Livelihood enhancement in the new South Africa:

Public expectation, environmental dynamics and 'muddling through'

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Abstract

Recent large-scale environmental assessments have identified Limpopo Province as one of the most 'degraded' regions in South Africa, with Sekhukhune District generally perceived to be one of the worst affected areas. However, while a narrative of 'degradation' is prominent, land users' knowledge has been neglected and little empirical research has been conducted to verify these claims. Furthermore, land use and management practices are poorly understood and the contribution of these activities to rural livelihoods remains uncertain and much debated, despite the fact that such knowledge is crucial for the design of effective policy to support 'sustainable' livelihood strategies. This research uses a hybrid multi-methodological approach within a modified livelihood framework to critically evaluate narratives of development and land degradation in South Africa, examine the dimensions and dynamics of contemporary livelihoods in the study area, and analyse the justification for and efficacy of interventions grounded in dominant environment-development narratives in reducing poverty and changing environmental processes. In so doing, it seeks to locate a more refined understanding of environment-livelihood dynamics and of the opportunities for enhancing livelihoods in Sekhukhune.

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List of acronyms

ANC	African National Congress
CBO	Community-based organisation
CCD	UN Convention to Combat Desertification
CDEA	Chief Directorate of Environmental Affairs
DFID	UK Department for International Development
DWAF	Department of Water Affairs and Forestry
EDA	Environment Development Agency Trust
EJNF	Environmental Justice Network Forum
GEAR	Growth, employment and redistribution programme
GTZ	German Technical Cooperation
IDP	Integrated Development Plan
IIED	International Institute for Environment and Development
ISRDS	Integrated sustainable rural development strategy
IDS	Institute for Development Studies
JICA	Japanese International Cooperation Agency
K	Potassium
LPDA	Limpopo Province Department of Agriculture
LSU	Tropical Livestock Units
MFAF	Ministry of Foreign Affiars of Finland
N	Nitrogen
NBI	National Botanical Institute
NGO	Non-governmental organisation
NR	Natural resource
P	Phosphorous
Ppm	Parts per million
PRA	Participatory rural appraisal
RRA	Rapid rural appraisal
RDP	Reconstruction and Development Programme
SADC	Southern African Development Community
SALGA	South African Local Government Association
SANCO	South African National Civic Organisation
SD	Sustainable development
SRAP	Sub-regional Action Programme
UN	United Nations
WCED	World Commission on Environment and Development

Contents

Chapter 1: Introduction

1.1 Introduction

This chapter begins by introducing key themes running through the research. These include influential 'narratives' of development and environmental degradation, problems of understanding environmental change, and the importance of attending to local knowledge, priorities and livelihood practices. It then moves on to summarise the theoretical foundations informing the research and the conceptual framework adopted, introduces the study location and describes the research aim and objectives. The chapter concludes with an outline of the thesis structure.

1.2 Key research themes

1.2.1 Narratives of development and environmental degradation

Assumptions about problems and their solution are often encoded in 'narratives', stories that have a beginning and end that also incorporate dominant symbols, ideologies and real or imagined historical experience of their adherents in order to increase their influence (Roe, 1991). This research focuses on two important South African environment-development narratives, neoliberalism and soil erosion.

Growing concerns with global environmental issues since the birth of the environmentalist movement in the 1960s have been combined with a developmental dimension in the overarching concept of 'sustainable development' (World Commission on Environment and Development, WCED, 1987). Within this framework, issues of poverty, livelihoods, development and environment have become inextricably, yet nebulously, entangled (Peet & Watts, 1993). The dominant development narrative is 'neoliberalism', yet its potential to significantly reduce poverty and improve environmental management in southern Africa is much debated with many researchers claiming that its impacts in southern Africa have to date been largely detrimental to the poor (e.g. Lahiff, 2001; Bond, 2000a; Turner & Ibsen, 2000; Williams & Taylor, 2000; Ferguson, 1994; Esteva, 1992). This research attempts to connect with these debates by tracing the linkages between settlement-level livelihood strategies and a national-level neoliberal macroeconomic framework.

The perception that environmental 'degradation' or 'desertification' is occurring at accelerating rates and exacerbating poverty due to human mismanagement of natural resources is an important force driving sustainable development interventions throughout southern African drylands (Sullivan, 2000; Leach & Mearns, 1996; Mearns, 1996). Environmental degradation and desertification have been constructed as 'environmental crises' (e.g. Swift, 1996). These crisis narratives are historically rooted and often based on highly contested Western scientific understandings of ecosystem change (e.g. Behnke & Scoones, 1996). Yet they are sustained at national and international levels by a global narrative of 'desertification', exemplified in the United Nations Convention to Combat Desertification (United Nations, 1994), a concept that has itself received considerable criticism (Thomas and Middleton, 1994).

This research focuses on drylands in South Africa, and more specifically, on Limpopo Province. Limpopo Province has been rated as one of the most environmentally degraded regions in South Africa (Hoffman and Ashwell, 2001), with the former homeland areas generally perceived to the most eroded. However, while a narrative of degradation is evident, there has been little empirical research conducted to verify or refute these claims; hence, one of the justifications for this research.

1.2.2 Scientific understandings of environmental change

An influential body of Western scientific literature, sometimes claimed to represent a new paradigm in understanding arid land ecology and land use practices, has argued that frameworks derived from equilibrium dynamics are extremely problematic in dryland environments where rainfall rather than grazing pressure is posited to be the main driver of vegetation change (Scoones, 1999; Behnke *et al.*, 1993; Ellis & Swift, 1988). The temporal and spatial patchiness of arid environments is perceived to enable these apparently impoverished environments to support diverse and dynamic biotic communities and provide benefits to natural resource users that are often neglected by orthodox scientific investigations (Thomas & Twyman, 2003; Sullivan, 2000).

This 'non-equilibrium' view of dryland environments means that conventional static rangeland concepts of 'over-grazing' and 'carrying capacity' are inappropriate. It therefore challenges conventional notions of rangeland change that have often underpinned policy aimed at reducing degradation. Yet this non-equilibrium model has

itself been questioned in some contexts (e.g. Fynn & O'Connor, 2000; Lykke, 2000; Illius & O'Connor, 1999). Key aspects of Western scientific understanding of dryland ecosystem dynamics thus remain contested and uncertain.

Understanding soil erosion by water, the most widespread form of soil degradation in South Africa (Laker, 2003), is also a complex endeavour that often involves contested perspectives and significant degrees of uncertainty. For example, Laker (2003) claims that many of the factors that influence soil erosion in South Africa cannot be quantified and as a consequence they are excluded from soil loss models, undermining predictions. Soil fertility dynamics are also difficult to accurately measure and predict (e.g. Scoones & Toulmin, 1999; Ramisch, 1999). Given the limited and partial nature of the understandings of dryland environments provided by Western science, this research promotes and pursues a critical consideration of local people's knowledge as a complement to Western scientific knowledge.

1.2.3 Local knowledge and local livelihoods: Critical elements for analysis

While Western scientific expertise has been at the forefront of attempts to increase agricultural productivity and reduce or reverse the impact of desertification in developing countries (e.g. Laker, 2003), from the 1980s increasing emphasis has been given to involving local people in research and environment-development interventions and to the importance of understanding local knowledge and priorities (e.g. Sullivan, 2000; Seely, 1998; UN, 1994; Richards, 1985). Nevertheless, whilst there is much 'bottom-up' and 'participatory' rhetoric, past habits of 'top-down' implementation sometimes persist and local knowledge often continues to be neglected (e.g. Bek *et al.*, 2004).

Local environmental knowledge is developed through experience and experimentation, including with techniques or technologies learnt from extension officers, other land users with different experiences and from off-farm sources (Richards, 1985). It is therefore influenced by the different ways in which individuals have exploited natural resource (NR) dynamics over their lifetimes in attempts to satisfy their immediate needs and wants. In the former homeland areas of South Africa, livelihood strategies are diverse with investment in livestock often combined with rain-fed crop production, gathering of 'wild' resources such as firewood, local wage labour, migration in search

of formal employment and dependence on government-administered social grants (e.g. Shackleton *et al.*, 2001; Baber, 1996). The pursuit of such variable opportunities, sometimes involving considerable time spent away from the household, may have important impacts on household labour availability, poverty, livelihood opportunities and priorities (Ainslie, 1999), although specific impacts are much debated (Potts, 1999). Diversity and dynamism in NR use interests and management incentives, and variability in resident populations, can make the establishment of community-based NR management systems extremely difficult (Ainslie, 1999). Yet few studies recognise this importance of scale, both spatial and temporal, in assessing dynamics and diversity in both livelihood and biophysical processes in dryland regions.

Although a large majority of South Africa's rural population (85%) is still reported to be involved in agriculture (Ramaru *et al.*, 2000), with an average farm size in the former homelands of approximately 1.5 hectares (White Paper on Agriculture, 1995), the importance of agriculture and NR based practices as a whole to households in the former homeland areas of South Africa is widely debated. NR-based livelihood strategies have often been seen as contributing very little to communal area households in South Africa (e.g. NBI, 2001; Fenwick & Lyne, 1999; Nattrass & Nattrass, 1990). Bryceson (2002) claims livelihoods based on NR use are declining throughout sub-Saharan Africa due to macroeconomic changes. South Africa is seen as a special case, with 'deagrarianisation' beginning in 1913 when the black rural majority, 80 per cent of the total population, were restricted to the overcrowded 'homelands' that covered a mere 13 per cent of the country's surface area (e.g. Van Zyl *et al.*, 1996). In 1951, less than five million people lived in the homeland areas of South Africa but by 1988 this population had stabilised at approximately 13 million (Van Zyl *et al.*, 1996). This huge increase in population, Bryceson (2002) claims, led to a virtual cessation of agricultural commodity production. However, the causal link between overcrowding and decline in production is not made explicit.

Overcrowding is often claimed to be associated with high levels of environmental degradation in the former homeland areas (e.g. Hoffman *et al.*, 1999), a situation that by definition must undermine the ability of rural dwellers to produce a viable return from NRs and thus further encourage 'deagrarianisation'. However, McAllister (2000) suggests that the role of agriculture in rural livelihoods has been frequently

underestimated because of methodological errors in estimating production. A study by Shackleton *et al.* (2001) found that NR-based activities including arable farming, livestock husbandry and consumption and trade in NRs make an important contribution to contemporary rural livelihoods in both financial and social terms and is greater than previously thought.

Income-based indicators of poverty indicate a stark racial differentiation in poverty status in South Africa, based on a poverty line of R352 per month per adult equivalent (see Table 1.1 below).

Table 1.1: Racial differentiation of poverty status in South Africa in 1995

Racial group	Percentage living below poverty line
African	61%
Coloured	38%
Indian	5%
White	1%

Source: May *et al.*, 2000, based on Statistics South Africa's Income and Expenditure Survey of 1995.

Whilst these data are somewhat dated, this massive wealth differentiation has been relatively stable for the last three decades (Adelzadeh *et al.*, 2001). South Africa's Gini coefficient was calculated at 0.73 in 2000 (Statistics South Africa, 2000), indicating that it continues to have one of the most unequal societies in the world.

Income poverty and unemployment are tightly linked. The unemployment rate was 55% for those living below the poverty line in 1995 compared to only 14% for those above it (May *et al.*, 2000). Due to economic problems in South Africa as a whole, remittances have recently been declining and opportunities for formal sector employment are unlikely to increase in the foreseeable future (Lodge, 2002; DFID, 2000). Therefore, a renewed focus on supporting rural livelihoods and improving NR management is likely. If rural development policy is to be effective, it must be based on a detailed understanding of the diverse livelihood portfolio of poor rural households, so that interventions can be targeted to enhance livelihood strategies by building on the strengths and assets of rural people and on the potential for NRs to support such livelihoods. Understanding the current and potential contribution of NR use practices to rural livelihoods, and also the influence of off-farm livelihood strategies on NR use, must be an important part of any such analysis.

If the aim is to improve *sustainable* livelihood opportunities for poor rural households, then knowledge of the biophysical implications of current patterns of NR use is also required. However, information on the NR use practices of rural residents in the former homeland areas is limited and empirical analysis of the biophysical bases of land degradation narratives is severely lacking (Shackleton *et al.*, 2001). This research seeks to contribute to the closure of this knowledge gap by adopting a hybrid approach guided by a modified livelihoods framework to investigate livelihood practices, local knowledge and environmental dynamics.

1.3 Theoretical foundations

Given the problems with the dominant narratives of environment and development introduced above, and discussed further in Chapters two and four, and recognition of the value of attending to local knowledge and practice, this research attempts to integrate 'official' and 'local' understandings in order to derive a more sophisticated and holistic analysis of environment-livelihood dynamics. If all forms of knowledge are accepted as being socially produced, partial and hybrid (Nygren, 1999; Agrawal, 1995), then one form of knowledge is not *a priori* privileged over another. The encounter between different knowledge repertoires thus becomes a transformation of existing knowledges and a 'fusion of horizons' (Long, 1994). On the basis of this understanding, integrated or hybrid methodologies (Batterbury *et al.*, 1997) are utilised to capture different knowledge repertoires and empirically investigate their biophysical bases.

Further key insights and emphases influencing this research were gained from 'post-impasse' development studies (Booth, 1994), specifically, from the actor-oriented approach (e.g. Long & van der Ploeg, 1994), political ecology (e.g. Peet & Watts, 1996; Blaikie, 1985) and actor network theory (e.g. Murdoch & Marsden, 1995). The actor-oriented approach emphasises the agency of 'social actors' and the importance of a cross-scale analysis (cf. Long & van der Ploeg, 1994; Schaffer, 1984). These emphasises are central to the research and link closely to concerns with the crucial role of 'development brokers' (cf. Bierschenk *et al.*, 2002) acting at the 'interface' of development between local people and representatives of broader scale structures (Arce *et al.*, 1994). Political ecology similarly emphasises a multi-scale approach to environment-development analyses, considering scales of analysis from the local land user to global institutions (Blaikie, 1985). This approach is also useful for its focus on

the cultural construction of the environment and its contention that environmental problems are fundamentally social problems, requiring negotiation of values and knowledge as well as material struggles (e.g. Moore, 1996; Peet & Watts, 1996; Blaikie, 1985). Lastly, the actor network approach of Murdoch & Marsden (1995) is important in advocating a focus on actors-in-situations or 'actor-spaces', drawing attention to the spatial constitution of resources which both enable and constrain action and encouraging case study based investigation of how social actors try to mobilise available resources in order to build networks and thus tie other actors at different spatial scales into the pursuit of common goals. These theoretical approaches inform the conceptual framework used in this research.

1.4 Conceptual framework

The conceptual framework guiding this research is a modified version of the sustainable livelihoods approach which has gained widespread recognition as a useful means for understanding the multiple and dynamic dimensions of livelihoods (Carney, 1998; Scoones, 1998). Focusing on assets, capabilities and activities, the approach emphasises site-specific investigation of social agency based on local priorities and interpretations within a broader context of stresses, shocks and transforming structures and processes (e.g. DFID, 1999; Scoones, 1998). It therefore fits neatly with the emphases of the theoretical approaches introduced above on cross-scale analysis and an actor-orientation.

A shortfall of the livelihoods framework is that it tends to emphasise assets and activities whilst neglecting power relations and differential access to resources and livelihood opportunities (Ellis, 2000). In this research the livelihoods framework is therefore adapted to incorporate the focus of the environmental entitlements approach (Leach *et al.*, 1997; Leach and Mearns, 1991) on access to, or command over, environmental resources as well as the ability to make effective use of those resources. The emphasis on explaining action through institutional processes in the entitlements approach represents a widespread trend in the social development literature (Twyman, 1997). However, this approach tends to reify what are considered to be 'central tendencies' (Long & van der Ploeg, 1994:81) and consequently masks the inherent variability in individual action (Twyman, 1997). This research seeks to investigate and emphasise the impacts of such individual behaviour, particularly in the case of local

entrepreneurs and 'development brokers' (Biershenk *et al.*, 2002), in addition to institutional mediating processes. The livelihoods framework is therefore further modified to highlight both institutional and individual aspects in environment-livelihood interactions.

This research thus contributes to the sustainable livelihoods literature by utilising a modified framework that incorporates issues of access to, and effective use of, NRs and both individual and institutional aspects of behaviour to empirically investigate interactive livelihood-environment dynamics in a dryland region of Limpopo Province and causal links to broader scale structures and processes.

1.5 Study area

The study area is in Sekhukhune District, a semi-arid region of Limpopo Province (called Northern Province until 2002) located in the northeast of South Africa, as shown in Figure 1.1 overleaf. Sekhukhune District is characterised by high plateaus and mountains of 700 to 1500 metres in elevation above sea level (e.g. Loxton *et al.*, 1972b). Estimates of average annual rainfall in the district cluster around an approximate value of 500 to 600 mm, with the vast majority of rainfall occurring between October and March (e.g. Spies, 1998; Tapson, 1996; Loxton *et al.*, 1972b).

Approximately 80 per cent of the province's population live in rural areas (Triesdorf Consult GbR, 1999), although population densities vary significantly between districts. 'Commercial' farming areas tend to be thinly populated with 0-5 people per square kilometre whereas the former homeland areas may support over 100 people per square kilometre (NBI, 2001). This apartheid legacy of drastically skewed land distribution continues to place intense pressure on environmental resources in former homeland areas such as Sekhukhune District. Limpopo Province has been rated as one of the most 'degraded' regions in South Africa and Sekhukhune District is perceived to be one of the worst affected areas within the province (Hoffman and Ashwell 2001; Hoffman *et al.*, 1999; Delius, 1996). A paper from the Provincial Department of Agriculture highlights the obstacles to agricultural development in the region including its fragile natural environment constantly threatened by soil erosion (Northern Province Department of Agriculture, 1999), while Crookes *et al.* (2000:1) claim some villages in Sekhukhune face "unsustainable use of natural resources undermining their own

Figure 1.1: Map of Limpopo Province, showing location of study area

livelihoods". These reported high levels of degradation were an important reason for choosing Sekhukhune as the study area.

Limpopo Province is generally agreed to be the poorest province of South Africa in terms of household income poverty (van de Ruit & May, 2003), with Sekhukhune District identified as one of the poorest of all districts (District Municipality of Greater Sekhukhune, 2001). Levels of chronic malnutrition in the area are thought to be very high (47% of preschool children measured in 2001) and growing due to continuing high levels of poverty, unemployment and increasing HIV/AIDS (Friedman *et al.*, 2001). Given the extreme levels of poverty and the potential impacts of continued environmental degradation on NR use and hence on livelihood options, food insecurity and poverty may intensify in future, leading ultimately to a vicious circle of increasing NR exploitation, environmental 'degradation' and poverty (cf. Blaikie, 1985). However, no studies have yet attempted empirically to investigate such relationships at the settlement scale in Sekhukhune District. There was therefore a clear need for in-depth case study based research to explore environment-poverty relations in Sekhukhune and causal connections to larger scale mediating processes.

1.6 Research outline

The broad aim of this research is to examine the changing livelihood-environment links and opportunities for enhancing livelihoods in the highly degraded and poverty-stricken district of Sekhukhune.

The objectives of the research are threefold:

1) To identify and critically evaluate narratives of development and land degradation in South Africa and their links to international directives;

2) To examine the dimensions and dynamics of contemporary livelihoods in the study area, with special regard to the contribution of land-based practices to broader livelihood portfolios and to local understandings of land use, land management and environmental change;

3) To investigate the justification for and efficacy of interventions grounded in dominant environment-development narratives in enhancing livelihoods and changing environmental processes.

These objectives reflect the three key themes running through this research identified at the beginning of this chapter, namely, investigation of the influence of narratives of development and environmental degradation, problems of understanding environmental processes, and the importance of attending to local knowledge, priorities and livelihood practices. Meeting the first objective involves analysis of national and international scale policies and narratives, while the second and third objectives build on the first by investigating how specific local practices and externally-funded interventions, guided by these narratives, impact upon livelihood strategies, NR use and livelihood outcomes in the study area. The cross-scale hybrid approach adopted here is thus organised around nested hierarchical levels of analysis spanning the range from international and national policy to regional and settlement scales to specific household level strategies and practices. Research progressed in an iterative manner with insights gained at one level driving investigations at other levels. The methods used to address each of the three objectives are discussed in detail in Chapter three.

1.7 Thesis structure

Chapter two reviews key aspects of the wide-ranging theoretical and empirical literature on the linkages between environment and development and constructs a theoretical and empirical approach for the investigation of these issues in Sekhukhune. This approach draws on the actor-oriented approach, political ecology and actor network theory, and creates a modified livelihoods framework incorporating elements of the environmental entitlements approach. Building on the discussion in Chapter two, Chapter three details the specific methods utilised in the research and problems encountered.

Chapter four identifies and critically evaluates, within a South African context, the historical development of two overarching environment-development narratives, neoliberalism and soil erosion (Objective one). These narratives were introduced in Chapters one and two but they are considered in greater depth in this chapter because they are believed to exert considerable influence over attempts to redress the legacies of apartheid. The chapter thus seeks to delineate national scale policy processes that frame smaller scale livelihood dynamics and interventions investigated in subsequent chapters.

Chapter five reduces the scale of analysis to the household level. The dimensions and dynamics of contemporary livelihoods in the study area are analysed based on fieldwork data, focusing specifically on the role of land-based practices in different households' broader diversified livelihood portfolios (Objective two). Other themes include the importance of access to means for the effective utilisation of asset endowments and investigation of the opportunities and extent of effective agency that rural dwellers possess to lift themselves out of poverty and pursue sustainable livelihoods. The latter is introduced in Chapter five but pursued in greater depth in Chapter six which explores attempts by different organisations and individuals to respond to the current economic context and create more economically viable livelihood strategies (Objectives two and three). Emphasis is placed on the human and social capital of specific individuals for mobilising others and capturing the necessary opportunities and resources to initiate income-generation projects within particular settlements.

To improve *sustainable* livelihood opportunities for poor rural households, rather than alleviating poverty over the short term, knowledge of the biophysical implications of current patterns of NR use is required. Chapter seven extends and grounds the analysis

of national level soil erosion narratives in Chapter four by critically evaluating the regional variants of these narratives and their implications for interventions. It addresses the environmental aspect of Objective 3 by investigating the justification for interventions provided by these narratives and the efficacy of these interventions in changing environmental processes. Special emphasis is given to the Landcare programme as the key government intervention for sustainable development in the region. Through analysis of a case study of a Landcare project, the approach is investigated and factors limiting its impact on environmental outcomes are identified.

Chapter seven also contributes to meeting Objective two by attending to local understandings of environmental change. Similarities and divergences in local and official understandings of environmental change are explored and where possible, the biophysical basis of these perceptions is investigated. Lastly, Chapter eight brings together the different aspects of the thesis, summarising the main findings and drawing out implications for interventions to enhance rural livelihoods, further research and broader academic debates.

1.8 Summary

This chapter has introduced important themes running through the research, summarised its theoretical foundations, introduced the study location and outlined the research aim, research objectives and the thesis structure. The next chapter moves the thesis forward by exploring fundamental environment-development debates and their implications for a modified livelihoods approach suitable for analysis of the environment-development nexus in rural areas of the 'new' South Africa.

Chapter 2: Theoretical and practical foundations: The environment-development nexus and sustainable livelihoods

2.1 Introduction

This chapter reviews and develops relevant themes, approaches and frameworks in order to place the research within broader debates about environment-development theory and practice. The chapter begins by introducing the 'mainstream' conceptualisation of 'sustainable development', a widely utilised and profoundly influential concept that seeks to integrate environment and development, the two central problems of the contemporary world (Pieterse, 2001). Consideration of key environmental and social science debates, both theoretical and practical, relating to this framework leads to exploration of approaches and conceptual frameworks of particular use to this research. The chapter concludes by introducing a modified version of the livelihoods approach that integrates these issues and enables a holistic and reflexive investigation of the environment-development nexus in South Africa.

2.2 Introducing sustainable development: The mainstream view of the environment-development nexus

The report of the World Commission on Environment and Development (WCED, 1987), also known as the Brundtland report, was fundamental in linking development and environment concerns and placing them both firmly on the international agenda. It defined 'sustainable development as "development which meets the needs of the present, without compromising the ability of future generations to meet their own needs" (WCED, 1987:46). The Brundtland report (1987) gave particular attention to poverty and to poor people as both the agents and victims of environmental change (WCED, 1987; Broad, 1994; Blaikie, 1985). More specifically, it stated that:

> "Those who are poor and hungry will often destroy their immediate environment in order to survive: They will cut down forests; their livestock will overgraze grasslands; they will overuse marginal land; and in growing numbers they will crowd into congested cities. The cumulative effects of these changes is so far-reaching as to make poverty itself a major global scourge" (WCED, 1987: 28).

This conceptualisation of the poverty-environment relationship has been highly influential amongst international development institutions. For example, the United Nations (1990) and World Bank (1989) have both expressed a belief in a relatively

deterministic link between poverty and environmental destruction, often related to a pressure to selfishly exploit NRs for short-term survival (Broad, 1994; Redclift, 1992; Durning, 1989). Over-exploitation of the environment combined with lack of action to combat environmental change due to poor health or lack of knowledge is claimed to result in a vicious cycle of degradation leading to increased poverty and environmental destruction (e.g. Lele, 1991; Blaikie, 1985).

The orthodox sustainable development (SD) solution advocated by powerful institutions such as the World Bank therefore focuses on stimulating economic growth in order to meet both the moral imperative of eliminating poverty via the 'trickle down' effect, and, by enabling escape from the poverty-degradation cycle, the ecological imperative of reducing environmental degradation (cf. Broad, 1994; Redclift, 1992; Lele, 1991). Increased economic growth and participation in the international economy is also argued to provide more funds for domestic governments to regulate their environments and increased access to information and technologies for enhanced environmental management (DFID, 2000).

2.3 Debating sustainable development

The mainstream view of the environment-development nexus is highly contentious. Key debates around the orthodox view of SD relate to the:

- Diversity of poverty-environment linkages;
- Alternative non-poverty causes of environmental problems;
- Impact of economic growth on poverty and environment; and
- Conceptualisation and measurement of environmental sustainability.

These debates are reviewed in detail below in order to locate this research within the broad-ranging sustainable development literature and to derive implications for the research design.

2.3.1 Diversity of poverty-environment linkages

Poor people can be very knowledgeable about the environment and can act as environmental 'sustainers' as well as environmental 'degraders' (Broad, 1994:812). It cannot therefore be assumed that poverty leads to degradation. Numerous studies claim to demonstrate that local people can effectively conserve the environment and innovate

to enhance productivity despite poverty and high population growth (e.g. Scoones, 2001; Fairhead & Leach, 1996; Richards, 1985; Thompson *et al.*, 1986).

The most cited example is that of Tiffen *et al.* (1994) who claim that despite high levels of poverty and rapid population growth in the Machakos District of Kenya, the environment has been successfully conserved, if not improved. Murton (1997) suggests, however, that this general view masks differentiation in wealth with the poor getting poorer whilst rich landholders get richer. This finding implies a need to disaggregate the 'community' and investigate intra-community differences in livelihood strategies (cf. Broad, 1994). Leach and Mearns (1991) assert that both 'poor people' and 'environment' lack meaning as discrete categories and must be disaggregated in order to understand whether or not different sorts of people degrade or enhance different aspects of the environment to varying degrees or in divergent ways, as well as whether or not specific environmental (and other) stresses or shocks impose different costs on different types of people. This research therefore adopts a disaggregated approach in order to investigate inter-household and inter-settlement differences in the use of specific NRs and off-farm livelihood strategies, perceptions of their viability or effectiveness for meeting local needs, and differences in perceptions of environmental change amongst land users and representatives of state departments and civil society organisations (cf. Scoones, 1998; Long & van der Ploeg, 1994; Leach & Mearns, 1991).

2.3.2 Alternative non-poverty causes of environmental problems

Aside from poverty, there are also other widely perceived causes of environmental degradation in developing countries. Key amongst these is the neo-Malthusian model, where population pressure is deemed to lead inexorably to NR degradation (e.g. Adger, 1999). However, Tiffen *et al.* (1994) claim that in Kenya's Machakos District, rapid population growth has led to intensification and improved environmental conservation, lending support to the Boserupian argument that population pressure triggers experimentation, intensification and increased productivity rather than degradation.

The 'populist' perspective claims that environmental degradation is the result of the 'marginalisation' of the poor by social, political or economic powers (e.g. Adger, 1999). Political ecologists have sought to uncover underlying social, economic and political causes of socio-environmental change that may act across a range of scales, such as the impact of international trade rules on local livelihoods or the influence of land tenure

legislation on land use (e.g. Peet & Watts, 1996; Bryant, 1992; Blaikie & Brookfield, 1987; Redclift, 1987; Blaikie, 1985). Such research suggests that reductionist and deterministic models of environmental problems often fail to usefully explain the fundamental causes of specific micro-level circumstances. However, political ecology has been criticised for tending to overemphasise the influence of the state or exclude ecological dynamics or other factors such as personal knowledge and skills, access to technologies or the role of NGOs in environment-development interventions (e.g. Batterbury, 2001; Vayda & Walters, 1999).

