset livelihoods and lifestyles; this stark dichotomy because rural and urbanised areas and associated quality of life, however, only continued and worsened and is still evident in the Eastern Cape today (Bank & Minkley, 2005).

5.3.3 Segregation (1910 – 1948)

The need for produce around the mines was largely met by successful black peasant farmers, and this, together with the mines need for cheap labour, stimulated the formation of the 1913 Native Land Act, which demarcated that only 7.3% (extended to 13% in 1936) of the land could legally be owned by black Africans. These demarcated 'homelands' rapidly became over-populated, and some of these areas quickly became degraded and unproductive, while white owned farms increasingly grew to supply export produce (Davies et al., 1985). The majority of the black population moved from being able to support themselves with adequate subsistence, with some trading to colonial markets, to now having to purchase food (Anderson & Marks, 1989). These shifts had affects on gender relations, as the traditional roles on the homestead are shifted and compromised (Hebinck & van Averbeke, 2007). As the lengths of migrants' work periods and subsequent time away from home were extended, migrant labourers increasingly grew disconnected from rural life, the land and land-based livelihoods (Hebinck and van Averbeke, 2007). A divide grew between migrants that sent money home to develop the homestead, and those who chose to rather form a life in town (Hebinck and van Averbeke, 2007).

By the late 1920s, more than 90% of adults in the 'homelands' of the Transkei and Ciskei had been infected with tuberculosis (Coovadia et al., 2009), and by the 1930s, 40% of the mine labour force came from the Eastern Cape. A nutrition survey in the Transkei and Ciskei maintained that 25% of children died in their first year (Anderson and Marks, 1989), with deficiency diseases being common. Coovadia et al. (2009) state that low wages, overcrowding, inadequate sanitation, malnutrition, and stress led to a high burden of poverty related diseases, and that a lack of income also perpetuated

violence and crime in these areas. Abduction and rape were common features in township life in the Witwatersrand from the 1940s (Coovadia et al., 2009), and escalating violence against women in the Ciskei in the 1940s and 1950s has also been documented (Marks, 2002).

The growth in towns and in South Africa's involvement in international markets over the previous century also spurred the manufacturing industry in the country, and mills, textiles and processing factories all steadily grew. Occupational health hazards were pervasive for factory, mining and agricultural workers, and these industries (and later, the refining industry in particular) also profoundly polluted air, soil, and especially water in their surrounds, affecting the health of marginalised informal settlements living in these areas (Packard, 1989; Nweke & Sanders, 2009; Adler et al., 2007; Fig, 2007). Although the majority of the manufacturing industry was and has remained mostly in Gauteng and Kwazulu-Natal, it is still applicable to the country as a whole due to the high rates of migrancy and movement.

This period saw the start of state provided social welfare, with pensions, child grants and disability grants initially awarded only to whites and coloureds, but extended to other racial groups in the 1940s, although still with stark discrepancies in uptake and monetary value (Liebenberg & Tilley, 1998).

The intensification of industrialisation processes and associated urbanisation and migratory labour further entrenched health problems associated with industrial development, loss of agricultural livelihoods, and migrancy, whilst there were still vast disparities in health care (Coovadia et al., 2009; Anderson & Marks, 1989). This period also saw heighted violence on the mines, and increased sexual violence against women, which continues to this day (Coovadia et al., 2009; Zwi & Cabral, 1991).

5.3.4 Apartheid (1948 – 1994)

The so called 'Betterment schemes'[1] were implemented from 1930s to the 1960s by successive governments under the claim of improving declining soil fertility and rising hunger in the 'homelands' (De Wet, 1989). In order to create a capitalist rich farming peasantry, small farmers in the 'homelands' were pressured to give up their land by limiting communal grazing and cultivation, implementing taxes on huts and cattle, and culling 'excess' cattle (Davies et al., 1985).

The 1960s and 1970s also saw the mechanisation of white agriculture as well as the switch from a labour tenant system to contract labour. Both of these changes in effect rendered most of the labour in the 'homelands' superfluous at the same time as populations in the 'homelands' were increasing through forced removals (Davies et al., 1985). These changes resulted in urbanisation and the rapid

[1] Betterment schemes refer to the attempts by successive governments to ostensibly combat soil erosion, conserve the environment, and develop agriculture to cut down on migration out of the 'homelands'. Betterment areas were divided into residential areas, arable lands and grazing commonages, to which households were later apportioned their own specified access. This resulted in substantial movements of people both within and out of rural areas (De Wet, 1989).

growth of townships and locations around large towns. This growth was further stimulated by the relaxation of migratory laws which acted as influx controls around the 1980s, and rising unemployment in other sectors. In 1974, 83% of the employed Transkei male workforce worked away from their homes (Marks, 2002). Increasingly capital-intensive modes of production and reduced foreign investment saw unemployment rise since 1974, with implications for the wellbeing of rural livelihoods which had already been disrupted by the repeated loss of land (Coovadia et al., 2009).

Migrancy and unemployment also has multiple implications for family structuring. Traditional rural youth groups which, amongst other benefits, upheld a social ban on premarital penetrative sex, were disrupted through increased urbanisation, with implications for teenage pregnancies (Coovadia et al., 2009). Growing impoverishment from the 1950s made it increasingly difficult for men to pay bride wealth, and there was a decline in marital status amongst black Africans in the 1960s (Coovadia et al., 2003). The disruption of family structures has far-reaching consequences on inter-generational human and social capital, such as the effects of absent fathers undermining the socialisation of children (particularly boys), while the absence of any parent has profound impact on the emotional development of a child. Coovadia et al. (2009:7) claim that in South Africa "there are high levels of sexual, physical, and emotional abuse and neglect of children, which has major effects on their mental and physical health, and increases the likelihood that boys will become involved in crime and violence."

Poverty related diseases persisted in the reserves and marginal urban settlements, where maternal, infant and child mortality remained high. The apartheid state took over mission hospitals, which had been the main health services in the 'homelands' and for-profit or private hospitals expanded in the 1980s and into the 1990s as part of successive governments' policies of privatisation (Coovadia et al., 2009). Qualified general doctors working in the private sector had increased from 40% in 1980 to 62% by 1990. Government spending on whites per capita was ten times higher than that on blacks in 1987 (Grundlingh, 2001). Other social development was equally skewed: in 1980/81 education spending per head on white children was five times that for black children as a deliberate policy to educate blacks only to the level of menial labour (Coovadia et al., 2009); in 1986/7 R1 billion was budgeted for development aid of non-whites, comprising 85% of the population, compared to R2.1 billion for whites (Anderson & Marks, 1989).

By end of Apartheid, the new democratic government was faced with growing unemployment, deepening poverty and related health problems, a further decline in marriage and break-up of traditional household family structures which saw children increasingly raised by extended family, a rise in mental health problems associated with apartheid amongst black and coloured people; higher rates of tuberculosis-related deaths in these populations; increasing violence, and a highly stratified society along racial lines (Coovadia et al., 2009).

5.3.5 Democracy (post-1994)

The post-1994 democratically elected government has gone far to redress the injustices and differential rights of access, but inequality and poverty persist.

Access to basic housing and services through the government's Reconstruction and Development Programme (RDP) followed by the Growth, Employment and Redistribution (GEAR) programme, have improved housing and basic services for millions of South Africans. Access to electricity has risen from 51% in 1994/5 to 72% in 2006/7 and access to sanitation increased from 50% in 1994 to 73% in 2007 (Coovadia et al., 2009).

However, land reform has been slow and inadequate. By February 2005, 3.5 million hectares had been transferred through all the different aspects of land reform – accounting for approximately 4% of agricultural land (Hall, 2007). At the onset of the programme, the target was to reach 30% by 2015. To achieve this goal, land reform would have to increase its current pace eight-fold (Hall, 2007). As of 2007, as much as 28% of the population (13 million), mostly black, were still living in the former 'homelands', with contested land rights and disordered land administration (DEAT, 2007). Here overcrowding persists, combined with a lack of basic services such as electricity and sanitation, placing strain on natural resources and leading to further land degradation (DEAT, 2007). These dichotomies are readily apparent in the Eastern Cape and former Transkei (Bank & Minkley, 2005). Coupled with this failure of South Africa's land reform programme, the adoption of the neo-liberal macro-economic framework of GEAR saw a 180% increase in the number of households without any measurable income as unemployment increased, leading to a growth of informal settlements (Cottle, 2006). Around 12 million South Africans lived in shack dwellings or informal settlements in 2006 (Cottle, 2006). In the Eastern Cape, discrepancies in land ownership are still deeply entrenched, with approximately 59% of the Eastern Cape controlled by about 6 500 commercial white farmers in 2005 (Lahiff, 2005).

Social welfare in the form of government provided grants was expanded and equalised along racial lines. The South African government provides 15.2 million people with grants to alleviate poverty and redistribute wealth. These are mostly child grants (the guardians of 10 million under-18s benefit from this grant), followed by 2.5 million pensioners' grants for people older than 60, with the remainder made up by war veterans' grants, disability grants, foster-care grants and care-dependency grants (Donnelly, 2012). Despite redressing wealth inequality through the government-provided social grant system, inequality grew in the first decade of democracy, although less than would have been without the grants. Unemployment rose between 1995 to 2005 by 12-72% for 15-24 year old women and by 11-58% for men of that age (Republic of South Africa, 2006 cited in Hunter, 2010) due to trade liberalisation and reducing trade tariffs to attract foreign investment (Hunter, 2010).

Other forms of social welfare include free education at government schools, some of which also receive free meals, and free state-provided healthcare. While the separated health administrations were consolidated into one national and nine provincial health departments, with free primary health care made the priority to redress historical inequities, there are still divides between public and private sector access and quality. Access to private sector medical care is limited, at 15% of the population, yet it accounts for 46% of all health-care expenditure (Coovadia et al., 2009). Health disparities are evident: the age standardised asthma related death rate amongst men in the Eastern Cape was four times higher than the comparatively more developed Western Cape in 2000, while the death rate for tuberculosis in the Eastern Cape was three times higher than in Gauteng, the economic hub of the country (Coovadia et al., 2009).

HIV prevalence grew rapidly following the first democratic elections in 1994. The rates of HIV infection amongst women attending antenatal clinics rose from 0.7% in 1990, to 8% in 1994, to 30% in 2005 (Coovadia et al., 2009), although initial figures are underestimated due to underreporting. In 2009, an estimated 5.6 million people were living with HIV/Aids in South Africa and 310 000 South Africans died from Aids-related illnesses (UNAIDS, 2011, 2010).

South Africa's history shows how segregation, deagrarianisation and industrialisation have worked concurrently to shape the country. The history of these processes traces the continual breakdown of multiple forms of capital, together with the disruption of livelihoods. Natural capital has been eroded, both in communal areas and as household's rights to ownership diminished (Davies et al., 1985; Hall, 2007). Human capital was continuously eroded through inadequate health care and education services (Coovadia et al., 2009. Human capital was also eroded through a breakdown in inter-generational knowledge and skill transfer systems, as families were split up over distances and as family structures became less secure, leading to a loss of appropriate socialisation, affecting social capital (Coovadia et al., 2009). Disproportionate access to quality jobs impeded the build-up of financial capital, and large areas of the country's physical capital were not developed for a long time (Bank & Minkley, 2005; Hunter, 2009).

Government efforts to address the HIV/Aids epidemic have seen an improvement with the roll-out of antiretroviral treatments and awareness raising. While these interventions have led to a rise in South Africa's average life expectancy since 2005 (SAIRC, 2011), HIV/Aids still remains a critical concern in South Africa, primarily affecting black women and rural households (Marks, 2002; Drimie & Gillespie, 2009).

Stark comparisons exist between areas in South Africa, frequently seen as two countries because of the dichotomy in quality of land, development and services (Bank & Minkley, 2005; Meadows and Ashwell, 2003). Within this context, new livelihood stressors pose a dire threat, particularly to rural areas. Meadows and Ashwell (2003) take into account rainfall, geomorphological factors, historical

and political circumstances and suggest that the former 'homelands' of South Africa are more susceptible to further intensification of land degradation due to climate change.

5.5.6 Future vulnerability: climate change

Climate change will increasingly affect the vulnerability of socio-ecological systems in South Africa. Water scarcity is increasingly becoming a concern for South Africa, which is an arid to semi-arid country, and climate change induced variations in rainfall and could exacerbate this state (Taylor, 2009). South Africa is currently warming at about twice the average global rate, and this trend is predicted to continue (Scholes, 2011), with implications for the country's ecosystem services. Changes in temperature and precipitation, with more erratic and extreme rainfall patterns, will lead to changes in ecosystem functioning and shifts in biome and species' ranges, which is likely to lead to a loss of biodiversity (Turpie, 2006). Erratic rainfall and possible changes in rainy seasons, in conjunction with an increasing temperature, will affect commercial and subsistence agriculture. The production of maize, the staple for the majority of the population, is predicted to decrease by 30% by 2030 (Lobell et al., 2008). Livestock are an important source of income, food and security for rural households (Shackleton et al., 2009). As air temperatures approach the body temperature of livestock, the production of milk and the animal's reproduction rate decrease (Scholes, 2011). Bush encroachment into rangelands can also decrease the amount of grazing land available in some areas (Turpie et al., 2006).

It is predicted that the Eastern Cape will experience its highest temperature increases towards the north-west of the province, while the coastline is likely to have the lowest increases (ECDEDEA, 2010). Higher temperatures will be associated with increases of evaporation rates and the increased intensity of droughts (ECDEDEA, 2010). Increased precipitation is more likely towards the east of the province (Johnston et al., 2011). Where agriculture, fishing, or natural resources are key components of a household's livelihood in the Eastern Cape, climate change could have a direct affect (ECDEDEA, 2010), while fluctuations in food prices, rising unemployment and a generally unstable economy through climate change induced strain on key sectors could stress livelihoods even when they are not directly based on these activities (Kiker, 2000).

Asides from the implications for human health through decreased food security and through further pressures on the availability of quality water, climate change will also have direct human health affects (discussed in 3.2.2). These include the spread of water-borne diseases, heat-related morbidity and sanitation-related illnesses. Areas with insufficient health-care and basic services are likely to be more affected by these risks, based on the higher vulnerability of these areas to disease in general (Coovadia et al., 2009). It has been suggested that the high prevalence of HIV/Aids in South Africa would exacerbate the effects of climate change on disease prevalence (van Jaarsveld & Chown, 2011).

For the Eastern Cape, the elderly, poor and infirm (such as HIV/Aids patients) are predicted to feel heigtened effects of increased mean temperatures and heat waves (ECDEDEA, 2010).

5.3.7 Dynamic understandings of vulnerability

The history presented here to account for the temporal origins of present-day vulnerability in South Africa has linked the three main tiers of socio-ecological systems that define most understandings of sustainable development: those of ecology, economics and society (see 3.2.5; 3.4.6). Access and availability of resources emerges as key to understanding present day human vulnerability in South Africa when assessing the country's history. Across this history, various ideologies have motivated and shaped the allocation of resources, affecting health, understandings of health, and responses to ill-health. Changes in dominant views, both of vulnerability and of appropriate development approaches, highlight that social systems are dynamic and multi-faceted.

Until recently, vulnerability in South African historical narratives was more often posited as arising primarily from social systems, while the 'environment' generally only featured as a back-drop (Caruthers, 1990; Nell, 2004). Although most histories of South Africa focus on land issues, agrarian changes, and conservation, only recently have mutually shaping relationships along human-environment interfaces been highlighted (Carruthers, 1990).

Emerging socio-ecological histories include the longitudinal legacy of mining industry on South Africa's water sources and the long-standing effect on neighbouring communities (Hanlon, 2010) and analysing changes in cultural landscapes over time to analyse socio-economic impacts on land-cover change (Giannecchini et al., 2007). Percival and Homer-Dixon (1998) revisit the heightened violence in South Africa at the time on Nelson Mandela's release, when violence was least expected, and attribute this to declining environmental resources and increasing population densities coupled with weakening institutional capacity.

When medical researchers first encountered the rapid spread of HIV/Aids in heterosexual populations in Africa, they turned to anthropologists, who argued that sexual promiscuity was culturally determined (Packard & Epstein, 1991). This not only side-lined other research paths, but also placed blame and responsibility on the infected person, resulting in internalised stigma and social discrimination. In retaliation to cultural explanations, a more popular understanding for the spread of HIV/Aids in the 1990s was the 'male-migrant-infector-model' developed by Kark in 1949, which linked AIDS "to the most potent symbol of apartheid, migrant labour" (Hunter, 2010:27). Kark (1949) showed that men were leaving their homes, getting infected with syphilis, and then returning to their homes and infecting their rural wives. This model was widely used to explain the South African epidemic (e.g. Horwitz, 2001).

Understandings of HIV/Aids in South Africa have increased to include a variety of explanations for why South Africa has the single largest population of people living with HIV/Aids, and why prevalence is highest amongst black women in marginalised communities. Some of these understandings are more biophysical or ecological in approach, such as the inter-play between HIV/Aids and malnutrition or additional infections (Stillwaggon, 2006; Gillespie et al., 2001; Loevinsohn & Gillespie, 2003). The alienation of South Africans from quality land and other natural resources can partly explain the epidemic today. Many also criticise the history of poor health service delivery and inappropriate government responses during apartheid and post-1994 and attribute this to the rapid spread of the epidemic from 1990 to 2005 (Grundlingh, 2001; Coovadia, et al., 2009; Posel, 2005; Natrass, 2008; Marks, 2002).

Some researchers re-approach the sexuality of the epidemic, and explore the "social, political and economic forces, and not simply culturally determined, patterns of behaviour" (Packard & Epstein, 1991). These approaches interlink psychosocial reactions to socioeconomic or political factors. For instance, Campbell & MacPhail (2002) highlight how the perceived lack of opportunity and sense of hopelessness amongst youth in marginalised communities transpires in risk-taking behaviour. Hunter (2010, 2007) refuted the 'male-migrant-infector-model' by exploring how informal sexual economies play a role in women's subsistence in informal settlements, where a disproportionate rate of new HIV infections occurs. This is due to the links between unemployment, the marginalisation of women, rapidly declining marital rates (due to women's entry in the job market and men being unable to pay brideswealth), together with women's migrancy and movement (migration rates for men and women in some informal settlements are nearly equal). Hunter's studies (2007, 2010) add a 'health geography' perspective.

The high rates of violence against women have been theorised as resulting from disrupted gender dynamics across South Africa's history: masculinities defined by physical strength and an acceptance of hierarchal authority, men's need to assert patriarchal domination in a changing world, and the loss of economic value of women's fertility (Marks, 2002; Coovadia et al., 2009). Linked to this, it has been suggested that violence has become entrenched as part of South African culture, as violence breeds more violence (Coovadia et al., 2009; Zwi & Cabral, 1991; Marks, 2001). It has also been suggested that disrupted families have worsened this violence: in a study of rape perpetrators in South Africa, Jewkes et al. (2006) found that partner and non-partner rape were both associated with negative childhood experiences. As mentioned above, an additional perspective is the role that environmental resource scarcity can play in facilitating or triggering violence (Percival & Homer-Dixon, 1998).

Examining the history and historiography of health in South Africa highlights how holistic understandings of vulnerability can be marred by dominant racist, political or economic ideologies of

the time. New understandings of HIV/Aids and vulnerability in South Africa are ecological in the sense of incorporating environmental determinants of human vulnerability as well as multiple social dimensions, which are themselves intertwined, and of exploring how human activities in turn can negatively affect the environmental conditions which facilitate human wellbeing.

5.4 Addressing present and future vulnerability

Both the youth and elders descriptions of changes in problems from the past to the present emphasise the historically-rooted nature of the stressors of poor education, unemployment and lack of basic services which were forcibly imposed by authoritarian apartheid governments (see 5.2). South Africa's history shows the continual erosion of multiple forms of capital and associated livelihoods for black South Africans, particularly in rural areas (see 5.3). The pervasive and deeply endemic nature of these problems is pertinent in addressing ideas of justice in understandings of development in South Africa, and, linked to this, understandings of minimising vulnerability and strengthening adaptive capacity (Hassim, 2008; Nattrass, 2007).

Efforts to redress inequalities have mainly taken three forms: an extension of social welfare grants, service delivery and the provision of basic housing, and land reform. Land reform in South Africa takes three forms: restitution, redistribution and tenure reform. Restitution allows anyone disposed of their land by the 1913 Native Land Act to claim restoration of ownership or monetary compensation, but this has not adequately transferred ownership. Restitution works on a 'willing buyer-willing seller' principle, and most settled claims have been urban (88.2%) and most have been settled with financial compensation (69.7%) and so there has not been a creation of a commercial rural farming class (Lahiff, 2008). Land redistribution awards grants for purchasing land to anyone formerly oppressed and wanting farm. These grants are, however, far too small, resulting in applicants 'pooling' their grants together leading to disputed ownership rights and tension (Hall, 2007). In the Eastern Cape, successful redistribution of land transfers represented 1.4% of the white owned agricultural land in 1994 (Bank & Minkley, 2005). South Africa's agricultural market has become increasingly centralised, competitive and capital intensive, and the failure to deliver adequate post-settlement support on effective land use practices and management or market training has rendered transferred land unproductive and fallow (Hall, 2007). It has been suggested that this effort is misplaced and should rather be directed towards smallscale, often subsistence, farmers in the former 'homelands', as agriculturalists in these communal areas outnumber redistribution beneficiaries by 20 or 30 to one (Aliber et al., 2009; Bank & Minkley, 2005). Structural changes need to be made to patterns of production, marketing and settlement so that smallholder farmers, who might not produce exclusively for the market, can be successful (Hall, 2009; Bank & Minkley, 2005). Intensive, smallholder farming can also be as viable and productive as larger scale ventures (Netting, 1993; Hebinck & van Averbeke, 2007).

In both sites farming had steadily decreased over the decades, to the extent that the youth in Lesseyton did not focus any attention on farming (see 5.2). This simultaneously emphasises the need to support small-scale farmers (Hall, 2009; Bank & Minkley, 2005; Hebinck & van Averbeke, 2007) while questioning appropriate responses and development agendas for areas where farming is not seen as viable to the next generation (Møller, 2005). As the climate is already placing strain on farming, particularly in the more arid landscape of Lesseyton (see 5.2), climate change poses a threat to the continuous functioning of agriculture in these areas. South Africa's climate change response strategy does not pay adequate attention to the adaptation needs of the rural poor (Madzwamuse, 2010).

Other government-led efforts to redress inequalities have taken the form of government-provided grants to redistribute wealth; and to improve housing and the delivery of basic services. This injection of financial and physical capital has not led to any profound change in the vulnerabilities experienced by marginalised sectors of society, as dichotomies are still visible. The majority of the population still utilises an inefficient, inferior and over-burdened health system, and unemployment and poverty are still pervasive. Spatial inequalities have not been addressed, and the poorest South Africans, who are overwhelmingly black, still tend to reside in townships, rural areas and growing informal settlements (Hunter, 2010)."This means apartheid has not died" (Desmond, 2008: 27).

Although inadequate to sufficiently redress inequality in South Africa, government grants are still frequently the only source of income for many households in the most vulnerable sectors of society (Patel, 2012; Møller, 2010; Hassim, 2008; Veenstra, 2008). While there are clearly deep-seated inequalities and experiences of vulnerability, these are not the same concerns as elsewhere on the continent, where food security is often a primary risk factor (Baro & Deubel, 2006; de Waal & Whiteside, 2003). Despite government grants being indispensible for many households in South Africa, they are still often perceived as an undignified means of livelihood, and are frequently criticised and viewed as the cause of multiple detrimental problems in communities (see 5.2 above; see Chapter 6 for more detailed debate; Noble et al., 2008). This contrast highlights a potential barrier to adaptation when there is tension between development practice and local perceptions (Hebinck & van Averbeke, 2007; Moser & Ekstrom, 2010), and emphases the need for community participation and ownership of adaptation and development (Moser & Ekstrom, 2010). The mis-identification of cattle-stocking as a problem in rural areas in the 1930s by 'experts' and subsequent implementation of 'Betterment' policies (see 5.3.4), together with misinterpretation, discrepancies and changing emphases in research over time (see 5.3.7) further emphasises this need (Hebinck & van Averbeke, 2007; Moser & Ekstrom, 2010).

Many researchers and policy makers have debated South Africa's democratic government's attempts at redistribution. Attempts at land reform are widely considered to have failed (Hall, 2007), while the motivations behind and benefits of government grants have been questioned (Hassim, 2008; Veenstra,

2008; Nattrass, 2007; Seekings, 2007). Hassim (2008) argues that fiscal spending on social welfare does not adequately foster capabilities to develop, particularly amongst women. Instead of radically transforming women's vulnerability, households and communities act as "shock absorbers" of the state's failures to adequately transform South Africa into a just society, most notably in terms of its health care system, which externalises the cost of care onto women (Hassim, 2008: 105). Veenstra (2008) examines several household level studies of HIV/Aids which all indicated increased expenses, less money spent on food and education, implying an unsustainable trade-off of developing human capital.

Government policies and popular opinion increasingly express the need for households to be independent from the state and to take ownership of their own development (Donnelly, 2012; Hassim, 2008; Seekings, 2008). However, as the situation stands, this is highly unlikely owing to the extent of relative deprivation and reduced capacity, and more emphatically, to the persistent unavailability of unskilled jobs (Nattrass, 2007; Hassim, 2008). Aside from the issue of justice, the debate raises questions about the actual ability of South African households to face elevating levels of livelihood stress with decreasing capacity and assets.

A more detailed understanding of how households are using their assets and their limitations in the context of multiple stressors is needed to determine the extent to which government or private support is needed, and in what areas, to create development policies that simultaneously confront the multiple stressors to which households are vulnerable. Such an understanding would need insights into how shocks and stressors differentially affect distinct social groups.

CHAPTER 6: DIFFERENTIAL EXPERIENCES OF VULNERABILITY TO MULTIPLE SHOCKS AND STRESSORS

6.1 Introduction

6.1.1 Differential experiences of vulnerability

Vulnerability is generally conceptualised as encompassing a combination of 'external' determinants relating to exposure to shocks and stress and 'internal' determinants relating to the ability to respond to these (Rakodi, 1999; Chambers, 1989). This division between external and internal determinants is increasingly seen as superficial and insufficient, as vulnerability emerges from a combination of these aspects working in unison (Chapter 3; Shackleton & Shackleton, 2012).

To understand vulnerability in a specific context requires an exploration how stressors interact with factors that make some groups of people disproportionately vulnerable to different stressors (O'Brien et al., 2009). This context should incorporate social, economic and ecological spheres and include different spatial scales to capture the multitude of causal relationships (Turner et al. 2003; Holling, 2001). Incorporating broader spatial and temporal scales across socio-ecological systems also contributes to understanding the extent to which vulnerability is emerging beyond the sphere of control of the household, which may imply a limit to the household's capacity to respond (Adger et al., 2009; Brooks et al. 2005). The previous chapter has illustrated the importance of considering temporal dimensions, as many aspects contributing to present-day vulnerability are deeply rooted in the past (Chapter 5).

Factors such as poverty and gender are well documented as being factors that increase vulnerability to HIV/Aids, climate change and a multitude of additional stressors (Eriksen & O'Brien, 2007; Whiteside, 2002; O'Brien et al., 2009; Chapter 3). Marginalised groups frequently lack access to quality goods and services valuable for building resilience to shocks and stressors or for responding to shock and stress in a way that minimises long-term harm (Eriksen & O'Brien, 2007; Chapter 3).

Various contextual factors and household characteristics influence vulnerability by constraining options or by increasing exposure, and different localities and groups also have diverse personal values, ethics and aspirations which influence their perceptions of vulnerability (Davis, 2010; Sen, 1999; Adger & Kelly, 1999). These different personal values and perceptions are also partly defined by contextual factors such as culture or gender roles (Eisler et al., 2003). Identities are important considerations in understanding perceptions of vulnerability, with implications for motivation to adapt (Eakin et al., 2011). This study incorporates a variety of groups in different localities which may have their own distinct perceptions and experiences: men and women, rural and peri-urban and high and low income levels.

6.1.2 Rationale, key questions and hypotheses

In order to address this thesis's broad objective of understanding how capital stocks are used to create livelihoods and respond to stress within the context of HIV/Aids and climate change, an initial understanding of differential and disproportionate experiences of shocks and stressors is needed to understand the vulnerability context. This chapter explores this aspect by answering the question: What defines and shapes vulnerability in the two sites?

This question can be elaborated into the following sub-questions:

1.) At what scales do stressors act and interact?

2.) What do different groups perceive as being the main drivers of vulnerability?

3.) How do factors which may render households vulnerable over-lap?

4.) Do households characterised by different locality, income brackets and gendered headship experience differential shocks and stress?

This chapter will explore different experiences of vulnerability across the two sites. In order to answer questions 1 and 2 above, the chapter starts with a more in-depth look at the current vulnerability context through the use of participatory mental modelling exercises to illustrate the links between multiple problems and vulnerabilities in the two sites as perceived by men and women respectively. To answer question 3, the chapter goes on to explore the distributions of the income and gender groups derived from the survey data across the two sites to assess how important contextual factors over-lap. To answer question 4, additional survey data is used to describe differential impacts of HIV/Aids based on proxy indicators, as well as the different types and frequencies of shocks and stresses experienced in the two sites. Perceptions of household-level food security and climate change impacts are analysed amongst the different sites, gender and income groups. This variety of contextual information helps to understand disproportionate and differential drivers of vulnerability.

Based on the heightened vulnerability of rural and low-income households, and women, to HIV/Aids, climate change and other stressors (see 1.1.1; 1.1.2; 3.2.2; 3.2.3) it was hypothesised that households in the rural site of Gatyana, those headed by woman, and/or those with low incomes, will be worse affected by various shocks and stressors as it was assumed these households would be less able to respond. It is assumed that this heightened vulnerability will be reflected in perceptions of stressors.

6.1.3 Methods

This chapter uses a variety of statistical and participatory methods to capture distinct vulnerabilities of different groups based on site, the gender of the household's head, and income levels, whilst

considering how vulnerability is defined by multiple drivers operating at different spatial scales (Chapter 3). This chapter thus incorporates perspectives around the drivers of vulnerability at a community-level as well as household-level experiences and impacts of vulnerability. Aside from participatory exercises, this chapter draws from a survey which interviewed 340 households split across two sites (see Chapter 4 for survey design and implementation).

a) Participatory mental modelling and problem trees to map multiple stressors

Mental modelling was used in both sites to record local perceptions of linkages between multiple stressors present in the area. In both Gatyana and Lesseyton, small focus group workshops were held with men and women separately. These focus groups were based on the methods developed by Ozemsi and Osemzi (2004) and used by Bunce et al. (2010). Bunce et al. (2010) used mental models to analyse perceptions of climate change amongst marginal African coast communities, and defined mental models as "qualitative representations of a system consisting of variables and the causal relationship between them" (Bunce et al., 2010: 414). Mental models have also been used to understand causes and consequences of climate change (Tschakert & Sagoe, 2009). Mental models are useful to quickly ascertain perceived causes and effects, and thereby feedback loops, amongst stressors operating across different spatial and temporal scales.

The mental models took the form of a spider-gram, with a key stressor being linked via lines showing directional causal relationships to other stressors. HIV/Aids was suggested to participants as an initial item to discuss and participants agreed that it was a major problem in the area that should be discussed. The causes and effects of HIV/Aids were added to the spider-gram. Once participants felt they had contributed enough towards this stressor, they were asked to list another stressor in their community, and this process was repeated until participants felt they had addressed all of the main stressors in their community. Participants were then asked to reflect on the stressors and their causes and effects, and to identify what they perceived to be the main or key driving stressor. This key stressor was then further analysed in a problem tree.

Problem trees are useful in exploring causes and effects of problems across scales in a systematic way to help identity interventions. A core problem is broken down to its local, regional, national and global causes and effects. The problem trees used in these focus groups were adapted so as to explore causes and actual and possible responses across scales. After identifying perceived responses to what was perceived to be a core problem in the area, participants were asked to reflect on the extent to which responding in these ways to the core problem would be effectual in addressing the other stressors identified in the mental models.

b) Using household survey data to compare the vulnerability context of the sites in relation to gender and income

To contribute to a fuller understanding of the present-day local vulnerability context, the data from the household survey were used to compare the distributions of various household types categorised by gender and income groups (Box 6.1.3 a). Within each site, the distribution of different gender headship groups and income quartiles were compared (see Box 6.1.3 a and 4.4 for more detailed explanations of these groups).

Box 6.1.3 a: Explanations of household types used in analyses

Household head (see 4.4.3)	Male only	Households with only adult males; i.e. male headed
	Male with female*	Male headed households with adult females
	Female with male*	Female headed households with adult males
	Female only	Households with only adult females; i.e. female headed
Income quartiles (see 4.4.4)	Lowest income	Quarterly income in cash and kind from R0.00 to R3480.37
	Low income	Quarterly income in cash and kind from R3354.85 to R6106.08
	Moderate income	Quarterly income in cash and kind from R6179.03 to R9600.78
	High income	Quarterly income in cash and kind from R9617.31 to R54 074.36

*Although often the case, these may not necessarily indicate a married couple, but could at times rather represent a mother/father living with adult children

c) Experiences of household shocks and stresses by different households

Household-level experiences of HIV/Aids impacts were analysed by site, gender and income whilst experiences of shocks and stressors were analysed by site only (Appendix 1).

The HIV/Aids proxy indicator categories were defined differently to other studies, where a count of the met proxy indicators is used to categorise the household as either affected or non-affected (Kaschula, 2009; McGarry, 2008; see 4.2.1). These proxy indicator data were disaggregated differently to try to capture different experiences of HIV/Aids. Chronic illness, illness-related deaths and the presence of orphans were reasoned to be qualitatively different experiences of HIV/Aids. Chronic illness increases the household's health-related expenses and diverts work towards the care of the ill person, while the ill person is not able to contribute to income. An illness-related death is a shock which combines the expense of a funeral with the loss of an income. The presence of orphans in the household adds a financial burden. During the interview process, respondents would sometimes report that one of a child's parents had passed away, while the other parent could not be accounted for or was described dismissively as "away". For this analysis, such children were considered in effect to be orphans.

Households were thus categorised as non-affected (not meeting any proxy indicators), chronic illness and receiving free care (amongst people aged 0 – 59 years old), an illness related death in the last ten years, and households with de facto orphans (children whose parents were deceased, or who had lost a parent and whose other parent was away) (Box 6.1.3 b). As many households experience more than

one category, there was over-lap between categories. Households which were categorised as having experienced an illness-related death may or may not have also had the presence of chronic illness. Households with de facto orphans may or may not also have had an illness-related death and/or may or may not have been experiencing chronic illness. Including households into these categories when they displayed other characteristics was necessary to create large enough groups for comparison.

A figure for comparison representing the degree to which HIV/Aids is impacting the household was derived by summing the amount of HIV/Aids experiences the household had (Box 6.1.3). A figure of 0 thus indicates no affliction, while 3 indicates that the household has chronic illness, has experienced an illness related death, and looks after de facto orphans (Box 6.1.3 b).

Box 6.1.3 b: Summarised explanations of HIV/Aids categories and numerical values

HIV/Aids categories	
Non-affected:	Household did not meet any proxy indicators
Chronic illness:	Presence of chronic illness amongst at least one household member aged 0-59 years old. Person also receives free health care for the illness.
Illness related death in previous ten years:	A household member had passed away in the ten years prior to the survey, following an illness of longer than 3 months
De facto orphans:	Household contains children whose parents are both deceased, or who had lost one parent while the other parent is absent
Numerical values	
HIV/Aids impact:	Sum of HIV/Aids experiences in household
Shocks:	Frequency of shock x weight of severity of shock's effect
Food security:	Weighted response ranging from 0 – 2
Climate change impact:	Sum of weighted responses

In the household survey, respondents were asked whether the household experienced any of a list of shocks and stresses, which included serious illness or death of a productive adult, loss of major household assets, loss of employment, or a costly social event such as a wedding or initiation (see Appendix 1). Households were also given space to specify other shocks not on the list. The severity of the shock's impact was ranked with 0 indicating no crisis, 1 indicating moderate crisis, and 2 indicating severe crisis. It is debatable whether these shocks and stresses should be considered as a 'shock', that is, an unpredictable and irregular disturbance or a 'stress', that is, a regular and predictable disturbance (King, 2011). For instance, serious illness or an expensive event may be either, depending on the household's experience and whether it was anticipated. The shocks and stresses here refer to large expenses or losses of income which disturbed the household's wellbeing or functioning.

Different types of shocks and stresses experienced by households were disaggregated by site only. The percentages of households experiencing a variety of shocks and stresses (see 4.2.3) were

tabulated, together with a score reflecting the impact of the shock or stress. These scores were derived by multiplying the frequency of a shock in a household by the respondent's rating of the shock's effect. If the shock caused no crisis in the household, it scored zero. If the shock caused moderate crisis, it scored 1. If the shock caused severe crisis within the household, it scored 2.

e) Alcohol purchasing amongst different household types

Alcohol emerged as a driver of vulnerability in both sites during participatory exercises (see 5.2.1; 5.2.2; 6.2). A question in the survey asked about household expenses, including expenditure on alcohol (see Appendix 2). The percentages of households purchasing alcohol was analysed categorically by site, and by gender headship types and income quartiles.

d) Food security and climate change perceptions

Households' food security and climate change perceptions were analysed by site, gender and income (see 4.2.3; Box 6.1.3 b; Appendix 1).

Food security perceptions were based on a question that asked whether the household's food production and income has been sufficient over the last 12 months. A food security score was created for each household by weighting their response to whether their food is sufficient, with 'no' = 0; 'reasonable' = 1; and yes = '2'.

Questions around climate change perceptions included ranking the impact of weather on aspects of the household's production and consumption. These included: the ability of crops to survive, the ability of livestock to survive, the abundance of useful plant and animal species in the area, the availability of water for livestock and crops, the availability of water for the household, food security, human health, and damage caused by extreme events. Respondents were given four scaled response options, which were weighted with 'no impact' = 0, 'low impact' = 1, 'moderate impact' = 2 and 'high impact' = 3. These weighted responses were summed for the eight weather impact questions to create a score out of 24.

f) Determining statistical differences between groups

Significant differences in categorical data derived from the survey were compared across groups using Pearson's chi-squared test, whereas continuous data derived from the survey were analysed for significance using t-tests when comparing the two sites, and ANOVA for analysis of differences between the gender and income groups. Where the data were not normality distributed, Mann-Whitney U and Kruskal-Wallis H tests were used for site, and gender and income comparisons respectively. Summarised explanations for how numerical scores were derived can be found in Box 6.1.3 b. Significant differences (where $P < 0.05$) are highlighted in the tables of results.

6.2 Results: Mapping the links between multiple, interacting stressors

6.2.1 Multiple, interacting stressors in Gatyana

The participatory mental modelling exercise revealed a complex network of interactions between a variety of stressors, vulnerabilities and problems spanning social, economic and environmental systems. Many of these stressors were site-specific.

In response to initial prompting around HIV/Aids in the mental modelling exercise (see 6.1.3 a above), the group of women in Gatyana identified unprotected sex, a person's fear of knowing his/her status, helping without gloves (i.e. exposure to infected blood), and having nothing to eat as the causes of HIV/Aids in the area (Figure 6.2.1 a (1)). The group identified that HIV/Aids caused weak immune systems, stress and strokes, deaths and orphans in the community.