Appreciation of temporal and spatial variability in socio-environmental systems, especially in dryland regions, has encouraged a shift within social science from a focus on highly generalised relationships and models of change, such as those of many Marxists in the 1970s (Booth, 1993), to a focus on rigorous, empirical investigation of complex 'conjunctural particulars' (Castree, 2003:52). An emphasis on situated historical analyses of 'people in places' (cf. Scoones, 1999) allows the diversity of people's differentiated assets, livelihood strategies, knowledge, priorities and networks to be recognised (cf. Milton, 1996; Murdoch & Marsden, 1995; Long & Long, 1994; McDowell, 1992; Slater, 1992), and the essential unpredictability of intervention outcomes to be understood (Long & Long, 1994), rather than assuming *a priori* that simplistic and deterministic models of change are correct and that these can be used to direct research (cf. Batterbury, 2001; Broad, 1994; Lele, 1991). This form of holistic yet grounded investigation of local understandings and practices dovetails neatly with notions of participatory approaches to development because "local inhabitants are, in many cases, most able to identify the spatial and temporal heterogeneities of their biophysical [and socio-economic] environments" (Zimmerer, 1994:118).

There is concern that a focus on participatory approaches and on the local sphere in general can distract attention away from broader political, economic and social components of local problems (e.g. Mohan & Stokke, 2000; Farrington *et al.*, 1999). The emphasis on case studies and micro-level social processes additionally makes each case unique and highly complex, tending to discourage generalizations or the construction of concepts of broader applicability that are necessary for policy-making purposes (Kothari, 2002; Schuurman, 1993; Edwards, 1993, 1989). As Booth (1993:59) warns:

> "We face the danger that social researchers, disillusioned with the old theoretical certainties and perhaps also a little intoxicated by their renewed immersion in an ever-surprising empirical reality, will become very good at producing detailed case studies but rather bad at communicating the general implications of their work to a wider academic audience, not to speak of a wider public of development practitioners."

This research therefore adopts a multi-scale approach that examines "*both* the specificities of particular places and the broader forces which shape *and are shaped by* particular local circumstances and histories" (Foster-Carter, 1991:11). Case studies of specific household and settlement-level dynamics are situated within broader political-economic contexts, social structures and environmental processes at local, provincial, national and international levels (cf. Simon, 2003; Batterbury, 2001; Scoones, 1999; Vayda & Walters, 1999; Murdoch & Marsden, 1995; Blaikie, 1985; Arce *et al.*, 1994). This enables the holistic analysis of cross-scale chains of causes and effects and the investigation of opportunities for optimising livelihood and environmental outcomes within the constraints imposed by different hierarchically organised systems as well as opportunities for adjusting these constraints. Moreover, by linking case studies examining specific 'concrete' situations to broader structural conditions, broader scale relevance can be retained in local level case studies (Twyman, 1997; Murdoch & Marsden, 1995). This research thus seeks to use a multi-scale approach in order to contribute to both local and global debates on livelihood-environment relationships and livelihood policy.

2.3.3 Impact of economic growth on poverty and environment

Economic growth is claimed to reduce poverty and benefit the environment by breaking the poverty-degradation cycle via the trickle down effect, yet the impact of economic growth on both poverty and environment is widely debated (Kothari & Minogue, 2002; Broad, 1994; Redclift, 1992; Lele, 1991). Increasing levels of poverty in many developing countries, rising inequality between and within countries, detrimental environmental impacts and a perceived failure of the dominant deterministic theories of development led to an impasse in development in the 1980s and it is now increasingly acknowledged that there is a need to devise new understandings, processes and targets for development (e.g. Kothari & Minogue, 2002; Schuurman, 1993; Lele, 1991; Redclift, 1987).

Improved management of international and national economic systems is deemed to be particularly important in order to ensure the benefits of economic growth, and 'globalisation', including enhanced environmental management, can be obtained by poor people in the developing world (e.g. Stiglitz, 2002; DFID, 2000). Yet the political will to pursue such pro-poor aims may be lacking since ruling elites tend to manage national and international economies in their interests (Stiglitz, 2002; DFID, 2000). The dominant development narrative of neoclassical economics, or neoliberalism, though not always homogenous, arguably represents a reformulation of Eurocentric modernization theory (Kothari & Minogue, 2002; Simon & Narman, 1999). This narrative has remained largely intact due to its compatibility with Western economic models and interests and its strong defence by dominant world powers and the Bretton Woods institutions (Kothari & Minogue, 2002; Simon & Narman, 1999). Alternative development approaches, particularly the adoption of participatory and people-centred approaches, have led to changes in the design and implementation of specific projects and programmes (e.g. Kothari *et al.*, 2002; McGee, 2002; Pieterse, 1998), but the underlying modernisation narrative embodied by the multilateral agencies and some major donors survives virtually unchanged (Kothari, 2002; Simon & Narman, 1999).

The potential of the 'development orthodoxy' of neoliberalism (Cammack, 2002) to significantly reduce poverty and improve environmental management in southern Africa is controversial with many researchers claiming that it has been detrimental to the well-being of the poor (e.g. Lahiff, 2001; Bond, 2000a; Turner & Ibsen, 2000; Williams & Taylor, 2000; Ferguson, 1994; Esteva, 1992). This research attempts to connect with these broad-scale ideological debates from a grounded empirical basis by tracing the linkages between settlement-level livelihood strategies and an overarching national-level neoliberal macroeconomic framework. It also seeks to investigate the 'room for manoeuvre' within this policy framework that 'capable agents' or 'development brokers' are able to exploit to access development gains for their villages (cf. Bierschenk *et al.*, 2002; Krishna, 2002, 2001; Murdoch & Marsden, 1995).

2.3.4 Problems of conceptualising and measuring sustainability

'Sustainable development' has become a massively popular development term, perhaps reflecting the scope its broad definition affords for multiple interpretations (e.g. Berkhout *et al.*, 2003). Yet there exist significant problems with both the

conceptualisation and measurement of environmental sustainability. Given the fundamental importance of this concept to any analysis of environment-development relations, these problems are discussed below.

If development is defined in accordance with the dominant neoliberal economic narrative as indefinite growth in material consumption and enhancement of objectively defined standards of living, then there exists a sharp contradiction with calls for a more environmentally 'sustainable' form of development and with the widely held view that, despite human ingenuity, ultimate limits to usable resources exist (e.g. Daly, 1994; Pearce *et al.*, 1990). Many researchers therefore claim that SD is a vacuous concept, a contradiction in terms (e.g. Adams, 1995; Lele, 1991; Rees, 1990; O'Riordan, 1985). Use of the term sustainable development to refer to maintenance of the total stock of all forms of 'capital', consisting of human, social, physical, economic and natural capital, rather than simply to natural capital alone (e.g. Ekins *et al.*, 2003; Serageldin, 1996; Turner, 1993), is also seen to be problematic in that it does not single out the NR base as vital to maintain. Development that increases income even at the expense of the NR base can therefore be viewed as contributing to SD by this definition. A special emphasis on maintaining the NR base over and above other capitals is justified due to the fact that the NR base is the only capital asset that, assuming human beings themselves continue to exist and create social, physical and human capital, is composed of elements and processes potentially subject to effectively irreversible decline (cf. Abel & Behnke, 1996). Moreover, it contributes to human welfare in unique ways that cannot be substituted for by other capital components (Ekins *et al.*, 2003). Without a NR base on and in which people can survive, questions of economic and social organisation or human and physical development are irrelevant.

Serageldin (1996) proposed a third conceptualisation of SD that he refers to as 'sensible sustainability'. Since the capacity of the poor to forgo consumption is extremely limited, Serageldin (1996) suggested that they have to convert some natural capital into other capital assets, but they should not do this excessively. More specifically, they should identify and conserve what has become known as 'critical natural capital', the sub-set of natural capital that is responsible for environmental functions deemed to be essential for human survival and which cannot be substituted in the provision of these functions by increases in other elements of natural capital or other forms of capital (cf. Ekins *et al.*,

2003; Hanley & Atkinson, 2003). However, defining, measuring and hence managing critical natural capital and related concepts of sustainability and degradation is highly problematic, both from social and physical scientific perspectives, as is now explained.

2.3.4.1 Power and the social construction of environmental problems

Any form of environmental change, such as soil erosion or deforestation, only becomes a problem when that process is identified and recognised as threatening the supply of products or services that people consider desirable (e.g. Clark, 1997). Whilst environmental *processes* may be external to human experience, environmental *problems* are mental and social constructions (Batterbury *et al.*, 1997:128), perceived differently by different individuals and groups according to such factors as their livelihoods, knowledge and priorities. Defining an environmental 'problem' or implementing a 'solution' may thus involve conflicts between social actors holding different values (e.g. Ainslie, 1999). The 'sustainable' management of NRs is therefore ultimately seen to be an ideological or political issue (cf. Blaikie, 1985) that creates various winners and losers over different temporal and spatial scales (O'Brien & Leichenko, 2003).

The definition of degradation itself provides an important example of the complexities involved. Degradation usually refers to a decline in the resource potential or productive capacity of the land, but there are many different definitions in use. Blaikie and Brookfield define land degradation as "a reduction in the capability of land to satisfy a particular use" (1987:6). This definition is important in that it implies degradation should be understood in terms of the land's utilisation for a *specific* purpose. Although a process such as deforestation will certainly have an impact on micro-climate, hydrology and soil, for example, it may not *necessarily* constitute degradation in the social sense of this definition:

> "Socially, degradation must relate to *capability*, and it is only if the degradation process under one system of production has reduced the initial capability of land in a successor system, *actual or potential*, that degradation is, as it were, carried across the allocation change" (Blaikie & Brookfield, 1987:6-7; italics added).

Degradation is therefore a mental construct, defined relative to the capability of land to continue fulfilling a specific productive purpose, and/or relative to the capability of land to meet *any potential* future production needs. The problem of defining criteria for the measurement of degradation, or critical natural capital or sustainability, for a given NR

thus becomes one of predicting which forms of resource use, and thus which functions and components of natural capital, are likely to be most valued in future (Ekins *et al.*, 2003). However, such NR values are likely to fluctuate over time in specific localities as conditions, opportunities, aspirations and priorities change and local people adapt their land use and livelihood practices accordingly. For example, a long-term decline in rainfall and an increase in off-farm employment opportunities may lead to a broad shift in livelihoods away from dependence on the soil, hence the value of local natural capital will drop dramatically. Moreover, as noted above, similar use priorities are unlikely to be held by all social actors with interests in a particular NR. Questions of what constitutes 'good' or 'bad' change in a specific resource (cf. Thomas & Twyman, 2003), whether or not investment in the rehabilitation of degraded resource is justified (cf. Abel, 1997), or what defines the boundaries of a specific resource, are all therefore likely to be subjects of ongoing and dynamic contestation.

The ability of different social actors to influence the definition of environmental problems and hence of interventions is often differentiated. Poor rural residents often have little opportunity to contest dominant understandings of problems or promote alternative perspectives to those advocated by powerful and convergent vested interests (e.g. Leach & Mearns, 1996; Swift, 1996). New ideas may be effectively censored through dismissal as unsubstantiated or nonsensical or be prevented from publication by institutional politics, and even where ideas are openly expressed and debated, practice may still change slowly due to the inertia of large bureaucracies (Forsyth, 2003; Scoones, 1996). Attention to the specific social actors involved and the historical, political and institutional context that conditions policy processes is therefore crucial (Leach & Mearns, 1996; Wynne, 1992). Assumptions about problems and principles relating to their resolution are often encoded in narratives, a concept introduced in Chapter one. These narratives can tacitly support certain social and political interests by influencing the production and presentation of knowledge, thereby framing a problem in such a way that specific 'solutions' are promoted (cf. Forsyth, 2003; Hoben, 1996; Roe, 1991). The narrative of soil erosion in South Africa and its influence on intervention strategies is discussed further in Chapter four. By linking local NR use and livelihoods to broader processes, this research seeks to enhance understanding of the shifting livelihood opportunities and constraints experienced by local people, and hence also the changing demands placed on the environment.

In this research the concept of degradation is rejected in favour of the broader notion of environmental 'change' or 'transformation' (cf. Thomas & Twyman, 2003; Beinart, 1996). Use of the term environmental change avoids the historical and semantic baggage that comes with use of the term degradation (e.g. Leach & Mearns, 1996), and enables more reflexive, participatory and holistic exploration of both the biophysical and perceptual aspects of environmental processes by avoiding pre-judgement of whether or not different stakeholders perceive them to be beneficial, detrimental, or inconsequential to their own objectives. Investigation of different stakeholders' perceptions of environmental processes and resource use priorities, the discontinuities and conflicts between these understandings, and their impacts on NR use and livelihoods becomes a key focus of the research (cf. Munton, 2003; Sullivan, 2000; Scoones, 1999; Seely, 1998; Moore, 1996; Peet & Watts, 1996; Arce *et al.*, 1994; Blaikie, 1985; Richards, 1985).

Government perceptions of 'environmental crisis' within a particular region (e.g. Swift, 1996), for example, can be explored and compared to resident land users' perspectives of environmental change. Post-structural political ecologists are especially interested in the influence of such dominant narratives and their associated cross-scale networks of actors on the design and implementation of development interventions (cf. Sullivan, 2000; Leach & Mearns, 1996; Murdoch & Marsden, 1995; Latour, 1986; Burawoy, 1985). This focus on the influence of overarching narratives, and the power relations and networks that sustain them, is taken up in this research which gives particular attention to the opportunities and constraints that the hegemonic narrative of neoliberalism and the historically rooted narrative of soil erosion place on the South African rural poor.

In this research, all forms of knowledge are fundamentally viewed as socially produced, partial and hybrid (cf. Nygren, 1999; Peet & Watts, 1996; Agrawal, 1995) with no dichotomy between 'people's science' and 'scientist's science' (Richards, 1985) and thus no *a priori* privileging of one form of knowledge over another. The challenge is therefore to bring these divergent and competing framings together in a constructive way, while attending to the power relations that exist between holders of different forms of knowledge (Berkhout *et al.*, 2003). By critically investigating both 'expert' and 'local' knowledges of environmental problems, priorities and related practices on and in

the environment in specific political, social, historical and ecological contexts, exploring the underlying power relations which shape these understandings and activities, and empirically testing the biophysical bases of key perceptions, this research attempts to take up this challenge and contribute to a finer-grained understanding of livelihood and environmental change.

2.3.4.2 Physical scientific uncertainty and complexity

Practical utilisation of concepts of sustainability and critical natural capital is further complicated by the uncertain and incomplete knowledge of environmental dynamics and thresholds of change in dryland areas of the developing world (Batterbury, 2001; Blaikie, 1985). This central problem is a consequence of a variety of factors relating to the measurement of indicators and interpretation of causality (see Table 2.1 below). For example, an absence of reliable data on historical changes in the environment, a frequent problem for researchers working in the developing world (e.g. Scoones, 1996), immediately creates problems for understanding past changes and their contribution to contemporary circumstances. This lack of data is especially troublesome in dryland areas where natural processes such as rainfall are often highly variable over time and space, making the identification of causal links between different patterns and processes exceptionally difficult (Warren *et al.*, 2003; Scoones, 1996).

Table 2.1: Factors contributing to the uncertainty of environmental knowledge

- Wide variety of potential processes involved in environmental change;
- Large spatial and temporal scales at which some processes occur;
- Variables are interdependent, interacting in diverse ways and thus exerting different influences on environmental processes depending on the specific circumstances considered (e.g. higher rainfall may lead to more or less erosion, depending upon interactions with other factors such as land use and vegetation cover);
- Lack of data on long term trends of key variables in developing countries due to lack of resources for measurement;
- Complex and highly variable manner in which symptoms of environmental change appear over time (e.g. soil erosion may occur intermittently as a result of low frequency, high intensity rainfall events after droughts when vegetation cover is most limited);
- Scale and method of measurement can affect the reliability and meaning of the measurement itself, especially given high temporal variability in dryland environmental processes (e.g. extrapolation and redistribution problems with run-off plot data);
- Links between environmental processes such as soil erosion and crop or livestock yields are highly complex given variable rainfall, labour inputs, pest and disease attacks;
- Disaggregating human-induced and 'natural' processes of change is highly demanding of data e.g. for soil erosion, the researcher needs histories of land use to combine with data on soil loss and climate;

Sources: Laker, 2003 ; Warren *et al.*, 2003 ; Scoones, 1996 ; Blaikie, 1985.

Specific problems relating to the physical scientific understanding of soil erosion, soil fertility dynamics and vegetation dynamics are considered below.

2.3.4.3 Problems specific to understanding soil erosion

Soil erosion by water is the dominant form of soil 'degradation' in South Africa (Laker, 2003). Deciding if and when soil requires protection from erosion, as a form of critical natural capital, requires prediction of likely future losses and their consequent detrimental impacts on social actor's interests. However, many of the factors that influence soil erosion in South Africa (e.g. type of parent material, degree of weathering and pedogenesis, availability of free iron oxides) cannot be simply quantified and thus are not included in soil loss models, leading to unreliable predictions of future losses (Laker, 2003). Reliance on a small number of universal indicators in soil loss models can also often be misleading since different factors have different influences on soil erosion processes depending on the specific circumstances considered, as highlighted in Table 2.1 above. Laker (2003:20) therefore suggests that in order to obtain estimates of erosion and its impact on productivity that are sufficiently accurate and useful for land use planning and management decisions, attempts to develop universal, national or even regional soil loss equations must be rejected in favour of a more flexible 'evaluation tree' approach that would allow the user to select and rank the importance of different factors (e.g. parent material or slope) and thus tailor the equation to a specific site. Yet due to a limited supply of soil scientists and government resources, it is unlikely that such an approach could have a tangible impact on soil erosion management at a landscape scale over the short to medium term. There is evidently a need to select specific areas in which to focus the application of this approach, yet given competing and dynamic land use priorities and uncertainty about the rate, extent and impacts of soil erosion prior to empirical investigation, such targeting is far from simple.

Attempts have been made to develop computer models to provide useful forecasts of soil erosion for planning purposes. For example, the MEDALUS project integrates characteristic 'strips', on which land use can change and down which water and sediment flow, to provide catchment scale forecasts of the spatial distribution of runoff and erosion and gross output of water and sediment in response to soil and vegetation change (Thornes, 1998). Models such as those developed in the MEDALUS project are useful in providing broad scale estimates of average erosion for raising awareness and

large scale planning and intervention targeting purposes (e.g. for calculating sedimentation rates of different potential dam locations). Yet since variability in runoff increases as scale of analysis decreases, they are less useful in revealing small-scale spatial and temporal diversity in erosion causes, rates and impacts (cf. Thorne, 1998; Biot, 1989). The precision of such models, especially at small scales, will ultimately depend on the spatial resolution and quality of the data inputted from the site under investigation (Higgit, 1993). Their usefulness for predicting quantity and spatial distribution of soil loss, and thus intervention requirements, under future conditions for any particular site is therefore likely to be constrained by the same resource and logistical factors that limit the application of soil loss equations. Moreover, this lack of precision is compounded by uncertainty in the nature of future land use changes and their impacts on erosion, a problem that afflicts all attempts at forecasting soil loss (Higgit, 1993).

Given that soil loss models tend to estimate interrill (sheet) and rill erosion only, even soil loss models tailored to specific sites may produce unreliable predictions in dryland areas where gully erosion is prominent (cf. Laker, 2003; Poesen *et al.*, 2003), such as in the study area for this research, Sekhukhune District. If soil is presently considered a critical natural capital in such a location (e.g. if livelihoods are reliant to a significant extent on arable production), Western science would be limited in its ability to contribute accurate predictions of its future loss through erosion at a scale useful for planning specific interventions.

Deciding if and when soil requires protection from erosion is evidently a tough task. In the face of considerable uncertainties, a commonly held view is that it is advisable to adopt a precautionary approach and attempt to reduce erosion as effectively as possible wherever it occurs (Middleton & Thomas, 1997). Areas that display symptoms of significant past erosion, such as large gullies, are targeted on the assumption that such erosion may continue if unchecked. A range of physical scientific methods, such as analysis of time series of aerial photographs, where available, or measurement of specific erosion features on-site can be useful for measuring such past change. However, high levels of past erosion do not necessarily imply high levels of future erosion, nor do they necessarily imply a negative impact on crop or livestock production (cf. Scoones, 1996). In locations where interventions are being considered based on evidence of

substantial past soil loss, the intensive approach to site-specific prediction of soil erosion and its consequences, referred to above, could be utilised to estimate the magnitude of future losses and thus provide more information to aid the effective targeting of interventions.

When planning any intervention to combat soil loss it is essential to clarify the specific purpose it is intended to meet and the particular beneficiaries it aims to benefit. Investing in protection of less eroded land that provides important *on-site* productive services may, in some cases, be more economical and achievable than trying to prevent erosion in and rehabilitate productivity of heavily eroded land (e.g. UN, 1994), although the former type of intervention is likely to be more difficult to target effectively given that the erosion and its consequences are of a smaller magnitude and therefore less visible. Both types of intervention may be hampered by high financial and opportunity costs of intervention and/or few obvious or predictable short-term returns to motivate local people's involvement in design, construction or maintenance of conservation measures. On the other hand, investment in the prevention of erosion at sites identified as large sources of silt load in prior years, and that are predicted to be likely to continue to perform this function in the foreseeable future, may be justifiable on the basis of downstream *off-site* benefits (e.g. reduced siltation of dams). As noted above, but worth repeating here, both on-site and off-site land uses may change over time, so study of land use change and prediction of future shifts are also important to ensure that interventions are appropriate over at least the short to medium term.

2.3.4.5 Problems specific to understanding soil fertility dynamics

Soil nutrient budget analysis is often used at the field or farm level to investigate nutrient inputs (e.g. fertilisers) and outputs (e.g. harvested products) for a given agricultural system (e.g. Stoorvogel & Smaling, 1990). When such data are combined with measures of the present stock of nutrients in the soil, the net change in nutrient balance can be calculated (e.g. Scoones & Toulmin, 1999). However, if soil erosion in an area is substantial then problems of accurate quantification of these flows and prediction of their future rates will complicate the calculation of nutrient budgets and the prescription of management guidelines.

Many other soil processes such as gaseous losses, dust inputs, leaching and rock weathering are also difficult to measure accurately in the field, yet they may account for important nutrient losses and errors in their estimation may have significant effects on overall results (Ramisch, 1999; Scoones & Toulmin, 1999). Such variables are often estimated using transfer functions and regression equations standardised across different environments (e.g. Smaling *et al.*, 1993; Stoorvogel & Smaling, 1990), but such functions may be inappropriate to the local agro-environment and will at best introduce increased uncertainty and error into the calculations. Wide standard errors in the estimated data mean are therefore likely (Scoones & Toulmin, 1999; Ramisch, 1999). As with soil erosion above, and as Smaling *et al.* (1993) acknowledge, more detailed site-specific research is necessary to enable the identification and eventual quantification of key processes and the validation and calibration of equations in order to enable more reliable estimations of nutrient flows and stocks. However, the time, cost and logistical requirements for such investigations are highly restrictive. Such factors often constrain nutrient budget studies to the measurement of Nitrogen, Phosphorous and Potassium levels as these are deemed to be the most important nutrients for plant growth (e.g. Voortman, 2001). Yet these are not necessarily the only limiting nutrients, nor does the balance of these three in itself define fertility as availability and interactions between nutrients are also important (Laker, 2003; Voortman, 2001). Physical and biological properties of soils such as texture, water-holding capacity, organic matter content, depth and slope further complicate simple understandings of productivity based on a small number of key nutrients (cf. Janssen, 1999).

Perhaps for the same logistical and economic reasons as above, some scholars calculate partial nutrient budgets, quantifying managed nutrient inputs and visible outputs only (e.g. IN1: fertiliser; IN2: manure; OUT1: harvested crops and livestock products; OUT2: crop residues and manure leaving farm; Dougill *et al.*, 2002). However, such partial accounts may also be misleading. For example, the difficult-to-quantify environmental transfers may be large and result in an overall negative balance for nitrogen in a particular plot, but a partial balance for the same plot may give a positive balance as a result of the application of externally sourced, and hence easier to quantify, nutrients (Ramisch, 1999). Partial nutrient budgets ignore and mask fundamental problems of quantification, rather than addressing them.

A further problem with nutrient budgets is that the extrapolation of 'snapshot' results at a specific time and place to predictions of long-term soil life is often of dubious value because, as discussed above, soil management and land use practices are likely to change over time in response to climatic, socio-economic and political dynamics. Ramisch (1999) therefore suggests that the focus of nutrient budget analysis should be confined to where it is most useful, namely identifying the shortcomings of present soil management systems by providing data on hidden soil processes. Yet achieving this more modest aim is itself extremely demanding of data, as highlighted above.

2.3.4.6 Problems specific to understanding vegetation dynamics

In situations where livestock production is a significant livelihood strategy, the existence of grasslands for grazing may be viewed as critical natural capital. Yet biophysical understanding of this form of natural capital is also incomplete and uncertain. An influential body of Western scientific literature on arid land ecology has argued that frameworks derived from equilibrium dynamics such as succession theory (Stoddart *et al.*, 1975; Clements, 1916) are inappropriate to dryland environments where rainfall rather than grazing pressure is posited to be the main driver of vegetation change (e.g. Scoones, 1999; Behnke *et al.*, 1993; Ellis & Swift, 1988). From this 'non-equilibrium' perspective, introduced in Chapter one, a wide range of variation across multiple spatial scales is perceived as integral to the functioning of resilient dryland ecosystems (Abel, 1997; Skarpe, 1991; Walker, 1987). This dynamic view challenges conventional notions of rangeland change that have often underpinned policy aimed at reducing apparent degradation and preserving what is perceived to be critical natural capital. Yet 'complexity *per se* is easily a cul-de-sac' (Pieterse, 2001:159), reducing the opportunity for observation and experience to be incorporated into management strategies (cf. Briske *et al.*, 2003) and ultimately leading to a post-modern paralysis of ambiguity and indeterminacy.

Researchers working in South African drylands (Fynn & O'Connor, 2000; Illius & O'Connor, 1999) and elsewhere (e.g. Lykke, 2000) have challenged the non-equilibrium perspective. On the basis of empirical research, Illius & O'Connor (1999) argue that density-dependent grazing impacts on vegetation are significant in climatically variable systems, contrary to the non-equilibrium perspective that deems

rainfall to be the key driver and herbivory to have little impact due to high levels of drought-induced mortality. More specifically, they argue that:

> "despite the apparent lack of equilibrium, animal numbers are regulated in a density-dependent manner by the limited forage available in *key resource areas* [where herbivore impacts are localised and intensified in the dry season]... Spatially and temporally, the whole system is heterogeneous in the strength of the forces tending to equilibrium, these diminishing with distance from watering and key resource areas and during the wet season" (Illius & O'Connor, 1999:798; my emphasis).

Thus, rangeland dynamics in at least some dryland areas of South Africa are still influenced by resource consumption, even though the impact of consumption on the characteristics of the resource may be intermittent and weak due to disturbances such as droughts (Illius & O'Connor, 1999). These researchers therefore distinguish between 'non-equilibrial' and 'dis-equilibrial' system functioning, arguing that the latter is more common. Dynamics can theoretically occur along a continuum between extremes of equilibrium and non-equilibrium plant-herbivore interactions in arid or semi-arid rangeland systems, with the extent of coupling varying between ecosystems (Briske *et al.*, 2003). Stochastic climatic variation does not maintain a system in a perpetual state of non-equilibrium, it superimposes fluctuations on an otherwise directional response of community composition to grazing pressure (Briske *et al.*, 2003). Whilst the threshold of 300 millimetres of rainfall per annum has been defined as that below which non-equilibrium functioning occurs (Ellis & Swift, 1988), generalisations about the extent of equilibrium are likely to differ with different spatial and temporal scales of analysis (Briske *et al.*, 2003) and are difficult to evaluate or apply in specific ecosystems (Walker & Wilson, 2002). Once again, the diversity and complexity of processes involved confounds the use of a universal model and promotes instead the pursuit of site-specific empirical exploration of interacting particulars.

These debates imply that there is still a role for physical science in the management of livestock-vegetation interactions (as well as rainfall-vegetation interactions) in at least some dryland environments and especially in the management of key resource areas (Fynn & O'Connor, 2000; Scoones, 1995). Nevertheless, it is also apparent that key aspects of our Western scientific understanding of dryland ecosystem dynamics remain highly contested and uncertain. For example, Parsons *et al.* (1997) state that there is insufficient data to assess which of the opposing models, plant succession with its

emphasis on the fragility and overgrazing of rangelands, or non-equilibrium with its emphasis on the resilience of grazing resources to herbivory and the key role of rainfall, best applies to communal areas in South Africa. Dougill *et al.* (1999) suggest that given the significant uncertainty surrounding the understanding of 'non-equilibrium' dynamics, environmental 'degradation' should not be assessed on the basis of vegetation changes alone. There is also reported to be inadequate data on, or ongoing debate about, various vegetation-related processes and limits, as shown in Figure 2.1. For example, the relative impact of herbivory and climatic variability on species composition remains uncertain (e.g. Dougill *et al.*, 1999; Abel, 1993; Walker, 1993).

Figure 2.1: Examples of uncertain rangeland knowledge

- Threshold levels of defoliation above which the negative impacts of grazing pressure outweigh the positive stimulation (e.g. Shackleton, 1993);
- Relationship between grazing pressure and grazing value/palatability (e.g. Fynn & O'Connor, 2000; Abel, 1993; Perkins & Thomas, 1993);
- Relative influence of grazing pressure and climatic variability on species composition (e.g. Abel, 1993; Walker, 1993; Dougill *et al.*, 1999);
- Processes driving bush encroachment and its relative costs and benefits (e.g. see Dougill *et al.*, 1999; Behnke & Scoones, 1993; Perkins & Thomas, 1993);
- Impact of erosion processes (e.g. loss of nutrients and moisture through increased run-off) on vegetation compositional change and productivity (e.g. Fynn & O'Connor, 2000);
- Circumstances that make some systems more resilient to change than others (e.g. Illius & O'Connor, 1999).

Given such uncertainty, rangeland users are often advised to learn to react and adapt as efficiently as possible to environmental changes (Walker, 1993; Sandford, 1982), flexibly adjusting livestock numbers and movements according to forage availability and thus reducing the risk that unpredictable thresholds to change are crossed. Scoones (1995) argues that such opportunistic strategies can maximise the economic productivity of livestock production systems, but more recent analyses have questioned this view (Campbell *et al.*, 2000).

2.3.4.7 Implications of physical scientific uncertainty for interventions

Even where agreement is reached on the criteria to use to measure degradation/sustainability, and recalling that such a consensus may be fragile due to fluctuations in a variety of variables such as livelihood opportunities, aspirations and available technologies, there are clearly many technical difficulties in measuring, monitoring and predicting changes in the processes involved (cf. Barraclough, 1995).

Without intensive and long term research at a specific site, it is not presently possible to reliably predict when critical limits of soil or vegetation system functioning may be transgressed, leading to 'effectively irreversible' decline in important capital flows (cf. Abel, 1997). Management of soil and vegetation dynamics must therefore rely on a precautionary approach that maintains the buffer capacity or resilience of the system (cf. Ekins *et al.*, 2003; Turner, 1993). Continuous and close monitoring of visible system dynamics and, where Western scientific input is available, of some important but less visible or invisible dynamics, can build site-specific hybrid knowledge of system functioning. This open-ended learning process can enable more efficient reactions to system perturbations and ultimately the active maintenance of critical natural capital in a relatively stable and productive biophysical state, within a broader context of uncertainty and surprise.

Such an approach points again to the importance of research that critically considers 'local' knowledge in conjunction with Western scientific knowledge. Local knowledge can provide a complement to the limited and partial view provided by Western scientific perspectives, enabling a more complete understanding of the visible and non-visible dynamics of critical resources (cf. Blaikie *et al.*, 1997; Richards, 1985), the uses to which these are put, and the practical options available to local people for enhancing the resilience and productivity of these systems. However, use of the adaptive learning and management approach outlined above does not obviate the need to select which locations and beneficiaries should benefit from finite supplies of scientific input and support, difficult decisions that require careful specification and trade-off of goals and values and that ultimately represent political decisions. This research attempts to analyse such decision-making processes by focusing on areas identified as highly degraded by government officials, comparing 'local' and 'official' perceptions of environmental change, and exploring the aims, activities and impacts of a government-funded programme that seeks to combat soil erosion.

2.4 Plotting a course: A new approach for the study of rural livelihoods

In order to grapple with and integrate insights from the principal debates relating to sustainable development discussed above, the 'sustainable livelihoods' framework was adopted as an appropriate and useful overarching conceptual framework for this research (e.g. Murray, 2000; Carney, 1999; DFID, 1999; Scoones, 1998). Insights

gained from entitlements approaches (e.g. Sen, 1999; Leach *et al.*, 1997) and from work on 'social capital' and 'capable agency' (e.g. Krishna, 2001) are used to modify the framework in order to emphasise neglected aspects and adapt it to the research aims and the South African context.

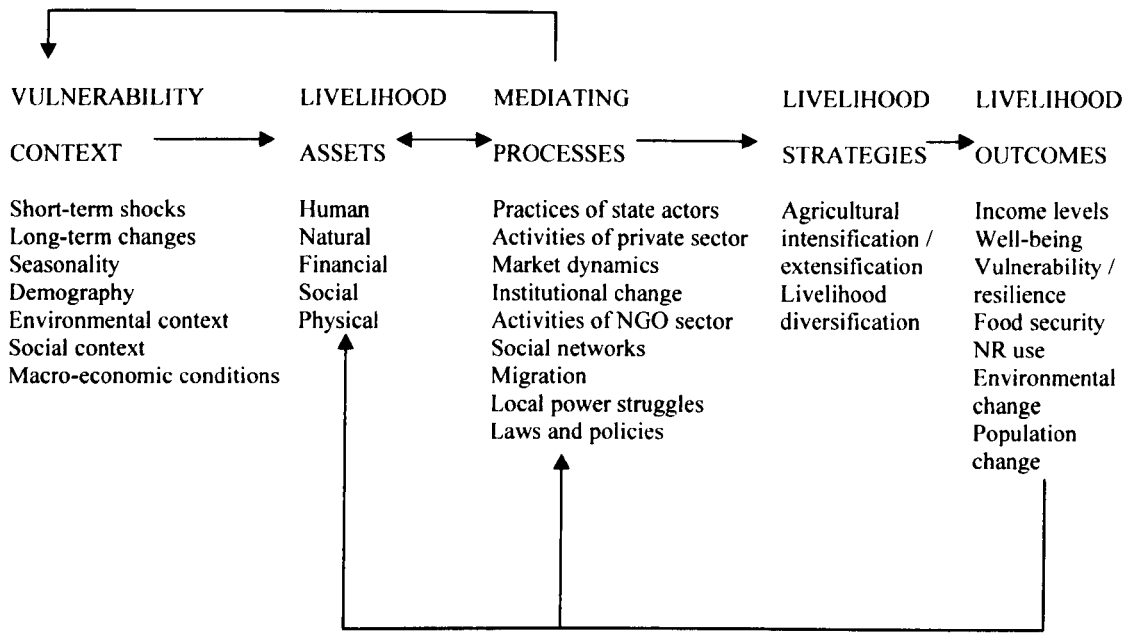
2.4.1 Sustainable livelihoods framework

The sustainable livelihoods framework has been widely recognised as a valuable tool for understanding the diverse and complex dynamics of rural development and NR management problems (e.g. Carney, 1998; Scoones, 1998). In this research the framework's holistic, cross-scale and non-sectoral structure was appropriate to the research topic and assisted the organisation of data collection and analysis. In accordance with the above discussions, it enabled:

- Participation with local people so as to understand the diversity and dynamics of people's differentiated assets, knowledge, priorities, NR use practices, livelihood strategies and practical opportunities for improvement;
- Disaggregated and cross-scalar investigation of diverse society-environment links, including exploration of the impact of national-level social and economic narratives and policies on local-level poverty and environmental management and the extent to which social actors are able to mobilise networks to influence these structures and processes;
- A dynamic historical perspective, investigating shifting relationships and iterative chains of events;
- Exploration of the biophysical, social, political and epistemological complexities of environmental sustainability (Murray, 2000; Carney, 1999; DFID, 1999; Scoones, 1998).

A representation of the sustainable livelihoods framework is shown in Figure 2.2 below.

Figure 2.2: Sustainable livelihoods framework



Source: Based on Batterbury & Forsyth (1999), DFID (1999), Carney (1998) and Scoones (1998).

Livelihoods have been defined in different ways by different development agencies and researchers (e.g. Ellis, 2000; Carney, 1999; Scoones, 1998; Chambers and Conway, 1992). Ellis's (2000) definition is adopted here since it gives explicit attention to issues of *access* that are often neglected in the livelihoods approach:

> "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" (2000:10).

A livelihood is thus a complex, variable improvisation sustained by agents who draw on both tangible (stores and resources) and intangible assets (claims and access) in order to reduce vulnerability and increase resilience and adaptability to livelihood stresses and shocks (Chambers, 1997; for a full list of livelihoods definitions see Appendix 1). Diversification of and diversity in livelihoods is often considered important because "diversity spreads risk by adding species, enterprises, linkages and activities" (Chambers, 1997:172).

There have been a number of critiques of the capitals approach that underlies the livelihoods framework, perhaps most crucially with regard to the difficulties involved in measuring any of the capitals or complex flows between them (e.g. Angelsen & Wunder, 2003; Warren *et al.*, 2001; Foley & Edwards, 1999; Harriss & de Renzio, 1997). For

example, measurement of human or social capital is problematic since physical measurement is obviously inappropriate and economic valuation is no more useful as it simply employs a surrogate measure, monetary value, to compare different forms of capital (Warren *et al.*, 2001). However, it may not be necessary to measure these forms of capital in order to make decisions about trading them off, as long as a comprehensive understanding of the benefits and costs of different options is accessible to decision makers. As Ellis (2000), Sen (1999) and Scoones (1998) all emphasise, there is no neat, simple algorithm for objectively weighing up alternative development scenarios, but by highlighting key issues, questions, contradictions and opportunities for action and avoiding neglect of important components (e.g. assets, capabilities), judgemental choices become explicit and informed negotiation between outcomes becomes possible. The livelihoods framework thus provides a checklist of issues to explore, highlighting potentially important elements and connections to consider when contemplating rural development problems, but it does not attempt to prioritise some aspects over others or prescribe solutions. As Scoones (1998:13) states, "while it offers no predictive power, it hopefully encourages the right sort of questions to be asked".

Angelsen & Wunder (2003) make a useful distinction between conceptual analysis of processes and measurement of outcomes. They suggest that the livelihoods approach is useful for understanding the multidimensionality of human welfare and providing an overview of livelihood changes and the processes generating this welfare at a specific location but simple measures such as income per capita are more useful for the measurement of poverty outcomes and the comparison of poverty between different locations (Angelsen & Wunder, 2003). However, Sen (1999) argues that commodity holdings can indicate little about the nature and quality of lives that people actually lead. For example, disability or illness reduce an individual's ability to earn an income, but as Sen (1999:88) highlights:

> "They also make it harder to convert income into capability, since an older, or more disabled, or more seriously ill person may need more income (for assistance, for prosthesis, for treatment) to achieve the same functionings (even when that achievement is possible). This entails that "real poverty" (in terms of capability deprivation) may be, in a significant sense, more intense than what appears in the income space" (Sen, 1999:88).

Given the problems of variation in impact of *means* of living on well-being, Sen (1999:73) suggests the alternative of focusing on the *actual living* that people manage to

achieve, or more fundamentally, on the *freedom* that people have to achieve different lifestyles that they value. To do this he uses the concept of 'capability' to refer to "the alternative combinations of functionings [e.g. things a person may value doing or being] that are feasible for her to achieve" (Sen, 1999:75). Sen thus seeks to take account not only of the assets and opportunities that a person holds, but also of the other characteristics and processes that govern the *conversion* of these endowments into a person's ability to promote his or her own ends. As Ellis (2000) and Reardon & Vosti (1995) observe, analysis of the ability of individuals or households to maintain a diversity of assets and to convert these assets from one type into another (e.g. from physical or social to financial) is critical since, especially in risk-prone dryland environments, it determines the *flexibility* of response to stresses and shocks, or capability, that is critical to successful livelihood strategies

Asset 'substitutability' will depend largely on the existence and functioning of asset markets, as well as having timely information about those markets, since these enable the conversion of assets into cash, the most substitutable asset, and *vice versa* (Ellis, 2000). Hence, a reminder that livelihoods analysis must progress in an iterative manner, investigating relationships at different scales (e.g. macro-economic policy and local livelihood impacts) in an integrated manner.

2.4.2 Access and entitlements

The livelihoods framework has been criticised for ignoring power relations and differential access to resources, services and livelihood opportunities (e.g. Ellis, 2000). These issues are dealt with in the environmental entitlements approach (Leach and Mearns, 1991; Leach *et al.*, 1997), elements of which were adopted as useful add-ons to the livelihoods framework for this research. Leach and Mearns (1991) suggest that links between poverty and environmental change processes depend on 'environmental entitlements' as well as on changes in NR availability. They defined environmental entitlements as combining the outcome of both access to, or command over, environmental resource bundles as a result of their ownership, production, or membership of a particular group and the ability to make effective use of those resource bundles (Leach and Mearns, 1991).

The emphasis on 'effective use' is particularly important to this research. Whilst much work on sustainable livelihoods has investigated how NR access is contested and has emphasised the mediating role of institutions (e.g. Leach & Mearns, 1991), in the former homeland areas of South Africa institutional ambiguity (Cousins, 1993) or institutional vacuums (Ainslie, 1999) are commonplace, resulting in effectively 'open access' to NRs. Even where access to resources may be mediated by formal 'rules' and regulations, these rules can be, and in the context of South Africa often are, broken (e.g. Ainslie, 1999). When such situations are combined with a possible decline in land use intensity in relatively low productivity dryland areas due to livelihood diversification out of agriculture (Bryceson *et al.*, 2002), the ability to contest claims over NRs becomes less important than the ability to effectively utilise available resources.

Since most attention in the entitlements approach often focuses on how institutional processes - defined as "regularised patterns of behaviour that emerge from underlying structures or sets of 'rules in use'" (Leach *et al.*, 1997:26) - affect access to NRs themselves, such as land tenure (Leach & Mearns, 1991; Leach *et al.*, 1997), the critical element of access to appropriate means (e.g. specific technologies and assets) for effective use of those resources can be neglected. Leach and Mearns' (1991) concept of entitlements is rejected here as unhelpful because it conflates two crucial but distinct issues, effective use of assets and effective rights of access to assets. These issues are incorporated here into a novel, simplified version of the livelihoods framework that gives explicit attention to the critical issue of access to appropriate means to make effective use of natural (and other) capital assets as well as access to the assets themselves, as shown in Figure 2.3 below.

Rights of access to assets are dealt with using the concept of endowments, defined here as the rights of access to capitals that social actors are able to gain *effective* control over (adapted from Leach *et al.*, 1999). Effectiveness is emphasised because as Leach *et al.* (1999:233) state, rights of access to a certain capital stock, whether or not based in customary law, social norms or formal legal institutions (cf. Leach *et al.*, 1999), are often contested and some actors' claims may tend to prevail over those of others as a consequence of power inequalities. Endowments are considered separately from capitals for two reasons. Firstly, because processes influencing effective control over capitals and those influencing the physical existence of capitals, while often interacting, are

important to distinguish. An example of the latter is a change in climatic processes that drives a shift in the physical availability and distribution of natural capital. Secondly, because a person may not have the right, formal or informal, to use a capital that is physically present but they may nevertheless do so.

The five forms of capital from the livelihoods approach are adopted in this research, but the issue of appropriate means to make effective use of assets is clarified by distinguishing between primary and secondary capitals. Social actors may not be able to mobilize some capitals (e.g. financial, human, social) that are necessary in order to make effective use of others (e.g. natural, physical). In this research a distinction is therefore drawn between primary capitals – specific stocks or processes from which utility (direct use, market value or environmental functions) is directly derived; and secondary capitals – stocks or processes that are necessary in order to effectively derive utility from primary endowments.

The important concept of capabilities, discussed previously, is also incorporated in the framework. Capabilities are here defined as things that people value doing or being (e.g. to be adequately nourished or have self-respect) that they are able to attempt with the endowments at their disposal (adapted from Leach *et al.*, 1999 & Sen, 1999).

Figure 2.3 illustrates that the capabilities of differentiated social actors are determined by their access to different capital assets, socially sanctioned or otherwise, their ability to use secondary assets (e.g. financial capital) to convert, or make effective use of, primary assets (e.g. land), *and* by a diversity of 'mediating processes' acting at multiple temporal and spatial scales. To quote Sen (1999:162) again:

> "Hunger relates not only to food production and agricultural expansion, but also to the functioning of the entire economy and – even more broadly – the operation of the political and social arrangements that can, directly or indirectly, influence people's ability to acquire food and to achieve health and nourishment"

The functioning of the biophysical environment, neglected in Sen's (1999) work, is another critical group of processes mediating capabilities such as the ability to escape involuntary starvation. The scale of the livelihood system can be arbitrarily defined to include a single individual or the whole world. Any system will be influenced by 'external' dynamics and flows such as the cooling of the sun, changes in global climatic

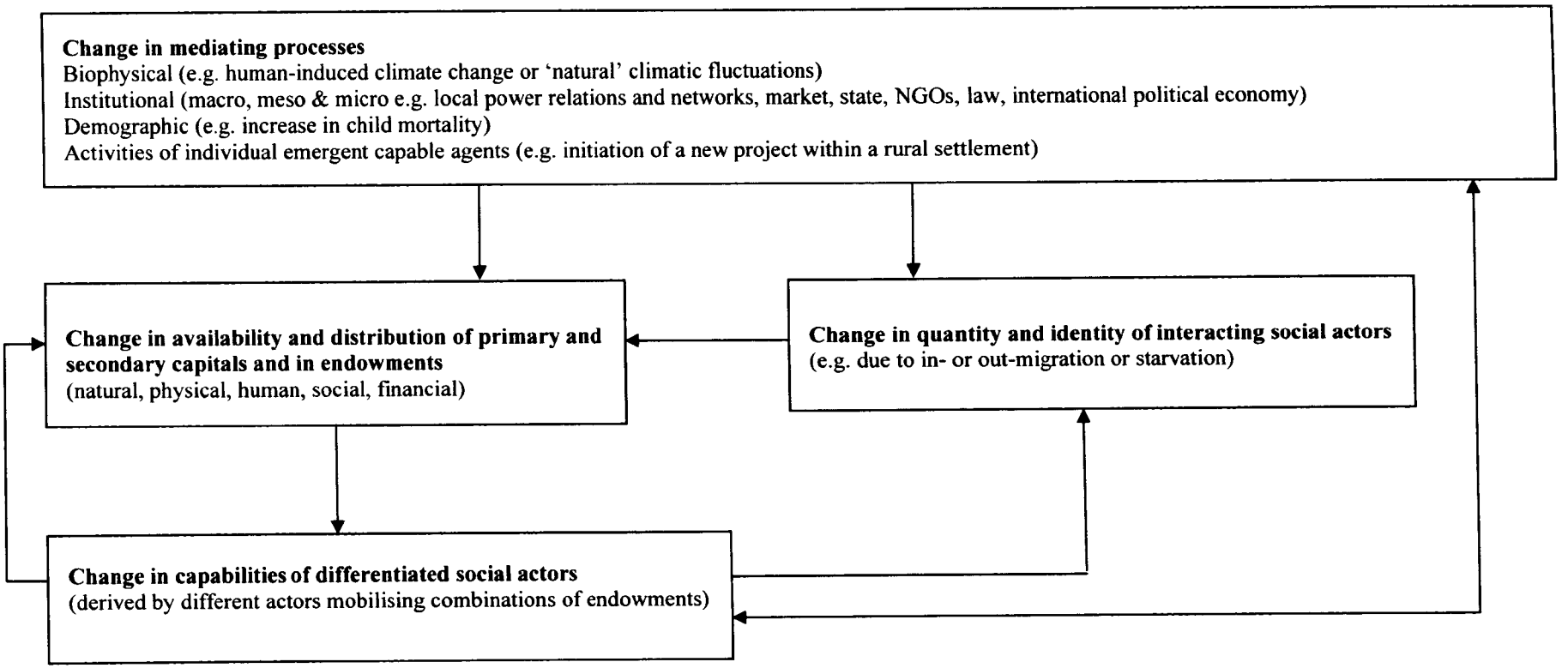


Figure 2.3: Modified livelihoods framework

patterns or demographic shifts within the region wherein a smaller livelihood system has been defined. The key point is that the availability of assets and their distribution between social actors is determined by exogenous factors as well as by local competition, negotiation and consumption. For example, changes in the availability of natural capital may be driven by 'natural' climatic fluctuations as well as by climate change induced by local deforestation. It is also important to realise that the relationship between mediating processes and capabilities is two-way, even if the relative influence of poor people over mediating processes such as policy-making is often disproportionate to the influence of the former over the latter. As Figure 2.3 depicts and as Sen (1999:18) highlights, while processes such as the enforcement of legislation can fundamentally alter people's asset endowments and capabilities, the direction of public policy, especially in a democratic country like South Africa, can also be influenced by the effective use of 'participatory capabilities' by the public.

2.4.3 Institutional and individual dynamics: Networks and agents

The emphasis on explaining action through institutional processes, 'the rules of the game in society' (North, 1990:5), in the livelihoods and entitlements approaches represents a widespread trend in the social development literature (Twyman, 1997). Devereux (1996) claims Leach and Mearns (1991) avoid a focus on the individual to avoid criticisms of voluntarism (as sometimes also levelled against the actor-oriented approach), yet this focus strictly on the institutional level prevents a more in-depth understanding of diverse social processes because it tends to reify what are considered to be 'central tendencies' (cf. Long & van der Ploeg, 1994:81) and consequently masks "the inherent variability in action which may emerge in unexpected or even seemingly chaotic ways" (Twyman, 1997:4).

This research seeks to investigate the individual as well as the institutional aspects of environment and livelihood dynamics. The actor-oriented approach is particularly useful here as it focuses on the *agency* of social actors (Long & van der Ploeg, 1994). Individuals are seen not as passive victims of 'external' forces, but as political actors that actively process information and strategise in order to realise their needs and interests and create 'room for manoeuvre' (cf. Schafer, 1984), even under the most intensive forms of coercion (Long & van der Ploeg, 1994; Giddens, 1984; Scott, 1985). Change cannot be explained merely by the 'structural logic' of the neo-Marxist or

modernisation theories. Rather, different patterns of social organisation or forms of intervention emerge unpredictably from interactions, struggles and negotiations that take place among differentiated actors over 'images of development and the good society' (Long & van der Ploeg, 1994:83). Whilst Long and van der Ploeg (1994:64) believe that 'external' forces such as the market and state can have significant impacts on 'local' circumstances, they consider that:

> "all forms of external intervention necessarily enter the existing life-worlds of the individuals and social groups affected, and in this way are mediated and transformed by the same actors and local structures".

Thus, attention is drawn to social heterogeneity at the local level and to the fact that different people will perceive and react to different external factors, such as development interventions or environmental variability and diversity, in different ways, in turn influencing their responses to further changes and affecting policy outcomes.

Yet agency is not merely individual decision-making, but rather something requiring social relations or organising capacities (Long & van der Ploeg, 1994). 'Effective agency' or the 'ability to influence' is seen as a dynamic attribute that is related to the strategic manipulation of networks of social relations across micro, meso, and macro levels and the channelling of specific items, such as claims, orders, goods or information, through certain nodal points of interaction (Long & van der Ploeg, 1994:66). This conceptualisation of agency overlaps with the focus of the actor network approach on how social actors try to mobilise available resources in order to build cross-scale networks and thus tie other actors at different spatial scales into the pursuit of common goals (Murdoch & Marsden, 1995). Those who are 'powerful' are not those who 'hold' power but "those who are able to enrol, convince and enlist others into associations on terms which allow these initial actors to 'represent' all the others" (Murdoch & Marsden, 1995:372).

A focus on actor-networks is also shared with the rapidly expanding literature on 'social capital' (e.g. Krishna, 2002, 2001; Bebbington & Perreault, 1999; Fine, 1999; Woolcock, 1998; Harriss & de Renzio, 1997; World Bank, 1997; Putnam, 1995, 1993; Coleman, 1990). In his now famous study of Italian economic development, Putnam (1995:67) defined social capital as "features of social organisation such as networks,

norms and social trust that facilitate coordination and cooperation for mutual benefit". A recent study by Krishna (2002, 2001) identifies the mechanism through which social capital can enhance development. On the basis of empirical research in India, Krishna (2001) argues that social capital is not sufficient by itself to achieve high 'development performance'; rather, stocks of social capital must be drawn on if benefits are to be realised and this requires 'capable agency':

> "Social capital represents a potential - a propensity for mutually beneficial collective action. But potential needs to be activated, and agency is important for this purpose" (Krishna, 2001:934).

Agency is required to coordinate a community and help it to select and agree upon objectives that are feasible and likely to be achieved (Krishna, 2002). Individuals who have invested time and effort in establishing contacts with government officials or market actors and who possess knowledge of their procedures and practices are able to help people to organise and represent themselves in ways that are more likely to win projects or funds (Krishna, 2002, 2001). By taking up marginal positions at the 'interface' of development between development 'providers' and potential 'beneficiaries' (cf. Arce *et al.*, 1994), these 'development brokers' establish themselves as powerful gatekeepers between networks or 'actor spaces' (cf. Murdoch & Marsden, 1995), ultimately becoming "*the* key actors in the irresistible hunt for projects carried out in and around African villages" (Bierschenk *et al.*, 2002:4). This research therefore extends the livelihoods framework to include explicit consideration of the influence of individual 'capable agents' and their associated cross-scale networks on environment and livelihood outcomes, in addition to the influence of macro and micro institutions, structures and processes normally considered within the conventional livelihoods framework, as depicted previously in Figure 2.3.

2.5 Summary

On the basis of a review of critical environment-development debates, this chapter has developed a modified version of the sustainable livelihoods approach that enables the holistic and reflexive investigation of dynamic interactions between environment and society in the risk-prone and 'degraded' drylands of Sekhukhune District, South Africa. The next chapter describes the specific methods used during two periods of fieldwork in Sekhukhune.

Chapter 3: Methodology

3.1 Introduction

The research aim, objectives and justification for the selection of study sites were set out in Chapter one. Chapter two presented the theoretical debates and conceptual framework that inform this research. This chapter discusses the methods used. The chapter is written largely in the 'ethnographic present' and the first person 'I' because it deals with fieldwork as a lived experience and draws attention to the ways in which *my* interpretations and understandings were influenced by power relationships between translators, respondents and myself.

To reiterate, the aim of this research is to examine the changing livelihood-environment links and opportunities for enhancing livelihoods in the highly degraded and poverty-stricken district of Sekhukhune. The three objectives of the research are:

1) To identify and critically evaluate narratives of development and land degradation in South Africa and their links to international directives;

2) To examine the dimensions and dynamics of contemporary livelihoods in the study area, with special regard to the contribution of land-based practices to broader livelihood portfolios and to local understandings of land use, land management and environmental change;

3) To investigate the justification for and efficacy of interventions grounded in dominant environment-development narratives in enhancing livelihoods and changing environmental processes.

A variety of possible techniques are available for investigating society-environment interactions and dynamics. The effects of soil loss in smallholder agriculture can be explored, for example, at a micro-scale through the analysis of erosion rates and their effects on yield but, as stated in Chapter two, this is a complex and highly time-consuming undertaking. Another popular technique involves assessing the monetary value of erosion to a household and/or the 'willingness-to-pay' for soil conservation (e.g. Crookes *et al.*, 2000), but problems with this approach include aggregating survey

data in communities where there is a wide variation in knowledge and practice and, more fundamentally, reducing complex values to monetary units (e.g. Tacconi, 2000). This research adopted an alternative holistic and multi-disciplinary approach, combining use of a range of social and physical scientific methodologies in a mixed methods or hybrid approach (Thomas & Twyman, 2003; Abbot and Guijt, 1998; Batterbury *et al.*, 1997; Brannen, 1992). The approach acknowledges that all understandings are mental constructions and as such are fundamentally imperfect, partial and provisional (Latour, 1993; Simmons, 1993) and must be interpreted in relation to the contexts within, and purposes for which, they were produced (Mosse, 1994; Finnegan, 1992). A value-free, 'true' account of experience is deemed impossible (Quicke, 1994; McDowell, 1992); instead, multiple rationalities are understood to coexist (Chambers, 1994; Thompson *et al.*, 1986). Yet as Batterbury *et al.* (1997:126) argue, biophysical resource fluxes are 'externally real' to human experience. The approach adopted here therefore attends to the social and political construction of different problems by multiple interest groups but simultaneously seeks to provide realist insights for the pragmatic management of environment and development problems (cf. Batterbury *et al.*, 1997).

The hybrid approach was customised to fit the research objectives but still allowed flexibility for iterative methodological adaptation to the specific fieldwork context encountered (Mosse, 1994). Forsyth (1996) suggests using local knowledge as the starting point in research and then using Western scientific methodologies to extend investigations to wider areas. In this research different knowledge repertoires are used for targeting at different spatial scales. 'Official' and scientific perspectives provided perceptions of national-scale differences in 'environmental degradation' that facilitated targeting of a specific district, Sekhukhune. The knowledge of personnel of the Sekhukhune District Department of Agriculture was used to focus on three allegedly highly degraded settlements. Within settlements, a similar approach was utilised to that recommended by Forsyth (1996). Local knowledge was investigated initially in order to direct subsequent scientific investigations to areas of particular interest or value to local people, thus allowing inclusion of issues and areas which are of importance to local people yet which might otherwise have been omitted from more conventional scientific assessments (Thomas & Twyman, 2004).

The approach involved a combination of social surveys, interviews, participatory methods and biophysical techniques. The term participatory is used here to refer to working with the knowledge of 'ordinary' people (Park, 1993), rather than to the more radical notion of attempting to empower local people through building community problem-solving capacities (e.g. Chambers, 1997; Stoeker, 1997). While attempts were and are being made to ensure the findings from this study are of more than academic value by distributing research results, expressed in suitable language and format, to networks and contacts established in key South African government ministries and NGOs, the focus of the research was largely on extracting information to meet objectives defined *outside* the local context, as PhD research necessitates.