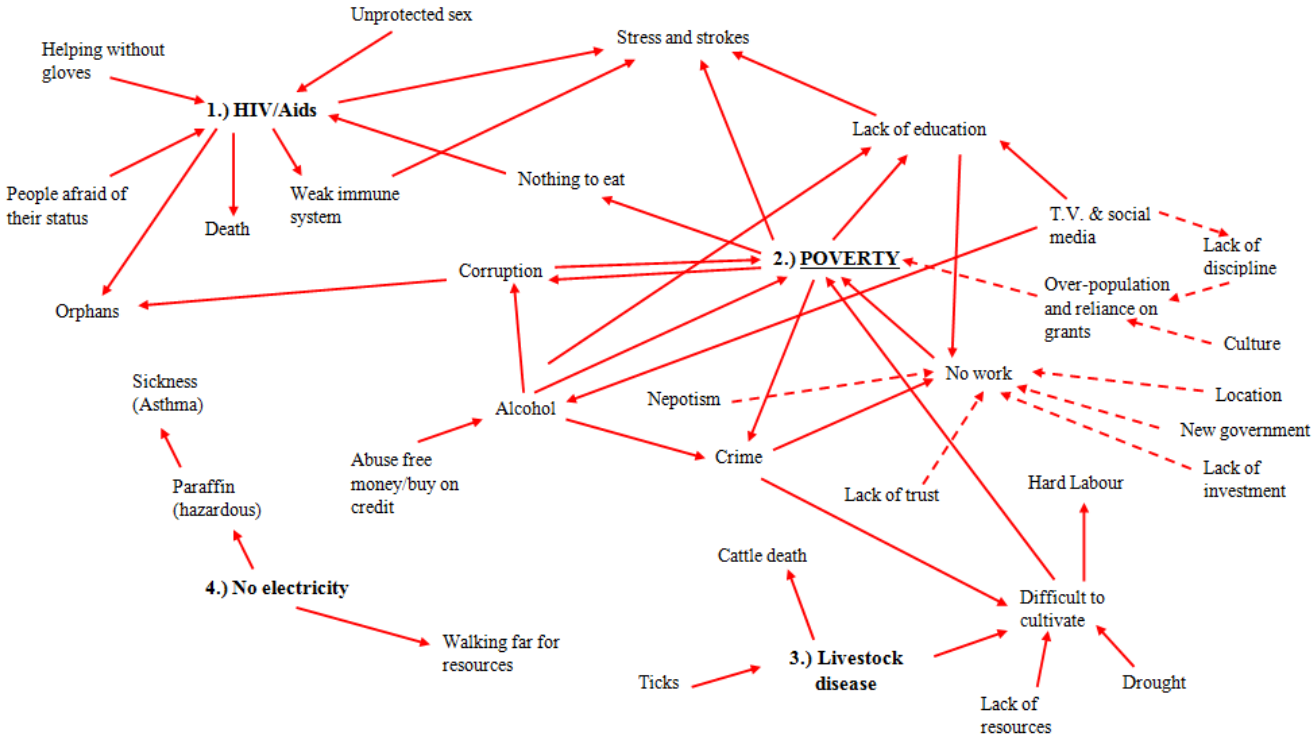

Figure 6.2.1 a: Women's mental model indicating causal relationships of multiple stressors in Gatyana. Numbered items indicate the order of discussion. Dotted arrows indicate that the relationship was identified in a separate exercise.

Following this, poverty was the first main problem or vulnerability that the group chose to discuss (Figure 6.2.1 a (2)). Poverty was said to be caused by a lack of work opportunities, by corruption at multiple levels and by the difficulty to cultivate, and was worsened by alcoholism. The group described how poverty led to stress and strokes, crime, moral corruption within the community, lack of enough food, and a lack of education. This group identified many cycles around poverty: the cycle

between poverty causing corruption and corruption causing poverty; poverty leading to crime, which decreased work, which caused poverty; poverty leading to a lack of education, which made it difficult to get a job, which led to poverty; and poverty causing crime which made it difficult to cultivate (as fences and cattle were stolen) which worsened poverty. In relation to HIV/Aids, poverty was said to affect the epidemic through the lack of food, and also worsened the situation of orphans in the community, as corruption (caused by poverty) led people to take in orphans in order to acquire the child support grant for their own use, not for the support of the child.

The group next identified livestock disease as a major stressor in the area (Figure 6.2.1 a (3)). Livestock disease was reportedly caused by ticks, and led to the death of cattle and most importantly, caused difficulty in cultivating land due to the lack of draught power for ploughing. The group also identified drought, crime and a lack of resources as causes making it difficult to farm in the area.

Lastly, the group identified the absence of electricity as a major stressor in the area (Figure 6.2.1 a (4)), as it added a physical burden on the women as they had to walk far for fuel resources or use paraffin to cook which caused health problems such as asthma.

Amongst all the stressors identified in the mental modelling exercise, the women in Gatyana identified poverty as the main stressor in the area and poverty was further explored in a problem tree (Figure 6.2.1 b). The group described poverty as equating to a lack of a steady income, which could be identified through its manifestations of abandoned land, illness and poor health, and poor housing. The lack of adequate, reliable income was described by the group as resulting from the lack of jobs in the area and from over-population and an over-reliance on government grants.

The lack of jobs was due to the remote geographical location of the site, and from nepotism and lack of investment at a regional-level, and national-level changes in government and lack of social cohesion and trust. In short the group felt that the new government prioritised areas of investment that benefited themselves or their kin, leaving areas such as Gatyana undeveloped and without jobs. The over-population and heavy reliance on grants also contributed to insufficient incomes. The group felt that their culture valued large families, and this, coupled with laws that allowed for personal liberties and social media which encouraged or valued promiscuity, led to over-population and a heavy reliance on grants.

In order to overcome poverty, the group felt that only more efficiency at regional government would lead to more jobs through Integrated Development Plans (IDPs), otherwise people would continue to rely on crime as a source of income. In order to discourage overpopulation and the heavy reliance on grants, the group felt that at national government should repeal laws that forbade parents from physically disciplining children, as this would allow schools to use stricter measures of discipline on children. The group also felt that more recreational activities would help with the perceived lack of

discipline amongst youth. By the end of the exercise, the group had agreed that only God could solve the problem of poverty.

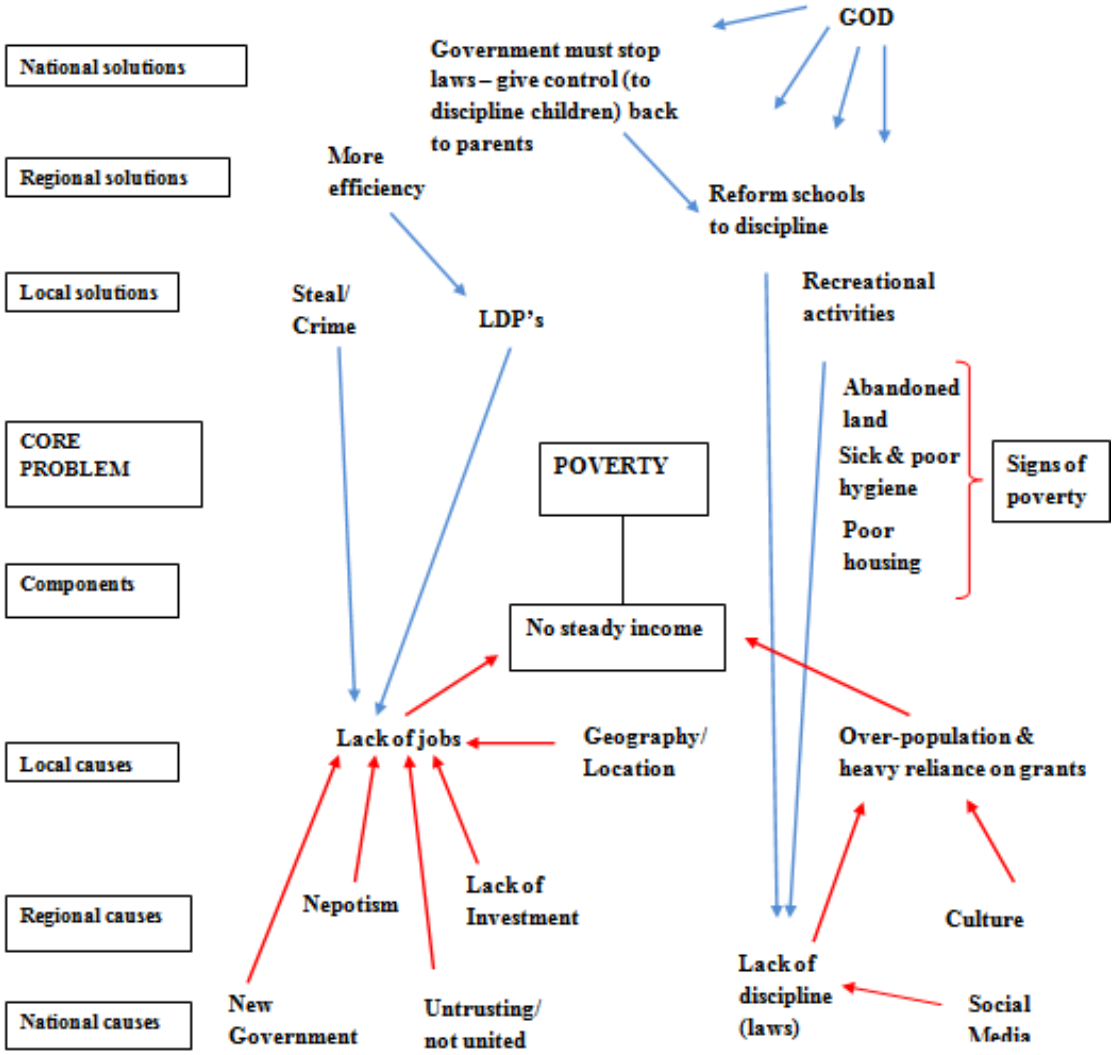

Figure 6.2.1 b: Problem tree discussed by women in Gatyana. Red arrows at the bottom indicate causes and blue arrows at the top indicate responses.

The men in Gatyana identified alcohol, the lack of development in the area, lack of information and the distance to clinics as drivers of HIV/Aids in the area (Figure 6.2.1 c (1)). The group also spoke of infection spreading due to traditional healers re-using razor blades and people intentionally spreading infection so they were not alone with the disease. HIV/Aids infection leads to discrimination, according to this group.

The men then identified crime as a major stressor in the area (Figure 6.2.1 c (2)). Crime was principally caused by the lack of jobs, by hunger and by alcohol abuse. Crime led to fear and stopped people from investing in assets, notably cattle, as they feared these would be stolen.

The group next placed heavy emphasis on the absence of electricity in the area as a major driver of stress (Figure 6.2.1 c (3)), as without electricity the area does not develop and there are fewer job opportunities. The slow process of acquiring electricity in the area was responsible for this.

The lack of farming activities underway in the area was next identified as a major problem (Figure 6.2.1 c (4)). This was primarily attributed to not enough money to invest in equipment and cattle for farming, as well as difficulties with irrigation and ticks causing health problems for livestock. The loss of farming activity was described as leading to the loss of income as produce could not be sold, and as food for the household and for livestock had to instead be purchased. The group also felt that the loss of farming also entailed a loss of tradition. Following this discussion the group identified the shortage of taps and related water problems as a major problem in the area (Figure 6.2.1 c (5)).

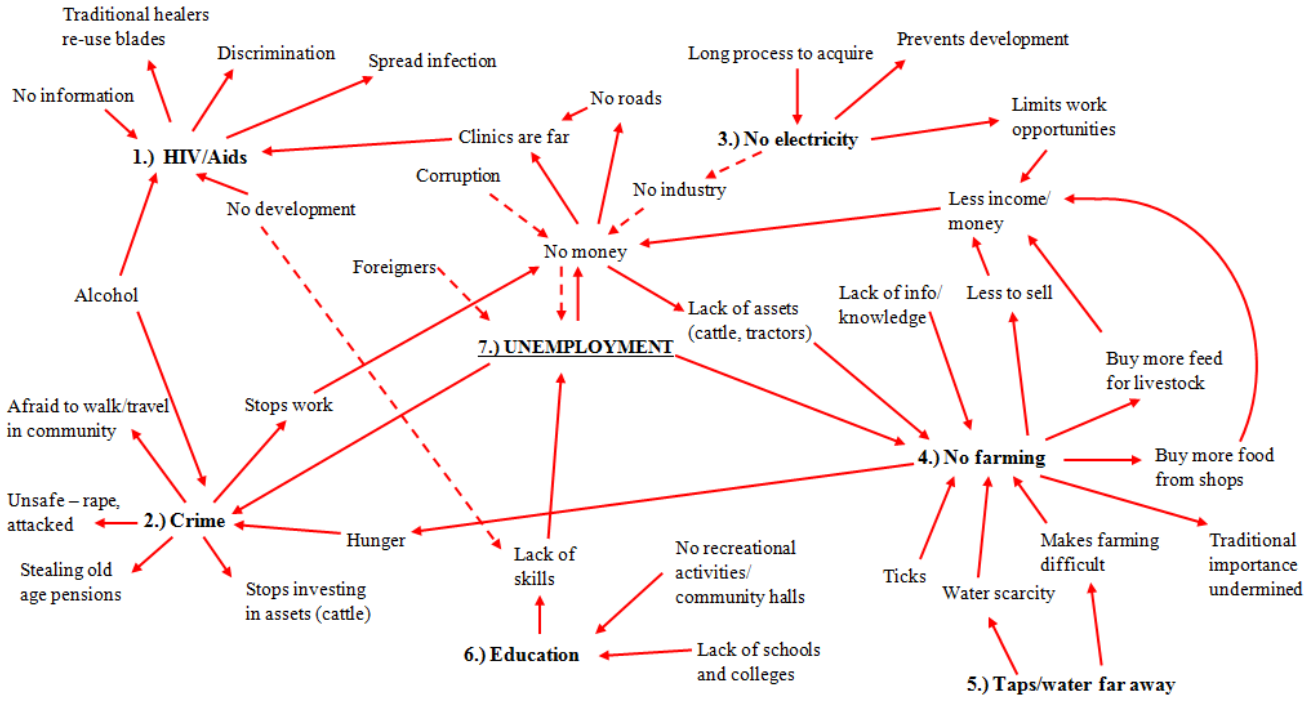

Figure 6.2.1 c: Men's mental model indicating causal relationships of multiple stressors in Gatyana. Numbered items indicate the order of discussion. Dotted arrows indicate that the relationship was identified in a separate exercise.

Problems relating to education in the area were collectively described as a driver of stress and vulnerability in the area (Figure 6.2.1 c (6)). Problems in acquiring quality education in Gatyana was described as leading to failing skills development, which in turn contributed to the lack of jobs and unemployment in the area. When asked to identify the key stressor driving this web of problems, the group identified this lack of jobs and resulting unemployment (Figure 6.2.1 c (7)).

Unemployment was then further analysed through a problem tree (Figure 6.2.1 d). Like the women in Gatyana, the men described corruption at the national level as a cause for unemployment in the area, as no-one in Gatyana had the money needed to pay bribes to get employment. The group also felt that

the lack of development in the area contributed to a lack of skills and industry, the latter exacerbated by the absence of electricity. The groups further described how foreigners were taking the few jobs that were there, as foreigners agreed to work for very low wages.

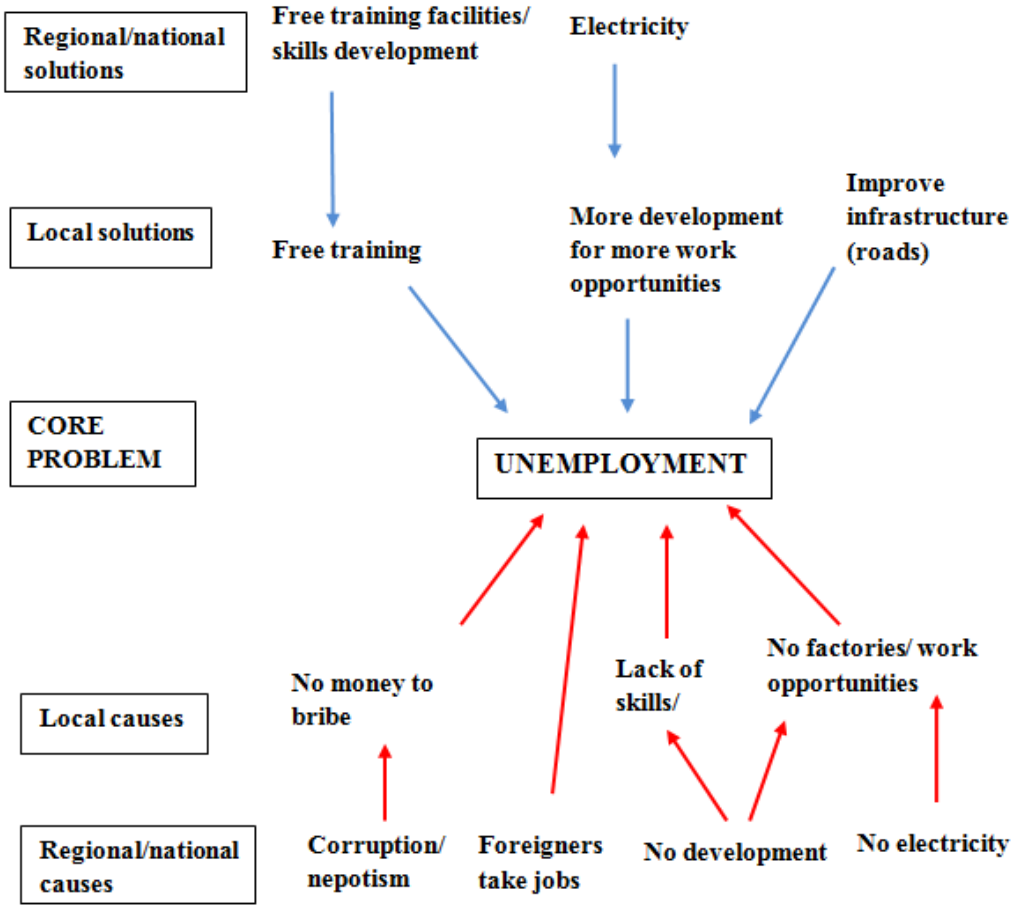

Figure 6.2.1 d: Problem tree discussed by men in Gatyana. Red arrows at the bottom indicate causes and blue arrows at the top indicate responses.

The group of men felt that in order to bring employment opportunities to Gatyana, infrastructural developments such as improved roads and electricity were needed. These would bring jobs in the short-term while these were put in place, as well as allowing business and industry to grow in the area in the long-term. The group also discussed how free skills training would boost local business opportunities. The group did not think there was anything that could be done to address unemployment at a local level without these infrastructural developments and government support.

6.2.2 Multiple, interacting stressors in Lesseyton

The group of women in Lesseyton identified parental neglect, addiction, unprotected sex, lack of education, poverty and carelessness as causes of HIV/Aids in Lesseyton (Figure 6.2.2 a (1)). The effects of HIV/Aids identified by the group were orphans, stigma and addiction.

Poverty was next discussed as the first stressor identified independently by the group (Figure 6.2.2 a (2)). The Lesseyton group of women identified poverty as the cause of unprotected sex, stress, crime and rape, and HIV/Aids, while also being the resultant effect of youth pregnancies. Crime and rape were next isolated as a single stressor (Figure 6.2.2 a (3)), with unemployment, stress, addiction and poverty causing crime and rape, which had the effects of mistrust and conflict or friction. Drought was next identified as a stressor in the area (Figure 6.2.2 a (4)), with the drivers of soil erosion and climate change, and the effects of illness, the inability to farm, and the loss of livestock, which in turn led to the malnutrition, leading to illness, and the loss of income.

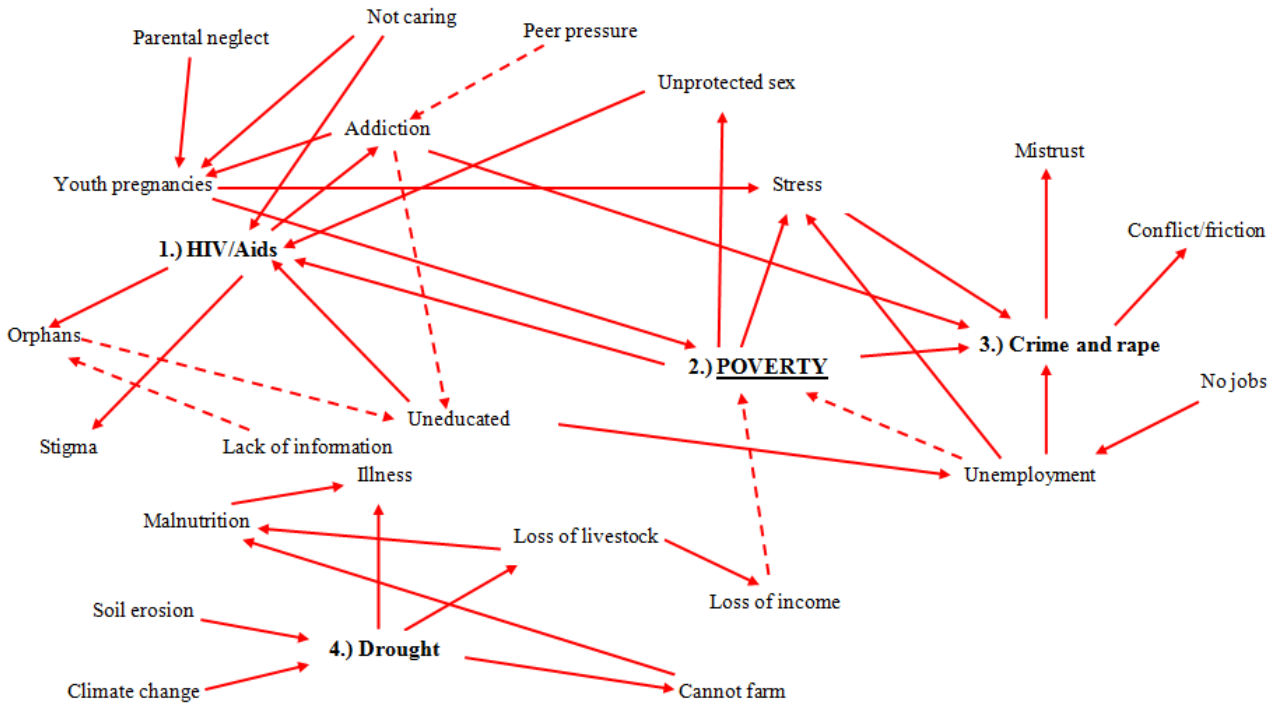

Figure 6.2.2 a: Women's mental model indicating causal relationships of multiple stressors in Lesseyton. Numbered items indicate the order of discussion. Dotted arrows indicate that the relationship was identified in a separate exercise.

Poverty, as the main or key stressor in the area, was further analysed through a problem tree diagram (Figure 6.3.2 b). Poverty was seen as comprising two components, namely the lack of education and lack of income. The local causes identified for lack of education were substance abuse amongst the youth (which is caused by peer pressure through the media) and youth staying at home to look after HIV/Aids orphans (which is caused by a lack of information of alternatives). The group decided that the lack of income aspect to poverty was caused by a lack of jobs (resulting from corruption and nepotism on a regional and national level) and too much dependence within a household from youth pregnancies (which are caused from a desire for grants and from prostitution). The group decided that

democracy and rights are root cause of the corruption and nepotism, desire for grants, and prostitution.

The group then identified responses or solutions across scales to the causes they identified. Recreational activities for the youth, more libraries and a law to limit the supply of alcohol and raise the drinking age were suggested as responses to youth substance abuse. Raising awareness for social workers, more shelters and foster care, and more external monitoring of existing foster carers were identified as responses for orphans in the area. Responses for the lack of jobs included more training and employment options, and the firing of corrupt officials. Church and prayer, and community support were suggested as responses to the phenomenon of youth staying at home to look after orphans. Overall, the women felt that only God would be able to ultimately fix poverty, although they agreed that most of the responses they identified relied on government.

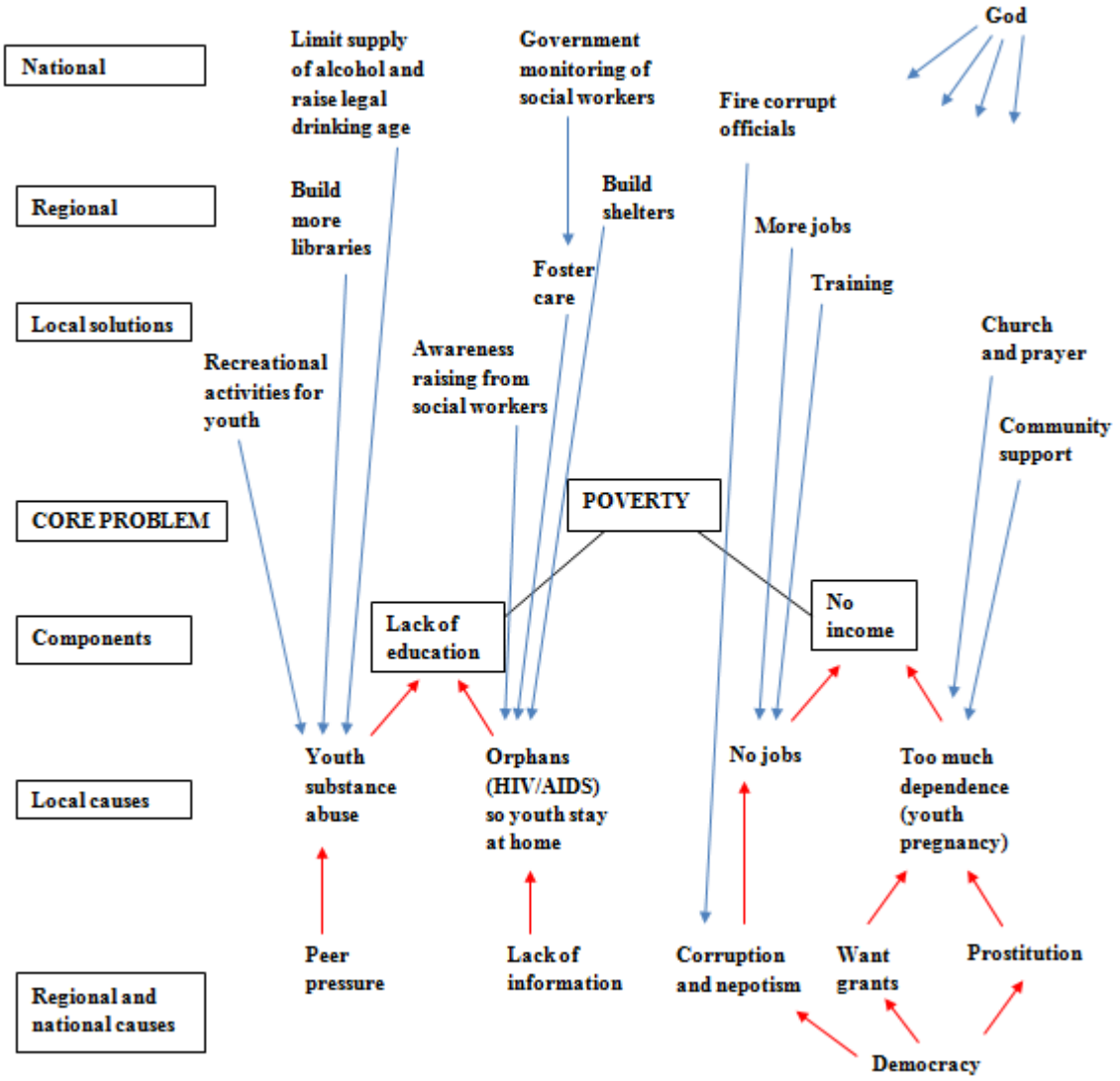

Figure 6.2.2 b: Problem tree discussed by women in Lesseyton. Red arrows at the bottom indicate causes and blue arrows at the top indicate responses.

The men's group in Lesseyton identified poverty, a lack of information, alcoholism, sex workers, accidents, unprotected sex and people not knowing their status as the causes of HIV/Aids (Figure 6.2.2 c (1)). The group further identified that HIV/Aids caused an increased death rate and sickness, which in turn caused the community to not develop and lowered incomes respectively.

The group then first named unemployment as a main problem in the area (Figure 6.2.2 c (2)). Unemployment was seen to be caused by corruption and inefficiency, by too few job opportunities, by the remoteness of Lesseyton from an urban centre and by people becoming discouraged by the low wages of the jobs that were available. The group described unemployment as causing substance abuse, alcoholism, crime, a high birth rate in order to acquire grants, and poverty.

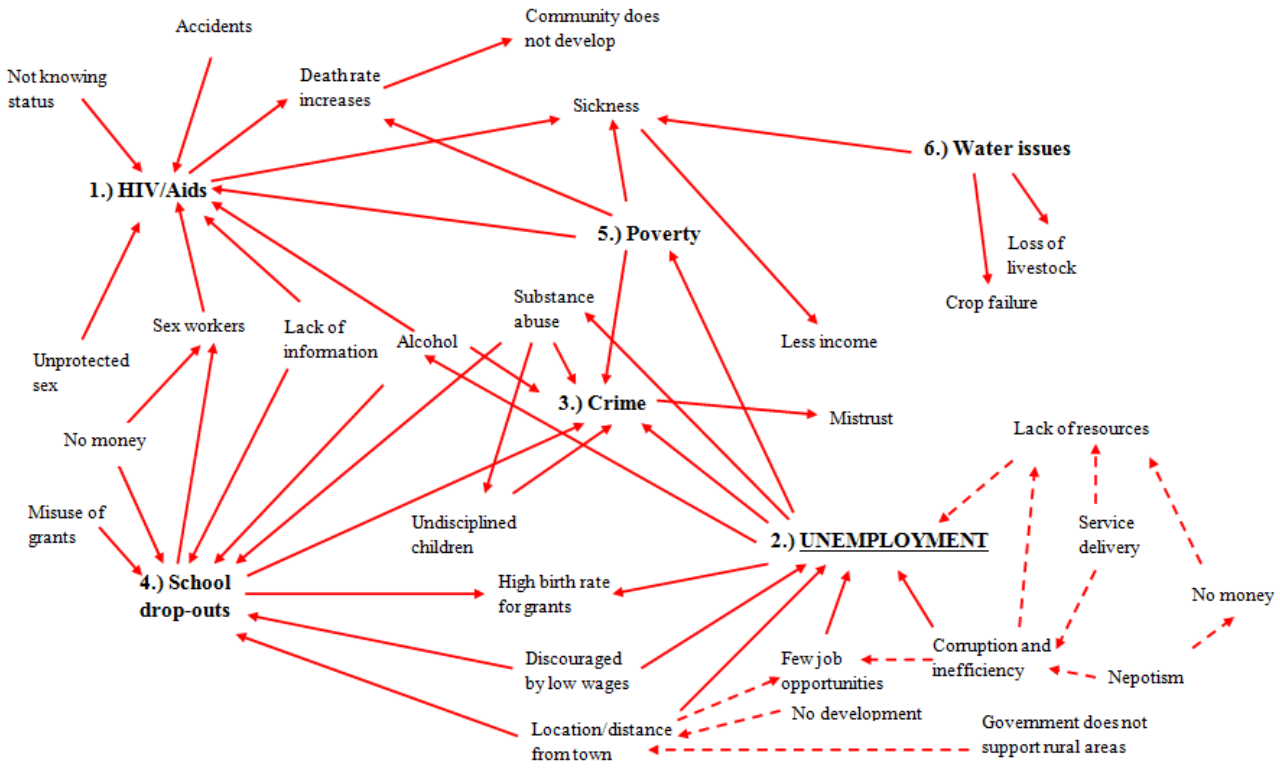

Figure 6.2.2 c: Men's mental model indicating causal relationships of multiple stressors in Lesseyton. Numbered items indicate the order of discussion. Dotted arrows indicate that the relationship was identified in a separate exercise.

The group of men in Lesseyton then listed crime as the next major stressor in the area (Figure 6.2.2 c (3)). As mentioned, the group identified unemployment as a cause of crime, but also listed alcoholism, substance abuse, poverty, undisciplined children and the high incidence of school drop-outs as causes. Crime was also seen to cause mistrust in the community.

The group then identified the high incidence of school drop-outs as a major problem in the area (Figure 6.2.2 c (4)). This was seen to be caused by a lack of money, the misuse of child grants (as money did not go towards meeting the child's needs), lack of information, alcoholism and substance abuse, the areas geographical location and youth being discouraged by low wages in the area (and so not seeing the value of schooling). The group related school drop-outs to sex workers, crime and the high birth rate as people sought grants. The men in Lesseyton then listed poverty as a major stressor in the area (Figure 6.2.2 c (5)). Unemployment was the only cause of poverty cited by this group. Asides from crime and HIV/Aids, poverty was also seen as causing sickness and contributing to the high death rate in the community.

Lastly, the men in Lesseyton identified water issues as a major problem in the area, although did not offer much discussion around this problem (Figure 6.2.2 c (6)). The group described how water issues resulted in crop failure, the loss of livestock and sickness in the area.

Unemployment was identified by the group as the main stressor in the area, and so was analysed in more detail in a problem tree (Figure 6.2.2 d). Unemployment comprised of the unavailability of jobs and the unavailability of resources for people to create their own means of employment.

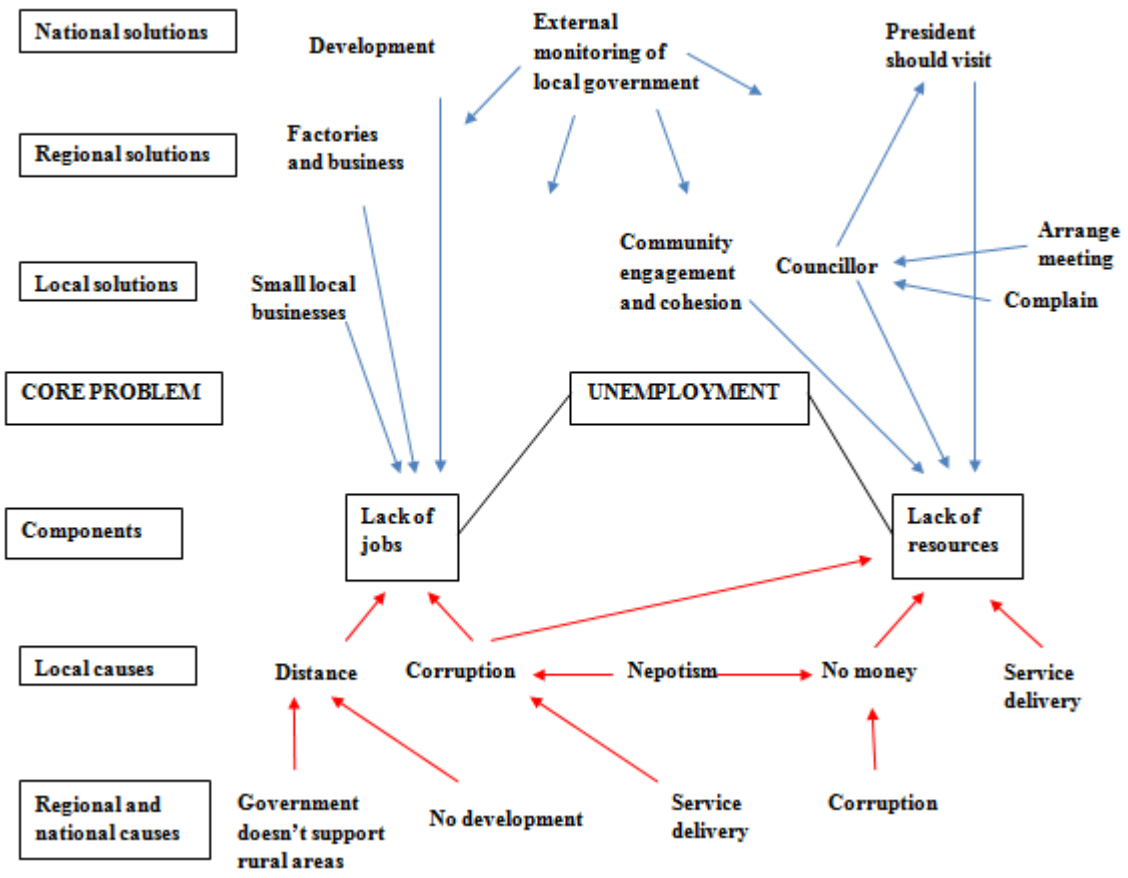

Figure 6.2.2 d: Problem tree discussed by men in Lesseyton. Red arrows at the bottom indicate causes and blue arrows at the top indicate responses.

The men felt that the lack of jobs was caused from local-level corruption and the distance from town or the geographical location of the area. This distance from town was a contributing factor as it resulted in the area not being prioritised for development at a regional- and national-level, as it was agreed that the government does not support rural areas. This problem was seen as being worsened by local-level corruption, resulting from a failure of regional and national level government to deliver services. Corruption at the local-level was also seen to result in the lack of availability of resources, which in turn was also caused by poor service delivery and a lack of money. Corruption and the lack of money were further seen to be created through nepotism on the local level.

The solutions identified by the group tended to primarily focus on improving government functioning across all levels. In order to address unemployment, small local businesses must be developed at the local level, factories and businesses must develop at the regional level, and in general development should be prioritised at the national level, according to the group. To address the lack of availability of resources, the group suggested that the community would have to arrange meetings with the local ward councillor and complain to her, so she can bring more resources to the area or encourage the president to visit the area and see how they are living there. Linked to this, more engagement and cohesion was needed within the community, to mobilise the community to campaign for more resources.

6.2.3 Contrasts and commonalities between groups and comparison with the literature

Many of the problems identified by the elderly and the youth (Chapter 5) were re-iterated in the mental modelling done with women and men in both sites, although their differing emphases on various aspects highlights differing values and vulnerabilities.

Women in Gatyana identified the lack of electricity as a major stressor in the area, as it added a physical and health burden. Women's role of preparing and cooking food, and the associated collection of fuelwood and wood-smoke or paraffin inhalation has been frequently cited as a burden faced by rural women and a contributing factor to their vulnerability (van Horen & Eberhard, 1995; Bruce et al., 2002). The men in Gatyana also placed much emphasis on the absence of electricity, but their concern was directed towards how this caused a lack of economic development in the area and how the absence of electricity limited options for employment. These different perceptions around the same concern illustrate the traditional role of women in the household, and that of men as breadwinners.

Both groups of women saw poverty as the main driving stressor, while the men in both sites identified unemployment. Employment is the most dominant option for income for young men in South Africa, as they have limited access to social security (Møller, 2010). The younger age of the groups of men in Lesseyton was emphasised through their focus on the youth issue of school drop-outs, an aspect

which did not dominate other groups focus. Women in Gatyana, which is more traditional, placed emphasis on social media and changing cultural norms, features which were absent in Lesseyton.

The two women's groups and the men in Gatyana placed emphasis on drivers that make it difficult to farm or cultivate, such as drought or livestock illness. While the men in Lesseyton did link water shortages as a problem for cultivation and livestock, this cluster of problems was not as detailed and emphasised as much as it was for the other groups. This could be because women and rural households are primary users of natural resources and primary agriculturalists in South Africa (Ruiters & Wildschutt, 2010; Shackleton et al., 2004; Aggarwal et al., 2001), as well as claims of the decline in perceived worth of farming amongst youth (Møller, 2005).

Both groups of women linked food insecurity to ill health – in Gatyana, having nothing to eat was causally linked to HIV/Aids and in Lesseyton malnourishment was causally linked to sickness in general. The men in Gatyana linked hunger to crime, but not to health concerns, whilst the men in Lesseyton did not identify food insecurity at all during the mental modelling exercise. The heightened priority that women attribute to food security could be a reflection of the role women often take in the collection, preparation and allocation of food (Gillepsie & Drimie, 2009a). The general impression given through the mental modelling exercises was that food security was a peripheral and not major vulnerability factor. Whereas throughout many sub-Saharan African countries food security is a dire aspect defining local vulnerability (Baro & Deubel, 2006; de Waal & Whiteside, 2003), the local vulnerability context within the two sites was attributed to violence, crime and corruption than to food security.

Gatyana women identified many cycles around poverty: the cycle between poverty causing corruption and corruption causing poverty; poverty leading to crime, which decreased work, which caused poverty; poverty leading to a lack of education, which made it difficult to get a job, which led to poverty; and poverty causing crime; which made it difficult to cultivate (as fences and cattle were stolen) which worsened poverty.

Taking into account the drivers of stressors which were identified through the problem tree by women in Lesseyton, there is a reinforcing-cycle of HIV/Aids leading to orphaned children which disrupts learning, which affects HIV/Aids infection rates – that cycle can also be extended to disrupted learning affecting employment, thus perpetuating poverty, which worsens HIV/Aids which feeds into the cycle again (Figure 2.2.2 a). In a longitudinal study, Case and Ardington (2006) found that maternal death impacted the likelihood of a child being enrolled in school, as well as on his/her performance, with an increased likelihood of dropping out of school. This can also be seen as a component on the 'vicious circle' of HIV/Aids and poverty, in which HIV/Aids depletes capital (in this case, human capital in the form of education) whilst a lack of capital (in this case, human capital

in the form of education) increases vulnerability to HIV/Aids (see 3.2.4; Gillespie et al., 2001; Piot et al., 2007).

Three of the four groups described in various ways a cycle of poverty causing a high birth rate in order to acquire grants, whilst over-population was a driver of poverty. These concerns were also raised amongst the elderly and particularly the youth in other workshops (see 5.2). The debates in South Africa around the grant system are on-going, with concerns that it offers a perverse incentive that discourages seeking employment and creates dependency (Hassim, 2008; Nattrass, 2007). However, there have been studies countering this theory commissioned by the HRSC (Noble et al., 2008; Noble & Ntshongwana, 2008). It is also worth noting that the common perception of the child grant as an incentive for teenage pregnancy and a discouragement for youth to seek employment has been dismissed (Makiwane et al., 2006; MacLeod & Tracey, 2010). Teenage pregnancies in South Africa in fact declined around the time when the child support grant was introduced; a low percentage (20%) of teenagers bearing children actually access the grant; and subsequent increases in the number of teenage pregnancies have occurred across all sectors including those who do not qualify for the grant (Makiwane et al., 2006). In fact, the number of teenage and young mothers entitled to the child grant, but not claiming it, is of far more concern (MacLeod & Tracey, 2010). The misconception that teenagers purposefully fall pregnant to access the grant has possible implications for discrimination experienced by young or teenage mothers, and also emphasises the role that adults play in being role models for youth and in raising awareness around sexual education and family planning (Campbell & MacPhail, 2002; see Chapter 5 for a youth perspective). In relation to HIV/Aids and teenage pregnancy, it is also worth noting how stigma surrounding the disease frequently makes young couples perceive contraceptives, particularly condoms, as a sign of mistrust in the relationship, resulting in unprotected sex and unplanned pregnancies (MacLeod & Tracey, 2010). It is interesting to note that people across multiple demographics in both sites identified teenage pregnancies for grants as a problem, despite this being disproved.

Both the men and women in Lesseyton identified transactional sex ('sex workers' and 'prostitution' respectively) in their identification of stress drivers in the area. The group of youth in Lesseyton also made reference to transaction sex in the area as a means to derive income (see 5.2.2). Transactional sex as a form of livelihood or as a coping strategy is increasingly emerging within marginalised urban settlements in South Africa, where women often do not have lucrative alternate means to derive an income (see 5.3.7; Hunter, 2007; Hunter, 2010). Transactional sex has severe implications for HIV/Aids, particularly as female sex workers are often highly marginalised, discriminated against, and have few rights in negotiating condom usage (Scambler & Paoli, 2008).

Many of the drivers and stressors that the groups identified as aspects contributing to vulnerability in the two sites are not common features of most literature relating to vulnerability (see Chapter 3).

However, many of these aspects frequently feature in the peripheries of studies, or are recognised as problems within South African society. These include ticks and livestock disease (Hebinck & van Averbeke, 2007); peer and social media pressure (Campbell & MacPhail, 2002; Posel, 2005) and alcohol abuse (London, 2009). The multiplicity of factors interacting – some common and others uncommon, some emerging from within the community and others arising from wider spheres of influence – together with the mixture of ecological, economic and social drivers, indicate the importance of understanding local perspectives of vulnerability in complex socio-ecological systems.

6.3 Comparing vulnerability contexts of the sites at the household scale in relation to gender and income

In chapters1 and 3, the theoretical exploration of vulnerability highlighted geographical location, poverty and gender as important considerations to understand vulnerability to HIV/Aids and climate change, owing to differential access to potentially valuable resources and assets. Households which are characterised by combinations of these factors are thus important considerations, as these factors may increase vulnerability.

The proportions of households in different gender headship types were significantly different between the two sites (Table 6.3.1 a). While the four gender headship types are roughly even in Gatyana, in Lesseyton a much lower proportion of households had only female adults (14.7 %) compared to Gatyana (28.4 %).

Table 6.3.1 a: Cross-tabulation of household headship types and income quartiles by site

		Site	
		Lesseyton (N = 170) %	**Gatyana (N = 170) %**
Household head	Male only	27.6	21.9
	Male with female	26.5	24.3
	Female with male	31.2	25.4
	Female only	14.7	28.4
	P value (Pearson Chi Square)	0.022	
Income quartile	Lowest income	24.7	25.4
	Low income	22.9	27.2
	Moderate income	26.5	23.1
	High income	25.9	24.3
	P value (Pearson Chi Square)	0.772	

The higher rates of female headed households in rural areas in South Africa has been observed and attributed to migrant labour, and more recently to the decreasing incidence of marriage (O'laughlin, 1998; Hunter, 2010). The fairly even distribution of households in different gender headship types

highlights the importance of studying gender dimensions in more depth, to understand subtleties in vulnerability (O'laighlin, 1998), as different gender dimensions may emerge when these categories are further explored.

Both sites had a fairly similar share of households falling into each of the income quartiles with no significant differences (Table 6.3.1 a). The similar distribution of households across the income quartiles could be a reflection of the high reliance on grants (see 8.2), which are a fixed amount. The slightly higher proportion of households within higher income quartiles in Lesseyton could be a reflection of the greater access to employment in this site (see 8.2).

In support of many authors highlighting the income disparities between genders (e.g. Demetriades & Esplen, 2008; Meer, 1997), there were more female headed households than male headed households in the two poorest income quartiles in both sites (Table 6.3.1 b). However, these differences were only significant in Gatyana.

Table 6.3.1 b: Cross-tabulation of household headship types by income quartiles for both sites

		Income quartiles %			
		Lowest income	Low income	Moderate income	High income
Lesseyton: Household head	Male only	31.9	21.3	17	29.8
	Male with female	22.2	13.3	33.3	31.1
	Female with male	13.2	32.1	30.2	24.5
	Female only	40	24	24	12
	P value (Pearson Chi Square)	0.078			
Gatyana: Household head	Male only	36.1	11.1	22.2	30.6
	Male with female	12.2	17.1	39	31.7
	Female with male	18.6	46.5	14	20.9
	Female only	35.4	31.2	16.7	16.7
	P value (Pearson Chi Square)	0.001			

The finding that female headed households tended to have lower incomes, and had significantly lower incomes in the rural site of Gatyana, has frequently been observed in South Africa and is well documented (Sender, 2002; Fuller, 2008; O'laighlin; 1998; see Chapter 3). Women's lower incomes are often linked to disadvantages in education and access to resources, together with lowered political power to exercise control over resources across multiple scales (Meer, 1997).

6.4 Shocks and stresses experienced by different types of households

6.4.1 Comparing HIV/Aids experiences in the two sites

A higher proportion of the households not meeting any proxy indicators (i.e. non-affected) were in Lesseyton, although the difference with Gatyana was not significant (Table 6.4.1). The similarities in experiences are again seen in the similar mean degree of impact score which combines these categories.

Table 6.4.1: Cross-tabulations of HIV/Aids experiences by site*

		Site	
		Lesseyton (N = 170)	**Gatyana (N=170)**
Type of impact	Non affected %	42.4	34.7
	P value (Pearson Chi-Square)	0.147	
	Chronic illness and receiving free care %	45.9	47.6
	P value (Pearson Chi-Square)	0.744	
	Illness-related death in previous 10 years %	18.2	22.9
	P value (Pearson Chi-Square)	0.283	
	Presence of de facto orphans %	24.1	17.6
	P value (Pearson Chi-Square)	0.142	
Degree of impact	Mean (±standard error)	0.88±0.071	0.88±0.06
	P value (T-test)	0.95	

*Percentages do not total 100 as households may have multiple experiences (see 6.1.3 b)

The similar experiences of HIV/Aids across the two sites counter the hypothesis that HIV/Aids would be more prevalent in the more rural site, owing to the disease's associations with marginalised communities (see 3.2.4; Hunter, 2010; Campbell & MacPhail, 2002). It is, however, worth re-emphasising that these are proxy measures and that the sample size is not sufficient to draw broad epidemiological conclusions.

6.4.2 Comparing HIV/Aids experiences in households with different headship types

As gender had repeatedly featured as a key consideration in understanding vulnerability (see Chapter 3), HIV/Aids experiences were further analysed by gender in the two sites. In Lesseyton, the differences in degrees of HIV/Aids impact amongst gender headship types were significant, with significant differences in the proportions of non-affected households and households experiencing chronic illness (Table 6.4.2). Male headed households with adult females had on average the lowest degree of impact, with an average score of 0.51±0.126, whilst female headed households with adult males had the highest degree of impact, with an average score of 1.15±0.136. In Gatyana, none of the differences in types or degree of impact between the gender headship types were significant (Table 6.4.2).

The different gender groups appeared to be differentially affected by HIV/Aids, and these experiences shifted in the two sites. Differentiating between single-sex headed households and households with adults of both sexes also elicited nuances in understandings of different experiences. While a lower

proportion of male headed households with adult females were affected by HIV/Aids in each site, a relatively high proportion of households with only male adults were affected in both sites. In Lesseyton, the higher proportion of female headed households with de facto orphans reflects a trend observed by Hosegood et al. (2007) that orphans across southern Africa are more likely to live in female headed households. Makiwane and Chimere-Dan (2010) found that the Eastern Cape has a high rate of older women taking responsibility for the caring of children, and so some of these households may be widowed single women, perhaps grandmothers, as is often the case (Foster, 1998). In Gatyana, the higher proportion of households with only adult females experiencing an illness-related death in the previous ten years could reflect mortality associated with migrant labour (O'laighlin, 1998; Chapter 5).

Table 6.4.2 Types of HIV/Aids impacts cross-tabulated by gendered headship and site

Lesseyton					
		Male only N = 47	**Male with female N= 45**	**Female with male N= 53**	**Female only N = 25**
Type of impact	Non affected %	40.4	66.7	28.3	32
	P value (Pearson Chi-Square)	0.001			
	Chronic illness and receiving free care %	46.8	28.9	58.5	48
	P value (Pearson Chi-Square)	0.034			
	Illness-related death in previous 10 years %	17	8.9	26.4	20
	P value (Pearson Chi-Square)	0.164			
	Presence of de facto orphans %	25.5	13.3	30.2	28
	P value (Pearson Chi-Square)	0.242			
Degree of impact	Mean (±standard error)	0.89±0.133	0.51±0.126	1.15±0.136	0.96±0.158
	P value (ANOVA)	0.007			
Gatyana					
		Male only N = 37	**Male with female N = 41**	**Female with male N = 43**	**Female only N = 48**
Type of impact	Non affected %	37.8	41.5	37.2	25
	P value (Pearson Chi-Square)	0.378			
	Chronic illness and receiving free care %	45.9	48.8	41.9	52.1
	P value (Pearson Chi-Square)	0.798			
	Illness-related death in previous 10 years %	21.6	14.6	18.6	35.4
	P value (Pearson Chi-Square)	0.098			
	Presence of de facto orphans %	13.5	17.1	18.6	20.8
	P value (Pearson Chi-Square)	0.849			
Degree of impact	Mean (±standard error)	0.81±0.122	0.8±0.132	0.79±0.108	1.06±0.121
	P value (ANOVA)	0.288			

6.4.3 Comparing HIV/Aids experiences in households with different incomes

As poverty also repeatedly featured in understandings of vulnerability (see Chapter 3), poverty was explored in relation to HIV/Aids by examining differences across income quartiles by site.

In Lesseyton, there were significant differences amongst income quartiles in the proportion of households experiencing illness related deaths and households with de facto orphans, and the overall degree of impact of households increased significantly as income increased (Table 6.4.3). Interestingly, the proportion of households with de facto orphans rose as the income quartiles went from lowest to highest.

In Gatyana, differences in types and degrees of impact between the income quartiles were not significant (Table 6.4.3), although, as with Lesseyton, a larger proportion of the two lower income quartiles were non-affected than the two higher income quartiles.

Table 6.4.3: Types of HIV/Aids impacts cross-tabulated by income quartiles and site

Lesseyton					
		Lowest income N = 42	**Low income N = 39**	**Moderate income N = 45**	**High income N = 44**
Type of impact	Non affected %	59.5	43.6	33.3	34.1
	P value (Pearson Chi-Square)	0.050			
	Chronic illness and receiving free care %	33.3	41	48.9	59.1
	P value (Pearson Chi-Square)	0.098			
	Illness-related death in previous 10 years %	9.5	12.8	31.1	18.2
	P value (Pearson Chi-Square)	0.048			
	Presence of de facto orphans %	9.5	20.5	26.7	38.6
	P value (Pearson Chi-Square)	0.016			
Degree of impact	Mean (±standard error)	0.52±0.114	0.74±0.126	1.07±0.147	1.16±0.156
	P value (ANOVA)	0.004			
Gatyana					
		Lowest income N = 43	**Low income N = 46**	**Moderate income N = 39**	**High income N = 48**
Type of impact	Non affected %	37.2	47.8	28.2	24.4
	P value (Pearson Chi-Square)	0.1			
	Chronic illness and receiving free care %	37.2	47.8	46.2	58.5
	P value (Pearson Chi-Square)	0.277			
	Illness-related death in previous 10 years %	27.9	15.2	35.9	14.6
	P value (Pearson Chi-Square)	0.060			
	Presence of de facto orphans %	20.9	10.9	25.6	14.6
	P value (Pearson Chi-Square)	0.293			
Degree of impact	Mean (±standard error)	0.84±0.12	0.74±0.126	1.08±0.139	0.88±0.094
	P value (Kruskal-Wallis)	0.206			

The finding that the two lower income quartiles were less affected by HIV/Aids than the higher income quartiles in each site was against expectation as this goes against frequently cited claims to the 'vicious circle' of HIV/Aids and poverty (see 6.2.1; 3.2.4). This finding is, however, supported in a nationwide study that found that wealth within impoverished communities did not significantly affect HIV incidence; whereas education played a greater role (Bärnighausen et al., 2007). There have also been suggestions that the greater personal autonomy and mobility associated with higher incomes is a risk factor for HIV/Aids (Gillespie et al., 2007). In Lesseyton in particular, and Gatyana to a lesser degree, a higher proportion of households in the two higher income quartiles contained de facto orphans compared to the two lower income quartiles. This could imply that households with higher incomes have the means to look after orphans.

6.4.4 Dominant shocks and stresses experienced by households in each site

Experiences of various household level shocks and stresses were analysed across the two sites to assess differential vulnerability in terms of the risk of exposure to a shock or stress.

Of the two sites, a higher proportion of households in Lesseyton indicated that they had experienced shocks and stresses in the previous 12 months compared to households in Gatyana (Table 6.4.4), although the shocks were qualitatively different. A significantly higher proportion of households in Lesseyton had experienced wage loss, while the differences between sites in households experiencing other shocks were not significant.

Table 6.4.4: Experiences of different shocks in Lesseyton and Gatyana

		Lesseyton (N = 170)	Gatyana (N = 170)	P value (T-test)
Crop Failure	Percentage	13.1%	11.8%	0.551
	Mean	0.15±0.031	0.12±0.027	
Illness	Percentage	5.9%	8.8%	0.703
	Mean	0.1±0.032	0.12±0.031	
Death	Percentage	0.6%	1.8%	0.316
	Mean	0.01±0.012	0.04±0.02	
Livestock loss	Percentage	10.7%	14.7%	0.341
	Mean	0.14±0.032	0.18±0.036	
Asset loss	Percentage	1.8%	2.9%	0.652
	Mean	0.03±0.018	0.04±0.019	
Wage loss	Percentage	5.9%	1.2%	0.013
	Mean	0.0.8±0.027	0.01±0.008	
Social event	Percentage	14.5%	12.7%	0.575
	Mean	0.16±0.031	0.13±0.028	
Other shock	Percentage	0%	1.2%	0.157
	Mean	0±0	0.01±0.008	

The higher rates of wage loss in Lesseyton are possibly indicative of the higher employment opportunities in general in the area. Gatyana's higher rates of livestock loss could be representative of

the higher prevalence of livestock ownership in the area. In terms of these aspects, it follows that what there is more of, there is higher incidence of its loss, and so households with specific types of assets or livelihoods are more sensitive to specific shocks and stressors.

6.4.5 Purchasing of alcohol amongst different household types

Alcohol, addiction or drug abuse featured in the participatory mental modelling exercises (see 6.2), as well as the timelines done with elderly and youth in both sites (see 5.2). Consequently, alcohol purchasing was analysed by site, income and gender to determine if there were differences between these groups.

There were no significant differences between the percentages of households purchasing alcohol in Lesseyton (24.4%) and Gatyana (22.9%) (Table 6.4.6), perhaps indicating that differences in proximity to urban centres or exposure to media does not influence alcohol consumption.

In contrast, there were significant differences amongst the different gender headship types in each site, where a significantly smaller percentage of households with only female adults purchased alcohol (Table 6.4.5), while male headed households purchased more. This is in line with country-wide statistics, which claim that one in four men and one in ten women experience symptoms of alcohol-related problems (Parry, 2005).

There were no significant differences amongst income quartiles in either site (Table 6.4.5). This is an interesting finding as it indicates that the same proportion of households with low incomes are purchasing alcohol as the high income households, despite the former having far less disposable income. This supports the linkages made in the mental modelling exercises (see 6.2) which drew causal relationships between poverty or unemployment and alcohol abuse, often in a re-enforcing relationship.

Table 6.4.5: Differences in percentages of households purchasing alcohol

		Lesseyton (N = 168)	Gatyana (N=170)
Total		24.4	22.9
	P Value (Pearson Chi-Square)	0.752	
Gender	Male only	39.1	32.4
	Male with female	26.7	34.1
	Female with male	19.2	25.6
	Female only	4	4.2
	P Value (Pearson Chi-Square)	0.008	0.002
Income	Lowest income	19.5	20.9
	Low income	33.3	17.4
	Moderate income	25	28.2
	High income	20.5	26.8
	P Value (Pearson Chi-Square)	0.458	0.604

Alcohol abuse is increasingly being recognised as a major risk factor for risk-taking sexual behaviour in South Africa, with HIV intervention strategies which focus on responsible drinking showing positive results in reducing the risk of infection (Morojele et al., 2006; Kalichman et al., 2007; Kalichman et al., 2008). Alcohol abuse also increases a person's vulnerability if they experience related social marginalisation and discrimination (London, 2009).

6.5 Food security and climate change perceptions of different groups

6.5.1 Perceptions of household food security

As food security is an important consideration in understanding HIV/Aids and climate change vulnerability, perceptions of household food security were disaggregated by site, household head gender types and income quartiles.

Lesseyton households were on average significantly more food secure than households in Gatyana, based on scores derived from weighting the responses (Table 6.5.1). However, on average households in both sites were food insecure.

Households with only adult females reported on average the highest food security in both sites, while households with only adult males reported the lowest food security (Table 6.5.1). However, these differences were not significant.

Table 6.5.1: Differences in mean (± standard error) weighted perceptions of food security for households in different groups in Lesseyton and Gatyana

			Lesseyton	Gatyana
Total		Mean N	0.96±0.62 170	0.70±0.62 168
		P Value Test	0.003 T-test	
Gender	Male only	Mean N	0.91±0.121 47	0.65±0.124 37
	Male with female	Mean N	0.91±0.122 45	0.70±0.120 40
	Female with male	Mean N	1.00±0.111 53	0.69±0.138 42
	Female only	Mean N	1.08±0.162 25	0.75±0.121 48
		P Value Test	0.810 ANOVA	0.180 ANOVA
Income	Lowest income	Mean N	0.86±0.130 42	0.64±0.131 42
	Low income	Mean N	1.05±0.132 39	0.51±0.108 45
	Moderate income	Mean N	0.84±0.123 45	0.77±0.130 39
	High income	Mean N	1.11±0.114 44	0.88±0.132 41
		P Value Test	0.305 ANOVA	0.954 ANOVA

In both sites, food security did not improve as income increased (Table 6.5.1), although households in the high income quartile had higher mean weighted scores compared to the other quartiles.

Generally, households in Lesseyton considered themselves to be significantly more food secure than those in Gatyana. However, rural households have been found to be more food secure than more urbanised areas in South Africa, owing to the role that proximity to cultivation contributes to food security (Schönfeldt et al., 2010). Within the two sites, higher income households and female headed households tended to rate themselves as more food secure than other groups in their respective sites.

Interestingly, the men's mental map in Lesseyton (see 6.2.2) did not feature food security, yet male headed households generally consider themselves less food secure than female headed households in this site. This could indicate that male headed households' food security is generally lower as these households do not place as much value in good nourishment as do female headed households. In participatory exercises in both sites, women linked poor food security to ill-health in participatory exercises, while the men in Gatyana linked hunger as a cause of crime in the area (see 6.2).

In community meetings in both sites, results from this study relating to women's lower income yet higher food security were presented. In Gatyana, a man suggested that this could be attributed to men's tendency to spend more of their money on alcohol, whereas women spend most of their income on food. There appeared to be agreement with this suggestion in the meeting in Gatyana, as well as in Lesseyton when this was suggested in a community meeting held there. As alcohol was offered as an explanatory cause for men's comparatively low food security, and as alcohol and substance abuse were described as drivers in all the mental modelling exercises (see 6.2), alcohol use was further explored (see 6.6 below). The higher food security of female headed households reiterates findings that child nutritional status tends to be higher amongst de facto female headed households (Kennedy & Peters, 1992).

6.5.2 Perceptions of household-level climate change impacts

The mean weighted and summed perceptions of the extent to which the weather affects various aspects of household life were not significantly different between households in each of the two sites (Table 6.5.2).

Amongst the climate change perceptions scores of the various types of household, the only significant difference was amongst the income quartiles in Lesseyton, where a higher impact was noted as income increased. This could be a reflection of wealthier households being more affected by the drought in this area, as seen in their higher rates of crop failure and livestock loss (see 6.4 above; 8.2 for livelihood portfolios).

Table 6.5.2: Differences in mean (± standard error) weighted perceptions of climate change for households in different groups in Lesseyton and Gatyana.

			Lesseyton	Gatyana
Total		Mean	15.69±0.41	15.81±0.38
		N	170	170
		P Value	0.842	
		Test	T-test	
Gender	Male only	Mean	15.51±0.77	15.03
		N	47	37
	Male with female	Mean	16.36±0.85	15.93±0.78
		N	45	41
	Female with male	Mean	16.32±0.62	15.42±0.7
		N	53	43
	Female only	Mean	13.52±1.27	16.52±0.7
		N	25	48
		P Value	0.137	0.536
		Test	ANOVA	ANOVA
Income	Lowest income	Mean	13.81±0.86	16.44±0.75
		N	42	43
	Low income	Mean	15.41±0.86	15.26±0.7
		N	39	46
	Moderate income	Mean	16.4±0.73	15.54±0.85
		N	45	39
	High income	Mean	17.02±0.8	15.9±0.79
		N	44	41
		P Value	0.032	0.712
		Test	ANOVA	ANOVA

6.7 Discussion

6.7.1 Multiple stressors and differential vulnerability

When multiple stressors interact there is a potential for heightened stress and vulnerability (see 1.1.1). Households in different locations, and with different genders and income levels can be differentially vulnerable to shocks and stressors, whether these are driven principally by economic systems (such as high health related expenses, caring for orphaned children or low income levels), social systems (such as the marginalisation of women), or ecological systems (such as livelihoods based on crops and livestock affected by drought). It has frequently been suggested that male headed households can be vulnerable in different ways to female headed households (O'laighlin; 1998). Similarly, households across income quartiles can be vulnerable in different ways. Different geographical localities also elicit nuanced experiences, whether these arise from socio-political, economic, or ecological differences. For instance, while the two sites had similar HIV/Aids impact experiences, gender and income were significant factors only in Lesseyton and not in Gatyana. In contrast, income was fairly evenly distributed amongst gender headship types in Lesseyton, but was significantly different amongst households in Gatyana.

This chapter has highlighted how stressors act and interact across multiple scales in complex ways. The main drivers of stressors in the two sites were seen to be poverty and unemployment, although

these had many contributing causal factors. The groups perceived that government intervention was the primary agent capable of addressing the main drivers of poverty and unemployment, if these are possible to address at all, implying that the solution rested beyond the level of the household or even the community. These main drivers aggravate and are aggravated by additional stressors, notably, a lack of education, crime, disease (such as HIV/Aids), difficulties in farming and the limited availability of water (whether climate-related or provided via infrastructure). While these stressors interact to form longer-term, often perpetuating vulnerable conditions (Chapter 5) they frequently manifest as shocks in the short term. The finding that the high income quartiles tend to experience more affects of HIV/Aids could be an indication of these households being at risk of falling below a threshold of vulnerability (see 3.4.6; McGarry, 2008).

Overall, this chapter revealed many aspects of the two sites that were counter to expectation and the hypotheses formed at the onset (see 5.1.3). In general, there were fewer differences between the two sites, and between households differentiated by gender headship types and income quartiles, than expected. Gender was not a significant factor for income poverty in Lesseyton (see 6.3.1), nor for HIV/Aids affects in Gatyana (see 6.3.3). Site was not a significant variable for HIV/Aids effects (see 6.3.2). Only one shock – wage loss – was significantly different between the two sites (see 6.4). Food security was different only between sites, while the only significant difference between climate change impact perceptions was amongst income quartiles in Lesseyton (see 6.5). Alcohol usage was only significant amongst gender groups (see 6.6). However, that there were fewer significant differences than expected is itself an interesting finding which highlights the complexity of multiple, interacting factors shaping these contexts.

These differential experiences of vulnerability are also further shaped by a multitude of additional contextual factors besides gender, geographical location and poverty. Such factors include the variety of resources available to a household to construct and define their livelihoods, and minimise exposure and respond to shocks and stress. These resources are a household's human, social, physical, natural and financial capital stocks (see Chapter 3), and will be explored in the next two chapters for a more comprehensive understanding of differential vulnerability.

6.7.2 Implications for adaptation, resilience and development

The variety of experiences and identities presented here are important considerations in understanding perceptions of vulnerability, with implications for capacity to adapt (Frank et al., 2011). Contrastive experiences of vulnerability by particular localities, livelihoods and social groups (such as different gender groups) frequently overlap, exposing them to multiple stressors.

Incorporating broader spatial scales across socio-ecological systems raises awareness of the extent to which vulnerability can emerge beyond the sphere of control of the household. This may imply a limit

to the household's capacity to respond (Adger et al., 2009; Brooks et al. 2005). In both sites, during participatory discussions amongst men and women, as well as with the youth and elderly (see Chapter 5), knowledge and agency repeatedly surfaced as a valuable mitigating factors for vulnerability.

When discussing possible and actual responses to stressors within the community, groups in both sites (see Chapter 5 for elderly and youth perspectives) placed heavy emphasis on the need for government to drive development in the areas to overcome the problems identified by the groups. Men in Gatyana felt that unemployment would only be alleviated with infrastructural development and skills training initiated at a regional or national level. While men in Lesseyton felt they could influence government to make these changes, women's concluding analysis in both sites that only God could solve their problems could be indicative of their comparatively heightened feelings of a lack of agency and lack of political power. Alongside discussions of the role of the state in facilitating development ran criticisms of the government and of democracy in general. Government officials across scales were frequently seen as corrupt and self-serving, while moral corruption within the community (such as misuse and abuse of government grants, crime and violence, substance abuse and alcoholism) arising from personal freedoms were also criticised. Political empowerment is needed to challenge environmental injustices, such as climate change (Faber & McCarthy, 2003; Thomas & Twyman, 2005), as these frequently arise from broader scales beyond the sphere of control of the household (see Chapters 3 & 5).

CHAPTER 7: HOUSEHOLD ASSETS DIFFERENTIATED BY SITE, GENDER AND INCOME

7.1 Introduction

7.1.1 Values of different assets in different contexts

Capital stocks are tangible and intangible types of wealth into which assets are categorised; a car, for instance, is an asset that forms part of a household's physical capital (see 3.3.2). A household's capital stocks can help define the livelihood choices available to a household to make a living and pursue the wellbeing of the household's members as well as the choices available to respond to shocks and stressors (Chambers, 1989; 1.1.2; 3.3). Examining household capital stocks can contribute to understanding vulnerability, as assets to some extent determine the household's exposure to shocks and stress through their use in defining the household's livelihood activities, and, notably for this study, by determining the household's ability to respond to a stress or shock in a way that minimises long-term damage or facilitates improvement (see Chapter 3).

Different assets, and combination of assets, have been emphasised as being necessary or complementary to specific livelihoods across various socio-economic groups and geographical settings (see Chapter 3). For example, natural resources have been shown to be a potentially valuable means to derive income for households living in poverty through sale of natural resource based products such as brooms or wood carvings (Shackleton et al., 2008).

A lack of sufficient resources to respond to shocks and stress reduces adaptive capacity, which is frequently understood to be a function of wealth, technology, education, information, skills, infrastructure and other resources (O'Brien et al., 2004). In climate change vulnerability assessments, various assets have been emphasised as being valuable for resilience or adaptive capacity, while the absence of specific assets could lead to increased harm. By using case studies of public and private coastal management institutions in southeast Asia, Adger (2003) suggests that social capital is vital for adaptive capacity, as the latter requires a certain level of collective action and institutional capability. The role of institutions for climate change adaptation has also been emphasised elsewhere (Agrawal, 2008). In understanding HIV/Aids vulnerability, various assets have been emphasised as being valuable to different socio-economic groups and/or at different stages of the disease's trajectory (see 3.4.4). For example, McGarry (2008) observed the heightened use of wild natural foods by children living in HIV/Aids affected households. Households affected by HIV/Aids frequently increasingly rely on their kin networks – their social capital – to assist with care and to provide financial support (Dawson, 2009; Gillepsie & Drimie, 2009a).

Chapter 3 of this thesis outlined the ways in which women and poor households, and remote or rural areas can be more susceptible to shocks and stressors and often have inadequate capacity to respond to these, owing to low levels of multiple forms of essential assets (Chapter 1, sec. 1.1; Chapter 3, sec., 3.2; 3.4). This chapter explores this assumption in more detail by considering and comparing the assets of households in the two study sites – one less remote than the other – across different gender headship types and income quartiles. Study sites are important to consider as they are not uniform and contain very different contexts (Chapter 6) which shape access to assets as well as particular vulnerabilities.

7.1.2 Chapter rationale, key questions and hypotheses

The main objective of this thesis is to understand vulnerability to multiple stressors by focusing on household assets, and so an analysis of the capital stocks of different types of households is a key focus point for this study.

Specifically, this chapter investigates the following questions:

1.) What are the differences in asset portfolios between the two sites, and between different gender-headed households and income groups?

2.) Are there relationships between assets within each type of capital?

3.) Are there relationships between different types of capital?

4.) What assets or types of capital do households see as most important in various contexts?

5.) What do these findings mean for understanding vulnerability and adaptive capacity?

This chapter analyses how different types of household have varying levels of human, social, natural, physical and financial capital, and identifies relationships between different assets, in order to understand potential cycles of vulnerability and pathways for adaptation. Questions 1, 2 and 3 above are addressed by analysing data derived from the household survey which recorded multiple variables associated with each of the five types of capital stocks (see 4.2.2). Question 3 is further answered qualitatively through a participatory exercise linking capital stocks. This participatory exercise also addresses question 4 and further interrogates the multiple potential values of various assets to households. Collectively, investigating the findings related to these questions helps to respond to question 5, by identifying the applicability of findings to understanding vulnerability and adaptive capacity. However, for a more complete understanding of vulnerability and adaptive capacity, it is necessary to also consider the flows of capital (see 3.3.2), which is the concern of chapter 8.

The importance of access to high stocks of multiple forms of capital for resilience to multiple stressors was outlined in 3.2 and 3.4. This, together with the widely held understanding that poor, rural households and women are particularly vulnerable to HIV/Aids, climate change and other stressors (see 3.2), leads to the hypothesis that households with these characteristics will have lower stocks of multiple forms of capital (see 3.4.2).

7.1.3 Methods

A variety of methods were used to measure and understand the capital stocks of different types of households based on site, headship gender and income (see 4.4.2; 4.4.3 and Box 6.1.3 a for explanations of gender and income groups). Aside from participatory exercises, this chapter is largely based on the household survey (340 households) (see Chapter 4 for survey design and implementation).

a) Capital stocks of households based on data from the household survey

Categorical and continuous data were considered as measures of various assets related to the five capital stocks. These variables are described below. Summaries of how continuous values, scores and indices were derived can be found in Box 7.1.3. These variables were analysed by site, gender and income groups, unless otherwise stated below.

Human capital: Human capital was considered to be the ability of its household members to do work (see 3.4.4). Thus, basic demographics (as an indication of the number of productive household members and available labour), health, education and skills, and contentment (or psychological wellbeing) were considered as attributes collectively contributing to human capital.

In terms of labour availability, household demographics were considered. Children were classified as persons under 18 years old, in accordance with the age requirements for South African government provided child grant. Pensioners were classified as persons over the age of 60, in accordance with the South African government provided pension or old-age grant. Adults were thus classified as between 18 and 59 years old. Differences in the number of children, adults and pensioners in each house were disaggregated by the different groups.

The health status of the household, an education index, and additional skills and languages were also all considered. Composite scores or indices were developed for each household which combined the attributes of the household's individual members. For the health status index, health responses of individuals were weighted as follows: healthy = 0, occasional illness = 1, chronic illness or disability = 2; chronic illness and disability = 3. These were summed and divided by the number of individuals (Box 7.1.3).

For the education index, education levels were weighted in the following way: illiterate = 0; literate without formal schooling = 2; literate: below primary = 3, primary = 4, middle secondary (grade 9) = 5, secondary (matric) = 6, diploma/ course with certificate = 7, graduate = 8, post-graduate = 9. The weighted education of each adult was then summed and divided by the number of adults in a household (Box 7.1.3). The presence of additional skills and languages within a household were summed and a score developed based on the number of adults, as with the education index (Box 7.1.3).

Box 7.1.3 Summary of categorical and continuous variables, composite scores and indices used to measure capital stocks

Human capital:	
Demographics	counts of children, adults, pensioners and total no. of household members
Health index	sum of health weights of household members / no. of people in household
Education index	sum of education weights of adults / no. of adults in household
Additional skills score	sum of additional skills present in household / no. of adults in household
Additional languages score	sum of additional languages present in household / no. of adults in household
Contentment	enumerator's subjective rating of respondent's contentment from 0 to 10
Social capital:	
Cognitive score	sum of weighted responses from 7 Likert scale items
Resource generator	no. of positive responses / total no. of generator questions answered
Group membership	no. of social groups to which household members belong
Decision making	% of households often, sometimes and never taking part in community decision making
Leadership	no. of household members holding a leadership position amongst households belonging to groups (above)
Physical capital:	
Property size	no. of buildings multiplied by the size (m^2) of main building
Household items	sum of values (ZAR) of large household items and appliances
Kraals	% of households owning kraals
Building materials	% of households with walls made of various building materials (site only)
Water sources	% of households with using various water sources (site only)
Natural capital:	
Land	area (m^2) of land available for cultivation
Natural resource use	% of households that use a river, grazing land, fuelwood, bushmeat, wild fruit and vegetables, medicinal plants, and marine products
Financial capital:	
Debt	household's total debt (R)
Savings	household's total savings (R)
Access to credit	% of households that can access credit (site only)

Psychological wellbeing positively correlates to productivity and thus forms part of human capital (Oswald et al., 2008). Contentment, as a measure of wellbeing, was based on an enumerator's assessment of the respondent after each interview. Enumerators were asked to assess how happy or content the respondent seemed on a scale of 0 to 10, with zero indicating not at all, and ten indicating very content. To ensure that an enumerator's tendency to score households high or low was not influencing these results, the percentages of households that each enumerator interviewed were tested categorically by gender headship and income. No enumerator interviewed significantly more

households from the different gender headship types or income quartiles, and so it is assumed that any tendencies to rate households high or low would not affect these results.

Social capital: Social capital was considered as comprising three aspects: a cognitive dimension of trust and reciprocity, a structural dimension of social support networks, and a political dimension of leadership and decision making (see 3.4.3).

For the cognitive aspect, data was compared from seven questions with four Likert response categories (see Appendix 1; 4.2.2; 3.4.3; Box 7.1.3). Responses from 7 statements were weighted as follows: strongly disagree = 0; disagree = 1; agree = 2; strongly agree = 3.

Group membership and resource generators were used as measures of social capital's structural dimensions (see 3.4.3). For group membership, simply the number of groups to which a household's members belonged was recorded and summed. The resource generator asked households whether they knew anyone who could give free advice on a set of aspects ranging from financial concerns to health advice. As many households were missing responses to this question, each household's score for the resource generator was formed by dividing the number of affirmative responses by the number of total responses, resulting in a fraction (Box 7.1.3). The closer this figure is to zero, the fewer people the household knows that can offer free advice.

For social capital's political dimensions, leadership within a group or organisation was considered amongst households that belonged to social organisations or groups. Households were asked about whether they participated in community decision making and responses were categorised into never participating, sometimes participating and often or always participating, and analysed through cross-tabulations.

Physical capital: Physical capital was considered to be the man-made, manufactured or produced physical property of a household (see 3.4.4). Property size and large household items were compared as aspects of physical capital.

The size of the homestead's main building was multiplied by the number of buildings to get a comparable figure representing total property area (Box 7.1.3).

A total value of large household items was calculated for each house by applying a fixed value across various household items, based on whether these were old (acquired over two years ago) or new (acquired within the previous two years). These re-sale values were derived from internet research of classified advertising sites. Access to water and electricity, the building materials used to make the household's property's walls, and kraal ownership were analysed categorically.

Natural capital: The natural resources available to a household were considered to represent the household's natural capital (see 3.4.4).

The amount of land available to a household for cultivation (m^2) was considered as an aspect of natural capital (Box 7.1.3) and was measured by enumerators as part of the household survey. The household's reported usage of various natural resources, namely a river, reservoir or dam, community grazing land, forests and trees for fuelwood, bushmeat, wild fruit and vegetables, medicinal plants, and marine products (Gatyana only), were compared across groups.

Financial capital: The total amount of household savings and debt were used as measures for financial capital (Box 7.1.3). Access to credit was considered categorically by site only.

These variables are considered as representing the stock of financial capital, whereas monetary income is considered as a flow of wealth (see 3.4.4). Multiple sources and amounts of income are explored in depth when examining livelihoods in Chapter 8.

b) Participatory linking of household capital stocks

Participatory exercises were done with the groups of men and women described in Chapter 6. This exercise was designed to contribute towards understanding local perceptions of whether and how different types of capital were linked, and whether some types of capital were more valuable or important than others for constructing livelihoods and reducing vulnerability.

This exercise followed on from a ranking exercise (see Chapter 8). The livelihoods framework was discussed with the group, with particular emphasis on the idea that the five capital types were types of resources that households can draw from to construct livelihoods. Symbols representing the five capital types were then spread out as a pentagram to facilitate discussion around the importance of different types of capital relative to other types, and the links between types of capital. To stimulate discussion, participants were prompted by being asked which of the five types of capital was the most important, whether a high amount of one capital type lead to a high amount of another type of capital, as well as what determines a household's capital stocks in the area.

c) Determining statistical differences between groups

Significant differences between site, gender and income groups in categorical data derived from the household survey were tested using Pearson's chi-squared test. In cases where the count within a cell fell below the minimum requirement for a chi-squared test (≤5) Fisher's test was used to test for significant difference. Continuous data derived from the survey were analysed for significance using t-tests when comparing the two sites, and ANOVA for analysis of differences between the gender and income groups. Where the data were not normality distributed, Mann-Whitney U and Kruskal-Wallis

H tests were used for site, and gender and income comparisons respectively. Significant differences (where P<0.05) are highlighted in tabulated results.

7.2 Results: Human Capital

7.2.1 Demographics and life cycles

Life cycles refer to the stage in a household's development based on its size, age and composition (Hajdu, 2006). These demographics are an indication of the amount of work that a household may be able to achieve (Hajdu, 2006). Households in Lesseyton had significantly more adults, whereas households in Gatyana had significantly more pensioners (Table 7.2.1 a).

Table 7.2.1 a: Differences in mean (± standard error) number of household members in different demographic categories in Lesseyton and Gatyana

	Lesseyton N = 170	**Gatyana N = 170**	**P value (T test) (between sites)**
Adults	2.5±0.1	1.9±0.1	0.000
Pensioners	0.5±0.1	0.7±0.1	0.001
Children	2.1±0.2	2.3±0.2	0.492
Total in household	5.2±0.2	4.9±0.2	0.376

Urbanisation and migration to find work could account for these differences, as work-age adults from rural areas, such as Gatyana, move to urban areas, to find employment. Makiwane & Chimere-Dan (2010) compiled recent surveys done within the Eastern Cape and noted a migration of young adults out of the rural eastern half of the province towards the more developed western half. Out-migration from Gatyana and in-migration into Lesseyton was described by the elderly in each site (see 5.2.1).