It is now widely recognised that participatory techniques as 'public' social events tend to mask diversity and produce 'safe', consensus opinions influenced by group composition, dominant personalities and 'the noise of power relations' (e.g. Mapedza *et al.*, 2003; Chambers, 1997; Pottier & Orone, 1995; Mosse, 1994; Simmons, 1993). Awareness of such studies encouraged the more extensive use of individual as opposed to group-based interviews that provide opportunities for a more open dialogue and 'deep listening' (de Gabriele, 1999). The principal sources of data were a household survey in each study settlement and semi-structured and repeat interviews with individual representatives of a range of stakeholder groups at settlement, district and provincial scales. These data sources were complemented by observations of, and participation in, local livelihood practices, use of Participatory and Rapid Rural Appraisal (P/RRA) techniques (Chambers, 1992), soil sampling and testing (Anderson & Ingram, 1993) and use of secondary sources including aerial photographs.

The chapter begins by introducing the research strategy and the study sites. It then examines in turn the specific methods used to address each of the three research objectives. Selection of methods and problems experienced in the field are also discussed, including perennial issues of positionality and reflexivity.

3.2 The research strategy

A comprehensive literature review informed the design of the research objectives and choice of methods used. Prior MSc research on livelihood diversity and sustainable land management in a dryland region of Northern India also informed the selection of

methods and theoretical orientation adopted. Two phases of fieldwork in 2002 and 2003 were the foundations on which the overall PhD project was based, as shown in Table 3.1. Research progressed in a flexible, iterative and exploratory manner, with a return visit to the UK between periods of fieldwork providing time for reflection and access to the literature and information technology resources necessary for a preliminary analysis of the data collected.

Table 3.1: Research strategy

Project stage	Time	Purpose and activities
Project planning	Sept 2001-May 2002	Review of literature; research training and fieldwork preparation; establishment of research links
Fieldwork phase one	May-Oct 2002	Address objectives in primary study location: Identification and review of information sources, study sites and stakeholders; selection and training of research assistants/translators; analysis of policy documents relating to rural livelihoods and formal semi-structured interviews with government officials; collection of social and biophysical data on local livelihoods and land use practices
Preliminary data analysis in UK	Oct 2002 – March 2003	Review progress against objectives; refine research methods and consolidate data prior to phase two; soil analysis
Fieldwork phase two	Mar 2003 - July 2003	Complete follow-up work where necessary in primary field site; address objectives in secondary field sites (see phase 1 above); feedback of preliminary findings to land users and collaborating institutions
Write up	July 2003-Sept 2004	Soil analysis; continued refinement, analysis and write up; feedback of findings to collaborating institutions and individuals

3.3 The study settlements

The village of Phahlamanoge, the primary study site for this research, is located in the western foothills of the Leolo Mountains in Sekhukhune District, approximately 150 km south of Polokwane (formerly Pietersburg). Phahlamanoge falls within the administrative boundaries of Fetakgomo Municipality, the local government authority through which development interventions are increasingly coordinated and implemented. The village is located on the mountainous eastern edge of the catchment area of the Lepellane River, a small tributary of the Olifants River, the major river in the region. The potential silt load from the 300 square kilometre Lepellane catchment area is estimated to be 600 tonnes/sq km/annum (Department of Water Affairs, 1991), although the actual sediment yield may be much higher because the area is reported to have been largely denuded of vegetation (Pardeller *et al.*, 1999). Such high silt loads can cause serious problems for downstream users of river water such as irrigation schemes and reticulated drinking water supplies.

Selection of Phahlamanoge as the primary study site was based on interviews with provincial and district level Department of Agriculture staff and NGO personnel. This settlement was of particular interest because the area around Phahlamanoge was widely regarded by provincial government and NGO personnel interviewed as one of the most 'degraded' and eroded areas in the province. This perception is supported by a satellite imagery based study of soil erosion in the former Lebowa conducted in 1993 which identifies the immediate area of Phahlamanoge as having erosion occurring in continuous patches on over 70% of the land surface (Department of Agriculture and Environmental Affairs, 1993). A second reason for selecting Phahlamanoge was the presence of a pilot project of the government's major environment-development programme: Landcare. The activities and impacts of this project on livelihoods and environment are of great relevance to this research. An initial visit to Phahlamanoge also indicated that many local residents had access to land and that land-based livelihoods were widely practiced as part of local household livelihood portfolios. Since 'degradation' processes are likely to be more significant to people where they depend to a greater extent on use of land, perceived needs for conservation are also likely to be greater in such areas. Thus, there appeared to be potential in Phahlamanoge to investigate and contribute practically to a locally recognised need for reducing detrimental environmental change.

Two secondary study sites located within the same watershed, Soupiana and Madibong, were selected for the second phase of fieldwork. Both are located in Makhuduthamaga Municipality adjacent to Fetakgomo. Selection of these sites followed further consultation with Department of Agriculture personnel, NGO staff and an interview with district level Environmental Affairs officers. The latter group identified all three of the selected study sites as being some of the most eroded areas in the district. The aim of working in two further sites was to pursue important issues arising from the primary field site and inter-settlement variation in key livelihood and NR dimensions within the region. By restricting study sites to the same watershed, variation in biophysical variables was minimised. A focus on the Lepellane catchment in particular was further justified because this area was the proposed target of a soil conservation and rural development programme to be implemented by the Japanese International Cooperation Agency (JICA) in partnership with the provincial Department of Agriculture. Discussions with the Limpopo Province Department of Agriculture (LPDA) suggested

that my study might make a useful contribution to this programme, thus broadening the impact of my research beyond the academic sphere.

The village of Soupiana was selected as a secondary study site because it was identified by district-level Department of Agriculture staff as another degraded area that was being considered for a future Landcare project. Like Phahlamanoge, it is also remotely located on the Leolo Mountains, with no all-weather access road, on the eastern edge of the Lepellane catchment. It is situated at higher altitude than Phahlamanoge and consequently receives greater average annual rainfall (cf. Department of Agriculture representative, pers. comm., 2003; Department of Water Affairs, 1991). The influence of this critical variable on livelihood and NR practices was of particular interest. The village was also an attractive research location because it possessed a woodlot project, a potentially useful means for reducing deforestation. Soupiana is a small village and many residents are born in the village or drawn from a sister village in Swaziland, hence kinship ties are strong.

Madibong is at an altitude similar to that of Phahlamanoge and experiences similar levels of rainfall (cf. Department of Agriculture representative, pers. comm., 2003; Department of Water Affairs, 1991). It is located on the western edge of the Lepellane catchment in a highly eroded area where huge erosion gullies exist that had been surveyed previously in preparation for implementation of a LPDA rehabilitation project. This project, however, never came about due to funding constraints. Madibong is distinct from the other two sites in that it is a larger settlement that links with the dense built-up area of Jane Furse, the major transport hub and 'development node' in the district. Residents have easy access to shops, traders, food outlets and transport links, and consequently greater contact with outsiders such as doctors, merchants and politicians. There is also a reticulated water system and electricity, services that are unavailable in Phahlamanoge and Soupiana. However, access to safe drinking water often remains problematic, as it can be in Soupiana and Phahlamanoge. The implications of service and infrastructure availability for livelihood and environmental outcomes were considered in this research. Madibong also experienced much greater immigration from white farms over the last 100 years than did Phahlamanoge and Soupiana, both of which are located in old reserve areas (cf. Delius, 1996). It is important to realise this spatial differentiation of apartheid policy impacts within former

homeland areas. A less settled and cohesive population and reduced land access were therefore predicted in Madibong with potentially significant impacts on land use and coping strategies. For all of the above reasons, Madibong made an interesting case study to contrast to the two smaller and more remote fieldwork sites.

Phahlamanoge, Soupiana and Madibong, like many other rural villages, have various infrastructure and services located in their centres, such as schools, small shops, tribal authority offices and in some cases boreholes and taps. Basic information on settlement characteristics is given in Table 3.2, allowing comparison between settlements.

Table 3.2: Background data on study sites

	Phahlamanoge	Soupiana	Madibong
Total number of households	432	51	1231
Primary schools	2	1	3
Secondary schools	1	1	2
Creches	1	0	5
Shops	5	1	>10
Piped water supply	No	No	Yes
Electricity	No	No	Yes
All weather road	No	No	Yes
Frequent public transport	No	No	Yes
Police station within vicinity	No	No	Yes

Source: Fieldwork

3.4 Research methods

The three research objectives and methods use to address these are summarised in Table 3.3 overleaf.

Table 3.3: Summary of research objectives and respective methods

	Objective	Methods
Objective 1	To identify and critically evaluate narratives of development and land degradation in South Africa and their linkages to international directives	Analysis of relevant policies, legislation, reports and regional level assessments; semi-structured interviews with government and NGO personnel at provincial, district and local levels
Objective 2	To examine the dimensions and dynamics of contemporary livelihoods in the study area, with special regard to the contribution of land-based practices to broader livelihood portfolios and to local understandings of land use, land management and environmental change	Informal discussions, participant observation, household surveys, semi-structured interviews, oral histories, participatory environmental assessments, ranking tasks, diaries, secondary data
Objective 3	To investigate the justification for and efficacy of interventions grounded in dominant environment-development narratives in enhancing livelihoods and changing environmental processes	Interviews with government and NGO personnel at provincial, district and local levels, land user interviews, participatory methods, analysis of aerial photographs, observation and analysis of secondary data

These methods are discussed in detail below.

3.4.1 Objective one methods

3.4.1.1 Literature reviews and semi-structured interviews

A combination of secondary data analysis and semi-structured interviews were used to explore narratives of development and land degradation existing within national, provincial and local spheres in South Africa. Relevant national policy documents, legislation, discussion papers, programme and project reports and related international directives – collected via internet, UK libraries or in South Africa - were subject to critical analysis (c.f. Adger *et al.*, 2001; Apthorpe & Gasper, 1996; Hobden, 1996).

Desk-based analysis of macro-scale narratives was complemented and grounded by semi-structured interviews with officials from provincial and local tiers of government responsible for the coordination and implementation of national policy, legislation, programmes and projects – summarised in this thesis under the term *interventions* - relating to rural livelihoods and NR management (Roe, 1998). Representatives of donor organisations such as the German Technical Cooperation (GTZ) and the Ministry of Foreign Affairs of Finland (MFAF) who worked closely with the LPDA to enhance its rural development interventions were also interviewed.

During the second phase of fieldwork in 2002, the Japanese International Cooperation Agency (JICA) arrived in Limpopo Province to begin a four-year study aimed at producing a Rural Development Master Plan for the Lepellane catchment on which this study focuses. The plan will include elements of soil conservation, agricultural development and infrastructure provision. The ultimate aim of the work is, "to help realize economically and socially active rural communities equipped to be responsible for their own development" (JICA, 2003:1). The work of JICA was clearly relevant to this study. Due to their time of arrival and intensive programme, detailed interviews were not possible. However, these would have been inappropriate given the early stage of the JICA project. An introductory meeting was held instead and copies of relevant reports on the programme were acquired. Representatives of personnel from non-governmental organisations (NGOs) active in Sekhukhune were also interviewed in order to both understand their efforts at intervening in environment-development processes and to explore their perceptions of government interventions.

Interviews were held with representatives from the following environment-development agencies, shown in Table 3.4.

Table 3.4: Interviews with representatives of state departments and NGOs

Agencies	Number of interviews
Provincial Department of Agriculture (including embedded donors: GTZ and Finnish Government)	5
Sekhukhune District and sub-district Departments of Agriculture	5
Provincial Chief Directorate: Environmental Affairs	2
Sekhukhune District Department of Environmental Affairs	1
Department of Water Affairs and Forestry	1
Environment Development Agency (EDA) Trust	1
Environmental Justice Network Forum (EJNF)	1
Heifer International	1
Hlatlolanang Health and Nutrition Centre	1
TOTAL	18

Most interviews were conducted with personnel from different hierarchical structures in the Department of Agriculture since this was found to be the dominant implementer of rural development and environmental interventions. The semi-structured interviews involved use of a standardised checklist of predetermined questions, but interviews unfolded in a flexible order and manner to make participants feel more comfortable and allow them to discuss issues they felt were most important (cf. Dunn, 2000). Officials

may have been more open to an interviewer of an older age – many people were surprised to discover I was doing PhD research – but almost without exception they were generous with their time. By emphasising the interests, values and knowledge that I shared with officials and my neutral identity, I sought to nullify visible signifiers of difference, such as my age, and represent myself as a temporary 'insider', creating momentary 'positional spaces' that engendered a level of trust, respect and cooperation in the interview encounter (Mullings, 1999; Fonow & Cook, 1991).

All official interviews were recorded on tape. Interviews were transcribed relatively soon after occurrence so that discussions could be recalled in detail and recorded more easily (Valentine, 1997). Transcription was aided by noting down technical terms, key issues and hard-to-hear words during or directly after interviews (Longhurst, 2003). Early transcription also allowed reflection on and follow up of emerging issues with informants where necessary.

3.4.2 Objective two methods

A variety of complementary methods and sources were used to examine land uses, environmental understandings and livelihoods in the three study villages in order to enable the triangulation of findings (cf. Valentine, 1997). Having reviewed prior studies of settlements in Sekhukhune, I was familiar with the range of livelihoods I might encounter in the area and thus it was possible to draft preliminary research questions and areas for enquiry. The interviews with officials undertaken to address Objective one enabled construction of hypotheses about the causes and consequences of changes in livelihoods and environmental processes and informed the questions posed to rural residents about their understandings of local changes.

Having previously gained official permission from the local tribal authority to work in the village, this information was used in conjunction with my research objectives to orient myself and begin informal interviews with key informants at the start of my research in Phahlamonge (cf. Burgess, 1984). These informants included the ruling chief, a number of his tribal authority members, teachers at local schools, representatives of local organisations, my two translators - both residents of Phahlamanoge - and numerous other residents met whilst moving around the local area. Through these interviews, exploration of the village and participation in daily household

activities it was possible to quickly construct a broad overview of the situation in Phahlamanoge. This background data, in conjunction with information gleaned from interviews with officials and secondary data sources, guided design of the household survey. In Soupiana and Madibong a similar survey was used to allow comparison of findings between settlements but the design was adapted to local circumstances where piloting deemed it necessary (McLafferty, 2003).

3.4.2.1 Household surveys

Winchester (1999) claims that data from surveys is of limited value when compared to the depth and quality of information that can be captured using depth interviews and participant observation. Yet where geographers require means of combining the collection of qualitative and quantitative data, questionnaire surveys represent a critical tool in innovative, mixed methodology approaches (Sporton, 1999). Questionnaire surveys were used in this research so that quantitative and qualitative data could be collected from a statistically significant number of households in a relatively short time. The questionnaire combined open-ended questions that allowed respondents to express themselves in the fullest possible way and thus potentially provide a better representation of their viewpoints with closed questions that are simpler for respondents to answer and provide data that can be analysed more easily (McLafferty, 2003). Design of the household survey was guided by widely agreed principles (e.g. McLafferty, 2003; Fowler, 2002; Oppenheim, 2000). A draft questionnaire was constructed, reviewed with key informants and then piloted on a few volunteers. Modifications were made to shorten the length of the questionnaire and clarify a number of the questions. Pre-testing also enabled training of my translators and refinement of interviewing skills.

The survey was usually conducted with the head of household, but if he or she was unavailable then another member of the family with detailed knowledge of land use and livelihoods was interviewed. If no such person was available, the household was returned to at a more convenient time or the neighbouring household was interviewed. The majority of interviews were conducted with older women because men were often working, away from the household looking for work, tending livestock or engaged in other activities. This approach could have biased the results from the questionnaire, yet it is widely acknowledged that women tend to undertake the majority of land-based activities in smallholder systems in South Africa (e.g. Rwelmira *et al.*, 2002; Pardeller

et al., 1999; Baber, 1998; Lipton *et al.*, 1996). The possible bias towards women in this research is not therefore considered problematic.

Interviews were usually conducted on weekdays during daylight hours since at other times people were occupied with private family and household tasks and, at weekends, often with funerals or weddings. It was important to be aware that people were giving up their time to answer my questions in return for no direct personal benefit. However, it is hoped that this thesis and reports derived from it will prove useful in an indirect way to the people of Phahlamanoge, Soupiana and Madibong. The questionnaire was designed so that it could usually be completed in less than 45 minutes, reducing the likelihood that respondents would become fatigued (Oppenheim, 2000). Visits to households were, nevertheless, often prolonged by social courtesies such as informal conversation and invitations to share food or drink.

Although the core survey was structured in order to allow comparison between households and settlements and reduction of interviewer effects and biases, sufficient flexibility was maintained to explore interesting emergent issues in a semi-structured manner (Kitchen & Tate, 2000; Miles & Huberman, 1994). Insights gained and trends that emerged as the survey progressed were discussed and reflected upon with my interpreter and key informants (Twyman, 1997), as well as during repeat visits to government and NGO personnel outside the village.

The household was chosen as the basic unity of analysis for this research because in Limpopo Province the household is the primary vehicle through which individuals gain access to crucial livelihood assets such as land, labour and income (e.g. Baber, 1998). 'Household' has many different definitions in the social scientific literature. Chant (1997) defines households as spatial units where members live in the same dwelling and share basic domestic and/or reproductive activities such as cooking and eating. However, Chant (1997) notes that the concept is problematic since the household is unlikely to be universally perceived by all people in all cultural contexts as the primary unit with respect to kinship, economy and residence. Brydon and Chant (1989) also highlight the dynamic nature of the household. The composition of a household will often change over time, both in the short term (between years, seasons and/or days), for example if others assist with food production at peak times, and in the longer term,

according to the household's phase in its lifecycle. It is also important to realise that the concept of household can hide the fact that the division of labour and benefits accrued are often highly differentiated between members within the household unit. While such intra-household relations are an important area for enquiry in research on smallholder agriculture, they are not the focus of this research.

Rural-urban links and migrant remittances are thought to have been fundamental to livelihood strategies and household survival in Sekhukhune over many decades (e.g. Rwelmira *et al.*, 2002; Baber, 1998; Delius, 1996). When considering household demographics it is therefore important to take into account household members who may be absent at the time of interview. The household unit is therefore defined after Baber (1998) as all individuals who have the right, as recognised by other household members, to be based within a particular homestead. The household unit is divided into a 'resident' and a 'non-resident' component (cf. Baber, 1998). This is important because households without a 'non-resident' component are unable to access income sources in the urban wage economy and consequently tend to have substantially reduced income (Carter & May, 1999; Baber, 1998). 'Resident household size' is defined as the number of people considered by the respondent to be living in the homestead at the time of the interview (cf. Baber, 1998). The non-resident component of the household is defined as the number of people who are not considered by the respondent to be living in the homestead at the time of interview, yet who are recognised as household members with the right to be based in the homestead (cf. Baber, 1998).

Quantitative and qualitative data were obtained on a variety of household variables including household demography, land ownership and use, types of crops grown and inputs used, livestock holdings, off-farm livelihoods, remittances and government grants, food security and perceptions of soil erosion and other constraints on NR productivity. A copy of the questionnaire is included in Appendix 2. The survey focused on the previous agricultural season since this allowed data to be gathered on such measures as crop yields and inputs from the same year as information on food security and household composition (Baber, 1998; Richards, 1996). This was necessary because smallholder agriculture tends to be highly dynamic with strategies often changing from year to year in response to changing capacities, opportunities and needs (e.g. Richards, 1985). Pertinent indicators of wealth such as the types of material used in homestead

construction, the size of the homestead and the presence of other assets such as cars or tractors were also recorded during interviews as another means of verification (Twyman, 1997). Where inconsistencies were found, return visits were made to the household in question.

Sensitive questions, such as those about food security and income, were enquired about tactfully, and were addressed only after more basic data on household composition, occupations and land use had been collected and a degree of rapport had been built up with the respondent (Fowler, 2002; Oppenheim, 2000). Many respondents were unable to estimate accurately the size of their landholdings, partly because local people tended to know only the length of their fields, the primary determinant of the cost of hiring a tractor for ploughing. Questions on land area were therefore deleted. Direct measurements of all fields were not possible because households' fields tended to be located at considerable distance from the homestead. However, measurements were made of the fields of a sub-sample of 10 households from the survey, representing the diversity of yields harvested in the prior season.

3.4.2.2 Sampling for the household surveys

Table 3.5 below indicates the number of interviews carried out during the household survey in each settlement along with the total number of households for each settlement, based on local records kept by the respective tribal authorities, to allow comparison.

Table 3.5: Survey sample sizes and settlement populations

	Phahlamanoge	Soupiana	Madibong
Total number of households	432	51	1231 (split into six formal subsections)
Total number of interviews	100	51	100
Percentage of households represented in survey	23%	100%	8%

Source: Fieldwork

Larger sample sizes would have provided more precise estimates of population characteristics, but larger samples would also have required more time and effort spent in interviewing and analysis (McLafferty, 2003). In this research the focus of analysis was on Phahlamanoge so a relatively high percentage of the households (23%) were

surveyed in this settlement. Soupiana and Madibong represented fieldwork sites of secondary importance; hence, in the large settlement of Madibong the percentage of the population surveyed was substantially reduced. Representatives of all households were surveyed in Soupiana because the sample frame was small.

Sampling of the populations of all three villages was constrained by a lack of reliable lists identifying all residents' households (cf. Baber, 1998). Lists of the total number of households present in each village were made available by respective tribal authorities, but these could not be used as sampling frames as they did not allow the identification of individual households. Since an inventory of all households in Phahlamanoge and Madibong was not viable due to the size of the villages, a systematic sampling strategy was adopted (McLafferty, 2003). Settlements were divided up into geographically differentiated clusters or subsections and households were sampled at regular intervals in each, often every third or fourth household, in proportion to the estimated size of the section (Robinson, 1998). The latter was ascertained from official records in Madibong and from a combination of official records and household counts in Phahlamanoge. No systematic bias due to cyclical arrangements of households was foreseen (Kalton, 1983). Ensuring that the sample was not biased to certain geographical areas of a village was important because, especially in the case of Madibong where large numbers of people had immigrated over recent decades, ethnic groups or groups establishing homesteads at different times or arriving from different locations, often resided in distinct areas.

3.4.2.3 Semi-structured interviews

Intensive semi-structured interviews were used with a variety of individuals including adult members of case study households, on land use practices; youth, about aspirations and perceptions of village life; and representatives of local organisations about institutional activities. Interviews were mostly undertaken in the person's home, in the field where they were working or, in the case of youth, on a football pitch where many socialised in their free time. These neutral and informal settings were selected to encourage informants to feel comfortable, ease access and reduce any inconveniences interviews might have caused them (Longhurst, 2003).

As with officials, interviews followed predetermined checklists of open-ended questions but unfolded in a reflexive manner allowing both anticipated and unanticipated themes to be explored (Miles & Huberman, 1994). Interviews in the study settlements were not recorded as respondents found the use of a tape recorder intimidating. Handwritten notes were taken during interviews, emphasising key concepts, phrases and sentences, and these were supplemented after completion of the interview with additional comments to provide context (Kitchen & Tate, 2000).

3.4.2.4 Oral histories

Historical changes in environment and livelihoods captured in surveys and semi-structured interviews were contextualised and complemented by oral histories captured from elderly individuals known to have knowledge of the area and to have lived in the village for most or all of their lives (Slim & Thompson, 1993). Interviews focused on specific changes in the settlement over the respondent's lifetime but allowed open-ended discussion so that interviewees could introduce other material in which they were interested. Encounters rarely took on the form of an entirely unstructured oral history where conversation is directed by the informant rather than by the set questions (Dunn, 2000). Rather, all interactions with local people depended to a greater or lesser extent on prompting and direction from myself, and therefore tended to resemble semi-structured extractive interviews based on a checklist of issues around which discussion was structured (Dunn, 2000), such as changes in human and livestock populations, areas of land cultivated, yields, rainfall and soil loss.

3.4.2.5 Participatory assessment of arable land management

Environmental assessments focused on arable land since this was found to be the most important NR practice for food security. Semi-structured interviews were conducted with members of a sub-sample of 10 of the 100 surveyed households in Phahlamanoge during visits to their fields to gain a more precise understanding of perceptions of environmental change and arable management strategies, priorities and problems (Thomas & Twyman, 2004). Households, and their specific fields (most cultivated only one field), were selected in order to represent the range of dominant local soil types, investigate specific locally recognised problems such as low yields and weed infestation (Thomas & Twyman, 2004), and assess the perceived impacts of interventions such as

contour banks and use of inputs, all factors and processes revealed as significant in the household questionnaire.

These visits included collection of soil samples for the measurement of soil fertility, defined as the capacity of soil to support plant growth. Soil fertility is often classified on the basis of the size of the plant available nutrient fraction, but this is highly dynamic in response to soil, microbial and plant processes (e.g. Smith, 1999; Tiessen *et al.*, 1994; Singh *et al.*, 1989). Levels of plant available nutrients are an unreliable indicator of soil fertility if they are measured more than 48 hours after collection (Allen, 1989). This research therefore focused on the measurement of total nutrient values as laboratory measurement was undertaken after return to the UK. Total levels of Nitrogen (N), Phosphorous (P) and Potassium (K) were focused upon because these are the three limiting nutrients for plant growth (e.g. Scholes & Walker, 1993). Sampling within fields was based on a grid system (e.g. Smith, 1999). As field sizes were small and variations in important variables identified by local people within fields were often limited, sampling of soil was based on a flexible grid arrangement involving four to six points covering the bulk of the field area but including areas identified by local people as manifesting differences in important variables such as crop yield, soil loss and weed prevalence. This enabled objectives to be met using a manageable number of samples.

Soil samples were taken from the topsoil (0-20cm) in line with previous studies of spatial characteristics of soil nutrients (e.g. Schlesinger *et al.*, 1996). A focus on topsoil characteristics is particularly appropriate in dryland environments since in these contexts nutrients are often concentrated in this horizon (Noy-Meir, 1979/80). Samples were stored in zip-lock plastic bags. On return to the UK they were air-dried, assessed for dry weights and stored. Samples were prepared for analysis and analysed using standardised laboratory techniques (Anderson & Ingram, 1993; Allen, 1989), as summarised in the table below.

Table 3.6: Soil preparation and analysis methods

Analysis	Sample preparation	Analysis method
Total N	Sieve at 212 µm; riffle; weigh out 1g of sample material to 2 decimal places accuracy; add kjeldahl catalyst tablets and 12ml anatar conc. sulphuric acid; digestion platform with pear shaped filled with deionised water for 6.5 hours at 395 °C; cool, top up with deionised water to 250ml, invert and filter at 0.45µm; refrigerate	Flow Injection Analysis (FIA): TKN Foss method AN 5221 and AN 5241
Total P	Sieve at 212 µm; riffle; weigh out 1g of sample material to 2 decimal places accuracy; add kjeldahl catalyst tablets and 12ml anatar conc. sulphuric acid; digestion platform with pear shaped filled with deionised water for 6.5 hours at 395 °C; cool, top up with deionised water to 250ml, invert and filter at 0.45µm; refrigerate	Flow Injection Analysis (FIA): TKN Foss method AN 5221 and AN 5241
Total K	Sieve at 212 µm; riffle; weigh out 5g into conical flask; add 100ml ammonium acetate (pH 7) using scales and pipette; shaker for 1 hour in relays so sample does not sit; filter sample using vacuum pump and moist paper GFC 0.45µm filters with tweezers; transfer to tubes and refrigerate	Atomic emission spectroscopy at 766.6 nm with 0.1% Cs buffer solution in range 0-2 mg/l using a Perkin Elmer 1100b Atomic Absorption spectrometer (AAS)

Sources: Anderson & Ingram, 1993; Allen, 1989

To ensure the efficacy of the digestion and analysis methods, the recovery of N, P and K from standard reference materials was used (Allen, 1989). Duplicates and blanks were also run to check for reliability and ensure the background solution was free from contamination (e.g. Smith, 1999; Allen, 1989).

Data from the analysis of soil collected from the first phase of fieldwork, undertaken during the interim period in the UK, provided a basis for further discussions around land use practices during the second fieldwork phase. Participatory mapping of NRs was also attempted to reveal further insights about land user's perceptions of environmental stocks and processes (cf. World Bank, 2002a; Chambers, 1997). However, this technique proved unsuitable as local respondents found the unfamiliar task of drawing maps intimidating. People tended to feel that they could not produce a worthwhile effort themselves and repeatedly referred me to others who might possess the necessary artistic skills. Assuring respondents that I was interested in their own representation of reality rather than an accurate spatial map and offering use of different forms of media (cf. Chambers, 1997) failed to overcome these problems, which may reflect a more fundamental lack of confidence amongst many local people in their own abilities and a dependence on government for technical planning and engineering advice, including mapping (e.g. Bek *et al.*, 2004; Phahlamohlaka, 2000; Cloete, 1985).

3.4.2.6 Ranking tasks

Simple matrix ranking tasks were used in a small number of semi-structured interviews or with small groups to enable the understanding of local priorities or the relative value of different resources, such as different crop, tree, fruit or soil types for different purposes (cf. Kersten, 1996; Maxwell & Bart, 1995). Rankings were cross-checked between informants and against other data sources.

3.4.2.7 Diaries

A sub-sample of households included in the village survey in Phahlamanoge and representing richer and poorer members of the population and dependence on different forms of livelihood strategies were asked to complete simple tick-box sheets once a day to provide basic information on land use and livelihood activities. Information was gathered on field activities, transformations to livestock holdings, income sources, expenditure, rainfall and food consumption. The aim was to provide supplementary longitudinal data on livelihood practices to corroborate other data sources and to flag up any important shifts in livelihoods, seasonal or otherwise, that might take place during my return visit to the UK, allowing follow up during my second visit. The diary was of a highly structured format in order to remove problems of selectivity, focus participants recall on key issues and ensure that it was quick and easy to complete (Burgess, 1984).