Table 7.2.1 b: Differences in mean (± standard error) number of household members in different demographic categories amongst different gender headship types in Lesseyton and Gatyana

Lesseyton						
	Male only N = 47	**Male with female N= 45**	**Female with male N= 53**	**Female only N = 25**	**P value (between gender types)**	**Test**
Adults	3±0.2	2.3±0.1	2.9±0.2	1.6±0.2	0.000	Kruskal Wallis
Pensioners	0.7±0.1	0.3±0.1	0.5±0.1	0.3±0.1	0.036	Kruskal Wallis
Children	1.9±0.3	1.8±0.2	2.6±0.3	2.4±0.4	0.111	ANOVA
Total in household	5.5±0.5	4.3±0.3	5.9±0.4	4.2±0.5	0.004	Kruskal Wallis
Gatyana						
	Male only N = 37	**Male with female N = 41**	**Female with male N = 43**	**Female only N = 48**	**P value (between gender types)**	**Test**
Adults	2.5±0.3	1.5±0.2	2.4±0.2	1.2±0.1	0.000	Kruskal Wallis
Pensioners	0.8±0.1	1±0.1	0.7±0.1	0.5±0.1	0.008	ANOVA
Children	2.2±0.3	2.7±0.4	1.7±0.3	2.4±0.3	0.154	ANOVA
Total in household	5.5±0.6	5.3±0.4	4.9±0.4	4.1±0.3	0.116	Kruskal Wallis

Amongst the different headship types based on gender, households with adult females only were on average the smallest households in both sites, and differences in size were significant in Lesseyton (Table 7.2.1 b). While households with adult females only were smaller in total size, this is mostly because they contained on average significantly fewer adults and pensioners. In Lesseyton, households with adult males only had on average more adults and pensioners compared to the other headship types. Male headed households with adult females had on average the least many pensioners and children out of the different headship types in Lesseyton. In Lesseyton, female headed households with adult males were significantly larger in total compared to the other gender headship types.

In Gatyana, female headed households with adult males were on average the largest in total compared to the other gender groups, and had on average more adults than the other groups. Male headed households with adult females in Gatyana were on average the next largest household, and had more pensioners and more children than all the other headship types.

These demographics suggest that male headed households with adult females in Lesseyton are predominantly recently-established households comprised of young couples, whereas the same category in Gatyana is an older, more established household. The relatively high number of children in households with only adult females in each site indicates the high rates of single mothers, and reflects how more households with only adult females were looking after orphans (see 6.4.2). In Gatyana, many households with only adult males are also experiencing single-parenthood.

Table 7.2.1 c: Differences in mean (± standard error) number of household members in different demographic categories amongst households in different income quartiles in Lesseyton and Gatyana

Lesseyton						
	Lowest income N = 42	**Low income N = 39**	**Moderate income N = 45**	**High income N = 44**	**P value (between quartiles)**	**Test**
Adults	2.1±0.2	2.3±0.2	2.5±0.2	3.2±0.2	0.001	ANOVA
Pensioners	0.3±0.1	0.4±0.1	0.5±0.1	0.7±0.1	0.20	ANOVA
Children	1.6±0.2	2±0.3	1.7±0.2	3.3±0.3	0.000	ANOVA
Total in household	3.9±0.3	4.7±0.4	4.7±0.3	7.2±0.5	0.000	Kruskal Wallis
Gatyana						
	Lowest income N = 43	**Low income N =46**	**Moderate income N = 39**	**High income N = 48**	**P value (between quartiles)**	**Test**
Adults	1.6±0.2	1.7±0.2	1.9±0.2	2.2±0.2	0.12	ANOVA
Pensioners	0.3±0.1	0.6±0.1	0.9±0.1	1.2±0.2	0.000	Kruskal Wallis
Children	1.6±0.3	1.81±0.3	2.7±0.4	3.1±0.3	0.001	ANOVA
Total in household	3.4±0.4	4.2±0.3	5.5±0.4	6.5±0.4	0.000	ANOVA

In both sites, average household size increased incrementally and significantly as income increased, with significantly more children in the high income quartile in both sites, significantly more adults in the high income quartile in Lesseyton and significantly more pensioners in the high income quartile in

Gatyana (Table 7.2.1 c). This could indicate that larger households lead to more income, or that higher incomes allow a household to take on more members.

7.2.2 Education and skills

As expected, households in the more urbanised site, Lesseyton, had a higher average adult education index score than households in Gatyana (Table 7.2.2 a). These differences were significant.

There were no significant differences amongst households with different gender headship types. In Lesseyton, male headed households with adult females had the highest education score, while households with only adult females had the lowest score in this site. Gatyana did not mirror this trend, and households with only female adults had the second lowest average education score, but male headed households with adult females had the lowest average score.

Table 7.2.2 a: Differences in mean (± standard error) adult education score for households in different groups in Lesseyton and Gatyana

			Lesseyton	Gatyana
Total		Mean N	7.3±0.2 170	4.9±0.3 170
		P value (between sites) Test	0.000 Mann-Whitney U	
Gender	Male only	Mean N	7.4±0.4 47	6.1±0.5 37
	Male with female	Mean N	7.6±0.5 45	3.5±0.5 41
	Female with male	Mean N	7±0.4 53	5.2±0.6 43
	Female only	Mean N	6.9±0.7 25	4.9±0.5 48
		P value (between gender) Test	0.662 Kruskal Wallis	0.163 ANOVA
Income	Lowest income	Mean N	7.2±0.5 42	4.3±0.5 43
	Low income	Mean N	7.2±0.5 39	5.1±0.7 46
	Moderate income	Mean N	6.4±0.5 45	4.6±0.5 39
	High income	Mean N	8.2±0.4 44	5.5±0.6 41
		P value (between income) Test	0.058 ANOVA	0.417 ANOVA

National level studies have showed that females in South Africa have on average a lower literacy level than men, and that while enrolment in primary school is gender neutral, secondary school enrolment is more male-dominated, and teenage pregnancy is the leading cause for drop-outs amongst young women (CGE, 2010). The contrasting education index scores of the male headed households with adult females in the two sites could be attributed to these households being on average younger

in Lesseyton than in Gatyana (Table 7.2.1 b above), and so have experienced reform in the country's education system. Most of the elderly, particularly in Gatyana, were observed to be illiterate, perhaps reflecting the poor education system in this area in the past (Chapter 5).

None of the differences between income quartiles were significant. Households in the high income quartiles in both sites had on average higher adult education scores compared to the other income quartiles (Table 7.2.2 a), while the lowest income quartile had on average lower scores compared to other income quartiles. However, the mean scores did not follow a gradient with income, as in both sites the moderate income households had on average lower scores than the low income households. This could indicate that income influences education, that education influences income level, or that the two work in a virtuous cycle (see 6.2 for participatory identifications of this cycle).

Additional skills are useful to a household as they can be used as safety nets to develop self-employment opportunities (Shackleton et al., 2008). Additional skills are also an important variable to consider as they are not an indication of formal schooling, but rather an indication of inter-generational skills transfer and/or of social cohesion. Most additional skills are not the type of skill that would be learnt at a college or school, but rather through peers and acquaintances. Common examples of additional skills were sewing, weaving, beadwork and domestic work for women, and driving, building/construction, carpentry, electronics, plumbing, welding and brick-making or -laying

Table 7.2.2 b: Differences in mean (± standard error) additional skills index for households in different groups in Lesseyton and Gatyana

			Lesseyton	Gatyana
Total		Mean N	0.2±0.0 170	0.2±0.0 170
		P value (between sites) Test	0.44 T test	
Gender	Male only	Mean N	0.3±0.1 47	0.3±0.1 37
	Male with female	Mean N	0.3±0.0 45	0.2±0.0 41
	Female with male	Mean N	0.2±0.0 53	0.2±0.1 43
	Female only	Mean N	0.1±0.0 25	0.2±0.1 48
		P value (between gender) Test	0.019 Kruskal Wallis	0.196 Kruskal Wallis
Income	Lowest income	Mean N	0.2±0.0 42	0.2±0.1 43
	Low income	Mean N	0.3±0.1 39	0.3±0.1 46
	Moderate income	Mean N	0.3±0.1 45	0.1±0.0 39
	High income	Mean N	0.2±0.0 44	0.2±0.0 41
		P value (between income) Test	0.768 Kruskal Wallis	0.522 Kruskal Wallis

for men. In Gatyana, additional skills for women were most often beadwork and weaving, and for men brick-work and construction, whereas Lesseyton had more variety in skills. Additional skills tended to mostly be attributed to middle-aged to elderly adults in the households, although they were sometimes ascribed to teenagers.

There were no significant differences in the additional skills held by households in the two sites (Table 7.2.2 b). In both sites, households with only adult males tended to have more additional skills than all the other household head gender groups, although the differences were only significant in Lesseyton (Table 7.2.2 b). This difference between male headed households with adult females in the two sites is interesting as this group in Gatyana is on average older (Table 7.2.1 b above), and additional skills were observed more amongst the elderly, yet this group has the lowest score in this site.

Households in Lesseyton had significantly more additional languages (other than isiXhosa) than households in Gatyana (Table 7.2.2 c). This could be because Lesseyton is closer to a large urban centre, and so more exposed to multiple languages, and as people in Lesseyton are better educated (Table 7.2.2 b).

Table 7.2.2 c: Differences in mean (± standard error) additional languages index for households in different groups in Lesseyton and Gatyana

			Lesseyton	Gatyana
Total		Mean N	0.7±0.0 170	0.3±0.0 170
		P value (between sites) Test	0.000 Mann-Whitney U	
Gender	Male only	Mean N	0.8±0.1 47	0.4±0.1 37
	Male with female	Mean N	0.7±0.1 45	0.2±0.1 41
	Female with male	Mean N	0.6±0.1 53	0.3±0.1 43
	Female only	Mean N	0.4±0.1 25	0.3±0.1 48
		P value (between gender) Test	0.014 ANOVA	0.321 ANOVA
Income	Lowest income	Mean N	0.6±0.1 42	0.3±0.1 43
	Low income	Mean N	0.7±0.1 39	0.4±0.1 46
	Moderate income	Mean N	0.7±0.1 45	0.2±0.1 39
	High income	Mean N	0.6±0.1 44	0.4±0.1 41
		P value (between income) Test	0.988 ANOVA	0.271 ANOVA

Differences in languages amongst gender headship types were only significant in Lesseyton, where additional languages declined incrementally as the household's leadership became more feminised (Table 7.2.2 c).

There were no significant differences in the mean total number of additional languages amongst households in different income quartiles in either site.

7.2.3 Health

Although fewer households in Gatyana met HIV/Aids proxy indicators than those in Lesseyton (Chapter 6), households in Gatyana had on average significantly poorer levels of health than those in Lesseyton (Table 7.2.3 a). Poorer health in the rural areas of South Africa is frequently observed, owing to poorer health services and other basic services (Coovadia et al., 2009; Chapters 5 & 6).

Table 7.2.3 a: Differences in mean (± standard error) health index for households in different groups in Lesseyton and Gatyana

			Lesseyton	Gatyana
Total		Mean N	0.7±0.1 170	0.9±0.1 170
		P value (between sites) Test	0.033 T test	
Gender	Male only	Mean N	0.7±0.1 47	0.9±0.2 37
	Male with female	Mean N	0.7±0.1 45	0.9±0.1 41
	Female with male	Mean N	0.8±0.1 53	0.8±0.1 43
	Female only	Mean N	0.8±0.2 25	1±0.1 48
		P value (between gender) Test	0.656 ANOVA	0.806 ANOVA
Income	Lowest income	Mean N	0.6±0.1 42	0.9±0.2 43
	Low income	Mean N	0.7±0.1 39	1±0.1 46
	Moderate income	Mean N	0.9±0.1 45	0.8±0.1 39
	High income	Mean N	0.7±0.1 44	0.9±0.1 41
		P value (between income) Test	0.349 ANOVA	0.724 ANOVA

Differences in health amongst gender headship types were not significant in either site. In Lesseyton, female headed households had on average poorer health than male headed households, although Gatyana did not display the same trend. The poorer health of female headed households compared to males in Lesseyton could be reflective of the higher HIV infection rates amongst women (Gillepsie & Drimie, 2009a; Makiwane & Chimere-Dan, 2010), and/or of the added health burden arising from

women's role of collecting fuelwood and the health implications of both paraffin and woodsmoke (see Chapter 6; van Horen & Eberhard, 1995; Bruce et al., 2002).

Contrary to expectations, there was no incremental decrease in ill-health with increasing income (Table 7.2.3 a). Income quartiles did not display the same trends across sites and differences were not significant. Health and wealth have frequently been shown to have a direct relationship (Deaton, 2002), although many factors influence health.

7.2.4 Contentment

Enumerators perceived respondents to be equally happy on average across the two sites; however, within the different groups, there were distinct differences (Table 7.2.4).

Table 7.2.4: Differences in mean (± standard error) enumerated-rated contentment scores of different groups in Lesseyton and Gatyana

			Lesseyton	Gatyana
Total		Mean N	6.7±0.1 168	6.7±0.1 169
		P value (between sites) Test	0.982 T test	
Gender	Male only	Mean N	7.2±0.2 47	7.1±0.3 37
	Male with female	Mean N	6.9±0.3 45	6.9±0.2 41
	Female with male	Mean N	6.5±0.3 51	6.3±0.3 42
	Female only	Mean N	6±0.3 25	6.7±0.2 48
		P value (between gender) Test	0.026 ANOVA	0.165 ANOVA
Income	Lowest income	Mean N	7.1±0.272 42	6.7±0.3 43
	Low income	Mean N	6.4±0.3 39	6±0.3 45
	Moderate income	Mean N	6.3±0.3 44	7.1±0.2 39
	High income	Mean N	7.2±0.2 43	7.2±0.2 41
		P value (between income) Test	0.035 ANOVA	0.003 ANOVA

In Lesseyton there was a distinct and significant decline in the perceived contentment of respondents as the household's leadership became more feminised, with respondents from households with only adult males being viewed as the most content and respondents from households with only female adults being viewed as the least content (Table 7.2.4). Gatyana did not display the same significant incremental trend, although respondents from households with only male adults were again still perceived to be the most content. Depression has been linked to HIV/Aids with the potential for a

mutually re-enforcing relationship (Nayika, 2010; Simbayi et al., 2007). Women are generally more susceptible to depression (Burt & Stein, 2002). Depression is linked to life stress, particularly for women as they are more vulnerable to depression and life stress related depression (Silberg et al., 1999; Tennant, 2002; Sherrill et al., 1997). The women in each site identified stress as an aspect of vulnerability in the areas, whereas the men did not identify stress (see 6.2). The women identified poverty, unemployment and poor health as factor contributing to stress, among others (see 6.2). Crime and rape also featured in the women's mental models (see 6.2).

In both sites the differences in contentment between the income quartiles were significant, although these changes did not incrementally increase as income increased. However, in each site, respondents in the high income quartile were perceived on average to be the most content. Psychological wellbeing has generally been observed to be positively related to wealth, although this relationship is most observable in poorer nations and flattens out in rich countries (Hartog & Oosterbeek, 1998).

7.2.5 Human capital, vulnerability and adaptive capacity

Human capital has often been considered as vital or non-substitutable as it is necessary for commanding other forms of capital and actualising capabilities (DFID, 1999; Anand & Sen, 2000). Human capital can be eroded through HIV/Aids as productivity declines. The ability to speak multiple languages could contribute to adaptive capacity as this might allow more possibilities to access information relating to health, weather variability or other vital information relating to HIV/Aids or climate change. Education is also valuable for accessing information, while education and skills are valuable for developing livelihood opportunities.

Between the two sites, Lesseyton appears to have higher human capital than Gatyana. Lesseyton has more household members of a productive age, higher education levels, more additional languages and better health than Gatyana. This supports claims that the components of human capital are inter-linked: that good health promotes learning whilst knowledge of good health practises is more likely to actualise them (Kalichman et al., 2000). The out-migration of productive members from Gatyana could be indicative of the high rates of unemployment in the area as well as how agrarian livelihoods are increasingly seen as not viable (see 5.2).

Households with only adult females had lower stocks of human capital, although the differences between genders were greater in Lesseyton. In both sites, households with only adult females had the fewest members of a productive age. In Lesseyton, skills, additional languages and contentment all significantly declined incrementally as the household's adults became female dominated. The fewer productive adults, with fewer skills, indicates a lowered ability to actualise capabilities, whilst a lowered contentment could reflect not being able to perceive opportunities (Campbell & MacPhail, 2002). Not being able to perceive a positive future is an important consideration for HIV/Aids, as this

can increase risk-taking sexual behaviour and compromise treatment regimes, whereas HIV/Aids increases the risk of depression through internalised sigma and low perceived self-worth (Simbayi et al., 2007). Low perceived self-worth and the inability to imagine a bright future, coupled with lower skills, may be contributing factors to transactional sex in the Lesseyton area, where it appears to be more prevalent based on the references to transactional sex in participatory exercises (see 5.2 and 6.2).

The only significant differences relating to human capital amongst income quartiles in both sites were in demographics and contentment. This could imply that income is not as much of an important contributing factor when considering adaptive capacity, if adaptive capacity is seen as a function of capabilities relating to knowledge, skills and agency (Jones et al., 2010).

7.3 Social Capital

7.3.1 Cognitive social capital: trust and cohesion

For the cognitive aspect of social capital, the mean total scores for seven Likert scale questions were disaggregated by the various groups (see 7.1.3 a and Box 7.1.3). The score combines questions related to social cohesion, participation, values, trust, norms of participation and reciprocity to get a weighted sum. Of the two sites, Gatyana had a significantly higher mean score than Lesseyton (Table 7.3.1).

Table 7.3.1: Mean (± standard error) cognitive social capital scores of different groups in Lesseyton and Gatyana

			Lesseyton	Gatyana
Total		Mean N	20.9±0.3 170	22.2±0.2 170
		P value (between sites) Test	0.000 Mann-Whitney U	
Gender	Male only	Mean N	20.9±0.5 47	22.2±0.4 37
	Male with female	Mean N	20.7±0.5 45	22±0.5 41
	Female with male	Mean N	20.9±0.7 53	22.7±0.5 43
	Female only	Mean N	21.2±0.7 25	22±0.5 48
		P value (between gender) Test	0.007 Kruskal Wallis	0.699 ANOVA
Income	Lowest income	Mean N	20.1±0.5 42	22.2±0.5 43
	Low income	Mean N	20.7±0.6 39	22.5±0.4 46
	Moderate income	Mean N	21.9±0.6 45	22.5±0.4 39
	High income	Mean N	21.9±0.6 44	21.7±0.6 41
		P value (between income) Test	0.185 ANOVA	0.645 ANOVA

Amongst the different gender headship types, households with only female adults had a significantly higher mean score in Lesseyton only (Table 7.3.1). There were no significant differences in cognitive social capital scores amongst income quartiles in either site (Table 7.3.1).

Trust, cohesion and reciprocity have been said to be associated with the exchange of resources and innovative thinking – and so have been suggested as indicators for adaptive capacity to climate change (Pelling & High, 2005). Trust, cohesion and reciprocity, measured through the set Likert scale questions, is said to decrease with an increase in linking social capital – or 'vertical' social interactions up a social hierarchy – which could imply that female headed households are not as vertically connected as male headed households (Pelling & High, 2005). This claim is supported by the differences in scores between Lesseyton and Gatyana, with residents in Lesseyton being closer to an urban city and therefore having more opportunity to form vertical relationships than those in Gatyana.

7.3.2 Structural social capital: group membership and resource generators

Aside from the cognitive dimension of trust and social cohesion, social capital also has structural dimensions, such as social support networks and interactions (Pelling & High, 2005). Community group or organisation membership can be seen as a measure of the household's social networks.

Table 7.3.2 a: Differences in mean (± standard error) number of community group or organisation membership of different groups in Lesseyton and Gatyana

			Lesseyton	Gatyana
Total		Mean N	1.9±0.1 170	1.2±1 170
		P value (between site) Test	0.000 T test	
Gender	Male only	Mean N	1.7±0.2 47	1.3±0.2 37
	Male with female	Mean N	1.9±0.1 45	1.1±0.1 41
	Female with male	Mean N	2.1±0.1 53	1.3±0.1 43
	Female only	Mean N	1.7±0.2 25	1.2±0.1 48
		P value (between gender) Test	0.129 ANOVA	0.408 Kruskal Wallis
Income	Lowest income	Mean N	1.4±0.1 42	0.9±0.12 43
	Low income	Mean N	1.6±0.1 39	1.2±0.1 46
	Moderate income	Mean N	1.9±0.1 45	1.3±0.1 39
	High income	Mean N	2.4±0.2 44	1.4±0.1 41
		P value (between income) Test	0.002 Kruskal Wallis	0.035 ANOVA

Lesseyton households on average belong to significantly more groups than households in Gatyana (Table 7.3.2 a). This difference could perhaps be because Lesseyton is more developed and more densely populated making it easier to travel to take part in group activities, whereas in Gatyana households are more scattered and travelling is more expensive.

Differences between gender headship types were not significant, and did not follow the same trend across sites. However, in both sites, group membership steadily and significantly increased as household income increased (Table 7.3.2 a). This could be because households with more income are more able to pay for transport to travel to group activities, or because higher group membership facilities opportunities to pursue income earning activities.

A household may have a wide circle of acquaintances, but whether a household's social network is diverse enough to be able to assist the household with a variety of concerns is another aspect of social capital. This can be seen as the diversity or quality of a household's social interactions, i.e. its social capital. Resource generators capture the diversity of a household's social networks. Generally most households scored very low on the resource generator. As with the structural social capital measure of group membership, Lesseyton had a higher mean score than Gatyana for the resource generator measure (Table 7.3.2. b). There were no significant differences between gender headship types or income quartiles in either site.

Table 7.3.2 b: Differences in mean (± standard error) resource generator scores of different groups in Lesseyton and Gatyana

			Lesseyton	Gatyana
Total		Mean N	0.3±0.0 169	0.2±0.0 170
		P value (between sites) Test	0.000 Mann-Whitney U	
Gender	Male only	Mean N	0.3±0.0 47	0.2±0.0 37
	Male with female	Mean N	0.3±0.0 44	0.1±0.0 41
	Female with male	Mean N	0.2±0.0 53	0.2±0.0 43
	Female only	Mean N	0.2±0.0 25	0.2±0.0 48
		P value (between gender) Test	0.546 Kruskal Wallis	0.287 ANOVA
Income	Lowest income	Mean N	0.2±0.0 42	0.1±0.0 43
	Low income	Mean N	0.2±0.0 39	0.2±0.0 46
	Moderate income	Mean N	0.3±0.0 44	0.1±0.0 39
	High income	Mean N	0.3±0.0 44	0.2±0.0 41
		P value (between income) Test	0.272 ANOVA	0.233 ANOVA

The structural component of social capital does not seem to relate to the cognitive dimension of trust and social cohesion. There would appear to be a slight correlation between the quantity and quality of the structural components of social capital if one were to look at the income and site groups.

7.3.3 Political social capital: group leadership and decision making

Another aspect of social capital which combines structural and cognitive dimensions is decision making and leadership. These can be seen as political capital, which some researchers feel should be an asset in its own right in the livelihoods framework (e.g. Rakodi, 1999) while others feel it should be a key component when considering aspects of social capital (e.g. Siegel, 2005).

Of the two sites, households in Gatyana had a higher mean number of household members with leadership positions in community groups and organisations (Table 7.3.3 a).

Table 7.3.3 a: Differences in mean (± standard error) leadership positions amongst different groups in Lesseyton and Gatyana

			Lesseyton	Gatyana
Total		Mean N	0.3±0.0 163	0.4±0.1 143
		P value (between sites) Test	0.677 T test	
Gender	Male only	Mean N	0.3±0.1 47	0.5±0.1 37
	Male with female	Mean N	0.4±0.1 45	0.1±0.0 41
	Female with male	Mean N	0.2±0.7 53	0.4±0.1 43
	Female only	Mean N	0.2±0.1 25	0.3±0.1 48
		P value (between gender) Test	0.485 ANOVA	0.04 Kruskal Wallis
Income	Lowest income	Mean N	0.1±0.1 42	0.1±0.1 43
	Low income	Mean N	0.2±0.1 39	0.5±0.1 46
	Moderate income	Mean N	0.2±0.1 45	0.2±0.1 39
	High income	Mean N	0.6±0.1 44	0.4±0.1 41
		P value (between income) Test	0.002 Kruskal Wallis	0.007 Kruskal Wallis

Amongst the various gender headship types, the differences in leadership were only significant in Gatyana where male headed households with adult females had a far lower average (Table 7.3.3 a).

The mean number of leadership positions in a household did not incrementally change with rising income, although in both sites the lowest income quartile had lower means than the other quartiles and the differences between income quartiles were significant (Table 7.3.3 a).

Another aspect related to leadership or political capital is participation in community meetings and decision making. Overall, the majority of households feel that they at least sometimes take part in community decision making (Table 7.3.3 b). A significantly higher proportion of households in Gatyana take part in decision making more often, compared to Lesseyton. This could be because people in Gatyana feel more comfortable and encouraged in taking part in traditional leadership structures, whereas political factionalism and mistrust of political leaders (often expressed in participatory workshops and during interviews) in Lesseyton could account for less participation in community meetings. As Gatyana is more rural and isolated compared to Lesseyton, its community members may be more reliant on one another, and thus more inclined to take part in community meetings.

There were no significant differences between the different gender headship types or income quartiles.

Table 7.3.3 b: Differences in percentages of households in different groups in Lesseyton and Gatyana indicating frequency of participation in community decision making

		Lesseyton (N = 170)			Gatyana (N=170)		
		Never %	Sometimes %	Often %	Never %	Sometimes %	Often %
Total		12.3	45.9	41.8	4.8	36.9	58.3
	P value (between sites) Test	0.003 Pearson Chi Square					
Gender	Male only	10.6	51.1	38.3	2.8	27.8	69.4
	Male with female	8.9	40	51.1	4.9	26.8	68.3
	Female with male	18.9	49.1	32	4.8	42.9	52.3
	Female only	8.0	40	52	6.3	47.9	45.8
	P value (between gender) Test	0.407 Fisher's			0.203 Fisher's		
Income	Lowest income	16.6	40.5	42.9	4.8	45.2	50
	Low income	2.6	61.5	35.9	6.5	30.4	63.1
	Moderate income	13.3	46.7	40	5.1	28.2	66.7
	High income	15.9	36.4	47.7	2.5	45	52.5
	P value (between income) Test	0.192 Fisher's			0.267 Fisher's		

7.3.4 Social capital, vulnerability and adaptive capacity

Owing to the multiple interpretations of what exactly constitutes 'social capital' (see 3.4.2; Fine, 2010), it is difficult to pin-point exactly what the differences in social capital variables mean for vulnerability and adaptive capacity.

These different aspects of social capital can have different uses and meanings for different groups, at different times, with different needs. Generally Gatyana is more trusting and established, with high participation in decision making, although it has low structural social capital probably owing to its poor infrastructure and lower cash incomes. This could indicate that while Gatyana has greater

potential for collaboration and co-operation within its community – which are important features of adaptive capacity (Jones et al., 2010; Moser & Ekstrom, 2010) – households have fewer opportunities to access new information through extended social networks compared to those in Lesseyton.

The higher trust and cohesion amongst households with only female adults in Lesseyton may be a reflection that they have more chance of accessing support from friends, family and community organisations if they are facing stress, which is a well-documented coping strategy, particularly for women (Hinton et al., 2010; Dawson, 2009). Cognitive social capital has been shown to be valuable for reducing risk of HIV infection amongst men and women, whereas structural social capital was found to only be risk-reductive for men, while women with high structural social capital had a higher correlation with HIV infection (Pronyk et al., 2008). Cognitive social capital has also been shown to contribute to household food security (Simatele, 2012), which may relate to the slightly higher food security perceptions of households with only adult females (see 6. 5.1).

In contrast to findings elsewhere (e.g. Meer, 1997), female headed households did not have significantly fewer leadership positions or lower participation in community meetings and decision making. This means women are engaging in promoting their interests in these sites. However, the lower leadership of the lowest income quartiles in both sites has implications for their adaptive capacity, as they may not be able to mobilise to protect their rights or promote their interests within the community, contributing to their already vulnerable position (see 3.2.1; Parker & Kozel, 2007; Adger & Kelly, 1999).

7.4 Natural capital

7.4.1 Area of land available for cultivation

The area of land that has household is able to cultivate can influence the food security of the household, in terms of production both for subsistence and for sale.

As expected, households in Gatyana have on average far larger areas of cultivatable land than Lesseyton (Table 7.4.1). Households in Gatyana are widely dispersed and most have around half a hectare of land for cultivation adjacent to the homestead, whereas households in Lesseyton are build more densely, often with only a small garden space that roughly equates to the size of the building itself.

In both sites, the two male headed household types had larger areas to cultivate than the two female headed household types (Table 7.4.1). In Lesseyton, this difference was readily noticeable. Households with only female adults in Lesseyton had a mean garden size that was over five times smaller than the mean garden size for households with only male adults. In Gatyana the male headed types had roughly a quarter more mean cultivatable land than the female headed types. These

differences were not significant across gender headship types; however, a post-hoc analysis revealed that the area of cultivatable land that households with only adult males had access to was significantly larger than that of both female headed household types in both sites.

Discriminations between men and women in land ownership and tenure in South Africa are an on-going concern, as widows and divorcees frequently lose their rights to access land, while single and unmarried women are often not granted these rights (Cousins, 2010). This is an important consideration for this thesis, as the female headed household types probably represent women of different marital statuses which experience different vulnerabilities.

In Lesseyton, the mean area of land available increased incrementally as income increased, from 60.2 m^2 to 286 m^2. However, differences between income quartiles were only significant in Gatyana. In Gatyana, the two higher income quartiles had substantially more land available than the two lower income quartiles. This correlation could be due to land being used to derive and boost income, or as higher income results in a household's ability to acquire more land or to utilise the land.

Table 7.4.1: Differences in mean (± standard error) area of garden (m^2) of households in different groups in Lesseyton and Gatyana

			Lesseyton	Gatyana
Total		Mean N	148.5±26.1 165	5066.6±390.2 163
		P Value (between sites) Test	0.000 Mann-Whitney U	
Gender	Male only	Mean N	259.3±78.3 46	6018.5±1644.4 35
	Male with female	Mean N	123.9±31.9 45	6303.48±765.04 40
	Female with male	Mean N	119±33.7 50	3885.05±646.5 40
	Female only	Mean N	47.1±18.7 25	4418.49±678.39 47
		P Value (between gender) Test	0.053 Kruskal Wallis	0.095 Kruskal Wallis
Income	Lowest income	Mean N	60.2±14.4 41	3914.7±729.9 40
	Low income	Mean N	119.8±36.5 38	3072.8±583.8 44
	Moderate income	Mean N	124±33.3 44	7107.6±897.9 39
	High income	Mean N	286.5±86.9 42	6421.8±753.4 40
		P Value (between income) Test	0.151 Kruskal Wallis	0.000 Kruskal Wallis

Small-holder or subsistence cultivation is frequently seen as a means to bolster household food security, free up household income and diversify livelihoods, while offering a potential safety net function (Hendriks, 2003; Aliber and Hart, 2009). It is interesting to note that the significantly higher

availability of cultivatable land in Gatyana is not reflected in food security perceptions in this site, which were lower than those in Lesseyton (see 6.5.1).

7.4.2 Use of different resources

The proportions presented here only indicate whether the household does make use of these resources, and not an indication of frequency of use. An indication of how much these resources contribute to household income is analysed when looking at household livelihood portfolios (see 8.2).

In general, as expected, households in Gatyana are more likely to make use of most different types of natural resources, and bushmeat use was the only exception (Table 7.4.2 a). A higher proportion of households in Gatyana reported using the river, grazing land, forest/bush and medicinal plants. The proportion of households reporting use of the river in Gatyana (91.2%) was over double that of Lesseyton (42.9%). Marine resources were only available to households in Gatyana. The proportion of households that collect wild fruit was almost identical in each site.

Table 7.2.2 a: Differences in percentage of households using various natural resources in Lesseyton and Gatyana

		Lesseyton (N = 170) %	Gatyana (N = 170) %	P value (between sites)	Test
Landscape resources	River	42.9	91.2	0.000	Pearson Chi-Square
	Grazing land	23.5	38.2	0.003	Pearson Chi-Square
Harvestable resources	Fuelwood	77.1	89.4	0.002	Pearson Chi-Square
	Bushmeat	28.2	20	0.076	Pearson Chi-Square
	Wild fruit	64.1	64.7	0.91	Pearson Chi-Square
	Medicinal plants	47.6	63.5	0.004	Pearson Chi-Square
	Marine resources	N/A	40	N/A	N/A

Amongst households with different gender headship types in Lesseyton, male headed households with adult females tended to make a bit more use of the various natural resources (Table 7.4.2 b). A significantly lower percentage of households with only adult females in Lesseyton used the river, bushmeat or medicinal plants.

In Gatyana, households with only adult females reported a lower proportion of users of all the different resources, except marine resources, which was lower amongst male headed households with adult females. However, the only significant difference amongst gender headship types was for bushmeat, which was lowest amongst households with only female adults.

The relatively low proportion of users of various natural resources by households with only adult females was unexpected, as women in South Africa have frequently been documented to harvest and make use of more wild natural resources than men (Shackleton et al., 2004; Brody et al., 2008). Households' use of various natural resources can be linked to the household's demographics. The

lower percentages of households with only female adults in Lesseyton collecting various natural resources may be a reflection of these households having fewer able-bodied adults to collect these resources (see 7.2.1). The low percentage of households with only adult females reporting the use of bushmeat could indicate how hunting is considered a male activity (McGarry, 2008). A household's reported collection of wild fruit could relate to the number of children in a household, as children are often the main collectors of wild fruit (McGarry, 2008).

Table 7.4.2 b: Differences in percentage of households with different headship of different genders using various natural resources in Lesseyton and Gatyana

Lesseyton							
		Male only N = 47 %	**Male with female N= 45 %**	**Female with male N= 53 %**	**Female only N = 25 %**	**P value (between gender types)**	**Test**
Landscape resources	River	48.9	55.6	35.8	24	0.039	Pearson Chi-Square
	Grazing land	21.3	22.2	28.3	20	0.797	Pearson Chi-Square
Harvestable resources	Fuelwood	76.6	86.7	69.8	76	0.267	Pearson Chi-Square
	Bushmeat	43	35.6	28.3	4	0.027	Pearson Chi-Square
	Wild fruit	59.6	68.9	69.8	52	0.36	Pearson Chi-Square
	Medicinal plants	55.3	55.6	45.3	24	0.04	Pearson Chi-Square
	Marine resources	N/A	N/A	N/A	N/A	N/A	N/A
Gatyana							
		Male only N = 37 %	**Male with female N = 41 %**	**Female with male N = 43 %**	**Female only N = 48 %**	**P value (between gender types)**	**Test**
Landscape resources	River	94.6	95.1	93	83.3	0.227	Fisher's test
	Grazing land	48.6	48.8	30.2	29.2	0.092	Pearson Chi-Square
Harvestable resources	Fuelwood	86.5	95.1	95.3	81.2	0.089	Fisher's test
	Bushmeat	37.8	14.6	20.9	10.4	0.013	Pearson Chi-Square
	Wild fruit	64.9	63.4	69.8	60.4	0.827	Pearson Chi-Square
	Medicinal plants	70.3	70.7	60.5	54.2	0.305	Pearson Chi-Square
	Marine resources	43.2	36.6	41.9	39.6	0.776	Pearson Chi-Square

Generally, in Lesseyton, a higher proportion of households in the high income quartile reported more natural resource usage, except regarding medicinal plants which was higher amongst the low income quartile (Table 7.4.2 c). In Gatyana, the proportion of households reporting higher usage varied from resource to resource. In both sites, households in the high income quartile reported significantly more usage of communal grazing land perhaps as these households are more likely to own livestock. While high income households often use more natural resources, lower income households often derive a

higher proportion of their income from these sources than high income households (see 8.2.3; Thondhlana et al., in press; Shackleton & Shackleton, 2000).

The low reported usage of natural resources across the various social and economic groups could have implications for the use of natural resources as a safety net, if these households do not consider these resources as desirable.

Table 7.4.2 c: Differences in percentage of households in different income quartiles using various natural resources in Lesseyton and Gatyana

Lesseyton							
		Lowest income N = 42 %	**Low income N = 39 %**	**Moderate income N = 45 %**	**High income N = 44 %**	**P value (between income groups)**	**Test**
Landscape resources	River	40.5	41	35.6	54.5	0.310	Pearson Chi-Square
	Grazing land	11.9	12.8	28.9	38.6	0.008	Pearson Chi-Square
Harvestable resources	Fuelwood	78.6	79.5	66.7	84.1	0.244	Pearson Chi-Square
	Bushmeat	21.4	33.3	22.2	36.4	0.296	Pearson Chi-Square
	Wild fruit	57.1	74.4	51.1	75	0.041	Pearson Chi-Square
	Medicinal plants	45.2	64.1	33.3	50	0.054	Pearson Chi-Square
	Marine resources	N/A	N/A	N/A	N/A	N/A	N/A
Gatyana							
		Lowest income N = 43 %	**Low income N =46 %**	**Moderate income N = 39 %**	**High income N = 48 %**	**P value (between income groups)**	**Test**
Landscape resources	River	88.4	89.1	97.4	90.2	0.367	Fisher's test
	Grazing land	34.9	26.1	35.9	58.5	0.016	Pearson Chi-Square
Harvestable resources	Fuelwood	81.4	93.5	89.7	92.7	0.244	Pearson Chi-Square
	Bushmeat	16.3	13	28.2	24.4	0.275	Pearson Chi-Square
	Wild fruit	55.8	60.9	69.2	75.6	0.233	Pearson Chi-Square
	Medicinal plants	58.1	56.5	76.9	65.9	0.2	Pearson Chi-Square
	Marine resources	51.2	30.4	35.9	43.9	0.129	Pearson Chi-Square

7.4.3 Natural capital, vulnerability and adaptation

Analysing the stocks of natural capital amongst different types of households in order to understand vulnerability and adaptive capacity with regards to HIV/Aids and climate change should take into account a number of complex concerns. The use of natural resources can be a valuable means of coping with stress or supplementing income, particularly in the face of stressors such as HIV/Aids (Kaschula, 2008; McGarry, 2008; Shackleton & Shackleton, 2004; Hendriks, 2003). Food security is an important consideration for households with HIV/Aids (see 3.2.3) and wild natural foods and subsistence cultivation can contribute to the food security in these households (McGarry, 2008;

Kaschula, 2008). However, higher reliance on natural resources can potentially make a household more vulnerable to environmental change, such as climate change (Kiker, 2000).

The greater use and reliance on natural capital amongst households in Gatyana can be linked to the site's lower physical capital and services (see 7.5 below), more traditional lifestyles and greater access to a range of natural resources.

7.5 Physical capital

7.5.1 Property size

While homesteads in Gatyana tended to have more buildings per household than in Lesseyton, the buildings in Lesseyton tended to be slightly larger. As the number of buildings is multiplied by the area of the main building, the resultant mean property size is similar in both sites (Table 7.5.1).

Differences in property sizes amongst different gender headship types were not significant in either site (Table 7.5.1).

Table 7.5.1: Differences in mean (± standard error) area of buildings (m^2) of different types of households in Lesseyton and Gatyana

			Lesseyton	Gatyana
Total		Mean N	121.6±9.8 164	126.5±9.4 167
		P value (between sites) Test	0.72 T test	
Gender	Male only	Mean N	134.7±23.6 44	143.5±25.3 36
	Male with female	Mean N	100±18.3 43	127.3±22.9 40
	Female with male	Mean N	133.5±14.8 52	129.7±17.3 43
	Female only	Mean N	110.4±22.1 16	111.5±11.3 47
		P value (between gender) Test	0.499 ANOVA	0.7 ANOVA
Income	Lowest income	Mean N	78.6±15.1 40	104.8±12.8 43
	Low income	Mean N	112.4±11.9 37	113.2±20.1 45
	Moderate income	Mean N	120.6±15.6 44	125.3±17.4 38
	High income	Mean N	170.5±27.7 43	164.8±23 41
		P value (between income) Test	0.001 Kruskal Wallis	0.114 ANOVA

As expected, income noticeably influenced the size of the household's buildings. In both sites, the mean building size incrementally increased as income increased, although differences were only significant in Lesseyton (Table 7.5.1). In Lesseyton, the mean building size for the lowest income

quartile was less than half that of the highest income quartile. This indicates how financial capital can be linked to physical capital.

7.5.2 Infrastructure

Households in Gatyana were not linked to Eskom, South Africa's electricity provider. While some households had solar panels or diesel-run generators, these were not common and it was felt that these did not provide the same level of electrification and were not comparable. Generators were not used every day, and solar panels were usually used to power one item only. As only 12 households (7.1%) did not have electricity in Lesseyton, electricity was not further disaggregated by the different groups. The absence of electricity in Gatyana partly explains the higher usage of natural resources in this site (see 7.4).

In both sites the majority of households used community taps as the household's primary water source (Table 7.5.5). In Lesseyton, 14.7% of households had a private tap on their property, whereas in Gatyana no households had privately owned taps. More households in Gatyana used a river, reservoir or dam as the household's primary water source. The differences between the two sites in their main water sources were significant.

Table 7.5.2 a: Differences in percentage of households with various primary water sources

	Rainwater tank %	Tap on property %	Community tap %	Reservoir, river or dam %	P value Pearson Chi Square
Lesseyton (N = 170)	4.7	14.7	77.1	3.5	0.000
Gatyana (N = 170)	5.4	0	89.3	5.4	

The differences between the main building materials used in the walls of households' properties were significantly different between the two sites (Table 7.5.2). Around three quarters of households in Gatyana had mud walls (74%), whereas in Lesseyton over half of all households (56.8%) had walls made of bricks or cement.

Table 7.5.2 b: Differences in percentage of households with various building materials for property walls

	Mud %	Bricks/ concrete %	Other %	P value Pearson Chi Square
Lesseyton (N = 170)	37.3	56.8	5.9	0.000
Gatyana (N = 170)	74	24.9	1.2	

7.5.3 Large household items

Households in Lesseyton had on average more large household items – such as beds, televisions, stoves, cellphones, refrigerators and other appliances and furniture – than Gatyana. The mean total

value for all large household items in Lesseyton was over double that of Gatyana (Table 7.5.2). Household's access to electricity in Lesseyton could also perhaps be linked to households in this site investing their income into large household items, many of which require electricity.

Although male only headed households had a higher mean total value of household items, whilst the items of female only headed households had lower mean values, these differences were not significant (Table 7.5.3).

As expected, there was some trend with income and the value of large household items, although it was not as incrementally correlated with increasing income as expected and only significant in Gatyana (Table 7.5.3). This again indicates how financial capital can be linked to physical capital.

Table 7.6.2: Differences in mean (± standard error) value (ZAR) of large household items for households in different groups in Lesseyton and Gatyana

			Lesseyton	Gatyana
Total		Mean N	9305.85±1480.72 170	4346,71±752.97 170
		P value (between sites) Test	0.000 Mann-Whitney U	
Gender	Male only	Mean N	13300±4115.55 47	6242.16±1644.38 37
	Male with female	Mean N	8809.11±2937.41 45	4048.29±1184.22 41
	Female with male	Mean N	7280±144013 53	4918.60±2323.46 43
	Female only	Mean N	6915.80±2015.12 25	2630.42±391.42 48
		P value (between gender) Test	0.818 Kruskal Wallis	0.393 ANOVA
Income	Lowest income	Mean N	5326.19±1561.71 42	2731.16±776.39 43
	Low income	Mean N	9836.51±4218.9 39	2654.78±752.43 46
	Moderate income	Mean N	8388.67±1892.8 45	3201.03±392.02 39
	High income	Mean N	13600±3547.05 44	8966.34±2774.44 41
		P value (between income) Test	0.256 ANOVA	0.000 Kruskal Wallis

While higher income tends to relate to more physical capital, the two sites have similar income levels (Chapter 6) yet Lesseyton has more physical capital. This could perhaps indicate that households in Gatyana are investing their income in other ways, perhaps into their natural capital, livestock and farming activities.

7.5.4 Kraals

Kraals are a valuable resource for livestock-based livelihoods. As expected, significantly more Gatyana households own kraals (Table 7.5.4). In both sites, gender was a significant factor determining kraal ownership. In Gatyana, kraal ownership decreased incrementally as the household's leadership becomes more feminised, whereas in Lesseyton, fewer male headed households with adult females own kraals compared to the other gender headship types in this site. Traditionally, in additional to being used as a cattle enclosure, the kraal is scared place where the men of a household will communicate with their ancestral spirits, whereas women's ancestral spirits reside in an *igoqo* (stockpile of fuelwood) (Cocks, 2006). The low kraal ownership amongst male headed households with adult females in Lesseyton may be an indication that this group is not particularly traditional in practise as this group is on average younger (see 7.2.1).

Table 7.5.4: Differences in kraal ownership making amongst households in different groups in Lesseyton and Gatyana

		Lesseyton (N = 168) %		Gatyana (N = 168) %	
		No	Yes	No	Yes
Total		37.5	62.5	20.2	79.8
	P value Test	0.000 Pearson Chi-Square			
Gender	Male only	28.9	71.1	10.8	89.2
	Male with female	55.6	44.4	12.5	87.5
	Female with male	30.2	69.8	20.9	79.1
	Female only	36	64	34	66
	P value Test	0.03 Pearson Chi-Square		0.029 Pearson Chi-Square	
Income	Lowest income	46.3	53.7	18.6	81.4
	Low income	47.4	52.6	30.4	69.6
	Moderate income	35.6	64.4	15.8	84.2
	High income	22.7	77.3	12.5	87.5
	P value Test	0.068 Pearson Chi-Square		0.168 Pearson Chi-Square	

Income was not a significant factor influencing kraal ownership, and while more of the higher income households tended to own kraals compared to the lower income quartiles, there were subtleties between the two sites. In Gatyana, fewer households in the low income quartile owned kraals, compared to the other income quartiles.

7.5.5 Physical capital, vulnerability and adaptive capacity

Housing is the first and most important asset that poor households seek to acquire (Moser, 2007), and establishing infrastructure that is resilient to extreme climate and weather has been described as the most effective means of adaptation to such stressors (Frayne et al., 2012).

There are clear contrasts in physical capital between the two sites. Lesseyton has better infrastructure in terms of electricity, water provision and building materials, and households in this site have more

large household assets. Gatyana only has more kraals, which may be more of an indication of the need for kraals given the higher numbers of livestock in the area (see 8.2.1). Gatyana's poorer infrastructure leads to greater natural resource use, such as fuelwood for energy and the river for water with potential for poor health effects (Bruce et al., 2002). The weaker building materials (i.e. mud as opposed to bricks) are more susceptible to damage by extreme weather.

7.6 Financial capital

7.6.1 Debt

In both sites, debt to hire purchase stores made up the largest proportion of the total debt (Table 7.6.1 a). Debt to hire purchase stores constituted around 15% more of the total debt in Lesseyton compared to Gatyana, probably owing to Lesseyton's closer proximity to an urban centre making it easier for households to purchase goods on credit as there are more stores which offer hire purchase. Bank loans were the next largest debtors in Lesseyton, whereas only one household in Gatyana owed money to a bank. In Gatyana, a higher proportion of households owed money to local money lenders, friends or neighbours, family and loan sharks, indicating a higher usage of informal monetary exchange.

Table 7.6.1.a: Percentage of total debt owed to different lenders in each site

	Local money lender %	Bank %	Friend/ Neighbour %	Family %	Savings club %	Loan shark %	Hire purchase %	Other %
Lesseyton	0.86	17.26	2.69	0.15	0.25	3.65	67.08	8.05
Gatyana	8.07	0.39	19.33	4.43	0	8.01	52.76	7.01

Average household debt was significantly higher amongst households in Lesseyton than in Gatyana; the average household in Lesseyton owed almost double the amount of money as the average in Gatyana (Table 7.6.1 b). These differences could be due to Lesseyton's proximity to the urban centre and integration into monetary markets, allowing more opportunities for borrowing cash. The access to electricity in Lesseyton could also encourage households to purchase electrical appliances on credit.

There were no significant differences amongst the gender headship types, and trends between headship types were different according to site (Table 7.6.1 b).

Amongst the income quartiles in Lesseyton, debt incrementally and significantly increased as income increased and the high income households on average had over four times as much debt as the average household in the lowest income quartile (Table 7.6.1 b). Differences between income quartiles were not significant in Gatyana. The significantly higher amounts of debt amongst households in the high income quartile in Lesseyton may be an indication of these households being more integrated into monetary markets, as well as the higher number of community groups and organisations to which

these households belong may allow for more opportunities to borrow money. High income is also often a prerequisite for loans, and it may be more likely that high income households are given credit.

Table 7.6.1 b: Differences in mean (± standard error) debt (ZAR) of households in different groups in Lesseyton and Gatyana

			Lesseyton	Gatyana
Total		Mean N	1165.63±211.69 170	450.6±94.33 170
		P Value (between sites) Test	0.003 Mann-Whitney U	
Gender	Male only	Mean N	1406.72±450.41 47	514.43±195.8 37
	Male with female	Mean N	1374.44±512.99 45	201.59 41
	Female with male	Mean N	1064.04±305.25 53	406.19±106.88 42
	Female only	Mean N	526.33±272.04 24	656.08±275.1 48
		P Value (between gender) Test	0.579 ANOVA	0.189 Kruskal Wallis
Income	Lowest income	Mean N	604.12±260.6 42	420.37±267.54 43
	Low income	Mean N	623.08±150.24 39	471.11±135.54 45
	Moderate income	Mean N	948.64±279.28 44	250.51±90.17 39
	High income	Mean N	2399.52±682.23 44	626.95±208.27 41
		P Value (between income) Test	0.005 Kruskal Wallis	0.599 ANOVA

7.6.2 Savings

The mean total of savings for each site was lower than the mean total of debt, and again households in Lesseyton had on average significantly higher stocks of savings than households in Gatyana (Table 7.6.2).

Differences between gender headship types were not significant even although, in both sites, households with only adult females had far less savings than the other gender headship types (Table 7.6.2). In Gatyana households with only adult females had on average R16.67 savings (approx. US$2).

As expected, income tended to influence savings. In both sites, households in the high income quartile had more mean savings than the other income quartiles (Table 7.6.2), although these differences were only significant in Lesseyton. In Gatyana, households in the lowest income quartile had on average just R7.14 in savings (less than US$1).

Table 7.6.2: Differences in mean (± standard error) savings (ZAR) of households in different groups in Lesseyton and Gatyana

			Lesseyton	Gatyana
Total		Mean N	524.48±170.66 160	185.47±89.02 169
		P value (between sites) Test	0.002 Mann-Whitney U	
Gender	Male only	Mean N	1007.84±536.806 44	313.89±277.23 36
	Male with female	Mean N	378.75±173.47 40	380.49±269.61 41
	Female with male	Mean N	443.5±222.88 52	84.74±51.14 43
	Female only	Mean N	56.67±23.18 24	16.67±8.6 48
		P value (between gender) Test	0.935 Kruskal Wallis	0.656 Kruskal Wallis
Income	Lowest income	Mean N	262.75±249.6 40	7.14±5.27 42
	Low income	Mean N	476.32±290.54 38	26.09±18.24 46
	Moderate income	Mean N	237.86±144.5 42	219.23±136.53 39
	High income	Mean N	1132.93±546.64 40	519.37±339.9 41
		P value (between income) Test	0.005 Kruskal Wallis	0.075 Kruskal Wallis

7.6.3 Access to credit

In both sites the majority of households reported that they would not be able to access formal credit if a household member for a farming or other self-employment venture, while a high proportion (roughly a third in each site) did not whether they could or could not access credit (Table 7.6.3).

Table 7.6.3: Percentage of households with access to credit in both sites

	Don't know	No	Yes	P value Pearson Chi Square
Lesseyton (N = 170)	34.1%	57.6%	8.2%	0.745
Gatyana (N = 169)	33.7%	55.6%	10.7%	

7.6.4 Financial capital, vulnerability, adaptive capacity

Financial capital is the most easily converted forms of capital, as it can be used to purchase goods – as indicated by the higher amounts of large household items owned by higher income households (see 7.5.3). Financial capital can also be used to benefit wellbeing directly through improving food security or paying school fees.

While debt can place the household in a vulnerable position if the debt is earning interest, the higher rates of debt amongst households in Lesseyton and those in the higher income quartiles could also be

a reflection that these households have more means through which to borrow money in an emergency. Although there may not be any difference between the two sites in terms of access to formal credit, access to informal credit varies substantially.

7.7 Linking capital stocks

7.7.1 Gatyana

Various capital stocks and assets often work in conjunction with others, such as how human capital has been described as necessary for commanding the other capital types (see 7.2.5). Depending on the local context, different assets or combination of assets may be more important to defining the livelihood of a household.

The group of women in Gatyana identified natural resources (natural capital) as the most important type of asset for day-to-day life as it comprised of water, fuel, food and medicine, and could be use to derive monetary income (financial capital). The group said that having a house or owning property (physical capital) was the next most important type of asset, and that physical property was also necessary to make better use of natural resources (natural capital). The group agreed that one's physical assets were acquired through money (financial capital). Money could be derived, according to the group, through the sale of natural resources, or through jobs. The group argued that while education (human capital) largely influenced one's ability to get a job, these days 'who you know', that is, one's social relations (social capital) was a more important factor. The links and emphases between the types of capital highlighted in the group's discussions are illustrated in Figure 7.7.1 a.

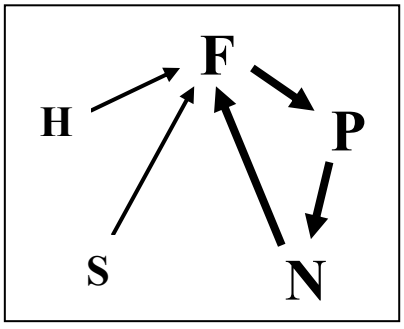

Figure 7.7.1 a: Linking capital stocks by women, Gatyana.
H = human capital; F = financial capital; P = physical capital;
N = natural capital; S = social capital.

The men in Gatyana described everything as dependent on a household's financial capital, which depended on government and government grants more than any of the resources available to a household. The group felt that in the past a household's financial capital would be determined by the other resources in the household, primarily through agricultural activities and other uses of natural capital. The group described that physical capital in the form of infrastructural developments, namely

improved roads and electricity provision, would be crucial for building financial capital stocks. The men in Gatyana also described how natural capital could be converted into financial capital, and that social capital could also be useful for forming groups around managing and conserving money. These discussions are represented in Figure 7.7.1 b.

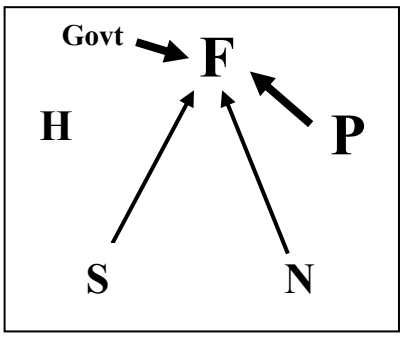

Figure 7.7.1 b: Linking capital stocks by men, Gatyana

7.7.2 Lesseyton

The group of women in Lesseyton identified physical capital as the most important in general, as one needs shelter and aspires to be comfortable. The group agreed that money (financial capital) was needed to acquire property, electricity and other physical assets, but that money could be derived through other forms of assets, namely one's education and skills (human capital), social connections (social capital) or the harvesting and sale of natural resources (natural capital). One's money also influenced the educational opportunities available and social connections in a mutually reinforcing relationship. The group also identified a mutual relationship between human capital and natural capital, as they described how natural resources were necessary to support good health, which, together with having the necessary skills and knowledge, is needed to be able to physically harvest and make use of natural resources. Having friends and family who can assist in identifying, harvesting and selling natural resources and natural resource products is also a valuable asset for natural capital, according to this group. This group summarised their discussions as physical capital being the most

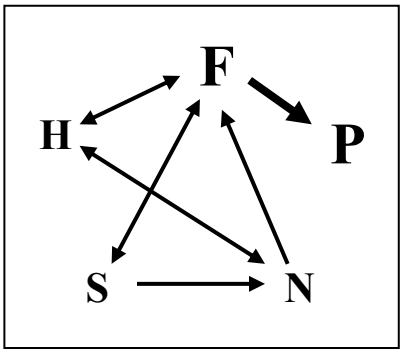

Figure 7.7.2 a: Linking capital stocks by women, Lesseyton

desirable end result, whereas all the other types of capital are important because they are needed to make a living. The links and emphases discussed by this group are illustrated in Figure 7.7.2 a.

The group of men in Lesseyton initially suggested that physical assets – and more specifically, housing and property - were the most important for day-to-day life, but that physical assets required money (financial capital). The group also argued that money was needed to make use of natural resources – particularly for farming, but also to a lesser extent for harvesting natural resources. The group then suggested that one's social relations (social capital) influences the money available to a person or household through the advice one gets from friends and family, and through connections which may lead to business opportunities, while the amount of money one has influences one's social relations. These social relations, as described by the group, were also affected by one's education (human capital). The group described how one's money (financial capital) also depends on the quality of job available, and this is determined by one's education and skills (human capital). As money featured strongly in these discussions, the group was asked whether money was the most important asset overall and the group agreed that education affects one's opportunities for acquiring money as well as one's ability to use it wisely. The men's group main emphases throughout these discussions can be summarised as education (human capital) is the main determinant for acquiring money (financial capital) which is then used to acquire property (physical capital), which is the important for day-to-day life. The linkages and emphases from this discussion are summarised in Figure 7.7.2 b.

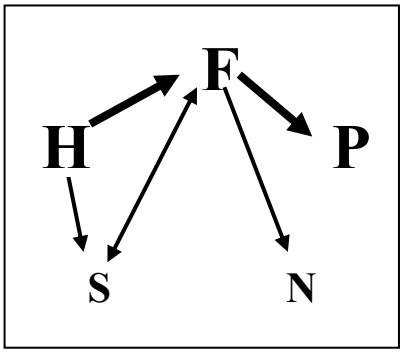

Figure 7.7.2 b: Linking capital stocks by men, Lesseyton

7.7.3 Linkages in survey and participatory discussions

Isolating a single type of capital as most important led to much debate amongst the groups in the participatory exercise, owing to the linkages between the different types of capital. Many of the linkages highlighted in the exercises were also found through correlations in the survey data.

For instance, all the groups felt that physical capital was derived through financial capital and physical capital was generally higher amongst the higher income quartiles (which had higher savings) (see 7.6.2). The women in Lesseyton expressly highlighted how one needed human capital to access

natural capital, and natural resource use was significantly lower for households with only female adults, which was attributed to these households having fewer productive household members (see 7.5.2).

All the groups indicated that high social capital facilitated opportunities to access money, and these linkages were also seen amongst the higher income groups having higher structural social capital (see 7.3.2) and higher debt and savings (see 7.6). Interestingly, the women all described how natural resources can be converted into financial capital through the sale of natural resource products, whereas the men felt that natural capital relied on financial capital, or that this was no longer the case. This may relate to how women often derive extra household income through the sale of harvested natural resource products (Shackleton et al., 2008), whereas cultivation and animal husbandry, traditionally men's activities (see 5.2) require monetary investment (Hebinck & van Averbeke, 2007).

7.8 Relationships between capital stocks, locality, socio-economic profiles, and vulnerability

It is difficult to identify a single asset or type of capital as being most important for adaptive capacity or livelihoods in general, as assets and capital stocks have been described as often working in unison or in re-enforcing relationships, and frequently correlate in results derived from the household survey data on which this thesis is largely based.

Generally, households in Gatyana have lower stocks in multiple forms of capital, with the exception of natural capital and cognitive social capital, both communal types of capital. Gatyana also appears more egalitarian in the distribution of its capital stocks amongst socio-economic groups, for there were fewer differences between the gender headship types and income quartiles in this site compared to Lesseyton. These aspects are positive for Gatyana's adaptive capacity, which is facilitated by cooperation and collaboration in a community (Jones et al., 2010). However, the higher reliance on natural capital and lower stocks in physical capital means that Gatyana is more vulnerable to climate variability and extreme events.

The frequent significant differences between the two localities reemphasise the importance of considering context when understanding vulnerability, both to climate change and to HIV/Aids (Chapter 3; O'Brien et al., 2009). Some of these were expected based on preliminarily explorations of the site (Chapter 2), such as contrasting stocks in natural capital and physical capital, with households in the more rural site of Gatyana accessing more natural resources whereas households in the peri-urban site of Lesseyton have access to more infrastructure. These differences have implications for vulnerability to climate change, as climate change will primarily affect natural capital through increased climate variability. The differences between the two sites in human capital assets, such as education and skills, and health, together with discrepant stocks in social capital (namely trust, cohesion and decision making) have implications for coping with HIV/Aids.

The importance of considering contextual factors becomes further apparent when examining how social and economic groups appear to elicit different results based on their locality. For instance, male headed households with adult females in Lesseyton have high human capital stocks in the form of education and other skills, and high social capital stocks based on resource generator scores and leadership, yet in Gatyana these same measures are comparatively lower for this group than the other gender headship types. Similarly households with only adult females were the most trusting in Lesseyton, yet the least trusting in Gatyana, and households with only adult males participated the most in community decision making in Gatyana, yet the least in Lesseyton.

Locality also seems to occasionally result in pronounced discrepancies amongst social and/or economic groups. For instance, the incremental decline in skills and additional languages as household headship moved from male to female was readily apparent in Lesseyton, yet not pronounced in Gatyana. Similarly, a decline in happiness in more feminised households was evident in Lesseyton, yet not Gatyana.

As income quartiles frequently, as expected, displayed significant differences in multiple capital stocks, it is worth briefly re-visiting wealth, financial capital, poverty and vulnerability. Poverty is frequently associated with multiple forms of vulnerability (Chapter 3; Parker & Kozel, 2007). Financial capital is the most fluid of the five capital types as it is the most easily transferable (DFID, 1999) and most readily converted in other forms of capital (e.g. purchasing physical capital). Poverty does not therefore necessarily refer to the absence of stocks in financial capital, but to the absence of financial flow or income. One might then expect that there would be an incremental trend correlating to income in the measure of any asset, although this chapter has shown how incremental progressions correlating with increasing/decreasing income, although frequent, are not always consistent particularly in the two middle-income groups and when comparing the two sites. As these income quartiles are based on in-kind wealth rather than monetary income, the exploration of household livelihoods in the next chapter (Chapter 8) helps explain these discrepancies.

There were not as many significant differences between the gender headship types as expected (see 7.1.2), although as expected, where there were differences, households with only adult females frequently had lower capital stocks than the other headship types. Levels of stocks frequently decreased incrementally as the household's adults became more female-dominated, particularly in Lesseyton. Where differences in assets were not significant, this could perhaps be partly explained by differences in the marital status of adult women, as a widowed woman may have accumulated more wealth and assets than a divorced or single woman.

The broad objective in this study is to understand how capital stocks are used to create livelihoods and respond to stress within the context of HIV/Aids and climate change in order to determine differential vulnerability to these stressors. While this objective initially seems simple, it incorporates notions of

interacting stressors, long-term change, contextual dynamics and possible constraints on livelihoods and asset use. This chapter has shown that it is difficult to pinpoint exactly who is most vulnerable based on their capital stocks as the results are highly variable. That no clear pattern has emerged through the breakdown in household assets may be an indication that a reductionist approach is not a feasible way to simplify a complex system with multiple, interacting variables. The analysis also did not combine factors that could influence access to assets, livelihoods and vulnerability owing to the sample size. For instance, women with low incomes in comparison to women with high incomes were not considered.

In using capital stocks to try to understand vulnerability, it is also important to understand that stocks are not stable but dynamic, and undergo many processes of accumulation and depletion. The next chapter (Chapter 8) will consider the use of household capital stocks in more detail by examining livelihoods, coping strategies and changes to household capital stocks over time.

CHAPTER 8: USE OF HOUSEHOLD ASSETS DIFFERENTIATED BY SITE, GENDER AND INCOME

8.1 Introduction

8.1.1 Processes of asset accumulation and depletion

Households may use their capital stocks in a variety ways to construct household livelihoods, or in response to shocks and stressors. Understanding processes of asset accumulation and depletion is a valuable means to gain insight into the multiple ways in which households may be vulnerable to HIV/Aids along the trajectory of the disease (see 3.2.3), as well as the extent to which a household may be vulnerable to the effects of climate change (see 3.2.2).

A household's capital stocks equip the household with a means to respond to and recover from any potential shock, yet depleting capital stocks through responding to a shock or stressor may potentially limit the household's capacity to respond to additional, future stress (Adger & Kelly, 1999; Shackleton & Shackleton, 2012; O'Brien et al., 2009). Furthermore, there is also the potential for the irrecoverable loss of an asset which constrains the options and availability of choice for the household, both in response to new stressors and to construct valuable livelihoods (Gillepsie & Drimie, 2009a; de Sherbinin et al., 2008). In this way, while the use of capital stocks to shape and define livelihoods frequently results in the accumulation of capital as income is earned, the unsustainable use of an asset or capital stock may place the household is a vulnerable position (O'Brien et al., 2009).

Different livelihoods are also vulnerable to different stressors, based on the differential availability of resources needed and the activities undertaken to sustain that livelihood (Scoones, 1998; Agrawal & Perrin, 2009). For example, migrant mine work has multiple implications for health (Campbell, 1997), while livelihoods based on agricultural production or the harvesting of natural resources are sensitive to climatic variability (Turpie et al., 2006).

Asset use in response to a shock or stress – the coping strategies employed – can also have positive results, and can help the household recover from a shock or stress with minimal harm. Coping strategies may be considered adaptive strategies if they have positive results and move beyond 'once off', short-term responses and rather become instituted in the household's long-term practices in livelihoods and behaviour to endure household wellbeing in the face of stress (Berkes & Jolly, 2001; Drimie & Gillespie, 2010).

Understanding how assets are being used within a household, what motivates asset use and whether capital stocks are accumulating or depleting within a household through this use all contribute towards understanding differential experiences of vulnerability (see 3.2.4; 3.2.5). Analysing differences in these processes across locations, genders and income levels contributes to

understanding how differential experiences of stressors and access to resources and opportunities influence vulnerability and adaptive capacity (see 3.2; 3.4).

8.1.2 Chapter rationale, key questions and hypotheses

This chapter contributes to the broader objective of understanding how assets and livelihoods relate to vulnerability to climate change and HIV/Aids by looking at processes of asset accumulation and depletion. The guiding key question for this chapter is, how are assets used and how is this use shaped by the local context? This question can be expanded into multiple questions relating to various forms of asset use.

Thus, the expanded guiding questions for this chapter are:

1.) How are assets used to form livelihoods amongst different types of household?

2.) Which assets are considered to be the most useful to cope with a shock or stress?

3.) Which coping responses are different types of households employing, and how do these make use of household capital stocks?

4.) Have the capital stocks of different types of households increased or decreased over the past ten years?

5.) Are the multiple uses of assets successful and sustainable?

This chapter uses a variety of methods to understand processes of asset accumulation and loss. Question 1 is addressed by utilising survey data to analyse livelihoods by reviewing household income portfolios in depth. Participatory workshop exercises were used to answer question 2, by looking at local perceptions of the value of using various assets to construct coping strategies. Question 3 is answered by using survey data to describe and analyse coping strategies employed by different types of households that have recently experienced a shock. Survey data are again used to answer question 4 to assess whether household's five main capital stocks have improved or worsened over the previous ten years. Key findings from these questions are used to consider through discussion whether asset usage is successful and sustainable (question 5).

Asset depletion and loss through the unsustainable use of assets in defining household livelihoods and in response to stress was highlighted as a pertinent cause for vulnerability (see 3.2; 3.4). As women and low-income, rural households are often considered to be most vulnerable to HIV/Aids, climate change and other stressors (see 3.2), it was hypothesised that households with these characteristics will have declining stocks of multiple forms of capital.

8.1.3 Methods

A variety of methods were used to measure and understand the use of household capital stocks by different types of households based on site, headship gender and income (see 4.4.2; 4.4.3 and Box

6.1.3 for explanations of gender and income groups). Aside from participatory exercises, this chapter is largely based on a survey which interviewed 340 households across two sites (see Chapter 4 for survey design and implementation; Appendix 1 & 2). Differences between the two sites, between different gender headship types and between income quartiles were compared across multiple variables derived from the survey data, unless otherwise stated below.

a) Using household survey data to develop livelihood portfolios

Using data from a household survey, livelihood or income portfolios were developed for each household by recording their quarterly income in cash and in kind derived from formal, casual and self- employment; grants; additional government support; remittances; crop production; livestock products and services; and natural resource harvesting. The proportion of income derived from each source was determined in order to identify dominant livelihoods, and differences in income sources amongst the different types of household (see Box 6.1.3 for summaries of these groups).

b) Participatory ranking of coping strategies based on capital stocks

These exercises were done with the same groups of men and women participating in the group exercises described in Chapters 6 and 7. This exercise was designed looks at local perceptions of the value of using different capital stocks as coping mechanisms in response to a major shock, in order to better understand processes of asset depletion and accumulation.

Participants were asked to imagine an extreme shock that might happen to a household in the area, where this shock either resulted in the loss of income or in a very large expense. They were asked to think of the ways that households would respond to that shock. They were then presented with five coping strategies that related to the five types of capital stocks so that the exercise would be uniform and comparable between groups. These coping strategies were:

Social capital: Assistance from friends and family

Financial capital: Loan money

Physical capital: Sell off large household items (appliances, furniture, equipment, etc.)

Human capital: Someone in household changes their usual role (e.g. children out of school to help around house, someone leaves village to find work in city, carer finds work, quit job to look after children, etc.)

Natural capital: Harvest/pick wild natural resources for food and fuel

Each of these was discussed in turn and participants described situations where households had used these coping strategies. Participants agreed that these coping strategies were common responses to shocks and stress within their community.

Participants were then asked to rank these coping responses. Pair-wise ranking is used to compare items against each other and develop an order to a list to understand values and preferences (Mukherjee, 1993). Items are placed in rows and then repeated in columns in a table, so that at each cell in the table a comparison is made between the item in the column and the item in the row. Moving through a table cell by cell with facilitated discussion, the participants explained their choice and thought about different contexts, options and effects of using one coping strategy over another.

c) Use of assets in response to shocks and stressors

In the household survey, if a household experienced a shock in the past 12 months (see 7.4.4), they were asked how they responded to it (see Appendix 1). These coping categories included: harvested more natural/wild products or agricultural products; changed farming/agricultural techniques; spent cash savings or retirement money; sold assets (property, livestock); did extra casual labour work or started a self-employment initiative; received assistance from friends and relatives; received assistance from NGO, community organisation, religious organisation, or similar; got a loan from money lender, credit association or bank; rented out land or rooms; and did nothing in particular.

Out of households which had experienced a shock, the percentages of households making use of these various coping strategies were analysed by site.

d) Trends in accumulation and depletion of capital stocks over time

In the household survey, households were asked whether each type of capital had changed over the previous ten years. These questions were:

> Human capital: 'Overall, is the household able to do more, less or the same amount of work compared to ten years ago?'
>
> Social capital: 'Overall, is the household's current involvement in community groups, events and meetings more, less or the same compared to ten years ago?'
>
> Physical capital: 'Overall, has the infrastructure on and around the household's homestead improved, worsened or stayed the same compared to ten years ago?'
>
> Natural capital: 'Overall, has the quality of the agricultural land (grazing land and soil fertility) improved, worsened or stayed the same compared to ten years ago?'
>
> Financial capital: 'Is it currently easier, harder or the same to meet all the household's needs each month compared to ten years ago?'

These changes were disaggregated by the different groups across the two sites. Change in capital stocks were weighted with less/worsened = -1; the same = 0 and more/improved = 1. Additional qualitative, explanatory comments were selected from the survey to contribute to understanding why certain capital stocks accumulated and others declined.

e) Determining statistical differences between groups

Significant differences in categorical data derived from the household survey were tested using Pearson's chi-squared test. In cases where the count within a cell fell below the minimum requirement for a chi-squared test (≤5) Fisher's test was used to test for significant difference.

Continuous data derived from the survey were analysed for significance using t-tests when comparing the two sites, and ANOVA for analysis of differences between the gender and income groups. Where the data were not normality distributed, Mann-Whitney U and Kruskal-Wallis H tests were used for site, and gender and income comparisons respectively.

Significant differences (where $P<0.05$) are highlighted in the results.

8.2 Results: Livelihood portfolios of households

8.2.1 Comparison of livelihood portfolios by site

In both Lesseyton and Gatyana, grants made up the highest proportion of the average livelihood portfolio, followed by formal employment (Figures 8.2.1 a and b). Grants made on average 10% more of the average livelihood portfolio in Gatyana than in Lesseyton, whereas formal employment comprised 12% more of the average income portfolio in Lesseyton compared to Gatyana. Natural resources, livestock and crops constituted a higher proportion of the average livelihood portfolio in Gatyana compared to Lesseyton. Formal employment, casual employment, self-employment and remittances made up a higher proportion of the average livelihood portfolio in Lesseyton compare to Gatyana.

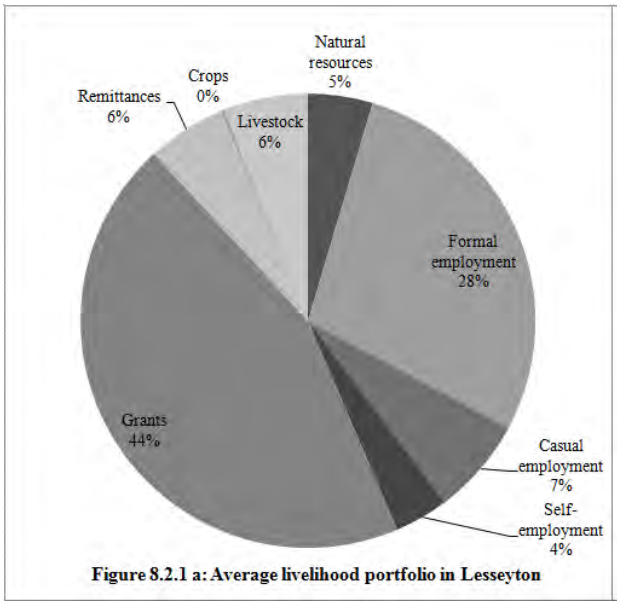

Figure 8.2.1 a: Average livelihood portfolio in Lesseyton

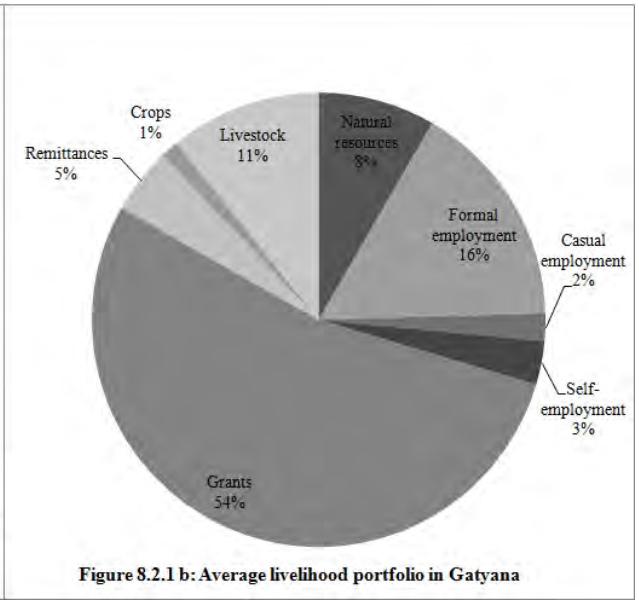

Figure 8.2.1 b: Average livelihood portfolio in Gatyana

Despite opposing compositions of household income, the average household quarterly incomes (in cash and in kind) in the two sites were not significantly different (Table 8.2.1). The amount of household quarterly income being acquired through government grants, casual employment, crops, livestock and natural resource harvesting were significantly different between the two sites.

Household's varying stocks of multiple forms of capital can partly explain these differences. For instance, the higher incomes being derived from grants in Gatyana can be attributed to Gatyana households have significantly more pensioners (see 7.2.1), who receive a grant of high value. The higher incomes earned through various forms of employment in Lesseyton could perhaps be attributed to the higher number of productive-age adults, and the higher education and skills levels in this site (see 7.2.1; 7.2.2), or to the site's location near to an urban centre and the various development projects under way in the area. Gatyana households' higher earnings from crops, livestock and natural resources are reflected in the site's higher stocks of various assets relating to natural capital, such as arable land and kraals, and the absence of electricity leading to higher natural resource harvesting for fuel (see 7.4.1 and 7.5).

Table 8.2.1: Differences in mean (± standard error) quarterly household income (ZAR) in Lesseyton and Gatyana

	Lesseyton (N = 170) ZAR	Gatyana (N = 169) ZAR	P value (between sites)	Test
Total quarterly income	7197.74±397.19	7321.41±491.73	0.845	T-test
Grants	3200.47±224.30	3918.64±223.98	0.024	T-test
Formal employment	2025.85±268.94	1185.16±384.79	0.074	T-test
Casual employment	495.52±105.72	142.40±36.12	0.041	Mann-Whitney
Self-employment	278.47±71.82	228.01±85.78	0.652	T-test
Remittances	401.94±76.13	343.00±85.78	0.607	T-test
Crops	15.77±6.97	96.22±21.62	0.000	Mann-Whitney
Livestock	432.08±147.84	786.92±169.95	0.000	Mann-Whitney
Natural resource use	330.48±55.51	609.29±72.76	0.000	Mann-Whitney

In Lesseyton, differences between the income quartiles in the degrees of HIV/Aids impact (see 6.3.3) and in multiple forms of capital stocks (Chapter 7) tended to often reflect incremental changes corresponding with increasing/decreasing income, whereas this was more often not the case with the income quartiles in Gatyana. This could be an indication of the qualitative difference between cash income and in kind income, as while the income totals and distribution of income quartiles are similar, Lesseyton households' income comprises more cash income whilst Gatyana households have more in kind income.

Gatyana could be considered to be more vulnerable to the effects of climate change, as the higher reliance on various uses of natural resources to define the average livelihood portfolio indicates a wider potential impact, as climate change is predicted to impact the provision of ecosystem services

(Turpie et al., 2006). However, it is worth noting that other drivers of change (e.g. crime) have been shown to have a greater detrimental impact on agrarian livelihoods in both sites, although particularly in Lesseyton (Chapter 5). The higher proportions of income derived through subsistence farming are not reflected in the perceived food security of households in this site, which were significantly lower than those in Lesseyton (see 6.5.1).

8.2.2 Comparison of livelihood portfolios by gender headship types

Amongst the various gender headship types in Lesseyton, government grants was the main source of household income for all groups except for male headed households with adult females, which derived on average 45% of household income from formal employment (Figure 8.2.2 b). Households with only adult females in Lesseyton derived on average the lowest proportion of income from formal employment (12%), yet the highest in self-employment (10%) amongst the gender headship types (Figure 8.2.2 d). The proportion of household income derived from livestock decreased from 9% to 0% as household leadership moves from male to female dominated (Figures 8.2.2 a to d). Female headed households with adult males derived a larger proportion of their income from remittances (8%) than the other gender headship types.