Participants were paid a small stipend to encourage cooperation and to compensate them for the time and effort invested. However, the stipend was sufficiently small both to make it affordable and to ensure it did not create social tensions between those included and those not (cf. Aliber, 2002). The diaries were established two weeks before my return to the UK and with training and trouble-shooting visits most households were producing useful information before departure. One of my translators checked on households every two weeks in order to solve any problems, collect completed sheets, provide new sheets and provide payment. Through this process continuous data covering at least three months was collected on six households, providing an important cross-check on other data and sources. However, respondent fatigue and considerations of 'optimal ignorance' (Chambers, 1992) ruled out the extended use of this method.

3.4.2.8 Secondary data

Use of qualitative and quantitative fieldwork methods was complemented by analysis of secondary data (Burgess, 1984), where available, on the dynamics of key livelihood and environmental variables such as demography, employment, rainfall and livestock trends. Secondary data sources were used to provide data that was unavailable in other forms and/or to enable the replication or corroboration of primary data (Kitchen & Tate, 2000). Secondary data sources were used to meet all three research objectives.

3.4.3 Objective three methods

Multiple social and physical scientific methods were also used to investigate the justification for and efficacy of interventions aimed at enhancing livelihoods and changing environmental processes that were grounded in the dominant environment-development narratives investigated under Objective one. Semi-structured interviews with government and NGO personnel were described above. The participant observation, semi-structured interviews and participatory methods used with land users to meet Objective two also informed Objective three, particularly interviews with members of projects about their experiences and their perceptions of the costs and benefits of involvement.

3.4.3.1 Analysis of aerial photographs

Analysis of aerial photographs was used to distinguish changes in cultivation and gully erosion over a 50-year period. The dates of photographs coincided with many participants' lived experience, potentially enabling identification of forces driving contemporary environmental transformations and allowing a further opportunity for triangulation of sources and findings (cf. Batterbury & Bebbington, 1999). The approach reflected that of Mapedza *et al.* (2003) and Elliot & Campbell (2002) who emphasise how use of participatory methods and aerial photographs can complement each other and lead to a more complete understanding of socio-environmental problems. The latter provide information on changes in land cover and erosion extent over past decades, while the former provide data on the changes in land use that led to vegetation change, as well as local perceptions of vegetation change. Land users' understandings may differ from actual vegetation change and may act as an important determinant of NR use (Mapedza *et al.*, 2003).

Pairs of South African government scanned aerial photographs from the 1950s/60s and the year 2000 for each study site were imported into the Arcview geographical information system and geo-referenced to a base map of the region using the ImageWarp extension to apply a bilinear transformation to control points. Polygons were then digitised over these photographs to delineate areas of cultivation. Ground-truthing was unnecessary due to my firsthand knowledge of the study sites. Boundary definition and classification of landcover types is acknowledged to be a subjective process (Whitlow, 1986), but by developing strict rules for classification and undertaking all assessments myself, error was minimised. Woodland was not mapped because tree and bush cover were sparse and dispersed and therefore difficult to positively identify on large-scale photographs. No dense areas of woodland were identifiable in proximity to the study sites. Some systems for the analysis of aerial photographs such as that complied by the Southern African Regional Commission for the Conservation and Utilisation of the Soil (SARCCUS, 1981) delineate types and degrees of severity of soil loss including sheet and gully erosion, but due to the quality and scale of the images available, this was not possible here.

3.4.3.2 Participatory rangeland assessment

For rangeland areas, field based surveys of vegetation community composition were considered at distances radiating from two or three centres of intense livestock activity identified in each study settlement (Perkins & Thomas, 1993), allowing livestock impacts on biomass and biodiversity to be evaluated and linked to local understandings of change. However, a lack of identifiable points where livestock pressure was highly concentrated acted against the adoption of this method. The occurrence of a drought during my fieldwork also made the reliable identification of a wide diversity of grasses in an intensive veld survey almost impossible.

An alternative approach was therefore adopted. A small sample of livestock herders in each settlement were asked in individual interviews to identify and describe key grasses favoured by their livestock (Bollig & Schulte, 1999). By cross-checking answers within settlements, it was possible to quickly document local perspectives on the grazing resources most prevalent around each settlement. By asking herders to find and collect relatively healthy samples of these grasses and combining these with their descriptions, it was also possible to match favoured grasses to secondary literature and derive a

provisional reading of the state of the veld from the species and varieties of grass identified (van Oudtshoorn, 1999; van der Walt & le Riche, 1999).

3.4.3.3 Soil sampling

Soil samples were collected with the guidance of land users to provide measurements of total stocks of Nitrogen, Phosphorous and Potassium, as described in section 3.4.2.5. These soil samples also provided insights into the impacts of soil erosion on nutrient status relevant to addressing Objective three. Construction of partial nutrient budgets in order to assess the nutrient use efficiency and effectiveness of present cropland management techniques was rejected for the reasons given in Chapter two.

3.5 The research experience and inherent biases

It is impossible to escape the power relations that shape the research process, both during fieldwork and in the process of representing 'others' in texts (McDowell, 1992). Attempts must therefore be made to understand and take account of these complexities in practice by examining the positionality of the researcher and subjecting the research process to scrutiny, particularly in developing world research where inequalities are often greatest (e.g. Brockington & Sullivan, 2003; Rose, 1997; Mather, 1996; Okely, 1996; McDowell, 1992). However, an awareness of the 'arrogance of research' (Katz, 1994:70) must not be allowed to degenerate into 'self-indulgent navel-gazing' (Brockington & Sullivan, 2003:73). Nor should it imply a privileging of developing world knowledge as this approach would be no less problematic, allowing the Western researcher to ignore his/her own responsibilities and introducing problems of 'gatekeeping' (Scheyvens & Storey, 2003).

3.5.1 Positionality and reflexivity

Interviews, like any form of social interaction, involve reflexive relationships that are mutually structured by all participants. How respondents viewed me could have influenced my interactions with them and hence the entire research process (Batterbury, 1994). During fieldwork it was therefore important to be mindful of the image I was projecting of myself, especially being a white, well-educated, British outsider conducting face-to-face transactions in a rural South African environment populated largely by black, poorly-educated individuals, many of whom were women.

People in Phahlamanoge were initially very suspicious about the presence of a white foreign 'other' in their village asking questions about their activities and projects. As a result it is possible that some individuals may have withheld information from me. In a small number of cases it was obvious that respondents were highly suspicious and did not want to give me too much information. Yet while many people were sceptical about my presence at first, in the vast majority of cases, no doubt partly due to my association with a local assistant and my attempts to make myself seen and known around the village, people became welcoming. Although I remained an 'outsider', the relationship between myself and those I researched had changed substantially, and was also highly variable between individuals, implying the simple but popular outsider/insider dichotomy may lack subtlety and flexibility (cf. Mullings, 1999; Mather, 1996).

Non-response bias is unlikely to have exerted a significant impact on the research findings as few problems were experienced with finding willing participants once initial suspicions were overcome (Fowler, 2002). On the other hand, it is possible that a positive bias exists in the information collected due to a potential desire on the part of respondents to provide answers that they thought might 'please' me (Mosse, 1994), what Gill (1993) refers to as a 'conspiracy of courtesy' (Gill, 1993). A positive bias might also have resulted because, despite explanations to the contrary, people thought their responses might lead to direct assistance from myself or the government. Repeat visits and cross-checking between sources and methods were used to make transparent any such problems.

3.5.2 Positionality and translation

Interviews with government and NGO personnel were conducted in English with no translator present, but all interviews and group discussions with villagers required the assistance of a translator due to the different local languages used, hence it is important to consider their positionality as well as my own (Twyman *et al.*, 1999). Efforts were made to learn and communicate basic phrases in the languages used in the study villages, Swazi and Northern Sotho, and although far from perfect, these attempts were important in breaking down psycho-social barriers; villagers seemed to value these efforts as a sign of my genuine interest in and respect for their culture and community (cf. Smith, 2003). Although reliance on the interpretive abilities of my translators could be considered to lead to a loss of precision and reliability of the data collected due to

misunderstandings or simplifications inherent in the translation process, the use of multiple translators, both male and female, in all villages and multiple methods and sources sought to reduce any such errors by allowing cross-checking for aberrations and the triangulation of findings (Valentine, 1997). Discreet efforts were also made to talk to those who spoke English, such as ward councillors, teachers and well-educated youth, without any translator present as a further means of ensuring I did not receive a representation of reality that had been sanitised or distorted, consciously or otherwise, by my translators (Valentine, 1997).

There is considerable debate in the literature about how a researcher may gain access to more balanced viewpoints (e.g. Archibald & Crnkovich, 1995; Fonow & Cook, 1991; Hill-Collins, 1990; Abu-Lughod, 1988). Some researchers contend that 'insiders' have an advantage because they are able to use their knowledge of a group to gain more intimate knowledge of its mental and physical activities (e.g. Hill-Collins, 1990; Abu-Lughod, 1988). However, Fonow & Cook (1991) argue that 'outsiders' will tend to be better able to take an objective viewpoint and observe behaviours without distorting their meanings. In this research, employing research assistants who lived in the villages where fieldwork was undertaken could be seen as a disadvantage because people being interviewed might have felt reluctant to reveal information that they might have shared with an independent and neutral outsider. However, this disadvantage was arguably more than out-weighed by the benefits of working with a local resident. These included personal recognition between translator and interviewee that facilitated access to respondents and in many cases contributed to reduced suspicions and a more relaxed, open and informal atmosphere than would otherwise have been possible, and greatly enhanced efficiency in understanding village layouts and activities and in locating key informants and hidden households.

An outsider working with an insider in the manner in which I worked with local translators is arguably a hybrid solution that captures both the insider advantage of intimate local knowledge (Hill-Collins, 1990; Abu-Lughod, 1988) and the outsider advantage of a more distanced and objective viewpoint (Fonow & Cook, 1991). By employing local residents and frequenting local shops I was also aware that in some small way my research was injecting 'outside' income into the local economy.

Attempts were made to investigate the backgrounds of potential assistants before employing them to ensure that they were as politically neutral as practicable and that they possessed appropriate language skills, time, personality and local knowledge. All assistants were trained in interviews skills and the understanding and translation of key terms was explored to ensure that the ideas and meanings of my English questions could be communicated as precisely and reliably as was practicable to respondents and *vice versa*. While literal translation in the interview was not possible (cf. Twyman *et al.*, 1999), it was essential that the translator summarised as accurately as possible what respondents said. Research assistants employed in Madibong had previous training in and experience of conducting survey work, substantially reducing the time required to refine interviewing skills.

Relations with translators were generally very positive and professional, although in Phahlamanoge during initial stages of fieldwork I quickly became aware that I needed my translator - who had invaluable local knowledge and a social standing which greatly facilitated access to a wide range of respondents - as much as, if not more than, he needed me (for income). Moreover, he was also aware of this delicate balance of power and his gatekeeping role (cf. Mullings, 1999). Thus when I was unsatisfied with his performance in an interview situation, considerable diplomacy and sensitive negotiation was often required to bring about desired changes in behaviour. Nevertheless, over time we built an excellent working relationship and the research benefited hugely from his local expertise, negotiation skills and patience.

3.5.3 Positionality and ethics

The research was conducted in an ethical manner, seeking appropriate permissions, respecting respondents' rights, local customs and land access issues. Before beginning all interviews, my translator would explain who I was, my background and my reasons for wanting to interview them (Burgess, 1984). My independence from government, NGOs and other local organisations was emphasised and local participants were also assured that information supplied would remain confidential and that they would remain anonymous. All names of local respondents provided in this thesis are fictional. Respondents were always given the opportunity to withdraw at any time, with assurances that this would not be a problem (Fowler, 2002). During all interactions I attempted to maintain an open, non-judgemental approach to encourage the respondent

to express him or herself fully and to respect their rights to express their own opinions (Burgess, 1984). Preliminary findings from the research were fed back to key informants in the study settlements and a report derived from this thesis has already been supplied to LPDA. Reports for other government ministries in South Africa including further reports for LPDA will be prepared in due course. Findings will also be posted on a website and links provided to collaborators. Yet as I stressed to respondents, as a supposedly neutral and objective academic researcher I was and remain powerless to ensure that my findings are read by government agents or acted upon in any way.

3.6 Other biases and potential biases

3.6.1 Seasonality

Findings could have been biased by seasonality and by the characteristics of the specific year in which research was undertaken and oriented. For example, the sustained period of dry weather that was being immediately experienced during both field visits, and that was subsequently officially recognised by government as a drought that demanded provision of assistance to rural people, may have had a substantial impact on people's perceptions of rainfall change (cf. Dahlberg, 1996). The previous year had experienced more rainfall but was also perceived by many local people to have been drier than many past seasons. Indeed, there was a widespread perception amongst respondents in Phahlamanoge and in Madibong that rainfall in the region had decreased over recent decades leading to a decline in yields. Respondents' perceptions of broader changes in rainfall, and other variables, and the impacts of these on their livelihoods, were used in conjunction with secondary data sources to contextualise the relatively tight temporal gaze provided by fieldwork.

The dryness of the specific year of fieldwork also impacted on biophysical research. For example, completion of a survey of rangeland grasses was not possible because, as noted above, the drought made reliable identification of local grasses problematic.

3.6.2 Location

The three study villages selected for fieldwork represented a variety of sizes of settlement, locations and altitudes, differing degrees of market, infrastructure and service access. However, the sample was purposely biased towards villages perceived by agricultural extension workers familiar with the region to suffer from particularly

high levels of soil erosion. This study does not therefore claim to be representative for all villages in Sekhukhune District; rather, it presents intensive case studies of livelihoods and interventions in a small number of settlements reported to be particularly 'degraded' (Richards, 1996; Harvey, 1969). These case studies may not provide a basis for making wide-ranging inferences about the general population, but they stand to be substantiated, and the detailed data gathered may enable an enhanced understanding of the processes that underlie empirical observations and reveal patterns that can be used to generate or modify models or hypotheses (Rice, 2003; Richards, 1996; Miles & Huberman, 1994; Harvey, 1969). Moreover, by linking local level case studies to broader structural processes, broader scale relevance is also retained (Twyman, 1997; Murdoch & Marsden, 1995). The focus of the case studies on poor, highly degraded villages and on Phahlamanoge as the site of a Landcare project is also significant in that it can generate insights into particular situations in order to improve them (Drenth, 1996). Thus the aim of this research is to generate knowledge that is accurate and contributes to theory and that is also potentially useful to improving the quality of life of respondents (Drenth, 1996).

3.6.3 Topic

Respondents appeared comfortable to talk about relevant livelihood and environmental issues. Income was rarely discussed directly since key informants suggested it was a highly sensitive subject. Natural causation, problems of jealousy and perhaps also local perceptions that generating income is a 'zero-sum game' (Orr, 2001), where gains for one actor imply losses for others, meant that households were unlikely to acknowledge that they were getting wealthier while others remain poor. However, the value of government grants, often the main source of household income, was known, as were the ranges of salaries generated from different forms of informal and formal employment. In addition, respondents were often willing to estimate the regularity of income flows and their relative contributions to livelihoods. Such subjective measures could be cross-checked to some extent against observations of household structure and construction and ownership of other assets such as tractors, stoves or generators. Even if individuals had been comfortable to discuss their income and expenditure in detail, a complete and rigorous economic analysis of monetary flows would have taken a considerable amount of time (cf. Baber, 1998). Ultimately, such analyses were not deemed necessary to meet the objectives of this study.

During my initial meeting to seek permission to work in Phahlamanoge, the tribal authority sought clarification that I was interested only in asking residents about land use and livelihood practices and that I was not going to involve myself in political issues. Key informants also warned me off talking about the highly sensitive subject of the political factions and power struggles in the community. However, it was possible to tactfully explore such contextual aspects with key informants once I had built up a certain level of rapport with them, or implicitly via discussion of apparently apolitical issues of land use or livelihoods in some instances.

3.7 Data analysis

Findings from multiple sources were gathered and integrated through an inductive, 'grounded' cycle of examination, analysis and cross-checking in order to uncover the reasons for and implications of different emergent understandings and to address the research objectives (Miles & Huberman, 1994). The livelihoods framework provided guidance to this process and assisted organisation of data. Keeping a fieldwork diary also aided management of my thoughts and emotions during fieldwork and assisted later recall and reflection (cf. Burgess, 1984).

Quantitative data was manipulated on return to the UK in Excel spreadsheets and SPSS. Selection of statistical tests to apply to the data was driven by the objectives of the research (Kitchen & Tate, 2000). As the sample sizes were often small and broke the normality assumptions of parametric tests, only non-parametric tests were used. Mann-Whitney U test was used for comparison of two independent samples, using a significance level of 0.05, but in most cases simple descriptive statistics were sufficient to describe the collected data. Levels of total Nitrogen, Phosphorous and Potassium in the collected soil samples were extracted and quantified in the laboratory using standardised methods, as described in section 3.4.2.5.

Qualitative data such as interview transcripts was coded and analysed based on widely used methods outlined in Corbin and Strauss (1998), Slim and Thompson (1994) and Finnegan (1992). Identification of themes and connections in interview transcripts was facilitated by the underlying structure to the questions asked (Kitchen & Tate, 2000). During coding there was a tension between organising segments of texts into thematically coded groups and maintaining links to the context within which each

element had originally been expressed (cf. Mason, 1994). However, by maintaining the original transcripts whilst simultaneously cutting and pasting coded sections, marked with signatures stating their origin, between different data files it was possible to move backwards and forwards between different arrangements of the data, facilitating a flexible and dialectical exploration of findings. Repeated readings of data sources, repeat interviews and discussions with key informants to pursue emerging themes in the field, intermittent reflection and consideration of neglected aspects, and spontaneous memories, thoughts and intuitions (cf. Okely, 1994) all represented additional influences on the process of coding that increased its complexity but ultimately produced a holistic and grounded analysis (Cope, 2003; Kitchen & Tate, 2000).

3.8 Summary

This research adopted a hybrid mixed methods approach to address the three research objectives. Use of household surveys and semi-structured interviews was complemented by experimentation with a variety of P/RRA techniques, oral histories, soil sampling and testing and use of secondary sources including aerial photographs. The theoretical approaches and debates discussed in Chapter two guided adoption and use of this methodology and the focus of fieldwork on a variety of social and environmental factors. The findings generated through use of this methodology constitute the remainder of the thesis. The next chapter analyses national scale developmental and environmental narratives that frame livelihood dynamics and interventions in the three study settlements; the latter are investigated in subsequent chapters.

Chapter 4: Environment and development narratives in South Africa: Macro level influences on local livelihoods

4.1 Introduction

This chapter seeks to address Objective one, namely to identify and critically evaluate narratives of environment and development in South Africa and their linkages to international directives. The chapter explores, within a South African context, the historical development of two overarching narratives, neoliberalism and soil erosion. These narratives were introduced in Chapters one and two but they are considered in greater depth here because they are believed to exert considerable influence over South African attempts to redress the development and environment legacies of apartheid. The analysis adopts an approach broadly similar to that of Hobden (1996). 'Core' and supporting 'corollary' narratives are delineated and described, key actors are identified, and the alleged impacts of these narratives on livelihoods in former homeland areas are reviewed. This chapter thus seeks to delineate principal national scale policy processes that frame livelihood dynamics and interventions at the settlement and household levels, dealt with in Chapters five, six and seven.

4.2 The neoliberal narrative in South Africa

This section explores the emergence of neoliberalism as a dominant narrative in South Africa during and after the transition to democratic government, the key role that was played by the private sector in the elevation of this narrative and its alleged impacts on rural livelihoods.

4.2.1 The rise of the neoliberal narrative and the role of the private sector

'Redistribution with growth' was a critical concept of the 'new' democratic South Africa advocated in the Reconstruction and Development Programme (RDP; Republic of South Africa, 1994). This concept had its roots in the radical 1955 Freedom Charter, a document drafted with considerable input from civil society organisations (Bond, 2000a). A key contention of the RDP was its rejection of the orthodox assumption that economic growth

will necessarily lead to development and redistribution in favour of a central focus on simultaneously balancing growth and redistribution:

> "Growth – the measurable increase in output of the modern industrial economy – is commonly seen as the priority that must precede development. Development is portrayed as a marginal effort of redistribution to areas of urban and rural poverty. In this view, development is a deduction from growth. The RDP breaks decisively from this approach. If growth is defined as an increase in output, then it is of course a basic goal. However, where that growth occurs, how sustainable it is, how it is distributed, the degree to which it contributes to building long-term productive capacity and human resource development, and what impact it has on the environment, are the crucial questions" (RDP, 1994: Section 1.3.6).

The RDP thus established a broad scale agenda for transformation in South Africa, focusing on poverty reduction, meeting basic needs and redressing past and present inequalities. It sought to promote a new vision of development that would correct the extreme inequalities that had resulted from implementation of the prior Verwoerdian model of 'separate development' (advocated from the 1950s to the early 1970s), which was premised on a belief in the distinctiveness of the various ethnic groupings within the 'backward' African population and their separateness from the 'developed' white population (Tapscott, 1995).

In practice, RDP interventions largely involved investment in infrastructure and provision of social services, often through public works projects that both created jobs and helped to redress apartheid-created infrastructural disparities. Such works programmes could also repair 'environmental damage', as in the Landcare programme (RDP, 1994: Section 2.3.5; analysed in Chapter seven). In rural areas, a land reform programme was seen as 'the central and driving force' for development (RDP, 1994: Section 2.4.2). The aim was to address the injustices of forced removals and the historical denial of access to land and to improve tenure security for rural dwellers, simultaneously boosting the rural economy by generating large-scale employment, raising rural incomes and alleviating overcrowding. The programme was to be 'demand-driven' and aimed to supply land to both the poorest section of the rural population and 'aspirant farmers', reflecting the dual linked goals of addressing both growth and development/redistribution.

Powerful business interests were unimpressed with the RDP and increasingly bemoaned the lack of a clear macroeconomic blueprint for South Africa (Williams & Taylor, 2000). In

June 1996 the Growth, Employment and Redistribution Programme (GEAR) was released, without prior public consultation, and declared 'non-negotiable' by the government (Williams & Taylor, 2000). GEAR aims to provide a stable economic framework that is claimed to be fundamental for, amongst other things, effective rural development (Republic of South Africa, 2000). It seeks to establish fiscal, monetary and exchange rate policies that will stabilise the economy, improve international competitiveness and increase integration with the global economy (Republic of South Africa, 1996). Although not intrinsically incompatible with the goals of the RDP, GEAR quickly subordinated the RDP and became the overriding economic and development framework in South Africa (e.g. Aliber, 2002).

The GEAR framework reflects the dominant international narrative of neoliberalism (or neoclassical economics), increasingly influential during the 1980s and now underlying much contemporary development practice (Mercer *et al.*, 2003; Pieterse, 2001). From the neoliberal perspective, development is simply a problem of 'getting the prices right' and letting the invisible hand of the market do its work (Pieterse, 2001). The central objective is economic growth, to be achieved through reduction of market-distorting interventions, organization of people and systems to unable them to participate in the market and by 'betting on the strong' (e.g. World Bank, 2002b; Pieterse, 2001). Capturing mobile capital is seen as the primary means both to increase economic growth and "to empower the disadvantaged through increased private investment" (Williams and Taylor, 2000:34). Whilst the orthodox core meaning of development as economic growth is retained, the agency of development is therefore transferred from state, as in modernisation and dependency theories, to market (Pieterse, 2001), with the role of the state reduced to that of an 'investment promotion agency' mediating between local interests and mobile capital (Soderbaum & Taylor, 2001:675).

Policy selection, like the definition of environmental problems described in Chapter two, is often more ideological than scientific, involving trade offs between issues (e.g. higher inflation and lower unemployment), groups (e.g. lenders and workers) and risks that often benefit an influential elite minority first and foremost (Interfund, 2003; Stiglitz, 2002). The rise to dominance of neoliberalism in South Africa (as elsewhere) was not inevitable. It was

actively achieved through promotion by a powerful network of actors who dismissed alternative proposals such as 'redistribution with growth' as nonsensical 'economic populism' (Williams & Taylor, 2000; Taylor & Vale, 2000). As Williams and Taylor (2000b:36) state:

> "the agents of neoliberalism successfully managed to conceal the (considerable) ideological content of their position, portraying it instead as the only sensible and socially-neutral position. This process stymied genuine debate by delegitimising (and often ridiculing) alternative positions".

Social actors involved in the process included advisers of the former regime still in government who were often unsympathetic to the new regime's policy goals, World Bank and International Monetary Fund economists, and in particular a large propaganda effort from business 'experts' and their associated media (Bond, 2000a; Lipton, 2000; Williams & Taylor, 2000). ANC economists lacked a unified policy vision and had limited room for manoeuvre due to national debt inherited from the National Party, hence they were poorly positioned to resist the new narrative (Bond, 2000a; Williams & Taylor, 2000). The socialist bloc was simultaneously collapsing, undermining any radical anti-market alternatives (e.g. Munslow *et al.*, 1997)

Taylor and Vale (2000:402) suggest that the realisation of a negotiated democratic settlement in South Africa in 1994 was itself largely motivated by the global rise of market ideology and a belief amongst the elite that a continuation of their privileged position in society was dependent on "access to the elixir of monetarism and the increasingly accepted principles of neo-liberalism". The adoption of this neoliberal narrative ultimately prevented the ANC from undertaking any radical initiatives for redistribution of assets that might have threatened the status quo while simultaneously establishing the necessary institutions for effective functioning of markets (Taylor, 2002a; Taylor and Vale, 2000; Marais, 1998). The virtual absence of debate on macro-economic policies in government in South Africa implies that either the neoliberal economic narrative has become accepted as common sense 'received wisdom' (cf. Taylor & Vale, 2000), or that the leadership has been effective in silencing dissenting voices. The clear moral arguments for growth with equity, as advocated in the RDP, have been traded off against the perceived importance of economic

growth (Pieterse, 2001). Given conventional trickle-down arguments for growth, morality has become 'merely a matter of time' (Pieterse, 2001:115).

Yet while the ANC has adopted many key elements of the 'neo-liberal package', it is important to emphasise that they have also implemented a number of non- 'free market' interventions such as targeting of jobs at the black population and the 'very poor' to reduce income inequalities (e.g. Lipton, 2000), cost-raising labour policies including a minimum wage (e.g. Interfund, 2003; Lipton, 2000) and provision of improved social grants as 'safety nets' to pick up the 'temporary victims' of market forces and assist them to rejoin the market (e.g. Williams & Taylor, 2000; Rist, 1997). The impacts of these non-market measures on livelihoods in the study villages, particularly the contribution of social grants to household income and livelihood strategies, are addressed in Chapter five.

4.2.2 Alleged impacts of the neoliberal narrative on rural livelihoods

GEAR can be seen as a self-imposed structural adjustment programme (e.g. Everatt, 2003), which, like other such programmes in Southern Africa, has curtailed spending on social service provision and general 'welfare' measures (e.g. Ferguson, 1994; Esteva, 1992). The Integrated Sustainable Rural Development Strategy document (Republic of South Africa, 2000) admits that the dismantling of parastatal organisations and the termination of development programmes in South Africa had a negative impact upon land users in the former homeland areas, leaving them facing the challenge of maintaining costly infrastructure without the access to financial resources and agricultural services enjoyed by larger commercial farmers. Concerns with fiscal stringency under GEAR are also reported to have limited the government's ability to deliver services and encouraged adoption of a 'cost recovery' approach to service provision and a search for public-private partnerships (Interfund, 2003; Tsheola, 2002). Yet the cost recovery approach has proved inappropriate in many poverty-stricken areas where residents' inability to pay user fees for water or electricity has led to high rates of service disconnection (e.g. Aliber, 2002; Bond, 2000a).

'Community participation', albeit guided by a 'top-down' strategy and achieved within the existing social order, is also advocated as a means to create more financially efficient,

'demand-led' institutions and include identified target groups in the development process (Mohan and Stokke, 2000). This managerial vision of participation, founded on rational choice theory, enables more political interpretations of the process to be transformed into the seemingly natural logic of 'efficiency' of service delivery and market involvement (Mohan and Stokke, 2000). Local government, communities or civil society organisations take responsibility for the management of local resources, and external interventions are limited to the provision of information and institutional support services that enhance efficient resource allocation (Kamara *et al.*, 2002). Yet while the economic efficiency of service delivery may be increased, there is concern that this process results in civil society organisations working with the poor becoming depoliticised and acting simply as agents of service delivery, not as agents of wider democratic change (Mohan and Stokke, 2000). Moreover, by decentralising responsibilities for development and services, central government is able to factionalise and fragment political opposition (Mamdani, 1996). The neoliberal focus on local level participation may thus, paradoxically, weaken the ability of rural dwellers to transform national and supranational political and economic structures, whether intentional or otherwise.