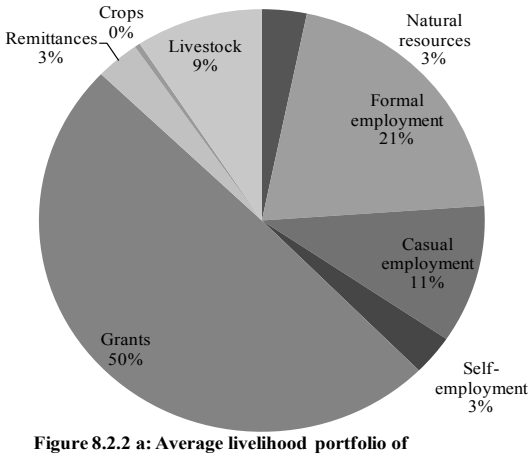

Figure 8.2.2 a: Average livelihood portfolio of households with only adult males in Lesseyton

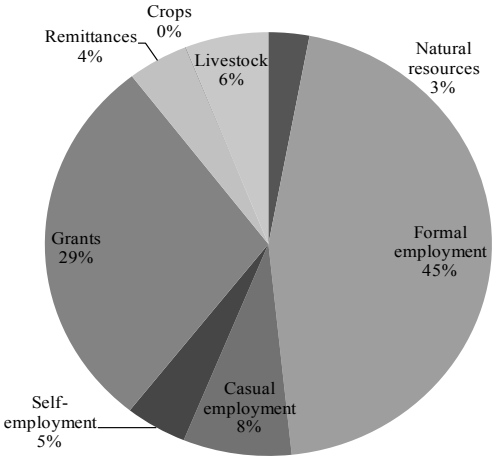

Figure 8.2.2 b: Average livelihood portfolio of male headed households with adult females in Lesseyton

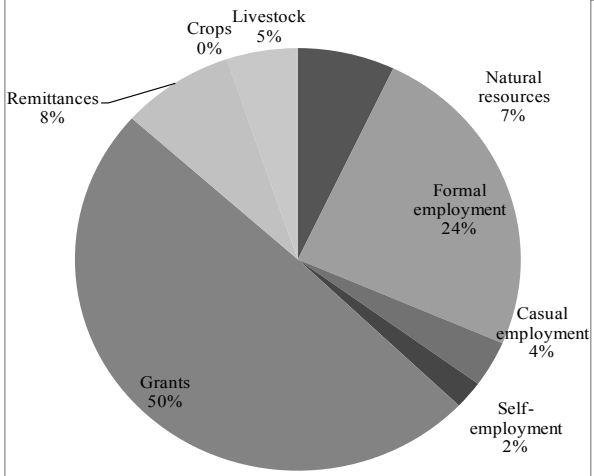

Figure 8.2.2 c: Average livelihood portfolio of female headed households with adult males in Lesseyton

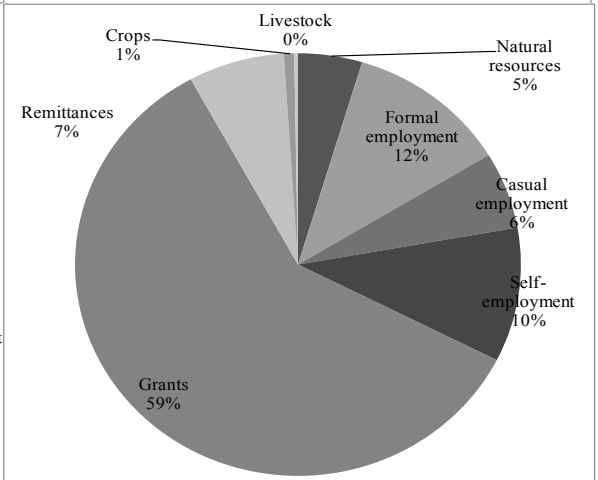

Figure 8.2.2 d: Average livelihood portfolio of households with only female adults in Lesseyton

Households with only adult females had the lowest mean quarterly income in Lesseyton, although the differences in total income were not significant amongst gender headship types (Table 8.2.2).

Table 8.2.2: Differences in mean (± standard error) quarterly household income (ZAR) of gender headship types in Lesseyton and Gatyana

Lesseyton						
	Male only (N = 47) ZAR	**Male with female (N= 45) ZAR**	**Female with male (N= 43) ZAR**	**Female only (N = 48) ZAR**	**P value (between gender types)**	**Test**
Total quarterly income	6952.35 ± 735.56	7869.54 ± 770.83	7926.12 ± 794.99	4905.67 ± 660.54	0.077	ANOVA
Grants	3445.53 ± 475.53	2272.00 ± 390.75	3903.40 ± 403.30	2920.80 ± 476.48	0.041	ANOVA
Formal employment	1433.60 ± 324.32	3566.28 ± 725.03	1928.41 ± 458.70	573.09 ± 298.25	0.007	Kruskal Wallis
Casual employment	734.66 ± 237.22	616.88 ± 243.74	278.30 ± 123.03	288.00 ± 235.15	0.089	Kruskal Wallis
Self-employment	214.04 ± 109.83	350.22 ± 157.45	168.30 ± 88.87	504.00 ± 285.51	0.852	Kruskal Wallis
Remittances	221.06 ± 85.49	342.22 ± 151.77	641.30 ± 178.39	342.00 ± 144.67	0.081	Kruskal Wallis
Crops	28.43 ± 15.48	5.84 ± 3.79	3.10 ± 1.97	36.68 ± 36.68	0.13	Kruskal Wallis
Livestock	640.76 ± 290.88	473.06 ± 255.39	409.87 ± 335.00	13.11 ± 11.16	0.628	ANOVA
Natural resource use	225.40 ± 116.22	231.92 ± 55.20	555.71 ± 131.01	227.99 ± 58.74	0.112	Kruskal Wallis
Gatyana						
	Male only (N = 36) ZAR	**Male with female (N= 41) ZAR**	**Female with male (N= 43) ZAR**	**Female only (N = 48) ZAR**	**P value (between gender types)**	**Test**
Total quarterly income	9157.35 ± 1776.84	8162.87 ± 629.12	7005.67 ± 851.91	5505.06 ± 521.79	0.012	Kruskal Wallis
Grants	4011.67 ± 602.14	5207.56 ± 494.17	3784.19 ± 410.79	2804.38 ± 234.51	0.004	Kruskal Wallis
Formal employment	2630.33 ± 1553.35	526.83 ± 275.95	837.21 ± 565.41	1000.00 ± 399.50	0.431	Kruskal Wallis
Casual employment	172.05 ± 103.67	134.97 ± 83.82	251.74 ± 72.49	31.54 ± 24.24	0.004	Kruskal Wallis
Self-employment	135.60 ± 83.87	357.60 ± 166.05	285.56 ± 278.96	139.82 ± 75.17	0.872	ANOVA
Remittances	305.79 ± 109.15	114.63 ± 57.65	575.58 ± 273.79	354.34 ± 146.51	0.191	Kruskal Wallis
Crops	54.08 ± 17.00	169.39 ± 67.50	122.56 ± 50.11	43.72 ± 14.10	0.576	Kruskal Wallis
Livestock	993.85 ± 543.48	1114.89 ± 362.62	577.52 ± 239.28	555.55 ± 228.55	0.559	ANOVA
Natural resource use	853.69 ± 215.90	541.43 ± 112.18	546.19 ± 95.22	553.15 ± 151.11	0.684	Kruskal Wallis

The higher proportion of income derived through self-employment amongst households with only adult females reflects that globally, the informal sector is often the primary source of employment for

women in developing countries (UN, 2000).Women in South Africa have been found to be more active in initiating informal, self-employment ventures to earn extra income (Shackleton & Campbell, 2007; Shackleton, 2004). The higher proportion of income derived through formal employment amongst male headed households with adult females could be an indication of their comparatively higher education, additional skills and languages, as well as their higher health levels and lower degree of HIV/Aids impact (see 7.2 and 6.3.2).

It is interesting to note the comparatively low quarterly income in households with only adult males, despite these households having relatively high education, as well as higher skills and language capability, in conjunction with the high numbers of pensioners (who are entitled to grants of high value).

It is also interesting to note that the two female headed household types derived a higher proportion of income from natural resources, despite a low proportion of these households reporting use of these resources than the male headed households (see 7.4.2). The higher dependence of natural resources amongst women in rural areas is a common finding (Shackleton et al., 2004; Brody et al., 2008).

Government grants constituted the largest proportion of the average household livelihood portfolio amongst the various gender headship types in Gatyana (Figures 8.3.2 e to h). Households with only adult males earned a larger proportion of household income from formal employment (29%) compared to the other headship types, whilst male headed households with adult females derived the lowest proportion of income from this source (6%) and the largest from grants (64%). Interestingly, households with only adult females earned more income from livestock (10%) than two of the other gender headship types in Gatyana, whereas in Lesseyton this group earned negligible income from livestock.

The differences in total income amongst the gender headship types were significant in Gatyana (Table 8.3.2), and followed the trend of decreasing income as leadership shifted from male to female dominated. Households with only adult males derived on average almost double the total income as the average household with only adult females.

Male headed households with adult females have on average more pensioners and children than the other household types (see 7.2.1), and this is reflected in the higher income derived from government grants. Households with only adult females have the fewest pensioners, yet the second most number of children on average, and this reflects in the average income of these households as a government pension is roughly worth five times that of the child grant (see7.2.1). Households with only adult males have the highest average income and highest proportion of income from formal employment, and these households have on average more adults and higher education and skills scores (see 7.2.1). Female headed households earned similar proportional income from crops and livestock, despite

having access to significantly less arable land (than male headed households) and owning significantly fewer kraals (see 7.4.1).

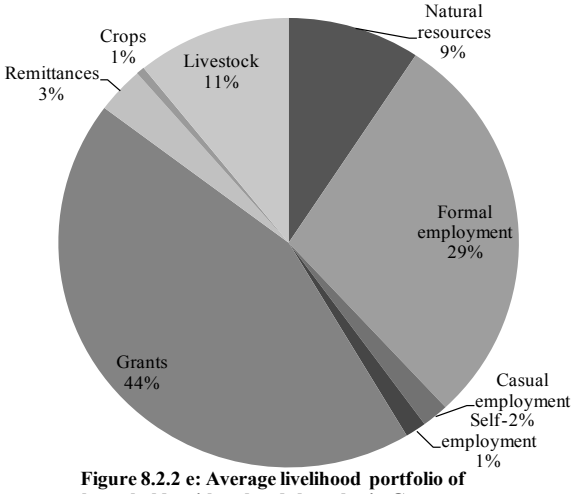

Figure 8.2.2 e: Average livelihood portfolio of households with only adult males in Gatyana

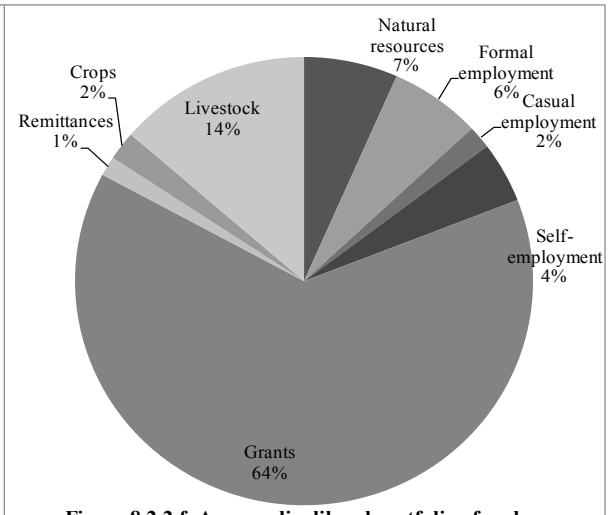

Figure 8.2.2 f: Average livelihood portfolio of male headed households with adult female in Gatyana

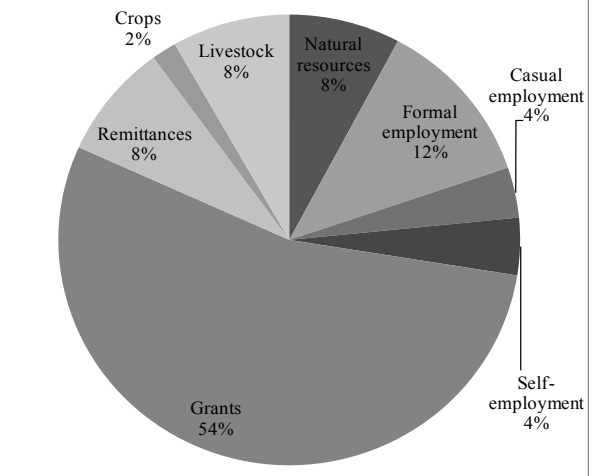

Figure 8.2.2 g: Average livelihood portfolio of female headed households with adult males in Gatyana

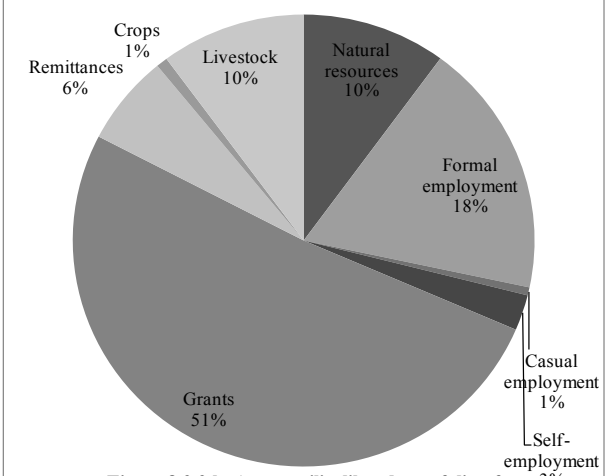

Figure 8.2.2 h: Average ilivelihood portfolio of households with only adult females in Gatyana

The high value of natural resources to women in South Africa is a common finding (Ruiters & Wildschutt, 2010; Shackleton et al., 2004), although the relatively equal proportions of income derived from natural resources and crops amongst the different gender headed households in Gatyana could be indicative of the higher importance of these resources in general in rural areas (Turpie et al., 2006; Shackleton et al., 2009; Shackleton & Shackleton, 2004).

In Lesseyton there were more significant differences between the different gender headship types in multiple assets whereas in Gatyana there were much fewer significant differences (see Chapter 7). It is interesting to note that in terms of income, in Lesseyton there was no significant difference between the gender headship types, yet there was a significant difference between the total incomes of gender headship types in Gatyana.

8.3.3 Comparison of livelihood portfolios by income quartiles

Amongst the income quartiles in Lesseyton, the proportion of income derived from formal employment increased and the proportion of income from government grants decreased as income quartiles increased (Figures 8.3.3 a – d). Households in the lowest income quartile on average had a higher proportion of income being received through remittances (10%) compared to the other quartiles, and were the only group deriving negligible income through self-employment in this site. Households in the high income quartile derived a higher proportion of income from livestock (10%) compared to the other groups. The proportion of income derived through natural resources declined as income increased: the lower income quartiles derived 8% from natural resources harvesting, the moderate income quartile derived 5%, while the high income quartile derived 3% of its income from natural resource harvesting.

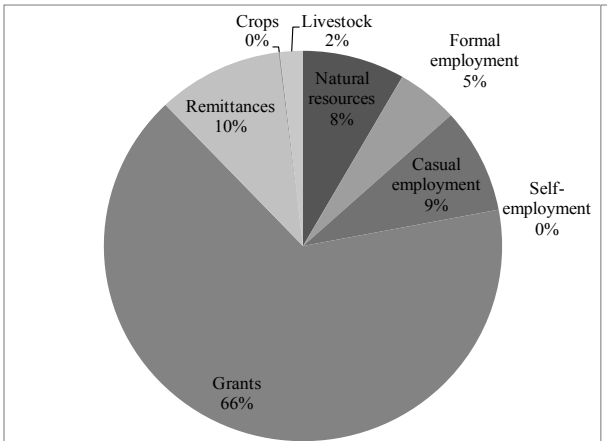

Figure 8.2.3 a: Average livelihood portfolio of the lowest income quartile in Lesseyton

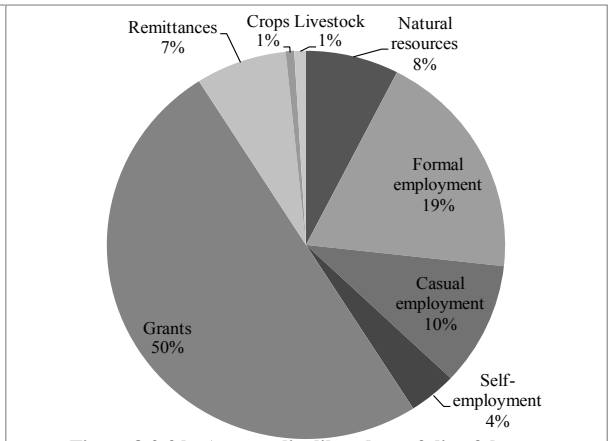

Figure 8.2.3 b: Average livelihood portfolio of the low income quartile in Lesseyton

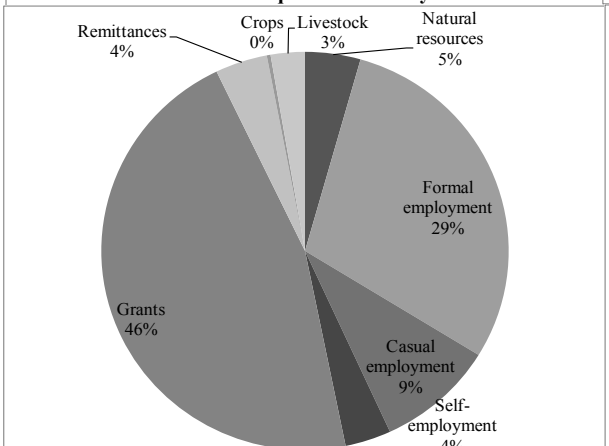

Figure 8.2.3 c: Average livelihood portfolio of the moderate income quartile in Lesseyton

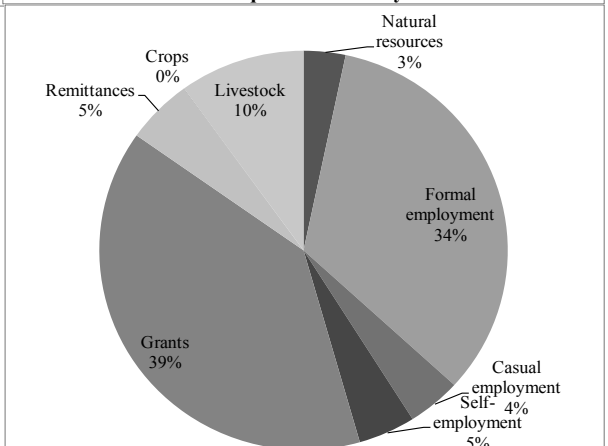

Figure 8.2.3 d: Average livelihood portfolio of the high income quartile in Lesseyton

As income quartiles are being compared, there are naturally many significant differences in the amount of income derived from each source (Table 8.3.3), with the high income quartile repeatedly deriving far higher amounts than the lower income quartiles. It is interesting to note where these differences are not significant – for instance, the amount of income derived through natural resource use and remittances is not significantly different across the income quartiles, although the importance

of these resources for poorer households is indicated in the higher proportion of total income being derived from this source.

Table 8.3.3: Differences in mean (± standard error) quarterly household income (ZAR) of income quartiles in Lesseyton and Gatyana

Lesseyton						
	Lowest income (N = 42) ZAR	**Low income (N = 39) ZAR**	**Moderate income (N = 45) ZAR**	**High income (N = 44) ZAR**	**P value (between income groups)**	**Test**
Total quarterly income	1972.30 ± 149.48	4807.22 ± 130.80	7558.46 ± 155.21	13935.63 ± 744.19	0.000	Kruskal Wallis
Grants	1299.29 ± 169.23	2387.69 ± 261.54	3469.33 ± 360.74	5460.68 ± 577.74	0.000	Kruskal Wallis
Formal employment	98.50 ± 55.76	915.01 ± 253.06	2211.67 ± 389.68	4660.16 ± 785.06	0.000	Kruskal Wallis
Casual employment	171.96 ± 75.12	490.63 ± 191.46	707.33 ± 246.73	592.09 ± 261.84	0.599	Kruskal Wallis
Self-employment	0.00 ± 0.00	186.15 ± 119.16	275.33 ± 137.78	629.32 ± 206.33	0.013	Kruskal Wallis
Remittances	200.00 ± 86.82	353.85 ± 113.22	311.76 ± 108.52	729.55 ± 234.80	0.372	Kruskal Wallis
Crops	2.48 ± 1.82	33.05 ± 18.76	22.67 ± 20.40	6.07 ± 3.17	0.308	Kruskal Wallis
Livestock	36.43 ± 25.06	45.03 ± 20.17	204.23 ± 119.02	1385.86 ± 535.95	0.002	Kruskal Wallis
Natural resource use	163.65 ± 42.46	361.61 ± 116.74	331.32 ± 91.48	461.30 ± 157.08	0.774	Kruskal Wallis
Gatyana						
	Lowest income (N = 43) ZAR	**Low income (N =46) ZAR**	**Moderate income (N = 39) ZAR**	**High income (N = 41) ZAR**	**P value (between income groups)**	**Test**
Total quarterly income	2210.45± 154.02	4829.20± 104.58	7720.10± 147.08	15098.59± 1323.46	0.000	Kruskal Wallis
Grants	1396.05± 197.62	3405.65± 191.64	4958.46± 359.74	6150.73± 581.15	0.000	Kruskal Wallis
Formal employment	0.00± 0.00	39.13± 39.13	830.77± 362.42	4051.02± 1469.92	0.000	Kruskal Wallis
Casual employment	144.39± 81.43	85.39± 40.32	66.51± 47.00	276.48± 102.74	0.243	Kruskal Wallis
Self-employment	49.78± 49.78	162.43± 90.14	168.24± 86.09	545.35± 322.74	0.248	Kruskal Wallis
Remittances	216.28± 79.17	236.05± 92.48	277.14± 93.74	658.54± 313.61	0.987	Kruskal Wallis
Crops	51.05± 24.31	47.52± 17.23	137.16± 51.89	159.27± 66.15	0.025	Kruskal Wallis
Livestock	54.38± 19.38	220.22± 98.39	520.28± 207.31	2444.62± 595.92	0.000	Kruskal Wallis
Natural resource use	282.24± 78.02	606.14± 89.06	749.69± 221.49	822.26± 161.83	0.001	Kruskal Wallis

The finding that households in the lower income quartile derive a negligible percentage of their income from self-employment is unusual, as low-income households generally derive greater benefits

through informal economies that wealthier households (UN, 2000). However, it is important to note that wealth is relative in this context, and that high incomes in these sites are still low in relative terms.

The higher proportions and value of income derived through employment as income quartiles increase could be a reflection of the significant incremental increases in productive-age adults and community group membership as income increases (see 7.2.1; 7.3.2). The higher incomes derived through livestock by households in the highest income quartile could be a reflection of this quartiles being more able to invest money in purchasing and maintaining cattle, as well as the infrastructure needed to raise them.

The livelihood portfolios of the income quartiles in Gatyana had nuanced differences in the proportions of income sources compared to Lesseyton. For instance, income derived from formal employment and grants did not increase and decrease respectively, although households in the high income quartile still derived a lower proportion from grants and a higher proportion from employment compared to the other income quartiles (Figures 8.2.3 e - h). Households in the lowest income quartile derived a higher proportion of income from remittances (10%) than the other quartiles. The high income quartile derived a higher proportion of income from livestock (16%). The proportion of

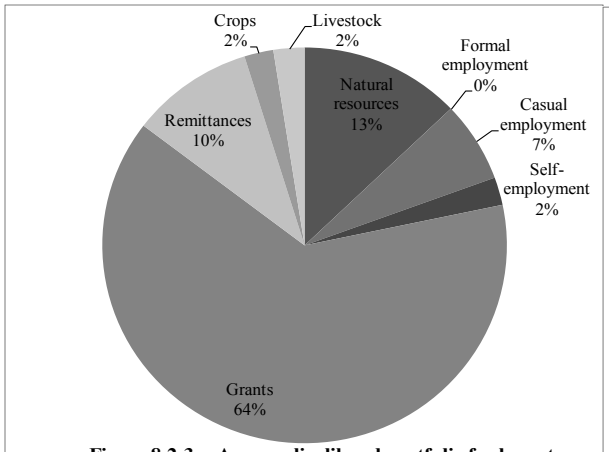

Figure 8.2.3 e: Average livelihood portfolio for lowest income quartile in Gatyana

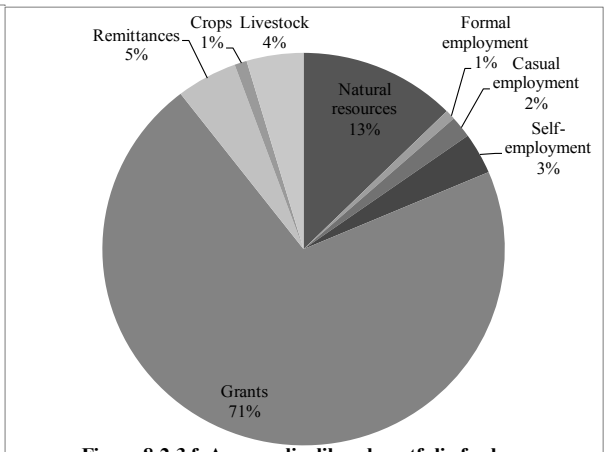

Figure 8.2.3 f: Average livelihood portfolio for low income quartile in Gatyana

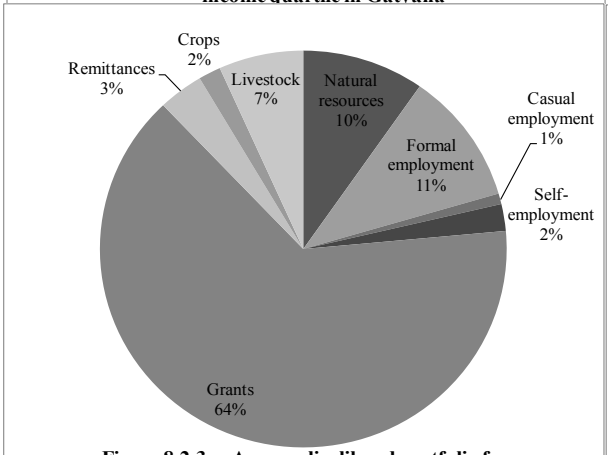

Figure 8.2.3 g: Average livelihood portfolio for moderate income quartile in Gatyana

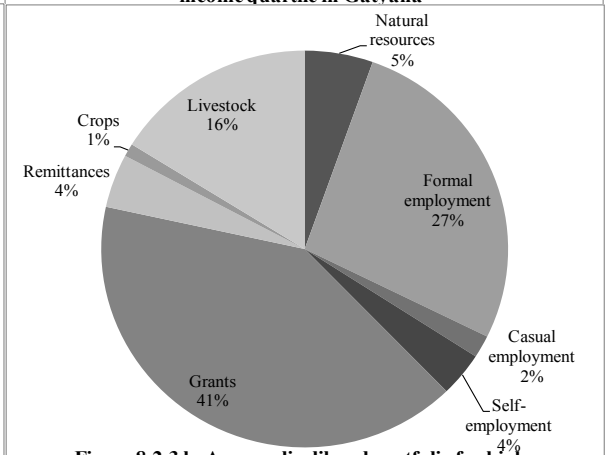

Figure 8.2.3 h: Average livelihood portfolio for high income quartile in Gatyana

income derived from natural resource harvesting was higher amongst the lower income quartiles (13%) and declined to 5% of the total income for the high income quartile.

Interestingly, there were no significant differences in education or skills amongst the income quartiles to account for the significantly higher incomes from formal employment (see 7.2.2). There were only significant incremental differences correlating with increasing income in the demographics and community group membership of households. Households in the high income quartile had significantly more pensioners and children, and more community group membership, which all declined incrementally as income decreased (see 7.2.1; 7.3.2).

The significantly lower value of income derived through crops by the low income quartile (Table 8.3.3) reflects that this quartile had significantly less cultivatable land than the other income quartile (see 7.5.1). However, the moderate income quartile had significantly more cultivatable land than the other groups (see 7.5.1), yet did not derive more income from crop farming than the other groups (Table 8.3.3). The mean income from livestock earned by the high income quartile in Gatyana is more than the total mean income of the lowest income quartile (Table 8.3.3), indicating the potential value of livestock (Shackleton et al., 2005; Adams et al., 2000).

The higher proportion of total income derived from natural resources by the lower income quartile, yet the equal or, in the case of Gatyana, significantly higher value of natural resource harvesting by higher income quartiles has been found elsewhere. While natural resources are more important to households with lower incomes, households with higher incomes are more able to exploit these resources and thereby derive higher values owing to their ability to use additional resources such as transport or labour (Thondhlana et al., in press; Arnold & Ruiz Pérez, 2001; Shackleton & Shackleton, 2000). This could perhaps illustrate how natural resources can either be a last resort or as a valuable means of contributing to household income to rise out of poverty (Shackleton et al., 2008). High reliance on natural resources can, however, make a household more vulnerable to the effects of climate change, and high income quartile in Lesseyton perceived significantly greater climate-related impacts than the other groups (see 6.5.2), perhaps due to this group's high income from livestock.

8.3 Participatory ranking of coping strategies based on capital stocks

8.3.1 Gatyana

The women in Gatyana identified harvesting natural resources as the best coping strategy out of the five, following the pair-wise participatory exercise. Natural resources were considered the best response as they were free and did not have to be paid back, and so did not place further strain on the household's finances or social relations. Assistance from friends and family was the next most popular choice for this group, followed by changing roles within the household and then selling off

physical assets. The group agreed that taking out a loan was never a good option, and only ever a last resort.

In reaching these agreements, the group also agreed that while this may generally be the case, that each situation was different and that in certain instances a coping strategy which ranked poorly might be the best approach. For instance, in many cases one needs money immediately, and in such cases natural resources may not be the most useful (although one could make money from harvesting and selling natural resources in the longer term). In such case, borrowing money from friends and family was still far more desirable than any other form of loaning money.

Table 8.3.1 a: Pair-wise ranking* of coping strategies by women in Gatyana

Coping strategies using assets	Assistance (S)	Change role (H)	Harvest NR (N)	Sell assets (P)
Loan (F)	Assistance (S)	Change role (H)	Harvest NR (N)	Sell assets (P)
Assistance (S)		Assistance (S)	Harvest NR (N)	Sell assets (P)
Change role (H)			Harvest NR (N)	Change role (H)
Harvest NR (N)				Harvest NR (N)

*Items in columns are compared against items in rows and the better of the two indicated in the table

In contrast, the men in Gatyana ranked taking out a loan as the best response, as they reasoned that it was immediate and that every problem needs money. Relaying on friends and family for assistance and changing household members' roles within the household were considered to be occasionally viable. Selling off physical assets and harvesting more natural resources were ranked the lowest in terms of appropriate coping responses, although they each received high emphasis and importance in day-to-day life, according to this group (see 7.7.1). Natural resource harvesting ranked poorly as the group argued that when faced with a shock, there will probably be less manpower to harvest natural resources.

Table 8.3.1 b: Pair-wise ranking* of coping strategies by men in Gatyana

Coping strategies using assets	Assistance (S)	Change role (H)	Harvest NR (N)	Sell assets (P)
Loan (F)	Loan (F)	Loan (F)	Loan (F)	Loan (F)
Assistance (S)		Assistance (S)	Assistance (S)	Sell assets (P)
Change role (H)			Change roles (H)	Change roles (H)
Harvest NR (N)				Harvest NR (N)

*Items in columns are compared against items in rows and the better of the two indicated in the table

8.3.2 Lesseyton

In Lesseyton, the group of women agreed that changing roles within a household was the most desirable option out of the five given coping strategies, following the pair-wise ranking exercise. The

group could not reach an agreement as to whether harvesting natural resources or relying on assistance from friends and family was the better response out of the two, and so these two coping strategies tied as the next best response. The group felt that one should not always rely on friends and family, and one's social relations are not limitless and these support networks can easily tire. Taking out a loan was only more desirable than selling off physical property, which the group identified as never being a good option, as physical property is hardest to get back. The women felt that it was always better to first attempt to deal with the problem through the household's immediate means – i.e. by changing roles within the household. The group felt that assistance from social relations was not a limitless nor was it always a reliable means to cope with a shock.

Table 8.3.2 a: Pair-wise ranking* of coping strategies by women in Lesseyton

Coping strategies using assets	**Assistance (S)**	**Change role (H)**	**Harvest NR (N)**	**Sell assets (P)**
Loan (F)	Assistance (S)	Loan (F)	Harvest NR (N)	Loan (F)
Assistance (S)		Change role (H)	Harvest NR (N)/ Assistance (S)	Assistance (S)
Change role (H)			Change role (H)	Change role (H)
Harvest NR (N)				Harvest NR (N)

*Items in columns are compared against items in rows and the better of the two indicated in the table

The men in Lesseyton narrowed the best coping response down to harvesting more natural resources, out of the five given responses in the pair-wise ranking exercise, as these resources were free and did not need to be paid back. The group decided that seeking assistance from friends and family was the next best response, followed by changing roles within the household. Seeking a loan was only better than selling off physical property, which was seen as never a good response to a household shock.

Table 8.3.2 b: Pair-wise ranking* of coping strategies by men in Lesseyton

Coping strategies using assets	**Assistance (S)**	**Change role (H)**	**Harvest NR (N)**	**Sell assets (P)**
Loan (F)	Assistance (S)	Change role (H)	Harvest NR (N)	Loan (F)
Assistance (S)		Assistance (S)	Harvest NR (N)	Assistance (S)
Change role (H)			Harvest NR (N)	Change role (H)
Harvest NR (N)				Harvest NR (N)

*Items in columns are compared against items in rows and the better of the two indicated in the table

8.3.3 Use of different capital stocks in response to shocks and stress

The men and women described how the various coping strategies base on the five types of capital stock can be useful – depending on the nature of the shock or stress, and the position that the household was in. For instance, most of the groups agreed that natural resources were a valuable means to cope as these are free and seemingly limitless. However, often cash is needed to cope with a

sudden shock – for instance, to pay for a funeral – in which case natural resources are not useful. Many of the groups recognised the value of seeking assistance from friends and family, but they expressed concern around over-utilising these support networks, and many comments suggested that not everyone has an equal availability of support networks.

The most desirable coping strategies identified by each group were frequently in contrast to the reported coping strategies based on the household survey (see 8.4 below). This may be an indication that what the groups identified were idealised responses, emphasising that these responses may not always be available or appropriate in reality.

8.4 Use of assets employed by households in response to shocks and stressors across the two sites

When a household had experienced a shock or stress in the previous 12 months (see 6.4.4 for details on these shocks and stresses), they were then asked how the household responded to the loss of income or incurred expense. In both sites, just over half of the households did nothing in response (Table 8.4.1). When a response was made, spending savings or getting assistance from a friend or family were the two most common responses in both sites. In Gatyana, significantly more households than Lesseyton responded to stress by taking out a loan. In total across both sites, only three households (1.5% of all households experiencing a shock or stress) indicated that they had harvested more wild natural resources in response to the shock or stress. These households were pooled in the "Other" response strategy, which also included children assisting, insurance policies and quitting work (to manage the household).

Table 8.4: Differences in percentages of households employing various coping strategies following a shock by site

	Site		
	Lesseyton (N = 100) %	**Gatyana (N = 97) %**	**P value (Pearson Chi-Square)**
Spent savings	24	26.8	0.651
Sold assets	7	3.1	0.212
Extra work	6	5.2	0.796
Friend's assistance	25	26.8	0.773
Organisation's assistance	5	4.1	0.768
Loan	12	24.7	0.021
Nothing	59	57.7	0.857
Other	25	16.5	0.142

Interestingly, over double the proportion of households in Gatyana (24.7 %) reported taking out a loan compared to Lesseyton (12%). The group of women in Gatyana expressed that taking out a loan was the least most desirable response to a shock, whereas the group of men ranked a loan as the most appropriate response (see 8.3). In Lesseyton, both men and women did not consider loans to be a

particularly appropriate coping response. However, the average household in Lesseyton has significantly more debt than the average household in Gatyana (see 7.6.1), illustrating that borrowing money is more common in Lesseyton. This may indicate that borrowing money is more of a matter of day-to-day life in Lesseyton.

The most common coping strategies – acquiring assistance from friends and family, spending savings, and taking out a loan – highlight the value of social and financial capital for coping with shocks and stresses. It is unusual that there was a low reported use of harvesting natural resources as a coping strategy, as it was described in participatory exercises (see 8.3) and has been well-documented elsewhere (de Sherbinin et al., 2008). Many households still make use of natural resource harvesting as part of their day-to-day livelihood portfolios (see 7.2) and so this may be a reflection that natural resource use offers a 'cushioning affect' to long term, persistent stress rather than a means for coping with the immediate needs of a sudden shock (de Sherbinin et al., 2008; King, 2011). This could also perhaps explain why so many households reported doing nothing in response to a stress, as 'coping' has become more integrated into day-to-day life (King, 2011).

8.5 Trends in accumulation and depletion of capital stocks over time

8.5.1 Trends in accumulation and depletion of human capital over time

As an indication of changing human capital (see 8.1.3 d), few households described their ability to do work as having increased over the past ten years (Table 8.5.1). In Lesseyton, the largest proportion of all households felt that their human capital had remained the same (48.5%), whereas in Gatyana more households felt that their human capital had declined (45.9%). These differences were not significant between the two sites.

Table 8.5.1: Differences in changes in human capital amongst households in different groups in Lesseyton and Gatyana

		Lesseyton (N = 169)			Gatyana (N = 170)		
		Less	**Same**	**More**	**Less**	**Same**	**More**
Total		35.5	48.5	16.0	45.9	40.6	13.5
	P value (between sites) Test	0.151 Pearson Chi-Square					
Gender	Male only	42.6	44.7	12.8	45.9	35.1	18.9
	Male with female	25	63.6	11.4	46.3	43.9	9.8
	Female with male	34	45.3	20.8	37.2	48.8	14
	Female only	44	36	20	52.1	35.4	12.5
	P value (between gender) Test	0.268 Pearson Chi-Square			0.706 Pearson Chi-Square		
Income	Lowest income	26.8	68.3	4.9	46.5	44.2	9.3
	Low income	38.5	38.5	23.1	45.7	45.7	8.7
	Moderate income	40	40	20	46.2	38.5	15.4
	High income	36.4	47.7	15.9	46.3	31.7	22
	P value (between income) Test	0.092 Pearson Chi-Square			0.561 Pearson Chi-Square		

Differences between gender headship types were also not significant. In Lesseyton, a higher proportion male headed households with female adults felt that there had been no change in human capital while a lower proportion reported a decrease, compared to the other gender headship types. This may be a reflection that this category was significantly less impacted by HIV/Aids (see 6.3.2). In Gatyana, the highest proportion of households with only female adults felt that their human capital had declined over the past ten years. This may be a reflection of the fact that a higher proportion of this type of household had experienced an illness-related death in the previous ten years (see 6.3.2).

The differences in changes to human capital amongst the income quartiles were not significant in either site. Out of the income quartiles in Lesseyton, households in the lowest income quartile appeared the most unchanged (68.3%), with lower proportions of reported increases and decreases in human capital compared to the other quartiles (Table 8.5.1). In contrast, in Gatyana households in the high income quartile reported high rates of change, with a higher proportion expressing an increase in human capital (22%) compared to the other groups.

Across both sites, reasons for changing stocks in human capital often reflected household members' migrations, or the household increasing in size or becoming smaller:

> *We used to live by ourselves but now we are staying with children and grandchildren* (Gatyana)

> *The children used to help around the house but they're not living here now* (Lesseyton)

Reasons for improving human capital often related to improving services and facilities, i.e. to improved physical capital which allowed for more time to utilise human capital in productive ways:

> *We worked hard in the past as well, but now there's electricity and water so there's more time for other work* (Lesseyton)

> *Community tap, pension and facilities have become more accessible* (Gatyana)

In both sites, changing life cycles within a household and the health of household members were common reasons for the household's reduced ability to accomplish work and household chores:

> *We are getting old and sick* (Lesseyton)

> *We can't work because we are old and sick now* (Gatyana)

Human capital has often been considered non-substitutable as it is necessary to command the other types of capital and as many assets associated with human capital – such as health and education – are ends unto themselves (DFID, 1999; Sen, 1997; Anand & Sen, 2000). Human capital also shapes the livelihood opportunities available to the household, as more productive adults, more skills, and better education and health all appear to lead to more lucrative livelihoods (see 8.2). The overall trend of perceived stagnation and decline in human capital across the two sites is thus a concern for the

potential for increasing vulnerability in the majority of households. That many households referred to higher incidences of illness may reflect how the elderly in each site described worsening health during participatory exercises (see 5.2). Education should have improved over the last decade (see 5.3.5), yet during mental modelling exercises with men and women in both sites (see 6.2), participants described multiple problems impacting on education, such as teenage pregnancies, high drop-out rates, and alcohol and substance abuse.

8.5.2 Trends in accumulation and depletion of social capital over time

As an indication of changing social capital (see 8.1.3 d), the majority of households in both sites reported that their involvement in community activities had remained unchanged over the past ten years (Table 8.5.2). A higher proportion of households in Lesseyton than in Gatyana felt that their involvement had declined, although these differences were not significant. This question referred to community group involvement, which relates more to the structural dimension of social capital (see 7.3). These findings do not reflect the impact of high or worsening rates of crime described by participants in each site (see 5.2 and 6.2), perhaps as the structural and cognitive facets of social capital did appear to be related (see 7.3).

Table 8.5.2: Differences in changes in social capital amongst households in different groups in Lesseyton and Gatyana

		Lesseyton (N = 170)			Gatyana (N = 166)		
		Less	**Same**	**More**	**Less**	**Same**	**More**
Total		33.5	54.7	11.8	25.3	60.2	14.5
	P value (between sites) Test	0.241 Pearson Chi-Square					
Gender	Male only	29.8	55.3	14.9	13.9	66.7	19.4
	Male with female	24.4	71.1	4.4	17.1	63.4	19.5
	Female with male	41.5	43.4	15.1	34.1	46.3	19.5
	Female only	40	48	12	31.9	66	2.1
	P value (between gender) Test	0.145 Fisher's			0.03 Pearson Chi-Square		
Income	Lowest income	35.7	59.5	4.8	23.8	69	7.1
	Low income	30	59	10.3	28.9	44.4	26.7
	Moderate income	31.8	53.3	11.1	25.6	64.1	10.3
	High income	31.8	47.7	20.5	23.1	64.1	12.8
	P value (between income) Test	0.467 Pearson Chi-Square			0.14 Pearson Chi-Square		

Trends in changing social capital were not significant amongst gender headship types in Lesseyton, but were significant in Gatyana (Table 8.5.2). In Gatyana, a far lower proportion of households with only adult females reported an increase in social capital. This group did not score highly on any social capital variables (see 7.3) and was the most HIV/Aids impacted out of the gender groups in this site (see 6.3.2). In particular, a higher percentage of this group experienced illness-related deaths in the previous ten years (see 6.3.2). This group also reported a higher use of assistance from friends in

response to a shock (see 8.4.2). This may be an indication that the social support systems of these households in this site have been overburdened.