Macro-economic policy change is also claimed to have had a major impact on formal sector employment. GEAR aimed to create 1.3 million new employment opportunities that, via the 'trickle-down' effect, would substantially reduce poverty, but the forecasted growth and job creation levels have failed to materialize (Aliber, 2002). Gross Domestic Product (GDP) growth has remained low and many retrenchments have occurred, leading to 'high and chronic' unemployment (Republic of South Africa, 2000:17). Rural areas have been particularly hard hit by lost remittances because retrenchments have occurred predominantly in the mining and manufacturing sectors dominated by migrant labourers (Limpopo Provincial Government, 2001). Government has attempted to assist growth in the informal sector as formal sector employment opportunities have declined, but the promotion of micro-finance and establishment of business advice centres has not had a substantial impact on unemployment (Aliber, 2002). However, as Stiglitz (2002) has pointed out, it is difficult to attribute particular economic changes such as declines in

formal sector employment to specific policies like GEAR, because it is impossible to know what would have happened had a different policy been pursued.

Growing pressure on government to accelerate growth and job creation by 'betting on the strong' (cf. Pieterse, 2001) may be diverting resources away from poverty alleviation and redistribution. For example, Lahiff (2001) claims that implementation of land reform, originally a key element of the RDP, has been significantly constrained by adoption of a market-based, demand-led approach in keeping with GEAR. The land reform policy, like the Strategic Plan for South African Agriculture (Republic of South Africa, 2001), seems to neglect the importance of part-time, subsistence-oriented agriculture for millions of poor households, concentrating instead on a relatively wealthy minority of 'emerging' or 'commercially viable' black farmers with the capital and experience necessary to undertake market-oriented production and participate in the global economy (Lahiff & Cousins, 2001). A related example is the clear focus in agricultural and spatial development policy on considering 'potential for growth' or 'economic viability' in the targeting of interventions. The White Paper on Agriculture (Department of Agriculture, 1995) emphasises that 'economic viability' of service provision is dependent on a certain minimum level of economic activity and 'buying power'. Potential for economic growth in agricultural activities is also affected by the 'restrictive potential' of natural agricultural resources and the variability of rainfall (Department of Agriculture, 1995). The White Paper therefore recommends that risks and opportunities presented by both environment and economy should be assessed before government implements any policy intervention aimed at agricultural development (Department of Agriculture, 1995). A possible outcome of this approach is that villages located in low rainfall areas with very limited economic activity and buying power, like those in Sekhukhune, may be judged non-viable investment opportunities and excluded from much needed development assistance.

Everatt (2003:96) claims there is a common perception in the public and private sectors,

> "that rural areas are inherently and uniformly unviable in economic terms. Seen in this perspective, rural areas need basic infrastructure, and their denizens need welfare support and basic survivalist skills – development as charity, with the purpose of eradicating infrastructural

> inequalities and assisting survivalist economic enterprises. No more ambitious economic goal is regarded as feasible".

This viewpoint is supported by Tomlinson's (2003) claims that the resources allocated to local economic development aimed at the poor and unskilled are dwarfed by those allocated to skill-intensive, export-oriented regional investment programmes, and that some people in the Department of Trade and Industry view present support for 'microenterprise stuff' as a 'welfare issue' separate from its economic growth policy (cf. Makgetla, 2004). These perceptions, Tomlinson argues, reflect,

> "the dilemma government faces between supporting micro-black-owned enterprises that have a tremendously high failure rate and create very few, very low-paid jobs, versus a sustainable job creation strategy taken forward by established small and medium enterprises, the minority of which are likely to be black-owned" (Tomlinson, 2003:116-117)

There is clearly a balance to be found, but under neoliberal fiscal constraints there is also a possibility that an increased focus on accelerating economic growth and on interventions targeted at 'backing winners' diverts resources away from interventions to redistribute wealth and reduce widespread poverty, especially if a trickle down of benefits from investment in winners fails to materialise. Analysis of data on livelihoods and intervention strategies in subsequent chapters, particularly Chapter six, attempts to address critical questions about the links between neoliberal economic policy and poverty and the options available to improving the situation of the rural poor.

The GEAR policy document (Republic of South Africa, 1996) proposes nothing meaningful on environmental issues and no reference is made to 'sustainable development', prompting Aliber (2002) to conclude that its adoption represented 'a step backwards' for poverty eradication and environmental management. Nor does the related Provincial Growth and Development Strategy for Limpopo Province (1998) make any mention of environmental issues, despite the fact that Limpopo Province has been identified as having some of the most environmentally 'degraded' areas in South Africa (Hoffman & Ashwell, 2001). Introduction of the Integrated Sustainable Rural Development Strategy (ISRDS; Republic of South Africa, 2000) has not addressed these shortfalls. Whilst conducting Environmental Impact Assessments has been made compulsory for new development

projects, there is a tendency to require that projects are benign to the environment, rather than actively promoting integrated environmental management (cf. Aliber, 2002). Environmental concerns therefore remain largely divorced from development policy, lending support to the argument that environment is regarded by government as being of lesser importance than growth and development (e.g. Butler and Hallows; 1998; Fakir, 1996). One of the most widespread processes of environmental change in South Africa is soil loss. Narratives of soil erosion are considered below.

4.3 Narratives of soil erosion in South Africa across the democratic transition

This section addresses soil erosion narratives, actors and related interventions in South Africa, a sub-set of rural development thought and practice that falls within the overarching neoliberal framework discussed above. Soil erosion is the most visible form of environmental change. It is commonly viewed as the key environmental problem in South Africa and is thought to affect 70 per cent of the land area of South Africa (e.g. Laker, 2003). Soil erosion is particularly severe in former homeland areas such as the study area, Sekhukhune (Hoffman and Ashwell, 2001; Hoffman *et al.*, 1999). The consequences of soil erosion include sedimentation of dams, loss of soil fertility and salinisation. Costs associated with these processes were estimated at almost two billion Rand in the financial year 1992-1993 (Hoffman and Ashwell, 2001:5).

Environmental narratives promoted by colonial regimes and more recently by donors and national governments are powerful forces driving environmental intervention in Southern African drylands (Leach & Mearns, 1996). These historically grounded, culturally constructed orthodoxies ascribe to Africa's land users a specific role as agents, as well as victims, of environmental change, both describing the problem and prescribing the solution. The core narrative that underlies many of the perceived relationships between society and environmental change in Africa is the neo-Malthusian one (e.g. Adger, 1999; Leach & Mearns, 1996). A historical approach is adopted here to investigate the development of soil erosion narratives in South Africa from colonial and apartheid eras to the present day, their links to neo-Malthusian ideas, and their salience to contemporary South African understandings of the soil erosion problem.

4.3.1 Soil erosion narratives in colonial and apartheid South Africa

Expansion of settler grazing in South Africa through the 1800s led to concerns with veld deterioration and management that were frequently linked to wider developments in European thought concerning the disturbance of NRs by agricultural development (Beinart, 1996). When stock numbers grew rapidly in the early 1900s many intellectuals started addressing the 'veld degradation problem' and thus by the interwar years a narrative causally relating overstocking to soil erosion and vegetation change had become firmly established (Beinart, 1996). Intellectuals involved in the promotion of this narrative included progressive farmers, scientists and government officials, most of whom were not generally antagonistic to the apartheid system (Beinart, 1996). However, ideas about 'degradation' were also adopted by others to critique the apartheid system's restriction of blacks to an extremely limited proportion of land (Beinart, 1996).

By the 1920s there was 'mounting anxiety' over the 'deterioration' of homeland areas with discussions increasingly shaped by a conservationist narrative focused on soil erosion (Delius, 1996). Mine-owners worried about the implications of soil erosion for the future of the migrant labour system, while politicians were concerned about rural impoverishment leading to mass urbanisation and an end to segregationist plans (Delius, 1996). Nevertheless, the government remained set on massive social engineering.

The South African Drought Commission of 1922 and publications about the Dust Bowl in America in the 1930s increased official anxieties about soil erosion in the homeland areas and the need for action to improve land management, increase production and rehabilitate agricultural land (e.g. Hoffman *et al.*, 1999; Beinart, 1989). The Native Economic Commission of 1930-32 re-emphasised the severity of soil erosion in the homeland areas, basing its claims largely on the 'scientific facts' from the literature on soil conservation, (e.g. Hoffman *et al.*, 1999; Delius, 1996). The Commission described environmental problems in the homelands as an obstacle to agricultural development and argued that soil erosion, destruction of grazing lands and the drying up of springs must be urgently addressed (Hoffman *et al.*, 1999).

Referring to Sekhukhune, the study area for this research, Delius (1996:73) states that there has been 'considerable comment' on soil erosion and overstocking in the official record since the 1930s and that there existed a broad official consensus that the area was experiencing an 'ecological crisis'. The Director of Native Agriculture is cited by Delius (1996:73) as urging,

> "the very great necessity for the improvement of conditions in Sekukuniland. The locations of Gelukwe and Mohlaletse [close to the primary study site, Phahlamanoge] are the worst denuded areas resulting from overstocking and erosion in the Union".

Conditions in the homelands were increasingly blamed by government on the destructive land use practices, lack of responsibility and limited ecological understanding of African land users, whilst the impacts of conquest, segregation, land alienation, labour migration and consequent lack of capital and labour to invest in land management were conveniently ignored (e.g. Lahiff & Cousins, 2001; Hoffman *et al.*, 1999; Delius, 1996; Cell, 1982; Bundy, 1977). As Yawitch (1981:10) argues, Africans were perceived by policy makers at the time as inherently poor land users "with an irrational desire to accumulate cattle and an unwillingness to accept crop rotation".

As a response to concerns about soil erosion and the impacts of environmental collapse in homeland areas on the rest of the country, implementation of the notorious strategy of 'betterment' planning began in 1939 in all homeland areas (Beinart & Coates, 1995; De Wet, 1990). This approach to 'improved' land management combined physical measures to combat soil erosion with stock reduction, fencing, use of improved seed, regulations on cutting green wood and use of fire, expanded provision of agricultural education and, most importantly, the imposition of 'expert' land use planning that reorganised and separated land into distinct areas for settlement, arable production and grazing (e.g. Hoffman *et al.*, 1999; Delius, 1996; De Wet, 1990; Yawitch, 1981). People were often forced to move into newly demarcated, concentrated residential settlements and de-stock against their will, although attempts at betterment planning were resisted in many areas (e.g. Delius, 1996; De Wet, 1990; Bundy, 1977).

'Top-down' state action to address the environmental 'crisis' was further encouraged in 1953 by the report of the Tomlinson Commission which viewed black farmers as having a low standard of living and poor diet as a consequence of agricultural practices that were inefficient, unproductive and 'degrading' (Hoffman *et al.*, 1999). Recalling the work of the Commission in the 1950s, Tomlinson (1980:51) stated categorically:

> "Wherever we went we found (with few exceptions) the same picture – wrong farming systems and extreme overpopulation of both people and animals".

The Tomlinson Commission aimed to create "a class of contented full-time Bantu farmers with holdings of sufficient size to enable them to farm profitably and to exercise their initiative" (Union of South Africa, 1955:151 quoted in Lahiff, 2000) and it went to considerable lengths to calculate the amount of land needed in different ecological conditions to provide an appropriate standard of living for a 'contented Bantu farmer' (Hoffman *et al.*, 1999). Using this information, the number of black farmers who should be encouraged to form a farming class was calculated, as was the far larger population that would have to find alternative livelihoods (Hoffman *et al.*, 1999).

The establishment of denser settlements for 'industrialised natives' was also proposed to create local employment opportunities, thus avoiding mass urbanisation and freeing up land to full-time farmers (e.g. De Wet, 1990). However, the establishment of industries in homeland areas offering wages sufficient to enable families to subsist without access to any land or livestock failed, due amongst other reasons to a lack of political will to commit to the high levels of investment required (Delius, 1996). Despite these setbacks, attempts were made to identify 'inefficient farmers' and allocate their land to more productive individuals, leading to the consolidation of a 'farmer class' (Delius, 1996). Revision of land tenure was also reconsidered, with the Tomlinson report identifying secure individual tenure as "one of the prerequisites to the stabilisation of the land in the Bantu areas and the full economic development of their potential" (Union of South Africa, 1955:151 quoted in Lahiff, 2000).

Betterment planning manifested a faith in the capacity of Western science to solve social and environmental problems that was becoming entrenched within Britain and America after the First World War (Evans, 1997; Dubow, 1989), combined with a converse belief in

the ignorance of African land users. The latter was related to apartheid era assumptions of African racial inferiority. However, utilisation of a 'top-down' approach may have reinforced assumptions of land user ignorance, since it limits any opportunities for exchanging perspectives between land users and development agents and stimulates local forms of resistance (cf. Scott, 1985, 1990) that could have been perceived by outsiders as representing ignorance of the 'correct' solution (cf. Scoones, 1996). An appreciation of African people's local knowledge may also have been constrained by the "early conquest and absorption of African societies in South Africa... [and] the relative stasis in peasant production in the reserves" (Beinart, 2002:219). Indeed, the apartheid regime's imposition of practices and dismissal of local knowledge may have undermined African land user's confidence in and valuation of their local knowledge as they internalised these negative images, thus tending to bring about the conditions the government assumed to exist.

Imposition of 'modern' methods and a failure to consider the logic of existing knowledge and land-use systems or the diverse livelihood strategies on which people survived led inevitably to inappropriate interventions (e.g. Clarke, 2002; Delius, 1996; De Wet, 1990). Existing systems of livestock management were disrupted and the impact of livestock was concentrated around new settlements where previously it had been diffuse, leading to aggravated soil erosion (e.g. De Wet, 1990). Whereas homesteads were previously located on or near suitable arable land, relocations often left them at considerable distance from the best land, resulting in under utilization of arable plots (De Wet, 1990). Flexibility in response to climatic shocks was reduced and households were forced to adopt coping strategies that were more environmentally destructive, such as cultivation of marginal lands (Aliber, 2002; De Wet, 1990).

New residential arrangements also led to the break-up of old social relations and networks, often giving rise to social tensions and undermining local governance systems in the process (Hoffman *et al.*, 1999; Cross *et al.*, 1996; De Wet, 1990). Perhaps fundamentally, such interventions also failed to reduce the population pressure on the land (e.g. De Wet, 1990; Cloete, 1985). These omissions and mistakes, combined with a lack of understanding of the specific ecological dynamics of former homeland areas or the political and economic

factors that had placed agricultural practices under pressure, contributed to betterment's detrimental impacts on productivity, poverty and soil erosion (e.g. Delius, 1996; De Wet, 1990; Yawitch, 1981). The Tomlinson report's vision of a minority group of 'true Bantu farmers' was therefore further undermined by the policy designed to facilitate it, and the "role of the homelands as labour reserves, whose populations depended only partially on agriculture and could not afford to commit themselves to sustainable land use, was reinforced" (Hoffman *et al.*, 1999:185). Nevertheless, the betterment strategy was pursued for two decades after the Tomlinson Report, and agricultural services continued to be provided to the homeland areas, all be it on a modest scale, right up to their dissolution in 1994 (Hoffman *et al.*, 1999).

4.3.2 Official narratives of soil erosion in the 'new' South Africa

In colonial and apartheid 'degradation' narratives in South Africa, soil erosion was ascribed to 'overstocking', 'wrong' farming practices and cultivation of marginal lands. These land uses were in turn frequently ascribed to more distal causative factors, namely high human and livestock population pressures on limited NRs (i.e. the popular neo-Malthusian narrative), land user ignorance of rational scientific methods of NR management, and lack of secure individual land tenure. Interventions in the homelands therefore attempted to redistribute and reduce population pressures on the environment, regulate NR use practices and adjust tenure arrangements.

A review of key policy documents and legislation of the post-1994 democratically elected government indicates the continuities and discontinuities of contemporary government perceptions of soil erosion with colonial and apartheid narratives. Statements detailing perceptions of major causes of soil erosion from these documents are shown in Table 4.1 overleaf.

Table 4.1: Official perceptions of the causes of soil erosion

Policy/Act	Stated causes of 'degradation'
Reconstruction and Development Programme (RDP; Republic of South Africa, 1994)	"Apartheid legislation distorted access to natural resources... [and] contributed to the degradation of environmental resources, including soil, water and vegetation ... Poverty and environmental degradation have been closely linked" (section 2.10). Poverty is also linked to 'overpopulation', caused largely by apartheid policy (section 2.2.8). Apartheid policy is therefore deemed to be the cause of both soil erosion and poverty through its restriction of access to, and concentration of population pressure on, NRs.
White Paper on Agriculture (Department of Agriculture, 1995)	The high susceptibility of South African soils to erosion is emphasised, especially when what are referred to as 'incorrect' farming techniques (e.g. cultivation of marginal land) are used, but the role of other broader factors in influencing the adoption of such maladaptive practices is not considered.
Green Paper on the Environment (Republic of South Africa, 1996)	Erosion in former homeland areas is due to "inappropriate farming practices and overcrowding", but the broader causes of these are undefined.
Agricultural Policy in South Africa (Department of Agriculture, 1998)	Degradation of NRs, including soil erosion, soil fertility decline and inefficient use of water, are ascribed to: "Rapid population growth, widespread poverty in rural areas, unequal access to and control over resources, and overcrowding" (p.67). Blame is also placed on government for poor provision of 'conservation advisory services', "fragmentation of environmental responsibilities caused by programmes being scattered among several Government agencies", and lack of 'effective zoning' of land use (p.67).
National Environmental Management Act (NEMA; Republic of South Africa, Act 107 of 1998)	"Inequality in the distribution of wealth and resources, and the resultant poverty, are among the important causes as well as the results of environmentally harmful practices" (p.1). NEMA thus recognises that structural inequalities can lead to poverty that subsequently can result in environmentally destructive NR use (not only the other way around), but fails to specify how poverty leads to soil erosion/degradation.
Draft First Draft National Action Plan: Combating land degradation to alleviate rural poverty (Department of Environmental Affairs and Tourism, 2002).	"The cropping of marginal land, particularly on the erodible duplex soils... poor cropping practices, and continuous, heavy grazing... are the immediate causes of land degradation [including soil erosion]... The ultimate causes include land use, policy, and socio-economic conditions. Inappropriate infrastructure, e.g. through road construction and storm drainage can also lead to accelerated erosion" (2002:6). The draft NAP also states that the most serious degradation is often found in former homelands due to large numbers of poor people relying on consumption of local NRs to meet their livelihood needs. "Communal tenure... is not itself a cause of degradation, but when the institutions that regulate communal tenure break down, as many have, the result is an open access resource that is susceptible to overuse" (2002:7).

Source: Literature review

The above table indicates that numerous additional causes of soil erosion have been included in government conceptualisations of the problem post-1994. Contemporary government perceptions of proximal and distal causes of soil erosion gleaned from post-1994 policy documents are summarised in Figure 4.1 overleaf. Causes that were also prioritised during colonial and apartheid eras are identified in italics.

Figure 4.1: Government perceptions of proximal and distal causes of soil erosion

Proximal causes
Inappropriate farming techniques
Cultivation of marginal land
Overgrazing
Inappropriate infrastructure development
Susceptibility of South African soils to erosion

Distal causes
Overcrowding
Poverty
Unequal access to and control over resources
Break down of institutions that regulate communal tenure
Apartheid legislation (causing distorted access to resources, 'overpopulation', poverty and local institutional breakdown)
Lack of 'conservation advisory services'
Lack of 'effective zoning' of land use (i.e. planning and regulation for soil conservation)
Lack of effective soil conservation regulations or enforcement (e.g. due to fragmentation of environmental responsibilities among government agencies)

Source: literature review

Perceptions of the most important proximal causes of soil erosion appear to have changed little with the change of government, although inclusion of two additional factors (inappropriate infrastructure development and susceptibility of South African soils to erosion) helps to broaden the concept of 'degradation' to include non-agricultural processes and the role of 'natural' factors (i.e. soil characteristics). However, other key 'natural' variables such as rainfall and topography are neglected and the emphasis remains largely on anthropogenic factors.

Given that collection of wood for fuel or clearing of trees for agriculture are considered by some researchers to be major causes of soil erosion in South Africa (e.g. Rathogwa & Shackleton, 1999; Fakir & Cooper, 1995; Eberhard, 1992), the omission of deforestation is problematic. This may be because politicians perceive no simple and affordable alternative fuels to local wood for many poor rural households. Other possible proximal causes of soil erosion that may also deserve consideration include sand and soil mining, veld management (e.g. inappropriate veld burning or uncontrolled/concentrated livestock movements) and

fallowing of arable land, all of which were found to be practiced, albeit often by a small minority, in one or more of the study settlements.

In contrast to the limited change in perceived proximal causes, 'official' consideration of distal causes has expanded substantially post-1994. A neo-Malthusian narrative of 'overcrowding' or population pressure leading to 'degradation' is still evident in many ANC policy documents, although it has broadened to include a populist/political element, namely the explicit recognition of the role of apartheid interventions in creating overcrowding and poverty and undermining local systems of environmental (and other) governance. Many present day researchers support the view that apartheid policy, by massively limiting access to NRs for the African population and thus artificially creating high population pressures on the environment, is the main cause of soil erosion and veld deterioration in the former homeland areas (e.g. Hoffman *et al.*, 1999; Van Zyl *et al.*, 1996; Cooper, 1991).

The recognition of poverty, also ignored during apartheid years, as a key distal cause of degradation is also of significance in that it encourages a shift from narrow interventions aimed at combating 'degradation' to more holistic interventions aimed at promoting 'sustainable production technologies' that both minimise environmental damage and enhance productivity in order to reduce poverty (cf. Turner, 2000). This 'sustainable utilisation' philosophy is evident in the document Agricultural Policy in South Africa (Department of Agriculture, 1998) and also in documents on the Landcare programme, a major government initiative for promoting more sustainable NR use (e.g. Landcare, 2001). However, it would be misleading to portray a neat transition from an apartheid 'degradation' focus to a post-1994 'sustainable productivity' focus since as noted above the apartheid state was also concerned with the problem of low productivity. In reality the change in outlook may be more limited and ongoing. As will be demonstrated in later chapters, ignorance is often still identified as a cause of low productivity and land degradation.

A further change in 'degradation' narratives involves elements of a critique of contemporary state policy and intervention that seek to explain ongoing environmental change. These signs of reflexivity represent a progressive development over the apartheid and colonial narratives. In combination with the shift to a more open and pluralistic approach suggested above, contemporary soil erosion narratives therefore appear to hold potential for improved understandings of erosion processes and thus more effective interventions. On the other hand, they include some significant omissions. For example, present narratives fail to question the idea of 'degradation' itself. People living in former homeland areas today clearly have to struggle with the legacy of apartheid 'overcrowding' and the pressure that this places on environmental resources for basic needs provision. Yet although degradation is claimed to be occurring (e.g. Hoffman *et al.*, 1999; Cross *et al.*, 1996), evidence of degradation is often partial and open to question. 'Cries of crisis' (cf. Stocking & Garland, 1995) may be misplaced due to a variety of definitional and measurement problems (see section 2.3.4 for full discussion), likely to include extreme variability in dryland rainfall, both temporally and spatially, lack of knowledge of thresholds of change and the lack of reliable long term data on key variables such as rainfall, population or livestock numbers. The State of the Environment in Southern Africa report (SARDC, 1994:70) asserts that "little is known about the extent and degree of the problem [of land degradation in Southern Africa], or how to solve it". Whilst this may be overstating the case, the problems of identifying and defining environmental 'degradation' or 'unsustainable' NR use remain real and significant and demand more explicit consideration.

Another omission in the soil erosion narratives is attention to settlement level inequalities in access to resources or means to exploit resources. Vink (1986) suggests that in the former homeland of Lebowa in 1984-85, only 29 per cent of 'rural' households owned any animals at all and four per cent of 'rural' households owned over half of all cattle in the region. These herd owners were often chiefs, elders, councillors and businessmen who had significantly higher incomes than other residents. High stocking rates on Lebowa's rangelands and consequent environmental 'degradation' were therefore ascribed to a 'tragedy of the chiefs' rather than a 'tragedy of the commons' (Bernstein, 1996:179).

Settlement-scale inequalities in access to resources, or to the means to exploit resources, demand greater consideration in soil erosion narratives.

The focus of official degradation narratives, both apartheid and contemporary, on anthropogenic causes of soil erosion rather than 'natural' ones is a further important limitation, yet a common one (e.g. Hoben, 1996). The Sub-regional action programme (SRAP) to combat desertification in Southern Africa (SADC, 1997), a key document closely related to the United Nations Convention to Combat Desertification (UN, 1994), shares the same bias. It states that desertification in Southern Africa is "marked by forage and soil degradation especially in arid and semi-arid lands, which are used beyond their capacity for sustained production by cultivators, herdsmen and other land users" (SADC, 1997:1). More specifically, the SRAP identifies over-cultivation, overgrazing and deforestation as the three main causes of desertification in Southern Africa (SADC, 1997:2), reflecting and, as a key supra-national policy framework, supporting the narratives of degradation due to misuse and overpopulation identified in colonial and apartheid eras in South Africa. This widespread but implicit *a priori* assumption that 'natural' factors are less important than anthropogenic ones is a false and potentially dangerous one since it may lead to the misdiagnosis of degradation symptoms (e.g. the causes of prominent gully erosion) and implementation of inappropriate or potentially harmful interventions, such as where interventions needlessly restrict land users' resource practices. Moreover, with respect to veld deterioration, such assumptions contradict non-equilibrium claims about dryland ecosystem functioning where rainfall is conceptualised as the driving force of ecosystem change (see Chapter two, section 2.3.4).

The narrative of anthropogenic 'degradation' nevertheless persists. A specific variant of this is the covert and perhaps implicit narrative of land user ignorance. This narrative is implied in reference to the need for 'conservation advisory services'. It also persists covertly in dichotomous representations of farmers as 'subsistence' based or 'resource-poor', and therefore unproductive and potentially degrading, versus more efficient 'emerging' farmers who possess the capacities and resources to become fully-fledged 'commercial' farmers (cf. Hall, 2004; Lahiff, 2001; Cousins, 2000). These ideologically-

loaded labels are arguably founded on colonial and apartheid stereotypes of 'backward' peasants farming on household plots in the reserves and 'progressive' market-oriented farmers who deserve to own land under individual title and to receive state support (Cousins, 2000). The White Paper on Agriculture (Department of Agriculture, 1995, section 8.10) attempts to unpack this issue. It states that 'resource-poor' farmers,

> "have often been regarded as inefficient and backward, but in fact they can be highly efficient users of agricultural resources.... [Therefore] rather than seeing resource-poor farmers as a dispensable production entity, efforts should be made to improve their productivity".

However, as discussed above, the constraints and biases inherent in the neoliberal framework discourage interventions that aim to boost 'subsistence' production in favour of those aimed at 'commercialisation' of agriculture.

The narrative of land user ignorance, or expressed in a more politically correct manner, 'lack of care', is further identifiable in the government's Landcare programme. This is targeted at "farming groups... associated with exploitative farming practices and limited resources for implementing corrective measures" (Landcare, 2001:3). It implicitly assumes a lack of awareness, or *ignorance*, of environmental change processes among land users, placing considerable emphasis on the need to raise this awareness and build an environmental ethic, or *re-educate* land users. That a wide range of other factors besides lack of knowledge of environmental changes, including labour and capital constraints and lack of appropriate regulatory structures, may explain lack of adoption of conservation measures is apparently ignored (e.g. Turner, 2000).

Whilst misinterpreting the evidence of environmental change, facilitated by regular exclusion of local land users' perspectives, may go some way to explaining the enduring popularity of anthropogenic explanations of land degradation, issues of power may also enter the equation. A narrative which constructs land users as destructive and thus promotes intervention to advise, regulate or re-educate users and control NR use effectively serves to expand, or at least maintain, the role (and jobs and budget) of the colonial or national government (Swift, 1996; Tiffen, 1996). It also legitimises the continued interventions of international aid donors such as UN agencies (Swift, 1996). Scientists are also actors in this

'soil erosion game', since it is in their interests not to acknowledge uncertainties and lack of knowledge whilst exaggerating the seriousness of environmental change processes in order to gain power, influence and continued employment (cf. Tiffen, 1996). Whether or not social actors actually do work, consciously or unconsciously, to maintain anthropogenic degradation narratives that support their interests, such narratives do persist in contemporary government networks and threaten to generate inappropriate interventions that could disrupt rural livelihoods (cf. Swift, 1996). Assumptions of land user ignorance contradict the contemporary policy narrative advocating 'community participation' in the planning and implementation of interventions to reduce or prevent environmental 'degradation' and alleviate poverty. This key corollary narrative is introduced below.

4.3.3 Community participation: A 'new' approach for soil conservation?

In the 'paternalist'/'classical' model of soil conservation established in colonial and apartheid times in South Africa, soil conservation was seen primarily as a physical environmental problem (cf. Blaikie, 1985). Land users' knowledge and opinion was viewed as part of the problem and ignored, whilst coercion was used to ensure social acceptance of 'expert' formulated 'solutions' (Blaikie, 1985). More recent approaches to soil conservation, and to development in general, such as the Integrated Sustainable Rural Development Strategy (Republic of South Africa, 2000:3), recognise that past intervention failures were largely the result of "failure to involve local people properly in a participatory process and the failure to build capacity" and thus seek to increase the involvement of local populations in planning and implementing interventions. Yet such understandings are not new. A report from the Department of Bantu Administration and Development, produced in 1977, recommends that a 'community development approach' be adopted based on,

> "[a] process by which the enhancement of the community takes place through *active participation by the community itself*... the community itself identifies its needs (or problems) and objectives; takes the necessary action and through this develops an attitude of self-reliance and co-operation... It remains an axiom that ... programmes which originate from a community have a far greater significance and are more permanent in nature ... than programmes which are imposed from external sources, ... therefore development should preferably be based on the principle of self-activity" (Lilley, 1977:3-4; my italics).

Despite such statements, it is only more recently that 'participatory' approaches to development, or at least 'participatory' rhetoric, have become popular in South Africa (see Table 4.2 below).

Table 4.2: Official statements on participation

Policy/Act	Statements on participation
Reconstruction and Development Programme (Repbublic of South Africa, 1994)	Development "is not about the delivery of goods to a passive citizenry. It is about active involvement and growing empowerment" (section 1.3.3). "The RDP reflects a commitment to grassroots, bottom-up development which is owned and driven by communities and their representative organisations"(section 2.2.3).
White Paper on Environmental Management Policy (Republic of South Africa, 1997)	Goal four: "establish mechanisms and processes to ensure effective public participation in environmental governance".
NEMA (Republic of South Africa, 1998)	"The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured" (section 4(f)). NEMA also asserts that "all forms of knowledge, including traditional and ordinary knowledge" (section 4(g)) should be taken into account when making decisions.
Agricultural Policy in South Africa (Department of Agriculture, 1998)	Use of 'participatory' approaches for research and extension to make it more responsive to small farmers needs is advocated, although 'subsistence' farmers will apparently only get advice through "special programmes, using the mass media to a greater extent"(p. 43).
Integrated Sustainable Rural Development Strategy (Republic of South Africa, 2000)	'Effective participation' is prescribed to ensure projects "respond to articulated priorities [or 'true needs'] at the local level"(4b), thus ensuring that interventions are appropriate and that local people take 'ownership' of and care about the long term success of them.
Landcare Implementation Framework (Landcare, 2001)	Landcare aims to "empower local people to make their own decisions" (p.6) and proposes the use of 'effective community participation' to ensure that land use is ecologically sustainable.

Source: Literature review

This rise of the narrative of 'community participation' in South Africa has no doubt been encouraged by the popularity of this narrative with international donors and its promotion by powerful international institutions such as the United Nations. For example, South Africa is a signatory to the United Nations Convention to Combat Desertification (UN, 1994), which encourages countries to direct special attention to the 'socio-economic' factors contributing to 'degradation' processes, respect and share local knowledge, and ensure the 'full participation' of both men and women at all stages of the planning and implementation of programmes for combating land 'degradation'. Increased use of 'participatory' methods may help to bring an end to the assumption that land user ignorance is necessarily a major driver of environmental change, but the broader bias towards a focus

on land use practices to the detriment of attention to 'natural' factors may be more difficult to disrupt. Moreover, in the context of a neoliberal policy framework, the implications of participation for residents of former homeland areas may be highly problematic and paradoxical, as discussed in section 4.4 above.

Even if government authorities are trained to undertake 'community participation', the specific meaning of the term is often ambiguous. For example, the White Paper on Environmental Management Policy (Republic of South Africa, 1997) and the Local Government Municipal Systems Act (Republic of South Africa, 2000) both outline the establishment of mechanisms and processes to ensure 'effective public participation' in environment and development activity, but subsequent reference to 'advisory structures' and 'invitations' for written representations from the public imply a system of public 'consultation' rather than 'genuine participation' (IIED, 1994). It is probable that participation in decision-making will always tend to be constrained by broader resource allocation decisions and political commitments of government (cf. Keeley & Scoones, 2000; IIED, 1994), including not least an adherence to a non-negotiable neoliberal agenda. Indeed, as the ISRDS states, community participation and empowerment will be "*within reasonable and flexible bounds*... stakeholder committees will not be ignored or by-passed, but neither will they be given a blank cheque to spend" (Republic of South Africa, 2000: section 5d; italics added). In short, participation is viewed as a technical tool that can be accommodated in existing management structures (Quinlan, 1993).

4.3.4 Implications of contemporary soil erosion narratives for rural livelihoods

Contemporary South African soil erosion narratives, including related 'participatory' rhetoric, are clearly complex and diverse. There is no single distinct narrative that can be directly related to a specific policy or programme, as was possible with consideration of the neoliberal narrative and GEAR macroeconomic framework. Understanding the practical implications of official government conceptualisations of soil erosion on former homeland populations is therefore more difficult.

Given the range of distal causes of soil erosion, explicit and implicit, identified in policy, legislation and programme documents, government could claim that many of its current

policies directly or indirectly respond to the apartheid legacy of 'overcrowding' and environmental change. Many important interventions are still in early stages of development or are making slow progress. For example, although land redistribution, restitution and land tenure reform seek to address key distal causes of soil erosion, namely overcrowding and unequal access to and control over resources, progress on the former two has been slow (Lahiff, 2001) and a Communal Land Rights Bill was only introduced in October 2003, hence its full implications are yet to be understood. Plans to redistribute population and thus reduce erosion are also proposed in documents such as the draft Spatial Rationale for Sekhukhune (Department of Local Government & Housing, 2002), but these are also yet to be implemented. This spatial plan appears to be strikingly similar to apartheid regime proposals to establish industries in homeland areas that could free up land to full-time farmers, yet given neoliberal constraints on state spending it seems likely that this plan will falter for the same reasons as its predecessor; namely, a lack of political will to commit to the high levels of investment required.

The South African government is also implementing interventions such as 'community development' projects, public works programmes and social grants to reduce poverty and thus potentially reduce dependence on and overuse of NRs. Of particular interest from an environmental perspective is the Landcare programme, which seeks to address numerous distal causes of soil erosion including poverty and the implicit distal cause of ignorance expressed as 'lack of care' (e.g. Landcare, 2001). Whilst implementation of such measures may have been constrained by the fiscal constraints of GEAR, their actual impacts on rural livelihoods demand empirical investigation. This is undertaken in Chapter six and, with specific regard to Landcare, Chapter seven.

4.4 Summary

This chapter has identified and critically evaluated the historical development of two highly influential South African policy narratives, neoliberalism and soil erosion, and considered how they may impact on rural livelihoods. The next three chapters seek to build upon and ground this analysis by investigating livelihood activities and environmental dynamics in the study settlements and tracing links to larger-scale mediating processes.

Chapter 5: Natural resource use practices and livelihood diversity in Sekhukhune

5.1 Introduction

This chapter reduces the scale of analysis to the household level. The dimensions and dynamics of contemporary livelihoods in the study area are analysed, focusing specifically on the role of land-based practices in different households' broader diversified livelihood portfolios (Objective two). The importance of access to means for the effective use of capital assets is a second theme emphasised in this chapter. A third theme relates to the opportunities and extent of effective agency that rural dwellers possess to lift themselves out of poverty and pursue sustainable livelihoods. Are rural people passive, dependent victims or active, autonomous innovators? This theme is introduced in this chapter before being pursued in greater depth in Chapter six. Problems of scientific uncertainty discussed at length in Chapter two also emerge to varying extents. Findings are presented in the context of the modified livelihoods framework outlined in Chapter two.

The chapter focuses predominantly on the primary study site, Phahlamanoge, but reference is made to the two secondary sites, Soupiana and Madibong, in order to draw attention to inter-site similarities and differences in circumstances and processes.

5.2 Household demography

In Chapter three, 'resident household size' was defined as the number of people considered by the respondent to be living in the homestead at the time of the interview. In the study settlements this often included one or two parents and their children, as well as grandchildren of an unmarried daughter. Such extended familial groupings may be the product of reduced employment opportunities in the formal economy that have limited individual's abilities to raise the necessary income to marry and set up new households separate from their parents (cf. Baber, 1998; Delius, 1996). Resident household size in Phahlamanoge varied widely from a single unmarried person whose parents had died and whose siblings had moved away, to a maximum extended family size of 15 people. The mean household size was six members for Phahlamanoge, as well as for Soupiana and Madibong.

The non-resident component of the household is the number of people who are not considered by the respondent to be living in the homestead at the time of interview, yet who are recognised as household members with the right to be based in the homestead. Non-resident members of households in the study settlements often included children attending schools or colleges remote from the village, jobseekers and jobholders. The size of the non-resident component of households in Phahlamanoge ranged from no absent members to seven absent members, with a mean of one non-resident household member. The mean non-resident component of households in Soupiana and Madibong was two and one respectively. However, remittances were received from non-resident members by only 17% of surveyed households in Phahlamanoge, 16% of households in Soupiana and 23% of those in Madibong. The relative contribution of these income flows to livelihood support are analysed further below after first considering the importance of NR based livelihoods to household reproduction.

5.3 Natural resource-based livelihoods

Respondents in Phahlamanoge and secondary sites identified arable and livestock production as the most important land-based livelihoods. Means for, and strategies of, arable and livestock production are considered below, followed by exploration of other forms of NR use.

5.3.1 Arable production

There are several forms of cultivation pursued in Phahlamanoge and the secondary sites. Rain-fed agriculture is widespread but in Phahlamanoge and Madibong is highly risky given low and unreliable rainfall. In Soupiana rainfall is claimed by respondents to be higher and households are more spread out over the landscape, allowing many to cultivate fields within much closer proximity to their homesteads and with much greater confidence of returns. Private irrigated vegetable gardens located close to the homestead and group-based vegetable projects also provide a means of production for a minority of households in all three sites, although the latter initiatives are often dependent to differing degrees on external initiatives and inputs from NGOs or government. These schemes and the critical issue of dependency are returned to in Chapter six. Whilst almost all homesteads are located on fenced plots, the vast majority of households do not cultivate any crops on this land. Respondents explained that this land is often very hard, stony and dry and hence is unsuitable for cultivation. Cultivation of vegetables

and other crops requiring irrigation was also discouraged by the need to collect water on foot from rivers, often at considerable distance from the homestead. However, a small number of irrigated vegetable gardens did exist in locations close to rivers or where donor aid had allowed drilling of a borehole.

5.3.1.1 Access to arable land

The majority of households surveyed in Phahlamanoge (83%) 'owned' at least one arable plot. The state legally owns the land which is distributed by the local chief, but people tend to have a strong sense of ownership over arable plots allocated to them. Land access was also high in Soupiana with only two out of 51 households lacking rights to arable land. In Madibong only nine out of 100 surveyed households did not own arable land, although a further four claimed they only had access to vegetable gardens. Access to land therefore appears to be widespread in the Lepallane catchment.

As discussed in Chapter three, many respondents found it difficult to estimate the size of their arable land areas and since fields tend to be located at considerable distance from the homestead it was not possible to physically measure all fields. Yet measurements were made of the fields owned by 10 Phahlamanoge households involved in arable production as part of detailed case studies. These included investigation of fields with some of the highest and lowest yields reported in the household survey. Measured areas varied from 0.5ha to 1.6ha with a mean of 0.9ha, significantly smaller than the average farm size in former homeland areas of approximately 1.5 ha (Republic of South Africa, 1995). Given that marketing of land is not permitted, arable landholding is usually determined by the chief or by inheritance, although a small number of households also managed to acquire fields by clearing a new plot of land from bush. Land is rarely sub-divided between sons but rather is inherited by the youngest son from his father due to the small areas of land ploughed. Although close relatives of the chief were reportedly allocated more land than others, the vast majority of land holdings can therefore be assumed to be relatively similar in size and to broadly reflect the range of field areas represented by the 10 case study households.

Some researchers suggest that although tenure in South African communal areas appears relatively secure during 'normal' usage, when development projects are implemented the weak legal standing of many land claims can be revealed (e.g. Oomen,

2000). Data from this study supports this view. One household in Phahlamanoge had lost use of inherited land to a housing development and a household in Madibong had a field taken by the municipality to develop a waste dump. Other households in Madibong also feared the municipality would appropriate their land for housing development, a sense of insecurity intensified by the remote locations of some fields. Yet tenure security was not perceived by the vast majority of households in Phahlamanoge, Madibong or Soupiana to be a constraint on arable production, a situation that reflects findings from other studies in Sekhukhune District (e.g. Pardeller *et al.*, 1999) and Limpopo Province (Lahiff, 1997). Claims have also been made that communal tenure represents an obstacle to economic advancement because the 'Permission to Occupy' certificates previously allocated to land holders are not accepted as collateral by banks (e.g. Pardeller *et al.*, 1999). However, even if land tenure were privatised, banks would be unlikely to accept small arable plots in 'low potential' former homelands as collateral (Lahiff, 1997). A small number of female-headed households in Madibong reported that their tenure felt insecure, particularly in the case of second wives of deceased husbands. This suggests a need to reinforce the legal standing of current arable tenure systems and ensure that they include equal rights for women, as has been legislated for in Namibia in the Communal Land Reform Act (Republic of Namibia, 2002). However, overall, there appears to be no strong case for privatisation of land tenure.

Households with no land or wishing to cultivate on more land were also able to rent or borrow it from others. Sixteen of the 100 households surveyed in Phahlamanoge had rented or borrowed a plot of land in the season prior to interview, 12 of which did not own land. In total 95% of households surveyed in Phahlamanoge therefore had access to land in the season prior to interview. Conditions of tenure were straightforward. Eight of the households worked together with the owners of the particular plot of land and split the yield produced into varying proportions between owner and cultivator, while a further eight households were able to borrow land for free from friends or relatives. Social capital in the form of friendship and kin ties was therefore important for some land-poor households to access land.

Availability of land to rent or borrow in Phahlamanoge was constrained by the lack of a requirement for a minimum usage of land in order to retain ownership. Many fields have been abandoned or left unploughed for a number of years without fear of loss of

tenure. This contrasts with Madibong where respondents believed that if land was not ploughed for two or more years it might be confiscated. For example, one respondent from Madibong reported that "if you take a long time not ploughing the chief will take it from you and give it to those who can plough it every year". Others suggested this pressure was linked to a large population including many landless 'refugees' wanting access to unused land. To counter such threats, one respondent who was unable to use her field due to poor health lent it out to neighbours in order to 'protect it from theft'.

These findings imply the need for a precise intervention in the tenure system. Opportunities for renting or borrowing unused land by individuals that wish to grow crops should be enhanced by obliging people that have not ploughed their land for a number of years to make it available to rent or borrow. At the same time, landowners must be guaranteed continued rights to use of that land in the future should they wish to recommence ploughing. These changes would greatly improve access to land for those wanting to cultivate without threatening landowners' endowments. However, in order to implement such changes local people and tribal authorities would need to be convinced of their value as it is they who would have to operate and enforce the modified system.

Findings of near universal access to arable land in Phahlamanoge, Soupiana and Madibong corroborate those of Rwelmira *et al.* (2002) who surveyed 24 villages throughout Limpopo Province and found that access to land is relatively high in Sekhukhune District in comparison to other regions. Although areas of land are generally small, the high levels of land access suggest that arable production could play an important role in supporting rural livelihoods (cf. Shackleton *et al.*, 2001).

5.3.1.2 Arable land quality

The vast majority of the fields in Phahlamanoge are concentrated in a broad shallow valley that runs alongside the bulk of the settlement. Slope is thus variable but generally gentle (less than 10%; SIRI, 1989) with the steepest angles occurring highest up slope where arable land gives way to common land scattered with rock outcrops.

Land users in Phahlamanoge judge soil quality primarily in terms of yield. A 'good' soil means that "if you plant on that soil, after harvesting you will get more bags". A land user judges the quality of the soil after harvesting "because you didn't take a soil sample

but you look by your own eyes, by the yield". Yet yield may be affected by a variety of other factors such as weed infestation and rainfall that are more easily detected than soil quality. Moreover, these factors may mask changes in soil fertility or soil structural properties. It is therefore perhaps unsurprising that variability in soil quality/yield potential is linked by land users in Phahlamanoge primarily to the interaction of different soils with rainfall and weed prevalence, rather than properties inherent to the soil. Interpretation of spatial differences in soil quality within a field is confined to description of different local soil types and/or differences in the prevalence of witch weed (*Striga asiatica*), rather than to descriptions of differences in fertility or structure within particular soil types.

Descriptions of the dominant soil types identified by 100 surveyed households in Phahlamanoge and the prevalence of these soils on the fields they cultivate are given in Table 5.1 below.

Table 5.1: Descriptions and prevalence of different soil types on the arable land of surveyed households in Phahlamanoge

Soil type		Number of fields in which it is found	Percentage of fields in which it is found
Local name	Description		
Sehlaba	Red sandy soil; good for crops because needs little rain; best for millet; found on large area of fields	61	50%
Seloko	Brown, fine loamy soil but forms clods and sticks when is a lot of rain; no salt taste; good for all crops; best for sorghum and maize; found on small area of fields	36	30%
Lenkwane (mix of sehlaba & seloko)	Grey/white mixture of sandy and loamy soils; salty taste; needs a lot of rain; good for sorghum; found in a quarter of the main cultivated area near to main road and on far side of mountain	14	12%
Letsopa	Light grey clayey soil; good for sorghum, but if little rain it dies fast; found on small area of fields	6	5%
Maboushane	Unknown	2	2%
Mix: *Sehlaba & letsopa*	Mixture of sandy and clay soils	1	1%
Mix: *Seloko & letsopa*	Mixture of loamy and clay soils	1	1%

Source: Survey of 100 households cultivating 121 fields

The 100 households surveyed identified sandy *sehlaba* soils as the most common type of soil, found in 50% of their fields, followed by loamy *seloko* soils and mixed

sandy/loamy *lenkwane* soils. These findings are broadly corroborated by secondary data from the South African Land Inventory data base (SIRI, 1989) which indicate that loamy, sandy and sandy clay loam Hutton and Oakley soils, equivalent to local classifications of *seloko, sehlaba* and *lenkwane* or *letsopa* shown in the table, are most prevalent in this area. Soil depths on arable areas are estimated to range between 500 and 1200mm (SIRI, 1989; Loxton *et al.*, 1973). Since the most common soils in the area are judged to be good for production of sorghum, the staple crop, by both local people and scientists (e.g. National Botanical Institute, 2001; Loxton *et al.*, 1973), the potential of agriculture to contribute to livelihoods is further supported.

The 'best' land, allocated to close relatives of the chief, was deemed to be located close to the village near the base of the valley. This land was thought to be favourable both because of its proximity to the village and because it provided good yields given sufficient rainfall. Relatively good yields on this land could be related to its low-lying location providing enhanced soil moisture and deeper soils. Owners of fields in this area also commented that these fields tend to incorporate two soil types, such that rainfall conditions could lead to a poor yield on one soil type but rarely on both. Diversity of soil types within fields was thus recognised by some farmers as a means of reducing risk and of increasing the likelihood of realising a return on arable investments (Carter & Murwira, 1995). Analysis of soil samples from these fields revealed no significant differences in total levels of Nitrogen, Phosphorous or Potassium to fields in other areas or between soil types within these fields, but the finding that some farmers seek out soil diversity as an adaptive strategy to deal with highly variable rainfall is important.

Soils in Madibong were reported to be largely *letsopa* (clay) with a smaller amount of *sehlaba* (sandy) soils or a mixture of the two, whilst those in Soupiana were perceived to be mostly *sehlaba* (sandy) with some *seloko* (loamy) soils or a combination of both types. However, in both Soupiana and to a lesser extent Madibong people were much more aware of the need to use inputs to 'renew the soil', apparently due to increased contact with extension agents and 'commercial' production methods and perhaps most importantly, a stronger perception that soil fertility itself was a principal constraint on yields. This is demonstrated by Paul, a small-scale farmer in Madibong who states:

> "The soil is no longer active or productive, the reason is that it is being a long time ploughing there without adding anything to fertilize the area. Also there was insufficient rain."

In order to boost soil fertility, some respondents from Madibong suggested people could re-plough after harvesting crops so that crop residues are incorporated into the soil and act as fertiliser. One household in Madibong claimed to practice this method. Others observed that by simply leaving crop residues on the field they will improve the soil. Use of fertilisers was recommended by the Department of Agriculture for Madibong, but some respondents viewed this practice as inappropriate because the fertilizer 'burns' the crops. This may be a result of a variety of causes including overuse of fertiliser, poor timing of application, lack of rain or use of the wrong type of fertiliser. Some Madibong respondents also believed that using fertiliser led to dependence on annual application for good yields. They therefore refrained from using it because they could not guarantee that they would be able to afford to apply it in the following years.

5.3.1.3 Input use and sowing/ploughing practices

Only five out of 100 households surveyed in Phahlamanoge and seven out of 100 households in Madibong had ever applied any form of input, including inorganic fertiliser, manure, compost, pesticides or herbicides to their arable land. This widespread lack of use of soil inputs was claimed to be due largely to a lack of financial capital to purchase or transport them, and a lack of availability of manure as a direct consequence of the small numbers of livestock kept by many households. Some land users in Phahlamanoge wanted to use manure, if they could afford to buy and transport it to the field, but this was often linked to reducing the prevalence of parasitic weeds rather than to a need to improve soil fertility *per se*. This finding supports the above contention that yield potential in Phahlamanoge is judged primarily in terms of the interaction of soil with rainfall and weeds rather than its inherent fertility.

In Soupiana the situation was markedly different – 37 out of 51 households used fertiliser (20 households) or manure inputs (15 households) or a combination of both (two households) on their land. These inputs were often applied infrequently and in small amounts but they tended to be targeted precisely, for example by adding a Coca-cola bottle capful of fertiliser into a hole with the seed. In Soupiana 34 out of 51 households also buy certified seeds on the advice of extension officers, as compared to

only 10 out of 100 households in Phahlamanoge and six out of 100 households in Madibong. Certified seeds were reported to be tougher, producing better yields even when there is little rain and being more resistant to pests. As a respondent from Soupiana reported, "sterilised seeds have a hard heart to grow even if there is no rain... worms and birds are not able to eat sterilised seed". These high-external-input, precision methods used in Soupiana appear to have been adapted from prior use of a planter machine and advice from agricultural extension on techniques to maximise production. Such methods necessitate that more income is available for investing in production and/or that more confidence is placed on getting a return from investments, perhaps due to the higher average rainfall reported in Soupiana. Two wealthier households were found to be experimenting autonomously with a package supplied from the Monsanto corporation which incorporated herbicides, pesticides and genetically-modified maize seed. They reported improved yields from the first year of use, despite reduced rainfall.

Interest in and experimentation with agricultural production is thus found to be high amongst many individuals in Soupiana, in stark contrast to the drier areas of Phahlamanoge and Madibong where the number of households ploughing is reported to have decreased over the last ten years and a commitment to agriculture has been undermined by poor yields. These are frequently blamed on a perceived decline in rainfall and/or laziness; e.g. a respondent from Madibong observed that:

> "Even those who have ploughed they don't go and take out the weeds just because they are no longer interested in ploughing".

The universal practice reported in Phahlamanoge (and Madibong) was to broadcast seed, often a mixture of sorghum and other crops saved from the previous year's harvest (60% of households) or given by relatives (32% of households), onto the surface of the field prior to ploughing. The topsoil was then turned onto the seed by ploughing consecutive furrows above and below an initial central furrow in an outward spiralling manner. This method was practiced despite some individuals' knowledge, gained from prior employment, of 'commercial' farming methods involving ploughing prior to sowing seed. Respondents questioned about sowing practices claimed that 'commercial' methods were prohibitively expensive or more often that their method of sowing was simply an aspect of their culture e.g. 'this is our culture'. Such expressions seem to suggest a passive approach amongst some individuals towards farming and innovation.

However, as described above, practices were very different in Soupiana and demonstrate that where the appropriate incentives (e.g. reasonable and relatively reliable returns on investment) and means (e.g. knowledge developed independently or with the help of extension officers, financial capital) exist, land users can actively adapt and experiment with agricultural practices.

A disordered broadcast sowing method may, however, have its own advantages: It leaves plenty of space for intercrops, it is labour saving and it may even make crop rotation and regular fallowing unnecessary since a kind of random rotation occurs 'naturally' and nitrogen can be put back into the soil by legumes (McAllister, 2001). Moreover, creeper crops planted between cereals can help to cover the soil, thus suppressing weeds and protecting it from extreme heat (Khumbane, 1997). On the other hand, respondents in Madibong reported that clustering of crops could cause them to dry or 'burn' each other, reducing grain yields. It also seems likely that the broadcast method will lead to seed being buried at more varied depths. This diversity of depths of seedbed may however help to reduce risk of total crop failure due to unreliable rainfall through its impact on differing crop development times (Nafziger, 2004). Since the risk reducing effects of current methods are unclear, practices cannot be simply dismissed as 'backward' or 'wrong' nor revered as the 'best solution'.

5.3.1.4 Access to draught power and extent of ploughing

Dependence on use of tractors for ploughing is high with 80% of the households that ploughed in the previous season in Phahlamanoge ploughing in this way in the previous season. Three of these households owned tractors and the other 58 households hired tractors from these owners or two others also located in the village. The 20% of households that did not plough with a tractor used donkeys, a combination of donkeys and tractor, or in one case, hand hoe. Although access to a tractor was often delayed beyond the best time for ploughing, thought to be as soon as the first rains have fallen in November or December, tractors were preferred because donkeys are much slower to plough with and hence may not be able to complete a field before the soil dries out and ploughing becomes impossible. Using a tractor is also much less physically demanding.

A socio-psychological motivation for adopting the use of tractors over donkeys may also exist. As one elderly respondent stated, people feel that they are 'entitled to a

modern way of living', thus tractors, rather than donkeys, are seen as the appropriate means of ploughing. Starky (1995) argues that in South Africa the tractor has become a signifier of 'modern' agriculture, despite the inappropriateness of high capital outlays for poor farmers. Confusion amongst respondents in Phahlamanoge about the impact of donkeys on the veld, linked to propaganda against donkeys promoted by extension workers during the apartheid era (cf. Jacobs, 2003; Delius, 1996), may also have encouraged, and continue to encourage, use of tractors rather than donkeys for draught power. The deeper ploughing enabled by tractors relative to livestock may allow deeper water penetration and conservation, improving crop yields (Fowler, 1999a). However, this benefit must be traded off against greater loosening of soil and break-up of soil aggregates that make soils more susceptible to erosion (e.g. Fowler, 1999a).

Dependence on tractors for ploughing was also high in Madibong where all those ploughing land in the previous season, with the exception of two households that used a hand hoe to plough gardens only, used a tractor. In Soupiana dependence on tractors was somewhat lower with 30 out of 50 households that had ploughed in the prior season using tractors, whilst the majority of others used hired donkeys. The more widespread use of donkeys in Soupiana probably reflects division of many fields into small terraced strips and to a lesser extent the limited vehicular access to fields due to steep slopes.

Overall, just over three quarters of all households (76%) in Phahlamanoge ploughed just under two-thirds (64%) of all fields to some extent in the previous season. This finding again suggests a key role for arable production in local livelihoods. However, only 33% of surveyed households ploughed all of the arable land that they had a right to cultivate. Reasons for not ploughing any or all of the available land were multiple, but by far the most common reason cited was a lack of money to hire a tractor to plough the whole field (71 out of 100 households). In stark contrast only three out of 49 households in Soupiana with access to land during the previous season failed to plough all of it and this was due to the 'muddy' condition of the soil rather than to lack of money. The implication is that Soupiana residents were more frequently able to access the financial capital necessary to hire the means to plough, perhaps as a result of higher crop yields that freed up income spent in other areas on purchasing grain.

Madibong was located part way between these extremes of cultivation. Sixty seven out of 90 households ploughed all of the land they had access to during the previous season, whilst the remaining 23 failed to plough all or part of their land, most frequently, as in Phahlamanoge, due to financial problems. Low levels of financial capital are clearly a major constraint on arable production in much of Sekhukhune, making it difficult to plough at the optimum time, if ever, or to apply inputs to enhance soil productivity.

5.3.1.5 Crops types and yields

The popularity of the ten most frequently grown crops in Phahlamanoge last season is shown in Table 5.2 below.

Table 5.2: Types of crops grown by number of fields in Phahlamanoge

Crop type		Number of fields planted
Local name	English names	
Mabele (thoro & '3-month' varieties)	Sorghum	74
Marotse	Stock-melons	45
Dinawa	Cowpeas	38
Mogapu	Watermelons	35
Leotsa	Millet	22
Maraca	Gourds	17
Mafodi	Pumpkins	15
Bongis	Sugar beans	15
Mahea	Maize	10
Dihlodi	Njugo bean/Bambara groundnut	7

Source: Fieldwork

Sorghum is the staple crop in both Phahlamanoge and Madibong as a result of its high tolerance of water stress and its popular taste. However, witch weed (*Striga asiatica*) often prevents it from producing a good yield. In Soupiana the higher rainfall allows production of maize as a staple, whilst sorghum is not grown at all. Millet is preferred over maize in Phahlamanoge as it is claimed to provide good yields with little rain and is reported to taste good in combination with *morogo* - harvested wild green leaves used as a relish like spinach. Millet is also useful because it can be grown on its own or mixed with sorghum to disturb witch weed, although it is said to give some people diarrhoea. Maize is the least popular of the three principal grain crops grown in Phahlamanoge due to its need for rain and its susceptibility to witch weed.

The most popular forms of intercrop between sorghum and millet in Phahlamanoge are stock-melons, cowpeas and watermelons. The high prevalence of cowpeas, traditionally grown as an intercrop with sorghum, is particularly noteworthy. Given the expense of

fertilisers and lack of manure due to lack of livestock, research elsewhere in Limpopo Province has recommended use of cowpea intercrops for their nitrogen fixation, tolerance of low fertility soils, high protein content and lack of detrimental impact on cereal crop yields (e.g. Ayisi, pers. comm.; Dan Project, 2001). These researchers are attempting to develop optimum legume species and varieties, plant spacing and staggered planting dates for legume-cereal intercropping strategies. Yet a disordered broadcast method might have important advantages of its own, as noted above.