Amongst income quartiles in both sites, the smallest proportions of households claiming an increase in social capital were in the lowest income quartile. Increases in social capital over the previous ten years increased with rising income in Lesseyton.

The most common reasons for improved social capital from the survey tended to relate to more information being available, and to developments in the area in which the household wished to be part, or to changes in circumstance which allowed the household's members more time to take part in various social interactions:

> *There are new ventures happening and more information today* (Lesseyton)
>
> *Household head is no longer working and can go to meetings* (Gatyana)

Reasons cited for declining social capital were varied, ranging from personal circumstances such as age or health, to the physical distance of meeting places (particularly in Gatyana), and often to the household members being disgruntled from the absence of resolution in community gatherings or the conduct of the youth or leaders.

> *I am old now and can't attend meetings* (Lesseyton)
>
> *Lots of problems in the meetings; there is often conflict and that discourages people to attend* (Lesseyton)
>
> *I stay alone and so I can't leave the children alone to go to those things* (Gatyana)
>
> *We don't have money to travel* (Gatyana)

In general stagnation and decline in social capital across the two sites has implications for household's vulnerability to HIV/Aids and climate change. Social capital has frequently been cited as a valuable tool for facilitating climate change adaptation (Adger, 2003; Jones, 2010; Pelling and High, 2005; Agrawal, 2008), generally using social capital to refer to the institutional support needed by individuals and households to actualise a variety of response strategies (Agrawal, 2008). HIV/Aids has been described as potentially eroding social capital through the breakdown in social cohesion, loss of trust and over-utilised support networks (Drimie & Casale, 2009). Social capital can decline through stigma and weakened institutions (de Sherbinin et al., 2008). Social capital is also said to decline through crime and violence (Moser, 2005), which has frequently dominated South Africa's history (see 5.3) and was identified by multiple groups during participatory explorations of drivers of vulnerability (see 5.2 and 6.2).The declining social capital of households with only adult females in Gatyana may be an indication that their social capital has been affected by their higher degree of HIV/Aids impacts (see 6.3.2).

8.5.3 Trends in accumulation and depletion of physical capital over time

The majority of households in Lesseyton claimed that their infrastructure and property had improved over the last ten years (64.9%), whereas in Gatyana the biggest proportion of households reported that these measures for physical capital remained unchanged (47.1%). These differences were significant (Table 8.5.3). This reflects the improved service delivery and the provision of RDP housing in Lesseyton.

Amongst the gender headship types in Lesseyton, the largest proportion of households claiming improved physical capital were households with only female adults, whereas in Gatyana this type of household had the smallest proportion with improved physical capital for this site. The differences between gender headship types or between income quartiles were not significant in either site.

Table 8.5.3: Differences in changes in physical capital amongst households in different groups in Lesseyton and Gatyana

		Lesseyton (N = 168)			Gatyana (N = 157)		
		Less	**Same**	**More**	**Less**	**Same**	**More**
Total		8.9	26.2	64.9	11.5	47.1	41.4
	P value (between sites) Test	0.000 Pearson Chi-Square					
Gender	Male only	8.7	26.1	65.2	10	43.3	46.7
	Male with female	8.9	20	71.1	7.9	47.4	44.7
	Female with male	9.4	37.7	52.8	7.3	51.2	41.5
	Female only	8.3	12.5	79.2	17	46.8	36.2
	P value (between gender) Test	0.293 Fisher's			0.819 Fisher's		
Income	Lowest income	19	14.3	66.7	10.3	66.7	23.1
	Low income	2.6	30.8	66.7	13.3	40	46.7
	Moderate income	7	32.6	60.5	11.4	48.6	40
	High income	6.8	27.3	65.9	10.8	35.1	54.1
	P value (between income) Test	0.136 Fisher's			0.687 Fisher's		

In Lesseyton, a large proportion of households in the lowest income quartile – over twice the percentage of any other quartile – indicated that their physical capital had decreased. In Gatyana, fewer households in the lowest income quartile reported that their physical capital had improved, compared to the other quartiles. From these, it would appear that physical capital is declining for low-income households.

In both sites, the reasons for improving physical capital provided by respondents most often made reference to government provided housing, taps, toilets or improvements to the local roads (these types of comments were more common to Lesseyton), else made reference to improved income which allowed for renovations or purchases (these types of comments were more common to Gatyana):

This is what freedom is all about (Lesseyton)

Now we have taps, improved roads, and new pit toilets (Lesseyton)

We built a fence and the government gave us community taps (Gatyana)

We renovated the house because now she gets pension (Gatyana)

Most reasons for a decrease in physical capital related to the lack of money, or made reference to how the only improvements were government provided, and these were insufficient and unsatisfactory.

There is no money, only earning pension (Lesseyton)

Roads not maintained, not enough taps (Gatyana)

Don't have money to repair roof and walls (Gatyana)

Physical capital is one of the few types of capital stocks seen to be generally improving across both sites, and particularly noticeable in Lesseyton. Physical capital improvements appear to be primary directly related to government-led service delivery, else indirectly linked to government-provided grants. Physical capital does not seem to be utilised to build livelihoods per se – it is not a productive form of capital – nor is it a valuable resource for responding to stress. However, physical capital was ranked as the most important type of capital to a household by three of the four participatory groups (see 7.7) and housing is usually the most important asset that people seek to acquire (Moser, 2007). Even although improved physical capital may not be improving incomes, it is an indication of improve quality of life. This may indicate that households whose physical capital is not improving are in fact particularly vulnerable.

8.5.4 Trends in accumulation and depletion of natural capital over time

Differences in the perceived changes in the quality of agricultural land between the two sites were not significant, and a very low proportion of households in either site reported an improvement in the quality of agricultural land (Table 8.6.4), as an indication of changing natural capital (see 8.1.3 d).

Differences were also not significant amongst gender headship types in either site. In Lesseyton, a slightly higher proportion of households with only adult males (55.3%) reported a decline in natural capital compared to the other headship types, whereas in Gatyana fewer of this same headship type reported a decline (30.6%), compared to the other headship types.

Differences between income groups were also not significant in either site, although noticeably more households in the lowest income quartile reported that there had been no change.

In Gatyana, comments around improved natural capital often made reference to people's changing livelihood practices away from agrarian activities and the subsequent recovery of the land; whereas in Lesseyton, government support was the main reason cited:

*There is a scarcity of oxen for ploughing, and so the land is underused and has regained fertility (*Gatyana)

The government is working with people to look after it (Lesseyton)

Table 8.5.4: Differences in changes in natural capital households in different groups in Lesseyton and Gatyana

		Lesseyton			Gatyana		
		Less	**Same**	**More**	**Less**	**Same**	**More**
Total		45.1	50	4.9	38.2	58.8	3
	P value (between sites) Test	0.243 Pearson Chi-Square					
Gender	Male only	55.3	44.7	0	30.6	63.4	2.4
	Male with female	40.9	52.3	6.8	42.9	54.8	2.4
	Female with male	46	48	6	42.9	54.8	2.4
	Female only	30.4	60.9	8.7	42.2	55.6	2.2
	P value (between gender) Test	0.206 Fisher's			0.855 Fisher's		
Income	Lowest income	41.5	53.7	4.9	24.4	73.2	2.4
	Low income	51.4	48.6	0	47.8	47.8	4.3
	Moderate income	40.9	52.3	6.8	41	56.4	2.6
	High income	47.6	45.2	7.1	39.5	57.9	2.6
	P value (between income) Test	0.874 Fisher's			0.813 Pearson Chi-Square		

In both sites, changes in rainfall patterns were the main reasons for a decline in natural capital. In Lesseyton, most comments noted drought or the lack of rain, whereas in Gatyana many respondents complained about heavy rains following a dry spell (this washes seedlings out the ground). Other reasons for the decline were focused around past land management practises:

There used to be grazing camps for livestock but the fences were stolen (Lesseyton)

Land was over-used in the past and now needs fertiliser (Gatyana)

The overall decline in the quality of natural capital has implications for climate change, which is predicted to add further strain onto the availability of multiple natural resources in South Africa (Turpie et al., 2006).

8.5.5 Financial capital

The majority of households in both sites indicated that their financial capital had declined compared to ten years ago, whilst 20% of households in Lesseyton and 15.2% of households in Gatyana indicated that their stocks in financial capital (their savings, absence of debt and income sources) had improved. The differences between the two sites were not significant (Table 8.5.5). Differences between gender headship types and income quartiles were also not significant.

Overall, irrespective of household type, financial capital had declined in both sites, and only around one in five households had experienced an improvement in their financial capital.

Table 8.5.5: Differences in changes in financial capital amongst households in different groups in Lesseyton and Gatyana

		Lesseyton			Gatyana		
		Less	Same	More	Less	Same	More
Total		55.3	24.7	20	63	21.8	15.2
	P value (between sites) Test	0.322 Pearson Chi-Square					
Gender	Male only	61.7	23.4	14.9	62.9	20	17.1
	Male with female	48.9	31.1	20	69.2	20.5	10.3
	Female with male	62.3	17	20.8	62.8	20.9	16.3
	Female only	40	32	28	59.6	23.4	17
	P value (between gender) Test	0.398 Pearson Chi-Square			0.971 Pearson Chi-Square		
Income	Lowest income	73.8	19	7.1	67.4	27.95	2.7
	Low income	53.8	25.6	20.5	67.4	15.2	17.4
	Moderate income	42.2	28.9	28.9	63.9	19.4	16.7
	Highest income	52.3	25	22.7	53.8	23.1	23.1
	P value (between income) Test	0.110 Pearson Chi-Square			0.277 Pearson Chi-Square		

Most explanatory comments for an increase in household financial capital related either to how a household member had acquired a job where they did not have one before, else through the acquisition of government grants. In Lesseyton in particular, new employment opportunities were frequently associated with education:

> *Family lifestyle improved through education* (Lesseyton)
>
> *The pension payout has eased things* (Gatyana)

Comments relating to decreases in financial capital either related to the rising cost of living or to rising unemployment, whilst a few households in each site cited the change in livelihoods away from agrarian activities:

> *We depend on state pension – no-one is working* (Lesseyton)
>
> *We no longer have fields; in order to eat you must have money. We don't have energy to plough or money to pay people to plough the fields* (Lesseyton)
>
> *Everything's more expensive now and there's less work* (Lesseyton)
>
> *Things are getting more expensive* (Gatyana)
>
> *We now depend on groceries whereas we used to plant our own food and the inflation rate has risen* (Gatyana)

The overall decline in financial capital across both sites has implications for household's livelihoods and vulnerability to multiple stressors as financial capital is the most easily transferable to accumulate

stocks in the other types of capital. Many of the groups identified that while physical capital was the most important to the household, that financial capital was necessary to accumulate physical capital (see 7.7). Financial capital was seen as the most important type of capital for households by men in Gatyana (see 7.7.1). Poverty was identified by women in both sites as being the main stressor driving vulnerability in each site (see 6.2).

8.6 Asset use and vulnerability

Various assets have been shown to be important to households through their use in defining the household's livelihoods and thereby accumulating income, or in response to a shock or stress. Assets can be depleted either directly by a shock or stressor, through their use in response to a shock or stress, or through their day-to-day use.

In Chapters 5 and 6, all groups in Lesseyton and Gatyana placed heavy emphasis on the importance of human capital, and in particular, on the importance of education. In this chapter, the link between education and high cash income-earning employment was made, yet was not as readily apparent as expected, as the education index scores amongst the income quartiles were not significant. Many groups (notably women in Lesseyton) described taking children out of school to help cope with a shock to be a better response than taking out a loan or selling off assets. The men in Lesseyton justified this by reasoning that if you need to take out a loan, then you cannot pay school fees or pay for uniforms and textbooks in any case. In contrast the men in Gatyana argued that taking out a loan as better than sacrificing the long-term benefits that education would bring in the future. Taking children out of school as a response raises concerns about the future impacts and sustainability of this choice for the household, and so can be seen as a coping strategy that is potentially harmful in the long term (Whiteside, 2002; Gillepsie & Drimie, 2009). In Lesseyton, school drop-outs were identified by young men as a major problem in the area, and were driven partly by a lack of money, as would often be the case following a shock or stress (see 6.2.2).

Many of the groups reported concern over the over-utilisation of their social support networks. Generally this type of capital has not been heavily depleted, yet also on average has not increased. Social capital was often significantly higher for the higher income quartiles (see 7.3), perhaps indicating that income is useful for developing social capital, or that social capital is useful for attaining employment opportunities.

Physical capital is generally increasing across the two sites. As all the groups participating in ranking exercise expressed that it was an inferior means to coping with stress, decreasing physical capital amongst households may be indicative of those households being 'trapped' in a cycle of vulnerability.

Although natural capital is in general declining in both sites, it still constitutes a valuable coping strategy and does contribute to livelihoods in both sites. Income derived from natural resources constituted a high proportion of the livelihood portfolios for high income households, probably due to a combination of these households being able to purchase livestock and labour, as well as these households on average being larger, and thereby having the human capital to make use of natural resources. The steady decline in natural resource based livelihoods in the Eastern Cape (Chapter 5), yet high importance placed on this resource, could be a sign of the support needed to small scale farmers in the area (Lahiff & Cousins, 2007; Hebinck & van Averbeke, 2007). Increased natural resource harvesting was not found to be a common coping strategy based on responses from the household survey, yet it emerged as a key strategy from participatory discussions. As natural resource harvesting featured in discussions and in the livelihood portfolios of households across both sites, this 'coping strategy' may rather be a long-term adaptive strategy: a way to manage stress on livelihoods, given that there are multiple stressors impacting households every day (see Chapter 6; McDowell & Hess, 2012).

Government grants constituted the biggest proportion of income to the majority of households in both sites, and the higher value of the pension was evident in households with more pensioners entitled to these grants. Despite government grants increasing in value, and more recipients receiving the grants each year, most households still reported a decline in financial capital.

The diversification of livelihoods has frequently been considered as a valuable means to reduce vulnerability by spreading out and thereby reducing the risk associated with losing a livelihood (Ellis, 2000). In this sense, households in the highest income quartile appear to be the least vulnerable to livelihood disruption, as they have the most diversified livelihood portfolios. In a study by Hajdu (2006) based in two rural villages in the Eastern Cape, participants described how diversified livelihoods required more effort and so are only possible in larger households. The significantly higher number of household members in this quartile in each site may explain their ability to diversify livelihoods.

It was hypothesised at the start of this chapter that female headed and low-income households, and households in rural areas, would have declining stocks in multiple forms of capital. In general, for most forms of capital respondents reported an over-all decline or no change irrespective of socio-economic type, although physical capital improved significantly less amongst households in Gatyana, and there was significantly less improvement in social capital for amongst households with only adult females in Gatyana. The divergence between expectations and findings is explored in more detail in Chapter 9.

PART 4: CONCLUSION

CHAPTER 9: GENERAL DISCUSSION AND CONCLUSIONS

9.1 Synthesising overview

9.1.1 Analysing vulnerability to HIV/Aids and climate change

Conceptualisations of vulnerability frequently refer to an external dimension of exposure to stress, and an internal dimension encompassing people's ability to withstand stress or respond without damaging loss (see 3.2; Chambers, 1989). These two aspects interact to determine the effect of a stressor on a household. For instance, HIV/Aids can affect multiple forms of capital either directly through the household-level impacts on health and productivity or through the secondary effects of depleting household's assets to cope with these impacts (see 3.2.3; Drimie & Casale, 2009). In the same way, vulnerability to climate change has internal and external dimensions, as exposure to climate variability and extreme weather may directly affect household capital, whilst responding to climate-related shocks and stressors may entail a depletion of household assets (see 3.2.2; IPCC, 2007). As adaptation to stress occurs on the local level, considering the means available to households with which they may respond, together with localised contextual drivers of vulnerability, has frequently been highlighted as a pertinent research need (e.g. O'Brien et al., 2009; see 1.2).

This thesis attempted to understand how capital stocks are used to create livelihoods and respond to stress within the context of HIV/Aids and climate change in order to determine vulnerability to these and other stressors (see 1.3). This study incorporated assessments of the historical drivers of vulnerability and the origins of asset degradation (Chapter 5), the interaction of multiple stressors in two sites and differential vulnerability to stressors (Chapter 6), household capital stocks (Chapter 7), and the variety of usages of household assets (Chapter 8). As context is an important factor when considering vulnerability (O'Brien et al., 2009), site comparisons were made throughout the study. As women and low-income households have frequently been considered to be more vulnerable to HIV/Aids, climate change and other stressors (see 3.2.2 and 3.2.3), comparisons were made between households with different gender headship structures and between households of different income levels.

In brief, numerous participatory discussion and various literature reviewed in this study tended to indicate that multiple, interacting stressors had increased and worsened over time in each of the two sites. These methods, together with perceptions data from a household survey, further suggested that stressors had depleted household capital stocks over time. Vulnerability was often found to be highly context specific, not only because of unique drivers of stress in different areas, but also because households often have a combination of characteristics that can potentially render them vulnerable,

while at the same time having characteristics that can potentially facilitate adaptive capacity. This combination of characteristics highlights the need to engage with communities in identifying their own strengths and challenges for developing adaptation strategies. The inability of this study to specifically identify vulnerable groups based on their capital stocks may be an indication of the inadequacy of using a reductionist approach (i.e. focusing predominantly on assets and asset use and analysing these aspects through pair-wise comparisons) to assess a dynamic, multivariate problem, such as differential vulnerability (see 3.2; 3.3 and 3.4). That vulnerable groups were difficult to identify could, however, rather be an indication that households within marginalised areas such as the two study sites can be vulnerable in different ways irrespective of socio-economic divides. This may be an indication that the 'external' dimensions of vulnerability, those of exposure and sensitivity, may have a high impact on households that would ordinarily not be considered vulnerable because of relatively higher, mitigating adaptive capacity. Overall, the general decline in multiple forms of capital, in conjunction with new and emerging stressors, raises concerns over the most appropriate means of social protection within these contexts (Moser, 2005; Veenstra, 2008). For while government grants make a substantial contribution towards household income, it appears that this flow of wealth could not be converting into longer-term stocks of capital, based on participants and respondent's perceptions, suggesting that asset-building or asset-protection might need to work alongside current social protection policies aimed at maintaining income/consumption. These and other concerns are elaborated upon in this final, concluding chapter.

9.1.2 Past and present drivers of vulnerability

Literary research and participatory histories from the two sites both indicated the trend of deagrarianisation and subsequent reliance on government provided grants, coupled with the depletion of multiple forms of capital. These processes are intimately linked to the country's colonisation, and later to industrialisation and related segregationist development and Apartheid policies. The depletion of capital over time and the loss of livelihoods, together with a rise of multiple, inter-linked stressors, appears to have left most households in a vulnerable position, as there are few resources to buffer against daily, persistent stress.

Literary research and participatory histories from the two sites indicated how poor health services and poor living and working conditions, giving rise to diseases of poverty, and over the past decade, to drug-resistant strains (e.g. tuberculosis), potentially impacted human capital. These histories also indicated how human capital could have been lost through inferior education systems. Social capital could have been affected by the perpetual violence that characterises South Africa's past, as well as through a breakdown in the socialisation of children as family structures were disrupted. The depletion of natural capital frequently surfaced in these histories, both as there was increasing alienation from the land resulting in the declined usefulness of this resource, and as rural areas

frequently were over-crowded and subjected to inappropriate land-management policies (e.g. Betterment planning), and later to ineffectual land reform, a breakdown of traditional land management institutions, lack of support, environmental degradation and climate variability. Across these histories, physical capital appeared to have largely suffered a lack of adequate investment in infrastructure, and has since been a key area of focus for development and retribution in democratic South Africa. Financial capital was described as being depleted through inferior wages, and increasingly through unemployment, rising costs of living, and growing inequality.

Participants traced shifts in dominant livelihoods away from agrarian or land based livelihoods, towards a reliance on migrant labour and remittances, and to a present-day reliance on government grants. Agrarian-based livelihoods were seen as increasingly unfeasible and difficult to maintain owing to crime and the lack of support and resources needed to sustain them (see 5.2; 6.2). Agrarian and land-based livelihoods are also losing appeal amongst the youth (see 5.2). The decline in agrarian livelihoods and natural resource use amongst communities in the Eastern Cape reflects the common trend of deagrarianisation in the province (Hebinck & van Averbeke, 2007). The long term sustainability of this trend can be questioned, as there is a shift from localised, intensive, smallholder production towards the consumption of delocalised goods (Hebinck & van Averbeke, 2007). Youth are increasingly 'outward looking', desirous of migrating towards more urbanised areas, raising concerns about the development of rural areas (Hebinck & van Averbeke, 2007). If youth remain, they are often reliant on the grants of pensioners within the household, and this is often insufficient to meet all of the household's needs, let alone to support the inputs needed to sustain agricultural activities (Hebinck & van Averbeke, 2007; Klasen & Woolard, 2002). The trend of unemployed youth relying on old-age pensions has implications for these households, as they risk falling into poverty as their income is diverted onto dependents, instead of on the wellbeing of the pensioner, as intended (Klasen & Woolard, 2002). An over-reliance on government pensions also raises concerns about the potentially vulnerable position the household will be in when the pensioner passes away and this source of income is lost.

While the decline of wild natural resource harvesting appears to have often been a positive experience for households as they have been freed from the drudgery and health effects of collecting fuelwood and river water with the provision of basic services, it also raises concerns about the perception of natural resources as a safety net. The use of natural resources has frequently been documented as a valuable coping strategy in the face of stress (de Sherbinin et al., 2008; McSweeney, 2005; Kaschula, 2008; McGarry, 2008) and was identified by women in Gatyana as the best coping strategy out of the given options. Yet from discussions it emerged that there has been a breakdown in knowledge about natural resource use, and harvesting is declining across generations. This raises questions around whether the next generation will view these resources as a means to respond to stress, and if not then what resources will in turn be seen as valuable for coping.

Participants felt that problems in their area had increased and were getting worse (see 5.2). Many of these problems, as well as being historically-rooted, were also inter-linked. For instance, unemployment was described as leading to crime, making it difficult for people to farm, which puts further strain on household finances. Many such cycles were identified relating to health, education, unemployment, poverty, water scarcity, food security, farming and livestock, to name a few areas of concern, indicating the links and overlaps between social, economic and ecological systems interacting over temporal and spatial scales.

The participatory identification of multiple, interacting stressors were often location or gender specific, re-emphasising the importance of context and differential vulnerability. For instance, the lack of electricity in Gatyana was heavily emphasised as a stressor in this site, although for women it was primarily a problem because of the physical and health burden of collecting fuelwood and cooking over open-flame, whereas men were principally concerned over the employment opportunities lost without this resource (see 6.2). In Gatyana, more concern was placed on livestock, livestock disease and ticks than in Lesseyton. In Lesseyton only, transactional sex repeatedly featured as a problem in the area. In both sites, alcohol, teenage pregnancies and corruption or nepotism frequently featured, while these aspects are largely absent from popular conceptualisations of vulnerability in the literature. Many peripheral drivers of stressors would not ordinarily be considered in dominant literature, such as pressure through the media or peer pressure, parental neglect, or traditional healers re-using blades (see 6.2).

These multiple drivers of vulnerability highlight how using context to understand vulnerability to climate change makes intervention complex. Many of the key drivers identified were not focused on climate or weather, although these concerns were raised more peripherally. If vulnerability to climate change arises principally from socio-economic conditions, as the findings from this study suggest, then intervention is situated far more in the political domain than many studies seem to imply. Calls for 'pro-poor adaptation' or 'sustainable adaptation measures' underestimate how vulnerability is a long-standing, deep-rooted problem that requires strong political will (Prowse & Scott, 2008; Eriksen & O'Brien, 2007).

9.1.3 Differential vulnerability across sites

Asides from the nuanced differences in contextual factors such as the main historical drivers of vulnerability, and interactions unique to each site (see 9.1.2 above), the two sites had many distinct attributes relating to differential experiences of shocks and stresses, capital stocks and livelihoods (see Box 9.1.3).

In general, Gatyana has lower stocks of multiple forms of capital, particularly in human, physical and financial capital stocks (see Chapter 7). Gatyana also has lower stocks in structural social capital,

although fairs better than Lesseyton in political and cognitive dimensions of social capital. Gatyana has far higher stocks in natural capital.

While in general Gatyana has lower stocks in multiple forms of capital, it appears to be more egalitarian in the distribution of its stocks of wealth in the sense that types of household based on gender headship and income quartiles do not show many stark, significant contrasts in their stocks of capital (see Box 9.1.4; 9.1.5). Where there are significant differences, these do not always follow a gradient based on increasing income or increasing feminisation of the household's adults, as would be assumed. There are also no significant differences in HIV/Aids effects amongst these same socio-economic groups (see 6.4).

However, the fairly egalitarian distributions in capital stocks do not translate into equally distributed income, and female headed households derive significantly lower incomes than male headed households (see 8.2). This is again reflected in cross-tabulations between the income quartiles and gender headship types (see 6.3.1 b).

In comparison, in Lesseyton, incomes are not significantly different between the four headship types (although households with only female adults do earn significantly less than households with only adult males). In Lesseyton, there are more significant differences in multiple stocks of capital between these social groups, and these differences follow a gendered gradient more frequently than is the case in Gatyana (see Box 9.1.4 and 9.1.5). Furthermore, in Lesseyton, the gender of the household's head and the income level of a household were both significant aspects when considering HIV/Aids experiences and degrees of impact, whereas there were no significant differences between the HIV/Aids impacts experienced by these groups in Gatyana (see Box 9.1.4 and 9.1.5).

Box 9.1.3 Significant differences between the two sites

		Lesseyton	**Gatyana**
Differential vulnerability (Chapter 6)	Food security perceptions	More food secure (although still food insecure)	
Capital stocks (Chapter 7)	Human	More adults Higher education, more languages, better health	More pensioners
	Social	More group membership Higher resource generator	Higher trust/cohesion, more participation in community decision making
	Natural		Much more land; more use of river, grazing land, fuelwood, medicinal plants
	Physical	More large household items	More kraals
	Financial	More debt, more savings	
Asset use (Chapter 8)	Livelihoods	Grants: 44% Formal employment: 28% Casual employment: 7%	Grants: 54% Formal employment: 16% Livestock: 11%
	Coping strategies		Loans

The higher natural capital in Gatyana is evidenced through the higher incomes derived through crop production, animal husbandry and natural resource harvesting. This boost to household food supply does not reflect in household's perceptions of their food security, which is perceived to be higher in Lesseyton. In contrast, the higher incomes derived in Lesseyton from salaries and wages reflects the higher human capital in this site – in terms of able-bodied adults, health, education and language skills (see 7.2) – as well as the site's proximity to a large town, and the housing development projects underway in the area.

These differences and nuances are influenced by cultures, dominant livelihoods, level of development, exposure to information, distance from markets, political systems and site-specific histories which all intertwine to shape and determine the values, options and opportunities available to households. These differences are further shaped by differential experiences of vulnerability at the household level, and differences in household capital stocks and asset use.

Each of the two sites has some characteristics that can be seen to be beneficial for facilitating adaptation and resilience, together with aspects that are often highlighted as crucial drivers of vulnerability. For instance, more households in Gatyana will be affected by climate change, as households rely more heavily on natural resources such as crops, river water, grazing land and wild harvestable natural resources. However, the recent drought appears to have left a stronger impression in Lesseyton, where water scarcity issues prevail and there were significant differences amongst income quartiles in their perceived impacts of weather on the household. Gatyana is also in some ways more egalitarian, and has higher stocks of cognitive social capital and more participation in community decision making, which are important and valuable traits for effective adaptation (Jones et al., 2010; Adger, 2003; IPCC, 2001). Lesseyton, however, has higher stocks in human, physical and financial capital, and has more access to information and essential services, which are also all beneficial for adaptation.

9.1.4 Differential vulnerability across gender headship types

There were not as many differences between the gender groups as was expected, although it was still found that female headed households are often worse off than the male headed households in terms of lower stocks of multiple forms of capital, lower incomes, and heightened vulnerability to many HIV/Aids effects (see Box 9.1.4).

Lesseyton had more significant differences amongst the gender headship types (see Box 9.1.4). There were differences in household demographics (see 7.2.2); for instance, households with only adult females had the fewest adults, whereas households with only adult males had the most adults. Female headed households with adult males had the most members in total, whereas male headed households with adult females had the fewest members in total. Households with only female adults were also

low in other forms of human capital, notably skills, languages and contentment, which all displayed significant decreasing gradients as the household's adults become more feminised. The only difference amongst social capital variables was for trust and cohesion (the Likert scale questions), which was highest for households with only adult females. In terms of natural resource use, male headed households had higher usage of the river and medicinal plants, while households with only female adults had the lowest use of bushmeat. In paired comparisons, households with only female adults had significantly less land, large household items, savings and debt than households with only adult males, although these were not significant in multivariate comparisons across all four groups.

Differences in HIV/Aids experiences were significant amongst gender headship types in Lesseyton (see 6.4). Male headed households with adult females had lower overall HIV/Aids impact score, and lower rates of chronic illness, whereas female headed households with adult males had high overall impact score and higher rates of chronic illness.

Despite these differences in HIV/Aids impacts and capital stocks, there were no significant differences in total income, even although there seemed to be a decline in income from male to female headed households.

In contrast, income levels were significantly different amongst gender headship types in Gatyana (see Box 9.1.4; 8.2.2). Incomes decreased from male to female headed households. The only significant differences in capital stocks amongst gender headship types in Gatyana were in the demographics of households, leadership positions, kraal ownership and natural resource use (see Box 9.1.4; Chapter 7). Households with only female adults had the fewest adults and pensioners, whereas households with only adult males had the most adults and male headed households with only adult females had the most pensioners. Male headed households with adult females had significantly fewer leadership positions in community groups and organisations. Kraal ownership steadily decreased from male to female headed households, and households with only adult females also hunted less. In paired comparisons, households with only female adults had less land and lower levels of saving than households with only adult males. Although social capital was declining in general in this site, a much smaller proportion of households with only adult females experienced an increase in social capital, compared to the other headship types. There were no significant differences in HIV/Aids experiences amongst gender groups in this site (see 6.4.2).

These findings illustrate the differences that context can mean to various socio-economic groups. For instance, in Lesseyton male headed households with adult females in appear to be mostly young, probably couples, educated and employed, with a few children, whereas this same household type in Gatyana appears to be older with more members, more established and more traditional in terms of their dominant livelihoods (namely animal husbandry and natural resource harvesting, aside from grants).

Box 9.1.4: Significant differences between gender headship types in the two sites*

		Lesseyton				Gatyana			
		Male only	Male with female	Female with male	Female only	Male only	Male with female	Female with male	Female only
Differential vulnerability (Chapter 6)	HIV/Aids		Low chronic illness Very low impact score	High chronic illness High impact score					
	Alcohol	Highest consumption →			Lowest consumption		Highest consumption		Lowest consumption
Capital stocks (Chapter 7)	Human	Most adults Most pensioners High skills → High language skills → High contentment →	Least total Least pensioners	Most total	Least adults Low skills Low language skills Low contentment	Most adults	Most pensioners		Least adults Least pensioners
	Social				High trust				
	Natural		High river High med. plants		Low bushmeat				Low bushmeat
	Physical	Most kraals	Least kraals			Most kraals →			Least kraals
	Financial								
Asset use (Chapter 8)	Three most dominant livelihoods	Grants:50% Formal:21% Casual:11%	Formal:45% Grants:29% Casual:8%	Grants:50% Formal:24% Remittances: 8%	Grants:59% Formal:12% Self-Employment :10%	Grants:44% Formal:29% Livestock:11%	Grants:64% Livestock:14% NRs:7%	Grants:54% Formal:12% NR/Remittances /Livestock:8%	Grants:51% Formal:18% Livestock/NR: 10%
	Income					Highest →			Lowest

*** Arrows indicate increases or decreases across groups**

Asides from the differences between sites, there are also often nuanced similarities between the gender headship types. These similarities are evidenced in the number of variables that were not significantly different, but also in variables such as the HIV/Aids experiences. In Lesseyton, households with adults of both sexes had the two extremes: male headed households with adult females were the least impacted on whereas female headed households with adult males were the most impacted on. Households with only adult males or only adult females had very similar, high rates of HIV/Aids impacts.

In considering these nuances, it is worth emphasising that there are many other factors in these basic demographic headship structures – such as whether adults of both sex represent a married couple or a single parent with adult child, and whether single-sex adults are single, divorced or widowed – which could potentially further influence differential asset ownership, livelihoods and vulnerabilities.

Across both sites, there were significant differences between the percentages of households with gender headship types reportedly buying alcohol. Male headed-households purchased significantly more alcohol, and purchases were far lower amongst households with only adult females. It may often be taken for granted that men drink more alcohol, but as alcohol featured so emphatically in all groups' descriptions of vulnerability in their areas (see 5.2; 6.2; 6.4.5), it is perhaps an area that needs to be recognised as needing address.

These differences and nuances again combine positive and negative implications for both vulnerability and adaptation. For instance, households with only adult males in Lesseyton have a high degree of HIV/Aids impact, but these households also often have relatively high stocks in multiple forms of capital that can potentially buffer the household against the negative effects of the disease.

9.1.5 Differential vulnerability across income quartiles

There were far fewer significant differences in various contextual vulnerabilities, capital stocks and livelihood activities between income quartiles in Gatyana than in Lesseyton (see Box 9.1.5). Overall there were fewer differences between income quartiles than expected, given that high income is assumed to correlate to high levels of multiple forms of capital.

In Lesseyton, households in the high income quartile had the most adults and the most members in total, and these declined steadily to the lowest income quartile (see 7.2.3). The high income households also had the most children, and were the most content, although these did not incrementally correlate with income. More household members in the high income households were members of community groups and organisations, and group membership declined with the lowest income quartile belonging to the fewest community groups (see 7.3). Usage of grazing land, property size, savings and debt were all highest for highest income households and decreased as income levels

decreased. In terms of dominant livelihood, reliance on grants decreased and income from salaries and wages increased from the lowest to the highest income quartiles (see 8.2.3).

In terms of HIV/Aids experiences, the high income households in Lesseyton had a higher overall degree of impact which decreased with income, and the number of orphans also decreased with decreasing income (see 6.4.3). Moderate income households experienced significantly higher rates of illness-related deaths in the past ten years. This could be a reflection that these households would otherwise have been in the highest income quartile. The higher incidences of HIV/Aids proxy experiences amongst higher income households were unexpected, although not entirely unusual. Other studies have found similar findings, and have argued that education plays a greater role in HIV/Aids resilience, whilst the wider social networks, personal autonomy and mobility associated with wealth are risk-factors (Bärnighausen et al., 2010; Pronyk et al., 2008; Gillespie et al., 2007). Perceptions of the negative effects of climate change on the household decreased with income, with the higher income households experiencing higher impacts (see 6.5.2). This probably related to the higher proportion and value of income derived through livestock compared to other income groups, reflecting how this group was the worst affected by the drought in the years prior to the study.

In Gatyana too, the proportional reliance on grants decreased with rising income, whilst cash income sources increased (see 8.2.3). The highest income households in Gatyana derived a higher proportion and value of income from livestock, compared to the other income groups. Lower income households rely on a higher proportion of their incomes from natural resource harvesting.

The highest income households were larger in total with more pensioners and children, and these figures decreased incrementally with income. The number of community groups or organisations to which household members belonged also declined steadily with income. Other significant differences did not follow a gradient, such as contentment, grazing land usage, and ownership of large household items, although the highest income households had more of these assets.

In Lesseyton, there were more significant differences in capital stocks and other characteristics that increased or decreased incrementally as income levels increased, compared to Gatyana. As Lesseyton has more cash income sources while Gatyana has more in kind income sources, this contrast between the number of significant differences between income quartiles in these two sites could be an indication of the qualitative difference in cash and in kind income. Cash could perhaps be readily transformed into measurable forms of wealth, as opposed to in kind income, which is perhaps mostly consumed by the household.

The varying proportional reliance on various forms of natural resources – most notably wild, harvestable natural resources for lower income households and grazing land for higher income households – and the monetary values of income derived from these sources indicates how natural

Box 9.1.5: Significant differences between income quartiles in the two sites*

		Lesseyton				Gatyana			
		Lowest	Low	Moderate	High	Lowest	Low	Moderate	High
Differential vulnerability (Chapter 6)	HIV/Aids	Fewer orphans ← Low impact score ←		High deaths	More orphans → High impact score →				
	Climate change impact perceptions	Low climate change impact ←			High climate change impact →				
Capital stocks (Chapter 7)	Human	Least total → Least adults →			Most total Most adults Most children Most content	Least total → Least children → Least pensioners →			Most total Most children Most pensioners Most content
	Social	Least leadership positions →			Most leadership positions	Least leadership positions	Most leadership positions		
	Natural	Low grazing land usage →			High grazing land usage		Least land Least grazing land usage	Most land	High grazing land usage
	Physical	Small household property size →			Large household property size		Least large household items		Most large household items
	Financial	Less savings → Less debt →			More savings More debt				
Asset use (Chapter 8)	Livelihoods	Grants:66% Remitt:10% Casual:9%	Grants:50% Formal:19% Casual:10%	Grants:46% Formal:29% Casual:9%	Grants:39% Formal:34% Livestock:10%	Grants:71% NR Use:13% Remitt:5%	Grants:64% NR Use:13% Remitt:10%	Grants:64% Formal:11% NR Use:10%	Grants:41% Formal:27% Livestock:16%
	Income	Lowest →			Highest	Lowest →			Highest

***Arrows indicate increases or decreases across groups**

resources can be important contributions to households living in poverty as well as valuable means of keeping households from falling deeper into poverty (Shackleton et al., 2005; Adams et al., 2000). It also indicates how households are vulnerable to the different effects of climate change exposure irrespective of income level, although higher income households have more resources with which to respond.

As similar percentages of each income quartile were purchasing alcohol (see 6.4.5), this indicates that lower income households are most vulnerable to alcohol abuse, as they have less disposable income to spare. Alcohol abuse was frequently emphasised by groups in participatory discussions, and emphasises an area needing intervention to reduce vulnerability.

It is worth emphasising while high income households in these sites may have more resources with which to respond to shocks and stress, they are still highly vulnerable to multiple stressors and of falling deeper into poverty. HIV/Aids is often considered to be associated with conditions related to poverty, but wealth, poverty and HIV/Aids risk are all multi-faceted and such an understanding is too simplistic (Gillespie et al., 2007).

9.2 Concerns and discussion emerging from findings

9.2.1 Asset based frameworks for analysing vulnerability

Many of the study's hypotheses assumed that rural areas, and low-income and female headed households, would be more vulnerable to stressors and have lower stocks of multiple forms of capital. However, these hypotheses were often not accurate, or were too simplified. There were fewer significant differences between income quartiles and headship types than expected, particularly in the rural area of Gatyana, and there appeared to be a disjuncture between capital stocks and income. For example, capital stocks were frequently significantly different between headship types in Lesseyton, yet the income levels between these households were not significantly different. However, in Gatyana, income levels were significantly different between these groups, yet there were not as many significant differences in these groups' capital stocks.

The contradictions between findings and expectations point in part to applying an asset-based framework and predominantly using pair-wise comparisons for understanding vulnerability, which may be too simplistic. While attempts were made to address the simplicity of the Sustainable Livelihoods Framework by incorporating the multiple factors influencing vulnerability of socio-ecological systems, this study was not able to consider these multiple aspects simultaneously.

Other aspects, besides assets, are integral to understanding vulnerability and adaptive capacity. The Africa Climate Change Alliance project (ACCRA) developed a Local Adaptive Capacity Framework (LAC) in recognition that adaptation occurs at the local level in localised contexts, and understanding

it requires more than an asset-based approach, which, while useful, fails to capture the processes inherent to adaptation (Jones et al., 2010). The LAC framework thus includes: the asset base, institutions and entitlements, knowledge and information, innovation, and flexible forward-thinking decision making (Jones et al., 2010). These aspects are said to facilitate adaptive capacity, and understanding assets is a useful starting point. Many of these other additional aspects form part of the broader research project within which this study is situated (see 1.3). For instance, one study in the broader research project examines local institutions and community organisations in the two sites, two other studies examine coping and adaptive strategies, while the participatory process founded on social learning methodology facilitates knowledge sharing and forward-thinking.

This study should be considered as an initial understanding contributing towards expanding the fuller picture of vulnerability and adaptation in the two sites.

9.2.2 Linking social protection with asset building, agency and institutions

In Lesseyton there was a disjuncture amongst the different headship types between stocks of capital and income: while there were multiple significant differences in capital stocks, there was not a significant difference for income. In contrast, in Gatyana, while there were not many significant differences in stocks of capital amongst gender headship types, there was a significant difference in income. In general, most households in both sites, irrespective of socio-economic types differentiated by income or gender headship, perceived a decline or stagnation in all forms of capital stocks except physical capital, despite improved uptake and value of government provided grants. This trend, in conjunction with findings contradicting the expectations that higher income would correlate to higher stocks of capital and that vulnerable groups would have lower stocks of capital, points to a potential inability to convert income into stocks of capital, and vice-versa.

This may indicate that the Sustainable Livelihoods Framework over-simplifies the conversion of income to capital stocks, and vice versa. Based on the findings from this study, it would seem that income is used to cope with the immediacy of stressors operating in these areas, and is just sufficient to maintain the status quo of households. Hassim (2008) argues that high government social spending is inadequate for transformation, particularly amongst women and instead offers only enough to cope with the state's failure to adequately transform their socio-economic position and bring about social justice. As the depletion of multiple forms of assets is deep-rooted (see 9.1.2), efforts to redress inequality should perhaps incorporate asset building alongside the current approach to social protection of maintaining income and consumption (Moser, 2005) in order to effect noticeable change. Moser (2005) argues that asset building entails a shift in focus towards the long term consolidation of household asset holdings, as opposed to the more short term focus of maintaining income and consumption, which, in contexts where there is persistent strain on household spending, does not allow the household to develop. Having a diverse bundle of assets is an important strategy to

reduce vulnerability as future risks are inherently uncertain (Frayne et al., 2012; Holmes and Jones, 2009).

There is also increasing emphasis on the role of access and agency which work alongside assets to facilitate adaptation and command assets for more beneficial livelihoods, and the role that institutions can play in actualising such opportunities (Moser, 2005; Anderson, 2012; McDowell & Hess, 2012). Vulnerable households are often unable to expand their asset base, and given the limits to the agency of such households, more is needed to facilitate the consolidation of assets. McDowell and Hess (2012) argue that adaptation and development should shift focus away from placing the burden of responsibility onto the vulnerable, and rather place responsibility on the social structures and institutions that govern access to resources and thereby create vulnerability, as an issue of justice. Such an argument is particularly pertinent to South Africa, where centuries of unjust rights of access and inequity have largely created the current contexts in which vulnerability to multiple stressors persists (see 9.1.2).

An area of concern around strengthening agency and access, and the role of institutions, is the role played by local government in transferring resources and information and in communicating the needs of their wards to provincial and national government departments. Many of the participatory discussions emphasised these needs in relation to local government, yet raised concern over the willingness and capacity of these institutions to address their needs.

9.2.3 Community participation in developing adaptive strategies

Many of the findings were site specific and largely influenced by the local context (see 9.1.2; 9.1.3; 9.1.4; 9.1.5), and reflected combinations of aspects that could be interpreted as beneficial or detrimental to adaptive capacity and resilience. These subtleties emphasise the need for community engagement and participation into identifying a community's own strengths and challenges: the areas that should be enhanced to derive greater benefit, and areas that need to be focused on for improvement. This supports claims of the value and need for community based adaptation (see 3.4.3; IIED, 2009).

Such engagement would also allow space to address incongruities between community perceptions and research findings. For instance, that teenagers purposefully fall pregnant in order to access the child grant was repeatedly described by participants, yet several nationwide studies have dismissed this common perception (see 6.2.3; Makiwane et al., 2006; MacLeod & Tracey, 2010). This perception may place young and teenage mothers at risk of marginalisation and prejudice, if their communities attribute blame onto their condition.

Dialogue between groups within a community also emerged as potentially beneficial and necessary throughout this study: for instance, the youth received much criticism from older generations, yet the youth lamented that their needs and recommendations to improve their own circumstances, behaviours and related vulnerabilities were not addressed when raised with adult leadership in the area.

Incorporating local knowledge into development and adaptation policy making through community engagement and participation also ameliorates the concern of imposing outsider, 'expert' knowledge and values. Hebinck and van Averbeke (2007) make the example of Betterment Planning (see Chapter 5) to argue how enforcing responses that are inappropriate to local contexts and practices, but instead drawn through 'expert' knowledge, can have long-lasting detrimental impacts.

9.2.4 Methodological concerns

Asides from concerns around the suitability of employing an asset-based approach to understand and assess vulnerability (see 9.2.1), a number of methodological concerns emerged throughout this study. These include the reliability of findings in general, respondents' and participants' perceptions of the role of research, and the reliability of data derived through the perceptions of respondents.

a.) Reliability of findings

Enumerators assessed their perceptions of the respondent's honesty in his/her responses to questions in the household survey. Overall, 9.2% of all respondents were considered to be somewhat dishonest in their responses, 67.9% were considered to be mostly honest in their responses, and 22.9% were considered very open and honest, based on these enumerator assessments.

While this means that the majority of respondents may not have always been entirely open in their responses, this is perhaps understandable given the highly personal nature of the questions asked, as these related to personal and sensitive aspects such as health, illness and death, income and income sources, personal property ownership, and shocks and stressors.

b.) Respondents' perceptions of researchers

While effort was repeatedly taken to emphasise the role of research and of researchers when interviewing households or in participatory group workshops, concern was raised amongst the project team that researchers were being perceived as agents for development. This may have potentially led respondents to over-emphasise specific aspects that they deemed worthy of development projects in the area, skewing findings.

c.) Reliability of perceptions

Many of the data used in analysis in this study were based on the perceptions of respondents. These included, notably, perceived food security, climate related impacts and changes in capital stocks over time. It is possible that respondents' perceptions do not always reflect reality, as people can have a tendency to perceive their own situation optimistically or pessimistically, depending on culture, age or their individual past experiences (Heine & Lehman, 1995; Van der Velde et al., 1994). For instance, the general perception of declining or unchanging stocks of multiple forms of capital may be too pessimistic, as many aspects of life have improved over the past ten years. However, these negative perceptions may indicate the slow rate of change and associated frustration, as well as how many reported improvements in South Africa are in absolute and not relative terms. While the GDP of South Africa has grown, so has the gap between the rich and poor. The communities in this study are highly unequal comparative to more well-off sectors of South African society. Inequality has often been considered more detrimental than absolute poverty (Sen, 1981; Maxwell, 1999).

Perceptions are important considerations for adaptation, for perceptions of a situation, whether these are focused on the drivers of vulnerability or one's own susceptibility to harm, alter the willingness to respond and the focus area around which the direction of the response effort is aimed (Taylor et al., 1988; Mubaya et al., 2012).

9.3 Strengthening resilience

Multiple stressors interact and compound the strain felt by a household, potentially depleting capital stocks and limiting the household's adaptive capacity to future stress. Policies aimed at minimising social vulnerability to HIV/Aids or climate change, or those aimed at poverty reduction, need to recognise areas where stressors interact or over-lap, and the possibility of localised contextual factors influencing vulnerability. This emphasises the need to build localised adaptation strategies that incorporate the strengths and challenges of communities (see 9.2.3 above). This, in turn, highlights the urgent need to make local government more effective, efficient and accountable in order to be able to engage and facilitate the transfer of resources and information between the state and communities.

In terms of the South African National Climate Change Adaptation Strategy (DEAT, 2004), the repeated potential benefits of infrastructural development in reducing vulnerability in the two study sites, as described by participants, highlights the importance of combining mitigation and adaptation with development. More effort in needed to involve communities in partnership with developments in their areas so as to produce equitable access to these resources and to the employment opportunities that arise from these.

In terms of South Africa' strategic plan for HIV/Aids and other STIs, there is a strong need to engage with men. Men in these communities need to recognise and address issues of violence and rape, as these were identified as main drivers adding to the vulnerabilities of women. Linked to this, alcohol

abuse needs to be addressed, particularly amongst men and in low income households, as alcohol abuse further stimulates underlying processes of vulnerability, especially around HIV/Aids and poverty. Policy makers also need to recognise that men are frequently equally and occasionally more vulnerable to various effects of HIV/Aids.

An area of direct overlap between climate change and HIV/Aids is food security. Many researchers have repeatedly emphasised the need to support small scale and subsistence farmers (e.g. Hall, 2009; Hebinck & van Averbeke, 2007). Small scale rural farming has the potential to contribute to food security and household incomes, but lacks resources which current incomes derive from government grants are insufficient to provide. Fences and tractors or draught livestock are tangible needs, while improved access to markets is a broader necessity. Møller (2005) raises concern over development efforts which seek to promote food gardens when there is increasing disdain towards such activity, particularly amongst the youth. A better understanding is needed as to whether a reinvigoration of rural agriculture would change perceptions so that it is instead viewed as an acceptable activity and viable source of livelihood, given the possible benefits (Hebinck & van Averbeke, 2007; Hendricks, 2003).

Such agricultural extension would be an example of social protection geared towards asset building, as opposed to that aimed at maintaining income and consumption levels. Asset building should be incorporated into development and adaptation strategies to facilitate noticeable change in the accumulation and protection of household assets. Furthermore, the multiple ways in which household assets can be depleted indicates investigation into the ways in which assets can be protected against the direct and indirect effects of a stressor. For example, households need more and better response options against shocks to ensure that desperate means of coping, such as taking children out of school, do not then further render the house more vulnerable to future stress.

9.4 Closing remarks

This study has highlighted the complexity inherent in understanding household-level vulnerability to multiple, interacting stressors across socio-ecological systems. This vulnerability was shown to have originated from centuries of differential access to key resources and services, and perpetuated by differential access and persistent stress. Ameliorating these vulnerabilities is an issue of social and environmental justice, a perspective adopted by many grassroots organisations mobilising around climate change adaptation.

Aside from the issue of justice, this study has raised concerns over the actual ability of South African households to face elevating levels of livelihood stress with decreasing capacity and assets. Adaptation planning needs to take in to account the multiplicity of interactions across scales as well as the needs of households to respond to these. Strong political will is required to address vulnerability to

HIV/Aids, climate change and other stressors, as many of the dominant drivers of vulnerability and pathways to resilience are beyond the sphere of control of the household. A better understanding of the ways in which partnerships between communities and local government can be strengthened, and of the means to monitor these processes for accountability, is needed.

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APPENDIX 1

Baseline household survey 1

Control information

Task	Date(s)	By who?	Status OK? If not, give comments
Interview			
Checking questionnaire			
Coding questionnaire			
Entering data			
Checking & approving data entry			

Household Selection

1. Map page & generated grid number	
2. North-most household interviewed? Y/N If yes move to 5.	
3. If 'no': Reason for not interviewing North-most household?	1. No houses in grid block (go to nearest house) 2. Refused to be interviewed – too busy 3. Refused to be interviewed – other 4. Never at home 5. Premises empty 6. Deaf/foreign language 7. Other - specify
4. Final grid number of household interviewed	
5. Is interviewed hh neatly marked on map? Y/N	

Starting time _____ ***Finishing time*** _____

A. Identification

1. Household name & code (Map page & grid no.)	**(name)*	(HID)
2. Village name and code	**(name)*	*(VID)*
3. Name and PID (see B. below) of primary respondent	**(name)*	*(PID)*
4. Name and PID (see B. below) of secondary respondent	**(name)*	*(PID)*
5. GPS reference point of household (UTM format)		

B. HOUSEHOLD COMPOSITION AND HUMAN CAPITAL

1. Please give the details of anyone living in the household, and anyone in the household who passed away in the past ten years.

1. Personal Identification number (PID)	*** Name of household member**	**2. Relation to household head[1)]**	**3. Year born** *(yyyy)*	**4. Sex** *0=male* *1=female*	**5. If deceased: What year did s/he pass away?**
1	Include surname of household head	Household head = code 0			
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

1) Codes*: spouse (legally married or cohabiting)=1; son/daughter=2; son/daughter in law=3; grandchild=4; mother/father=5; mother/father in law=6; brother or sister=7; brother/sister in law=8; uncle/aunt=9; nephew/niece=10; step/foster child=11; other family=12; not related (e.g., friend)=13.*

Yes	**No**

1.b. Are there other households living on this property?

1.c. If yes, how many other people, aside from those in your household, are living on this property?

_____

2. Please could you provide more details about the employment status and skills of everyone that has just been recorded in the previous table as part of the household (anyone living in the household and anyone who has passed away in the past ten years):

1. Name/PID	**2. *Employment status*[1)]** ***(Can have more than one, list in order of importance)***	**3. Level of education[2)]**	**4. Other formal or informal training or skills.** **(Probe – employment or self-employment skills, eg. Welding, nursing, artisan, etc.)**	**5. What languages can this person speak, other than Xhosa? List all responses** None = 0 English = 1 Afrikaans = 2 Other = 3
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				

CODES: 1) Employed full-time = 1; employed part-time = 2; self-employed (farmers in this category) = 3; unemployed = 4; in school or some form of training (apprentice, course) = 5; retired = 6; doesn't work or go to school (eg. disabled, too young) = 7;

2) Illiterate = 1, literate without formal schooling = 2, literate: below primary = 3, primary = 4, middle secondary (grade 9) = 5, secondary (matric) = 6, diploma/course with certificate = 7, graduate = 8, post-graduate = 9.

Please take a moment to remember life in this household ten years ago – when Mandela's presidency came to an end and Mbeki became president and we entered the New Millennium

3. Overall, is the household able to do more, less or the same amount of work (formal or around the homestead) compared to <u>ten years ago</u>?

Less	**The same**	**More**

3.b. If more or less, why the change? _____

C. SOCIAL CAPITAL

1. a. How long ago was this household first established in the village?

< 2 years 1	2 - 6 years 2	6 – 10 years 3	11 – 20 years 4	21 – 50 years 5	51 – 100 years 6	>100 years 7

1.b. If less than ten years, **why did the household move?**

_____

2.a . Do household members participate in any groups in the community? If yes, ask details of the group/organization. If more than one person from the household is a member of the same group, record all of their names.

1. Type of group	**2. Name of group**	**3. Who in the household is part of this group? List names**	**4. How many hours a week/month does household member participate?**	**5. Is household member part of a committee for the group? Y/N (List name/s if yes)**	**6. Has the household ever received any cash benefits from the group? Y/N**	**7. Has the household ever received any other type of support from the group? Y/N**
Church						
Savings						
Farming						
Volunteer						
Sports/ dance/ music						
Health, care or support						
Women's group						
School group						
Lobbying						
Development/ income generating						
Other (specify)						
Other (specify)						

3. Does anyone in the household know anyone who could advise you/them on the issues below without charging? This can be formal (e.g. an organisation) or informal (e.g. a friend). If not, do you feel that the household would benefit from knowing where to get advice on these issues?

Area of expertise	Is free advice available to household? Y/N	If no, would it benefit? Y/N	Area of expertise	Is free advice available to household? Y/N	If no, would it benefit? Y/N
Human rights			Building/construction		
Legal advice			Schooling		
Medical advice			Relocate/ move elsewhere		
Veterinary advice			Market and self-employment		
Crop farming advice			Credit and financial advice		

4. How strongly do you agree or disagree with the following statements?

4.1 a. People around here are willing to help their neighbours

1. Strongly disagree	2. Disagree	3. Agree	4. Strongly Agree

4.1 b. This is a close-knit or 'tight' neighbourhood where people generally know one another

1. Strongly disagree	2. Disagree	3. Agree	4. Strongly Agree

4.1 c. If I had to borrow R50 in an emergency, I could borrow it from a neighbour.

1. Strongly disagree	2. Disagree	3. Agree	4. Strongly Agree

4.1 d. People in this neighbourhood generally get along with each other

1. Strongly disagree	2. Disagree	3. Agree	4. Strongly Agree

4.1 e. People in this neighbourhood CAN be trusted

1. Strongly disagree	2. Disagree	3. Agree	4. Strongly Agree

4.1 f. If I were sick I could count on my neighbours to shop for groceries for me

1. Strongly disagree	2. Disagree	3. Agree	4. Strongly Agree

4.1 g. People in this neighbourhood share the same beliefs, culture and values

1. Strongly disagree	2. Disagree	3. Agree	4. Strongly Agree

5. Does this household, or anyone in the household, take part in community decision making (in ward meetings, community meetings, etc.)?

No / never 1	Sometimes 2	Yes / often 3

Please take another moment to remember life in this household ten years ago/ when you first moved here – when Mandela's presidency came to an end and Mbeki became president and we entered the New Millennium

6. Overall, is the household's current involvement in community groups, events and meetings more, less or the same amount compared to <u>ten years ago</u> OR <u>when you first moved here</u>? *(circle appropriate)*

Less	The same	More

6.b. If more or less, why the change? _____

D. PHYSICAL CAPITAL AND SERVICES

1. Please indicate the type of main house you have?

1. Number of buildings	
2. *Enumerator:* What is the approx. area of the main building?	M^2
3. What are the walls of the main building mostly made of? [1)]	
4. What is the roof of the main building mostly made of? [2)]	

***1) Codes**: mud/soil=1; wooden (boards, trunks)=2; iron (or other metal) sheets=3; bricks or concrete=4; reeds/straw/grass/fibers/bamboo=5; other, specify :*

***2) Codes**: thatch=1; wooden (boards)=2; iron or other metal sheets=3; tiles=4; other, specify:*

2. Do you have a kraal?

Yes	No

3. Please indicate the number of implements and other large household items that are owned by the household. Please estimate the current value of these items.

	1. Number of units owned	**2. Total value (current sales value of all units, not purchasing price)**
1. Car/truck		
2. Tractor		
3. Motorcycle		
4. Bicycle		

5. Cellphone/phone		
6. TV		
7. Radio		
8. Cassette/CD/ VHS/VCD/DVD/ player		
9. Stove for cooking (gas or electric only)		
10. Refrigerator/freezer		
11. Chainsaw		
12. Plough		
13. Trailer		
14. Shotgun/rifle		
16. Wooden cart or sledge		
17. Bed/s		
18. Water pump		
19. Solar panel		
20. Sewing machine		
21. Jo-jo tank		
22. Geyser		
23. Wheelbarrow		
24. Generator		
99. Others (worth more than approx. R500 purchasing price)		
Other		

4.a. Do you have electricity?

Yes	No

4.b Do you receive free basic electricity?

Yes	No

4. c. How much do you spend on electricity each month? R _____

Please take another moment to remember life in this household ten years ago/ when you first moved here – when Mandela's presidency came to an end and Mbeki became president and we entered the New Millennium

Improved	The same	Worsened

5. Overall, has the infrastructure on and around the household's homestead improved, worsened or stayed the same compared to ten years ago OR when you first moved here? *(circle appropriate)*

5.b. If improved or worsened, why the change?

_____

6.a. Where does the household get most of its water from? [1)]	
6.b. Is this source ever inadequate for all of the household's need? Y/N	
6.c. Does the household have access to alternative sources of water? If so, what are they?[1)]	
6.d. Has there ever not been enough water at all? Y/N	

(CODES: 1) *rainwater tank provided by govt=1; rainwater tank owned/purchased by household=2; tap on property=3; community taps=4; borehole=5; reservoir=6; dam=7; river=8; truck = 9; bought=10, other = specify*

8. a. Does the household recycle/ re-use any water?

Yes	No

8. b. If yes, from which activity/activities is water re-used/recycled, and how is it re-used/recycled?

_____

E. NATURAL CAPITAL

1. Do you have a garden or fields for growing or grazing? If yes, how large is the area and do you use it?

	1. Area (RECORD UNIT - meter, hectare, etc) *Measure if unknown*	**2. Is it fenced? Y/N**	**3. Is it used? Yes, no or partly**	**4. If any part is not used, why is it not used?**	**5. If partly used, approx. how much (1/2, ¼, etc.) is used?**
1. Garden on homestead					
2. Fields for cultivation					
3.Community grazing land					
4. Grazing land belonging to household					

2. Does the household use the following? If it is not used by the household, is there anything preventing the household from using the resource if they did want to use it, and would the household ever use it?

	1. Is it used by the household? Y/N	2. If not used, is there anything preventing the household from using the resource if they wanted to? Explain if yes.	3. If not used, is there ever a situation where you might use it? Y/N
1. River or dam for freshwater fishing, recreation or cultural activities			
2. Community garden			
3. Grazing land			
4. Forests and trees			
5. Wildlife/bushmeat			
6. Wild fruit and vegetables			
7. Medicinal plants			
8. *Willowvale only:* Marine products (fish, mussels..)			

Please take another moment to remember life in this household ten years ago/ when you first moved here – when Mandela's presidency came to an end and Mbeki became president and we entered the New Millennium

Less	The same	More

3.a. Overall, does the household currently use more, less or the same amount of the natural resources mentioned in the two previous questions compared to <u>ten years ago</u> OR <u>when you first moved here</u>? *(circle appropriate)*

3.b. If more or less, why the change? _____

Worsened	The same	Improved

4.a. Has the quality of agricultural land (grazing land, soil fertility) worsened or stayed the same compared to <u>ten years ago</u> OR <u>when you first moved here</u>? *(circle appropriate)*

4.b. If it has improved or worsened, why the change?

_____

F. FINANCIAL CAPITAL

1.a. How much does the household have in savings? (in banks, credit associations, savings clubs or any other place)

R_____

1. b. Is the household saving for anything specific? If yes, what specifically?

_____

1.c. Is the household currently saving more, less or the same amount compared to ten years ago?	**Less**	**The same**	**More**

2. a. Do you owe money to anyone? To who, and how much is owed? Can have more than one

Don't owe money	Local money-lender	Bank or formal credit institution	Neighbour or friend	Family	Savings club	Loan sharks	Hire purchase (furniture, appliances, etc.)	Other (specify)
R	R	R	R	R	R	R	R	R
								TOTAL R

3.a. Could the household access credit for a farming or self-employment venture if it needed to?	**Yes**	**Don't know**	**No**

3.b. If yes, where from?

_____

3.c. Has anyone in the household accessed credit in the last ten years?	**Yes**	**No**

Please take another moment to remember life in this household ten years ago – when Mandela's presidency came to an end and Mbeki became president and we entered the New Millennium

4.a. Is it currently easier, harder or the same to meet all the household's needs each month compared to <u>ten years ago</u> ?	**Easier**	**The same**	**Harder**

4.b. If easier or harder, why the change? _____

G. RESPONSES TO SHOCKS:

1. In the past 12 months, has the household faced any of the following shocks? If so, how severe was the shock and how did the household cope with this shock?

Event	1. Y/N?	2. How severe? 0 = no crisis 1= yes, moderate crisis 2 = yes, severe crisis	3. How did you cope with the income loss or costs? Tick column/s [1)]											
			1. Harvest more	2. Changed farming	3. Spent savings	4. Sold Assets	5. Extra work	6. Friend Assist	7. Org. Assist	8. Loan	9.Reduce consump	10. Rented out	11. D id Nothing	12. Other, specify
1. Serious crop failure														
2. Serious illness in family (productive age-group adult unable to work for more than one month during past 12 months, due to illness, or to taking care of ill person; or high medical costs)														
3. Death of productive age-group adult														
4. Land loss (expropriation, etc.)														
5. Major livestock loss (theft, drought, etc.)														
6. Other major asset loss (fire, theft, flood, etc.)														
7. Lost wage employment														
8. Initiation, wedding or other costly social events														
9. Payment for sale of hh products arrive later than expected														
10. Other, specify:														

1) *Codes coping:*

1. *Harvest more natural/wild products or agricultural products*
2. *Changed farming/agricultural techniques*
3. *Spend cash savings or retirement money*
4. *Sell assets (land, livestock, etc.)*
5. *Do extra casual labour work/self-employment initiative*
6. *Assistance from friends and relatives*
7. *Assistance from NGO, community org., religious org. or similar*
8. *Get loan from money lender, credit association, bank etc.*
9. *Tried to reduce household consumption (food and/or goods)*
10. *Rented out land or rooms*
11. *Did nothing in particular*
12. *Other, specify:*

H. HEALTH

1. Please could you provide more details about the health of everyone that has just been recorded in the previous table as part of the household (anyone living in the household and anyone who has passed away in the past ten years):

1. Name/PID	**2.** For under 19's only (born after 1992): **Where are his/her parents?**[1)]	**3.a. Health status**[2)]	***3.b. If deceased: Was he or she chronically sick or sick for 3 or more months before he/she passed away? Y/N***	***If chronically ill (4 or 6 in 3.a.):***	
				3.c.Is he/she receiving care or treatment from a clinic?	***3.d.If yes, is the care or treatment free?***
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14.					

CODES:1) Alive, both living in house=1; alive, but both away=2; mother in house, father away=3; mother in house, father deceased=4; father in house, mother away=5; father in house, mother deceased=6; both parents deceased=7.

2) Excellent health = 1; occasional illness = 2; frequent illness = 3; chronic/long term illness (over three continuous months) = 4; disabled = 5; both chronic illness and disabled = 6; deceased = 7.

I. Welfare perceptions

1. All things considered, how satisfied are you with your life over the past 12 months? *Codes: 1=very unsatisfied; 2=unsatisfied; 3=neither unsatisfied or satisfied; 4=satisfied; 5=very satisfied*	
2. Do you feel the household's situation is better, worse or about the same today than it was ten years ago? *Codes: 1=worse off now; 2=about the same; 3=better-off now*	
3. If worse or better off, what caused this change?	
5. Do you consider your village (community) to be a good place to live? *Codes: 1=no; 2=partly; 3=yes*	
6. Has the household's food production and income over the past 12 months been sufficient to cover what you consider to be the needs of the household? *Codes: 1=no; 2=reasonable (just about sufficient); 3=yes*	
7. Compared with other households in the village (or community), how well-off is your household? *Codes: 1=worse-off; 2=about average; 3=better-off*	

F: Climate change perceptions

1. Compared to ten years ago OR when you first moved here? *(circle appropriate),* have the following extreme events become more or less severe? Tick

Event type	More severe	Same	Less severe
Storms			
Droughts			
Veld fires			
Floods			
Heat waves			
Cold snaps			
***Willowvale:* Snow**			
***Lesseyton:* Frost**			

1. How would you rate the weather's impact on the following aspects of the household? Tick columns

Impact	High impact	Moderate impact	Low impact	No impact
Ability of crops to survive				
Ability of livestock to survive				
Abundance of useful plant and animal species in the area				
Availability of water for the livestock and crops				
Availability of water for the household				
Food security				
Human health				
Damage caused by extreme events				

J. HIV/Aids perceptions

1. How would you rate the impact of HIV/Aids on the following aspects in this community, and has this impact resulted in an increase or decrease of these aspects?

Impact	Inc or dec?	High impact	Moderate impact	Low impact	No impact
Willingness of neighbours to help each other					
Trust					
Food security (people's ability to get enough food every day)					
Labour to undertake activities					
Remittances					
Migrancy					

2. What do you think is needed the most by households living with HIV or Aids?

_____

ENUMERATOR ASSESSMENT

1. Based on your impression, how content/happy would you say the respondent is on a scale of 1 to 10 (with 1 being not content at all and 10 being very content)	
2. Based on your impression and what you have seen (house, assets, etc.), how well-off do you consider this household to be compared with other households in the village? Worse-off = 1; About average = 2; better off = 3	
3. How reliable is the information **generally** provided by this household? Poor = 1; reasonably reliable = 2; very reliable = 3	

Appendix 2

QUARTERLY HOUSEHOLD SURVEY

Note: Incomes from formal employment, own business and grants are asked for the past month, for income from casual employment, remittances, rent, crops, livestock and other income sources the recall period is 3 months.

Control information

Task	**Date(s)**	**By who?**	**Status OK? If not, give comments**
Interview			
Checking questionnaire			
Coding questionnaire			
Entering data			
Checking & approving data entry			

A. Identification

1. Household number		
2. Village	**(name)*	*(village ##)*
3. Name and PID of household head	**(name)*	*(PID)*
4. Name and PID of adult male (M)	**(name)*	*(PID)*
5. Name and PID of adult female (N)	**(name)*	*(PID)*

Personal identification numbers (PIDs) should be the same as used in the baseline survey.

Starting time _____ ***Finishing time*** _____

B. CHANGES IN HOUSEHOLD COMPOSITION

1. Has anyone left the household in the last 3 months? If yes, who? Why did they leave?

Who	Reason for leaving the household
1.	
2.	
3.	

2. Has anyone joined the household in the last 3 months? If yes, who? Why did they come here?

Who	Reason for joining the household
1.	
2.	
3.	

3. *NB only if information has not yet been recorded – refer to baseline & previous quarters* - Please could you provide some personal details for anyone who has joined or left the house in the past 3 months:

1.Name	**2. Relation to household head**[1)]	**3. Year born** *(yyyy)*	**4. Sex** 0=male 1=female	**5.** For under 19's only: **Where are his/her parents?**[1)]	**6.a. Health status**[2)]
1.					
2.					
3.					

CODES:1) Alive, both living in house=1; alive, but both away=2; mother in house, father away=3; mother in house, father deceased=4; father in house, mother away=5; father in house, mother deceased=6; both parents deceased=7.

2) Excellent health = 1; occasional illness = 2; frequent illness = 3; chronic/long term illness (over three continuous months) = 3; disabled = 4; both sick and disabled = 5; deceased = 6.

1. Name	*6.b. If chronically ill: Is he/she receiving free care or treatment from a clinic ?Y/N*	7. *Employment status[1)]* *(Can have more than one, list in order of importance)*	8. Level of education[2)]	9. Other formal or informal training or skills.	10. What languages can this person speak, other than Xhosa? List all responses None = 0 English = 1 Afrikaans = 2 Other = 3
1.					
2.					
3.					

CODES: 1) Employed full-time = 1; employed part-time = 2; self-employed (farmers in this category) = 3; unemployed = 4; in school or some form of training (apprentice, course) = 5; retired = 6; doesn't work or go to school (eg. disabled, too young) = 7;

2) Illiterate = 1, literate without formal schooling = 2, literate: below primary = 3, primary = 4, middle secondary (grade 9) = 5, secondary (matric) = 6, diploma/course with certificate = 7, graduate = 8, post-graduate = 9.

BENEFITS

C. PERMANENT EMPLOYMENT

1. Is anyone a permanent employee (full- or part-time)? Please provide details about this employment.

1. Who? Name	2. Full- or part-time?	3. Type of work	4. How long has he/she worked there?	5. How much does he/she earn each month?

D. CASUAL EMPLOYMENT

1. Has anyone had any casual work over the past 3 months? Please provide details about this employment.

1. Who? Name	2. Type of work	3.a. Was it part of public works programme? Y/N	3.b. If Yes, which public works programme? (e.g. Working for Water, Road Care, etc.)	3. Wage rate *(NB indicate daily or hourly rate)*	4. Number of days or hours worked *(NB record unit)*	5. Total income (3x4)

E. INCOME FROM OWN BUSINESS (not natural resources or agriculture)

1. Are you involved in any types of business that are not related to agriculture, livestock or natural resources, and if so, what are the gross income and costs related to that business over the past month?
For example, hairdressing, spaza, shebeen, lending, child care, taxi or transport service, etc.

	1. Business 1	2. Business 2	3. Business 3
1. What is your type of business?			
2. Gross income (sales)			
Costs:			
3. Purchased inputs			
4. Hired labour			
5. Transport and marketing cost			
6. Other costs			
7. **Net income (2- items3-8)**			
8. Current value of business assets			
9. Is this business permanent or temporary? P/T			
10. **Over the average year**, what are the input costs in terms of purchasing, maintaining and repairing assets?			

2.a. If products are sold in the business, are they mostly sold to family, friends, or strangers?

Family	Friends	Strangers

F. SOCIAL PROTECTION, GRANTS AND PENSIONS

1. Does anyone in the household receive a monthly grant or pension? Please provide details

	1. Number of grants?	2. Who receives it?	3. Total amount each month?
1. Child grant			(R250 p/month)
2. Disability grant			(R1080 p/month)
3. Care dependency grant			(R1080 p/month)
4. Foster care Grant			(R 710 p/month)
5. Government pension			(R1080 p/month)
6. Private/other pension			
Other			

2.a. In the past three months, has the household received any non-cash regular welfare support, such as meals at school for children or free paraffin? If yes, please what did the household receive?

_____

2.b. What was the approximate value of this support? R_____

G. REMITTANCESAND GIFTS

1. Has anyone living away from the household sent any cash, food, clothing, gifts or other goods to the household <u>over the past 3 months</u>? Please provide details and the approximate value.

	1. How many times over past 3 months?	2. How much each time? List each approximate value for each time	3. Who sent/gave it?	4. Where did it come from? (e.g. within village, city)	5. Who was it sent to?
1.Cash					
2. Food					
3. Clothing					
4. Other					

H. RENT

1. Has the household earned income from renting out rooms or land over the past 3 months? If yes, how much did the household earn in total?

R_____

AGRICULTURAL BEEFITS AND COSTS

I. Income from agriculture – crops

1. What are the quantities and values of crops that household has harvested during the past 3 months?

Crops *(code-product)*	**1. Y/N?**	**2. Total production (4+5)**	**3. Unit (for production)**	**4. Own use (incl. gifts)**	**5. Sold (incl. barter)**	**6. Price per unit**	**7.Total value (2*6)**
Cabbage							
Spinach							
Lettuce							
Mielie							
Tomatoes							
Beans							
Sweet potatoes							
Pumpkin							
Onions							
Carrots							
Peppers							
Turnips							
Beetroot							
Butternut							
Other (specify)							
Other (specify)							

1.b. If products were sold, were they mostly sold to family, friends, or strangers?

Family	Friends	Strangers

2. What are the quantities and values of inputs used in crop production over the *past 3 months* (this refers to agricultural cash expenditures)?

Note: Take into account all the crops in the previous table.

Inputs	1. Used? Y/N	2. Quantity	3. Unit	4. Price per unit	5. Total costs (2*4)
1. Seeds					
2. Fertilizers					
3. Pesticides/herbicides					
4. Manure					
5. Draught power/ animals					
6. Hired labour					
7. Hired machinery/tractor					
8. Transport/marketing (only use total)					
9. Payment for land rental (only use total)					
10. Other, specify:					

3. If any crop failed in the last 3 months, how much of it failed and why? Write the crop on the left, the proportion of the crop that failed, and indicate why it failed by ticking a column.

1. Crop type	2. Proportion of crop that failed (¼, ½, all, etc.)	Disease 1	Pests 2	Drought 3	Too hot 4	Weeds 5	Too cold 6	Soil fertility 7	Don't know 8	Other (specify) 9

J. Income from livestock

1. What is the number of ADULT animals your household has now, and how many have you sold, bought, slaughtered or lost during *the past 3 months*?

Livestock	1. Own? Y/N	2. Number owned now	3. Sold (incl. barter), live or slaughtered	4. Slaughtered for own use	5. Lost (theft, died…)	6. Bought or gift received	7. Births	8. Beginning number (3 months ago) (2+3+4+5-6-7)	9. Price per adult animal	10. Total end value (2x9)
1. Cattle										
2. Goats										
3. Sheep										
4. Pigs										
5. Donkeys										
6. Ducks										
7. Chicken										
8. Horses										
9. Other, specify										

2. If any livestock was sold, why was it sold?

_____

3. What are the quantities and values of animal products and services that you have produced during the past 3 months?

Product/ service	1. Y/N?	2. Production (4+5)	3. Unit	4. Own use (incl. gifts)	5. Sold (incl. barter)	6. Price per unit	7. Total value (2x6)
1. Meat[1]							
2. Milk[2]							
3. Eggs							
4. Hides and wool							

5. Manure							
6. Draught power							
7. Milk products							
Other, specify							

1) Make sure this corresponds with the above table on sale and consumption of animals.

2) Only milk consumed or sold should be included. If used for making, for example, cheese it should not be reported (only the amount and value of milk products).

4. If products were sold, were they mostly sold to family, friends, or strangers?

Family	Friends	Strangers

5. What are the quantities and values of inputs used in livestock production <u>during the past 3 months</u> (cash expenditures)?

Note: The key is to get total costs, rather than input units.

Inputs	1. Used? Y/N	2. Unit	3. Quantity	4. Price per unit	5. Total costs (3*4)
1. Feed/fodder					
2. Rental of grazing land					
3. Medicines, vaccination, dips and other veterinary services					
4. Costs of maintaining barns, enclosures, pens, etc.					
5. Hired labour					
9. Other, specify:					

6. In the past 3 months, did you receive any agricultural inputs, public relief or inputs from a development project?

Yes	No

6.b. If yes, what did you receive? _____

6.c. What was the estimated value? R_____

6.d From who or from what organization did this come from? _____

K. NATURAL RESOURCE HARVESTING

1. Were any of these products bought or collected by anyone in the household in the past three months?
Enumerators attach a page (NATURAL RESOURCE USE) for each resource used or collected

Resource	**Bought Y/N**	**Collected Y/N**	***If yes for bought OR collected: page no. ___ of____***
1. Fuelwood			
2. Wild fruits			
3. Wild herbs/spinach (not vegetables such as cabbage etc.)			
4. Wild animals or birds for food (Bushmeat - NB. Tell them answer is secret)			
5. Fish			
6. Mussels			
7. Oysters			
8. Lobsters and crabs			
9. Other marine products (specify)			
10. Insects for food			
11. Birds eggs			
12. Poles for housing (note if use poles from plantation)			
13. Poles for fencing (gardens/fields/home) or kraals			
14. Wood for household items such as spoons, axe handles, etc (see list)			
15. Wood for carvings to sell			
16. Wood for furniture			
17. Thatch grass			
18. Grass for hand sweepers			
19. Twigs for hand sweepers			
20. Reeds for weaving (mats etc.)			
21. Reeds for construction (buildings & roofing, etc.)			
22. Wild honey			
23. Honey beer			
24. Medicinal plants			
25. Mushrooms			
26. Umuncwane			
27. Traditional beer			
28. Sand/Soil/Clay/Termite mounds			
29. Roots or tubers			
30. Seeds			
31. Other (specify)			

L. EXPENSES

1. How much does the household spend on its monthly expenses? If there are other monthly expenses (i.e. buy/pay *every* month), please provide details

Expense	**Amount spent each month**	**Expense**	**Amount spent each month**
1. Groceries		7. Cell/phone	
2. Transport		8. Furniture/appliance payments	
3. Vehicle installments		9. . Money sent to support others	
4. Savings accounts or clubs		10. Alcohol	
5. Insurance policies		11. Cigarettes	
6. Funeral plans		12. Other (specify)	

2. Has the household had any other irregular expenses or contributions over the past 3 months? How much did they cost? If there were any other large expenses over the past 3 months, please provide details

Expense	**Amount**	**Expense**	**Amount**
1. School fees and uniforms		6. Agricultural implements	
2. University/technikon fees		7. Clothing	
3. Medical bills		8. Money or gifts sent to support others	
4. Funeral		9. Other (specify)	
5. Traditional event/ ceremony (initiation, wedding, etc.)		10. Other (specify)	

M & N. ***ADULT MALE AND FEMALE TIME USE - REFER TO PAGES 10 - 12.***

O. As part of this research, group workshops and individual interviews will also be taking place over the next few months. People will be asked if they would like to participate in these based on certain profiles such as age, gender, source of income, etc. If you or someone in your household match these profiles, do you think that person would like to take part? Please note that if you answer yes, there is no guarantee that this person will be contacted to participate, and if they are contacted that person can still choose whether to participate or not.

Yes	No

Remember to thank anyone who participated for their time, input, and patience!

Questions for individual household members

***** RECORD PID NUMBER OF ADULT MALE RESPONDENT _____**

M. Adult Male – Time Use

We are trying to understand how you spend your time from the time you wake to the time you go to bed. Could you describe what you did ***yesterday****?*

Activity	Code	Time begun	Time end	Total Time
Total Time				

***** RECORD PID NUMBER OF ADULT FEMALE RESPONDENT _____**

N. Adult Female – Time Use

*We are trying to understand how you spend your time from the time you wake to the time you go to bed. Could you describe what you did **yesterday**?*

Activity	Code	Time begun	Time end	Total Time
Total Time				