A wide variety of vegetables and fruits were also grown by a small number of households in all villages where land was located close to water sources and was suitable for irrigation. These vegetable gardens varied greatly in size from small-scale homestead gardens geared to production for own consumption to large-scale market-oriented enterprises. Case studies are analysed in detail in Chapter six.

Respondents were not able to reliably estimate yields of intercrops as these are harvested in small quantities as and when required over many months (cf. McAllister, 2001). However, the amount of staple grain (sorghum, millet and/or maize) harvested in Phahlamanoge during the season prior to interview was estimated to the nearest whole bag, equal to approximately 80kg of grain (Pardeller *et al.*, 1999; Phatfoludi, pers. comm.). The results are shown in Table 5.3 below.

Table 5.3: Bags of grain harvested by number of households in Phahlamanoge

Bags of grain harvested (to nearest whole bag)	Number of households
0	32 (24 of these did not plough)
1	22
2	13
3	10
4	6
5	5
6	3
7	3
9	1
10	1
13	1
15	1
17	1
Don't know	1
TOTAL	100

Source: Fieldwork

The mean number of bags harvested per ploughing household in Phahlamanoge was three (to the nearest whole bag) or approximately 240kg of grain. The mean grain harvests per cultivating household in Madibong and Soupiana was slightly higher at five bags. The broad similarity in mean yields between the three settlements reflects the similar agro-ecological conditions and general limited use of inputs but it masks variability in yields linked to different field sizes or use of inputs by a minority of land users. Data allowing investigation of intra-settlement variation in productivity at Phahlamanoge are analysed below.

5.3.1.6 Differential crop productivity: Problems of fertility, witch weed and stalk borer

Areas of land cultivated, number of bags harvested and yield per unit area are shown for ten case study households in Phahlamanoge in Table 5.4 below. These households were selected to represent differing yields, soil types and input use within Phahlamanoge.

Table 5.4: Differential arable productivity in Phahlamanoge

Soil type	Field area ploughed (ha)	Yield (bags)	Yield (bags/ha)
Sehlaba	1.6	3	1.9
Sehlaba	1.2	7	5.8
Sehlaba	1.3	4	3.1
Seloko	0.5	1	2
Seloko	1.2	13	10.1
Seloko	0.5	1	2
Sehlaba/seloko	0.6	2	3.3
Sehlaba/seloko	0.6	2	3.3
Maboushane	0.9	0.25	0.3
D/k	0.6	10	16.7

Source: Fieldwork

Productivity is seen to vary widely within sampled fields from 0.3 bags per hectare to over 16 bags, equivalent to around 20kg per hectare up to around 1300kg per hectare. These yields are broadly comparable to those quoted by de Villiers and Nkosi (2001) for smallholder farmers in KwaZulu Natal. They calculated maize yields among 41% of the farmers to be within the range of 0 to 500kg/ha, while less than 3% of farmers obtained yields higher than 2000kg/ha (de Villiers & Nkosi, 2001).

Soil samples taken from the 10 households' fields indicated that the highest yielding field had the highest mean total Nitrogen (N) soil levels and also some of the highest total Phosphorous (P) values. Literature values indicated total Nitrogen levels in

sampled fields were generally low (100-400ppm) (Claassens, pers. comm. 2003; Landon, 1984) and closely comparable to those found by Smith (1999) in neighbouring Botswana (raw data is included in Appendix 3). The highest yielding field had the highest mean total N levels of 438ppm. These values must be interpreted with caution because, as is often the case, the types of N present and their relevance to crop nutrition are not known (Landon, 1984). Total P values of all fields ranged from 100ppm up to almost 11000ppm, all of which are deemed to be 'high' by Claassens' benchmarks (pers. comm. 2003) and significantly higher than values of total P reported in other studies of Southern African soils (e.g. Smith, 1999; Dougill, 1995). Assuming at least 20% of this Phosphorus is plant available, these levels are adequate for even those crops that are highly demanding of Phosphorous such as the onions and potatoes grown in vegetable gardens (Landon, 1984). Total Potassium (K) values were also high (Claassens, pers. comm. 2003), varying widely from 45 to 1050 ppm across sampled fields. The mean and standard deviations for total N, P and K based on all 71 soil samples taken are shown in Table 5.5 below. The high standard deviations relative to the means are indicative of the heterogeneity typical of smallholder soils in Southern Africa (e.g. Scholes, 1990; Weltzin & Coughenour, 1990).

Table 5.5: Total means and standard deviations for all soil samples

Analysis	Mean (ppm)	Standard deviation
Total N	290	153
Total P	1639	2703
Total K	262	207

Source: Fieldwork (n=71)

Reflection on soil results with the land user of the highest yielding field during the second phase of fieldwork revealed that no inputs had been applied and that the cropping strategies were no different from other respondents. A track used by livestock crossed the field and it is possible that substantial manure inputs from passing livestock explain the relatively high N and P values. Dublin (2001) suggests that cattle manure is 4% Nitrogen by weight and 1% Phosphorous by weight. Two other fields with the same soil type located close to the highest yielding field but away from the livestock pathway also had high mean total P values relative to other fields in the village, suggesting that small-scale variation in parent rock type may also partly contribute to differences in soil nutrient content. Yet the dominant rock type in Sekhukhune is Ferrogabbro, a dark

coloured, coarse-grained basic intrusive igneous rock that is rich in iron but not in Phosphorous (Goudie, 1997; Read & Watson, 1966).

The lowest yielding field had low to medium total N levels according to literature values (Claassens, pers. comm. 2003; Landon, 1984) and relatively high total P values compared to other fields. Plant available levels may however have been substantially different from measured total levels. The user of the field claimed the soil had 'no food', a rare reference to soil fertility in Phahlamanoge and a potential explanation for poor yields, despite relatively high total P values indicated by soil analysis. Other variables that could have affected between-field differences in productivity per unit area include extent and timing of labour input for weeding, timing of ploughing/sowing, extent of infestation of the parasitic witch weed (*Striga asiatica*), existence of plough pans and/or differences in soil structures or depth.

Witch weed (*Striga asiatica*) was the most commonly identified pest, disease or weed problem in Phahlamanoge (55 households), followed by couch grass (*Cynodon dactylon*) (45 households), stalk borer larvae (18) and grasshoppers (locally known as *kodi*; 15). Couch grass is not regarded as a serious threat by land users as it can be cut or removed prior to sowing and does not kill the crop. *Striga* is said to be "like fire, it burns the roots of crops", a good description of the impact of this parasitic weed which penetrates the roots of crops and takes nutrients from them, causing stunting (Kanampiu, 2002; Press *et al.*, 2001). Actions mentioned by land users to prevent *Striga* include rotating millet and sorghum or mixing millet and sorghum in the same field, although the success of these practices appeared to be limited with many people practicing these local methods but continuing to experience problems. Research literature on *Striga asiatica* suggests that it is the most economically damaging parasitic weed in semi-arid Africa (e.g. Mboob, 1986) and that its seeds can stay viable in the soil for over 15 years making it extremely difficult to eradicate (Kanampiu, 2002).

One possible means of reducing *Striga* infestation would be to improve soil fertility, since it is known to prosper in low fertility soils (e.g. Press *et al.*, 2001; Oswald *et al.*, 1996). As noted above, some farmers would like to apply manure which would possibly reduce the weed's prevalence by improving soil fertility, but they lack the financial capital to purchase it or the animals to produce it in substantial quantities. Rotating or

intercropping grain crops with non-host plants such as cowpeas, already practised by some land users in Phahlamanoge, is also thought to reduce *Striga* prevalence (Kanampiu, 2002). Other cheap combative measures include hand pulling and uprooting (cf. Runge-Metzger *et al.*, 1997), but although this strategy reduces re-infestation, Kanampiu (2002) deems it uneconomical since most damage is done before the weed emerges from the ground. Ongoing research at the International Maize and Wheat Improvement Centre (CIMMYT) and other international institutions aims to find cheaper, more effective methods of control, including precision targeting of herbicides and genetic engineering of resistant crops (Kanampiu, 2002).

Soil testing revealed no significant relationship between *Striga* occurrence/non-occurrence and soil fertility within or between fields and no influence of remedial actions such as addition of fine crop residues and small quantities of manure on total nutrient levels. Available levels of nutrients may have been more variable than total levels measured, accounting for within field differences. Alternatively, differences in soil structure or moisture may have played a role in influencing witch weed prevalence. These questions require further empirical investigation.

A desire to increase cereal yields was almost universal amongst surveyed households in Phahlamanoge and other settlements. Frequently perceived strategies for increasing crop yields in Phahlamanoge are stated in Table 5.6.

Table 5.6: Strategies for increasing total crop yields in Phahlamanoge

Method for increasing crop yield	Number of households
Plough more of land	38
Add manure to kill *Striga*	33
Hope for more rain	11
Don't know	7
Get more land	5
Increase knowledge of farming	5
Get water supply for irrigation	3
Plough on time when rain arrives	3

Source: Fieldwork

These results corroborate perceptions of the principal constraints to crop production in Phahlamanoge mentioned elsewhere: Lack of income to plough all land, *Striga* and lack of rain. Many respondents believed that the application of manure to land would kill witch weed because they had seen its effects elsewhere on 'commercial' farms. However, having the knowledge (human capital) does not necessarily imply having the

ability to mobilise that knowledge and realise improvements to the productivity of the land (natural capital). The central importance of financial capital for making effective use of endowments is reiterated. As Carter & May (1999:16) state, "poverty is thus not only a matter of few assets, but also of constraints to effective use of those assets".

In Madibong and Soupiana *Striga* was perceived to be less of a problem. In Madibong low rainfall was most frequently identified as the primary constraint on arable production, followed by birds, stalk borers and *Striga*. By far the most frequently identified means to increase production in Madibong was increased rainfall or supply of irrigation water, followed by affordable provision of fertiliser or manure. Stalk borer was seen as the principal problem for cultivation in Soupiana, followed by lack of rainfall and grazing of crops by livestock or wild animals. Access to 'medicine', or chemical treatments, for stalk borer was viewed as the primary means to boost crop production, followed by increased access to affordable fertiliser or manure supplies and more rain/water supply for crop production. Stalk borers are the larvae of a group of lepidopterous insects and are widely recognised along with *Striga* as being a cause of major yield losses in cereal production throughout sub-Saharan Africa (e.g. Khan *et al.*, 2000). Research into use of intercrop mixes as affordable means to attract stem borers away from crops or repel them from crops is presently being conducted in Sekhukhune District under the aegis of the Agricultural Research Council.

5.3.1.7 Temporal changes in staple cropping practices and yields

Respondents in Phahlamanoge were asked about their staple cropping practices over the years since 1994. Responses were very mixed, perhaps indicating that agriculture is to some extent an improvised system of performance (cf. Richards, 1985), adapted to specific and dynamic circumstances, rather than a set procedure. The five most frequently mentioned cropping practices identified by respondents are tabulated below.

Table 5.7: Staple-cropping practices of surveyed households in Phahlamanoge

Cropping strategy over last ten years	Number of households
Sorghum grown most years, except occasional year when lack money to plough or when rain is scarce	25
Not farmed field for all of last ten years (e.g. because of lack money to hire a tractor or because the male head was working in an urban area)	20
Mix sorghum and millet most years	14
Sometimes grow sorghum, sometimes millet	6
Grow millet most years	4

Source: Fieldwork

A quarter of all sampled households (25%) had planted sorghum most years over the past decade, although this does not imply a monoculture since sorghum is often mixed with other crops such as stock-melons and cowpeas, as discussed above. A further 20 households grow millet, either on its own, mixed with sorghum, or rotated with sorghum, often in an attempt to control *Striga*.

Of the 76 households that cultivated in Phahlamanoge in the previous season, the majority (48 households) claimed yields had decreased over the eight years since the democratic elections of 1994. The most important perceived reason for a decrease in yields was a reduction in rainfall (71% of those claiming a decrease) followed by witch weed and stalk borers. Findings from Soupiana and Madibong indicated that perceptions of a drop in yields due to a decline in rainfall were shared amongst substantial numbers of people in other settlements: 77% of cultivating households in Soupiana felt yields had declined since 1994 and 92% of these households ascribed this to a reduction in rainfall; 95% of households in Madibong perceived a decline and all blamed a reduction in rainfall as a principal factor. Perceptions of climatic change will be differentially influenced by a whole host of factors including involvement in land use over the period of interest, present conditions at interview and previous personal experiences of drought or plenty and change in land use (Dahlberg, 1996). A reduction in rainfall quantity is nevertheless widely perceived and is important in its own right as it fundamentally affects inclinations to use and invest in land (cf. Kinlund, 1996).

5.3.1.8 Use of harvested crops and crop residues

Of the 76 households that cultivated land in the previous season in Phahlamanoge, and allowing that individuals renting land had to split the harvest with the landowner, the vast majority of households (96%) consumed all of the crops and vegetables they produced. Depending on the specific species, crops may be consumed immediately or dried and/or boiled and stored for later consumption. Use of harvested crops is highly efficient. Even pumpkin pips are dried and preserved for snacks or as an accompaniment to or basis for porridge. Nutritional matter in the pulp of local pumpkins is limited but the pips are claimed to be a source of calcium, magnesium, phosphorous, potassium, protein and fat (van der Walt & le Riche, 1999). Intercrops can thus provide a valuable source of nutrient-rich relish for home consumption.

Of the three surveyed households that sold produce in Phahlamanoge, two were specialised vegetable producers who sold a selection of vegetables year round; the third household produced one of the largest reported harvests of 15 bags of sorghum. Eleven of these bags were sold and a further three bags were exchanged for an equal number of bags of maize meal. The land user claimed he used no special techniques or inputs on his land. As it was not possible to gain permission to take samples of his soil or measure the area cultivated, reasons for the high yield remain unknown. The key point is that market-oriented production is limited to a small minority of households in Phahlamanoge, as was also the case in Soupiana (4 out of 51 households) and Madibong (nine out of 100 households). Case studies of market-oriented production will be used in the following chapter to explore these efforts in more detail.

Exchange of harvested grain for other produce was rarely practiced in Phahlamanoge or Soupiana, but in Madibong 27% of surveyed households had exchanged grain harvested from the season prior to interview for other produce or materials. The products most frequently exchanged for sorghum included sweet potatoes (13 households), maize mealie (11 households) and chicken heads and feet (nine households). One respondent claimed he had constructed his whole house from materials acquired through exchanging harvested grain. Reasons for the significantly greater prevalence of exchange relationships in Madibong compared to Phahlamanoge or Soupiana remain open to speculation. Given its proximity to transport links and shops, a greater range of products is available in larger quantities in Madibong than in other settlements. Therefore, traders and other employed personnel in the Jane Furse area who are able to supply this range of products may, in a sense, tessellate relatively neatly with individuals that cultivate crops but lack expendable income.

Livestock are granted access to all fields after harvest time to graze crop residues. This is especially important for livestock owners since common grazing is often very limited in the dry winter months. All but one household in Phahlamanoge stated they leave crop residues in the field for livestock to graze, and in Madibong and Soupiana the general tendency was the same. The outstanding household in Phahlamanoge cut and transported crop residues to the homestead for animal fodder. Another household stated they had not cut crop residues in the past but if they could get access to transport and sickles they would cut the residues and make compost as seen used on 'commercial'

farms. This is another example of how the recognition of opportunities for alternative practices may not lead to uptake of these opportunities due to a lack of access to appropriate means, linked fundamentally to an absence of sufficient financial capital. This is not to suggest, however, that alternative practices, such as the cutting of crop residues for livestock feed or compost, would necessarily constitute a 'better' or 'more efficient' use of NRs. Leaving crop residues in the soil may have its own advantages. This practice can help to prevent soil erosion by binding soil together and residues not grazed prior to ploughing can be incorporated back into the soil, potentially contributing to soil organic matter content and soil fertility (e.g. Fowler 1999a). Livestock that graze on crop residues may also deposit manure on the land, further enhancing soil health.

5.3.2 Common property resource use and management

Common land is subject to 'open access' with no effective controls by government, traditional authorities or other community-based institutions on land use strategies in any of the study sites (cf. Ainslie, 1999). The most important use of common lands identified by local people is for livestock production (cf. Bester *et al.*, 2002). Strategies for livestock production are detailed below, followed by two other common utilisation strategies of significance to the vast majority of households: Cutting of wood for fire and collection of wild fruits. Employment opportunities provided on common land through the Landcare programme are also introduced. Less frequent uses of common resources included utilisation of wild plants for medicines, collection of wood for roofing, fencing or manufacture of cooking utensils, collection of soil for brick making, and in Soupiana, collection of clay and reeds for producing pots and mats. A small number of respondents in Phahlamanoge and Soupiana reported hunting hares with dogs, but besides pests such as porcupines, baboons and jackals, few other wild animals were reported to exist in the region. Hunting opportunities are thus extremely limited.

5.3.2.1 Livestock production

Issues of livestock ownership, stocking trends, uses of livestock and management practices are now discussed, beginning with livestock ownership.

Livestock ownership

The types and numbers of different animals owned by households in Phahlamanoge are shown in Table 5.8 below.

Table 5.8: Livestock ownership in Phahlamanoge

Type of animal	Percentage of households owning livestock	Range of animals owned	Mean number of animals owned by owning households	Mean number of animals owned by all 100 surveyed households
Poultry	49	1 - 30	7	3.6
Goats	44	1 - 40	9	4.2
Cattle	25	1 - 47	10	2.6
Donkeys	8	4 - 15	8	0.7
Sheep	7	1 - 13	7	0.5
Pigs	2	8, 12	-	0.3
Households with no livestock	32	-	-	-

Source: Fieldwork

Chickens are the most popular animal owned, followed by goats and cattle, the latter owned by only a quarter of households. These data support the claim made by Delius (1996) that cattle ownership in Sekhukhune has declined to a minority of households and that ownership of small stock is more widespread, in the case of Phahlamanoge involving a total of 45% of surveyed households. Concentration of livestock in a small number of households may have been exacerbated by high unemployment that prevents youth from acquiring the necessary financial capital to marry and establish their own households, a process that has traditionally involved the transfer of cattle. Yet almost one third of households surveyed owned no livestock, implying an even more limited participation in a livestock-based economy. A lack of income to purchase medicines to protect livestock health or to purchase new animals seems a likely causal factor.

Statistics for the settlements of Madibong and Soupiana show even lower figures for household livestock ownership.

Table 5.9: Livestock ownership in Madibong and Soupiana

Type of animal owned	Households	
	Madibong	Soupiana
Poultry	41%	37%
Goats	10%	10%
Cattle	7%	24%
Donkeys	1%	2%
Sheep	2%	6%
Pigs	2%	0
Households with no livestock	49%	51%

Source: Fieldwork

The reason for the relatively limited cattle ownership in Madibong may be the lack of suitable grazing areas due to settlement expansion. Local extension workers report that Soupiana has poor quality 'sour' veld because of its relatively high altitude and high

rainfall location (cf. van Oudtshoorn, 1999). Respondents from Soupiana confirmed this, reporting that the veld could not support many livestock and owners took their livestock to graze at lower elevations where possible. In conjunction with a focus on crop production due to higher rainfall relative to the other study sites, this may explain why 51% of households do not own livestock in Soupiana.

Temporal changes in livestock ownership

Livestock herders' perceptions of overall change in cattle numbers in Phahlamanoge since 1994 were mixed. Twelve out of 31 felt cattle numbers had increased, 15 stated they had decreased, while four were unsure. The single reason given for increases in cattle numbers was natural reproduction, whilst the main reason for decreases in cattle numbers were thought to be cattle theft (seven households) and deaths due to lack of rain or unknown causes (seven households). Perceptions of a decline in number of cattle herding households and total number of cattle owned were more widespread amongst cattle owners in Madibong and Soupiana, but the reasons given were the same. A short time-series of livestock statistics covering the period from 1990 to 1996 were the only secondary data available on temporal changes in livestock numbers at the primary study site (see Table 5.10), but information was unavailable on what types of animals were included in these calculations or how these figures were calculated. These data were recorded by staff of the former Department of Agriculture of the Government of Lebowa and relate to an area called Geeneinde that incorporates Phahlamanoge and neighbouring villages.

Table 5.10: Livestock statistics for Geeneinde: 1990-1996

Statistics	Year					
	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96
LSU	761	837	831	-	866	829

Source: Population and Livestock Statistics: 1990-1996. Sekhukhune District Department of Agriculture, Lebowakgomo.

Over the period 1990/91 to 1995/96 livestock growth rate averaged 16% per annum, over five times that of the human population. However, this average figure hides more than it reveals. Inter-annual changes appear to be erratic with concurrent years seeing alternate increases and decreases in the total number of livestock units. Without a longer time-series of data it is not possible to interpret whether or not these are chance fluctuations in a broader trend of increasing (or decreasing) livestock units, or if they

represent the norm. The emphasis placed on rainfall as a key constraint on grazing by respondents suggests such fluctuations in livestock numbers may be a common occurrence related to drought-induced starvation, as occurs in many semi-arid areas of Africa (e.g. Scoones *et al.*, 1993). The year 1994/95 to 1995/96 that showed the largest decrease of 37 LSU or 4% of holdings at Geeneinde also showed a substantial decline in livestock on the neighbouring 'farm' of Parys from 970 to 848 LSU, implying that the cause was a driver acting beyond the settlement scale, probably low rainfall. Reliable rainfall figures for the region for these years were unavailable to test this hypothesis, although key informants in Phahlamanoge did state that 1995 was a drought year, implying a decrease in rainfall was the cause of the crash in livestock numbers.

Numbers of donkeys kept in Phahlamanoge were reported to have decreased because of loss and deaths of animals as a result of a reduction in the availability of herding labour due to school attendance. Apartheid propaganda against donkeys in the region may also have played a part, as mentioned previously. As a consequence, residents' dependence on tractors for ploughing has increased.

Uses and valuation of livestock

Purposes for keeping different livestock are shown in the table below, based on survey results from Phahlamanoge.

Table 5.11: Purposes for keeping different livestock

Animal	Purposes
Chickens	Consumption; sale; eggs; easy to keep and quick to reproduce
Goats and sheep	Consumption; sale; slaughter for special occasions; enjoyment; easy to look after since they can be let out of the kraal in the morning and return by themselves in the evening
Cattle	Sale when income is needed; slaughter for special occasions; bridewealth; occasionally for milk (5 out of 25 cattle owning households take milk)
Donkeys	Demand claimed to be high for hiring donkeys for ploughing and transportation
Pigs	Consumption and sale, but members of the popular Zionist Christian Church (ZCC) are not allowed to eat pork

Source: Fieldwork

Reasons for keeping livestock are largely pragmatic, frequently involving concerns about food and income supply. For example, ownership of poultry, the most frequently owned type of livestock in all settlements, was primarily for meat consumption. Livestock sales are rarely made except in times of greatest need, as indicated by survey results suggesting that only seven out of 51 households in Soupiana and four out of 100

in Madibong had sold livestock during the previous year. Thus whilst respondents report that they would keep cattle to sell when income is required, this seems to be avoided where possible due to the cultural value associated with cattle ownership. Indeed, the value of cattle as a symbol of wealth and for meeting social obligations such as bridewealth payments and sacrifices for special occasions was often mentioned. Both socio-economic and cultural considerations are thus important in livestock ownership, particularly regarding cattle.

Households surveyed in Phahlamanoge were asked if in future they would like to change the animals they own. The five most popular answers are tabulated below.

Table 5.12: Livestock aspirations in Phahlamanoge

Number of households	Desired change in animals and reason
28	Keep/get more cattle to sell to generate income
18	Keep/get more goats – easy to look after
18	Keep the same animals as at present
16	Keep/get more chickens – to eat
12	Keep/get more sheep – to eat and slaughter for special occasions

Source: Fieldwork

These findings suggest that cattle are still highly valued by a substantial number of respondents and reinforce the above finding that this valuation is often primarily in terms of economic, practical or insurance value. Of the 28 households who stated the desire to keep or get more cattle, 21 owned no cattle at the time of interview, indicating a large unmet demand for cattle ownership. Given that 25 households out of the 100 interviewed currently own cattle, this is a substantial number of additional households. An increase in economic fortunes of Phahlamanoge households might therefore be expected to lead to a substantial increase in cattle numbers in the area and consequently significantly increased pressure on grazing resources.

Livestock management practices

All animals in all study settlements are kept over night in kraals close to the homestead. Sheep, goats and chickens are allowed to roam during the day, whereas cattle and donkeys are usually shepherded by the senior male member of the household. A cattle post system involving remote camps in the mountains was said to have been used for grazing management in Phahlamanoge in the past, but concerns about stock theft and 'criminals' in the remoter areas and loss of youth labour to schooling led to its collapse.

This *de facto* decrease in the grazing area in Phahlamanoge may have led to increased pressure on the areas currently utilised.

In late winter, after the harvest, animals roam on the fields and eat the crop residues. However, in the summer the animals must be kept away from the developing crops and are herded to grazing on the mountains. It was not possible to identify water points used by a large number of different household's cattle in Phahlamanoge; rather, cattle are watered unregulated at many different places along the two streams in the area. No formal system of grazing management existed beyond the winter/summer system. Use of grazing areas was not coordinated between users and no limits existed on the number of livestock kept. People therefore tended to take their animals to the hills closest to their homesteads where they allowed their livestock to graze as they desired.

Input use for livestock production was minimal. Only 16 out of 68 households that owned livestock in Phahlamanoge purchased any medicines for their animals. Fifteen of these were cattle owning households who acquired medicines through the village-based livestock organisation. Death due to disease was consequently perceived by the majority of livestock owners in all settlements to be a major cause of a decline in livestock in general and in cattle owning households and total number of cattle owned since 1994 in particular. Another frequently mentioned cause was limited grazing, often linked to lack of rain. In low rainfall years, the vast majority of livestock owners take no remedial measures to mitigate the effects of lack of grazing on their livestock. Livestock owners often hold onto their animals in drought years rather than selling early when the animals possess greater market value, leading to a decline in the condition of livestock and eventually livestock deaths due to a lack of financial capital to access feed (cf. Cummins & Rootman, 2003). Purchase of fodder inputs – often Lucerne mix for cattle and grain for poultry - was very limited with only 1, 8 and 12 households in Phahlamanoge, Soupiana and Madibong respectively ever buying any livestock feed. Predation by wild animals also contributed to livestock losses, especially in chickens, sheep and goats.

5.3.2.2 Collection of firewood

The most important common property resource collected by respondents is wood. Ninety three per cent of surveyed households in Phahlamanoge, 94% of households in

Soupiana and 71% in Madibong cut timber for firewood. The percentage of households using wood as a fuel is lower in Madibong because electricity is available for those who can afford to use it; one-third of households (33 of 100) used electricity as a fuel source. Women or children usually collected firewood on foot, forming head loads or bundles of varying sizes, although division of gathering activities between household members appeared to be flexible. For example, men sometimes gathered wood whilst herding cattle. Five households in Phahlamanoge collected wood using tractor or donkey pulled trailers or vehicle. The minority of households that did not collect firewood for fuel either buy wood locally or rely on use of other fuels such as paraffin, gas and coal. Dried aloe leaves or dried dung are also used by a small number of households, particularly by those composed of elderly or unwell members who cannot travel far and thus collect fuels close to the homestead. Use of dung for fuel was found to be much higher in nearby villages of Manganeng and Makua (Crookes *et al.*, 2000). This reflects the more limited availability of wood in these areas. Indeed, the director of a CBO in Manganeng reported that people have for many years travelled from Manganeng to Phahlamanoge to collect wood due to its greater abundance around the latter village.

Fifty surveyed households in Phahlamanoge were asked about the types of wood they collect. The five most commonly collected types of wood are listed in order of ranking in Table 5.13 below. Salient characteristics of these species independently identified in a PRA session with a group of four women are also listed.

Table 5.13: Popular tree species for firewood

Local name	Scientific name	Salient characteristics
Mohiolodi	Unidentified	Abundant, easy to cut and burns well; also used for kraals, fences
Mologa	*Croton gratissimus*/ Lavender croton	Abundant, burns easily; also sometimes grazed by livestock
Motholwane	*Acacia caffra*	Abundant, easy to cut and burns well (cf. Mol, 1993), makes good flames and charcoal
Moshwana	*Acacia tortilis*/ Umbrella thorn	Abundant, burns well (cf. Mol, 1993); also used for fences, goat kraals; leaves and pods eaten by livestock (cf. Mol, 1993 – very nutritious fodder)
Mohlewere	*Rhus gueinzii*/ Thorny karee	Abundant, burns well although one respondent claimed it does not 'glow well'; also used for kraals, fences

Source: Fieldwork

In the neighbouring village of Manganeng, preferences for firewood species were similar to those in Phahlamanoge with *Acacia tortilis, Acacia caffra* and *Rhus gueinzii*

all being ranked in the top ten (Crookes *et al.*, 2000). These commonalities reflect similar environmental conditions and species dominance patterns (cf. Rathogwa and Shackleton, 1999). Availability of wood species is clearly important in determining use of species for firewood, especially since controls on access to these resources are presently ineffective. Surveyed households were also asked to estimate the amount of firewood they had collected over the past week or month, but many households were unable to give estimates because the amount collected, frequency of collection, and person collecting all tended to vary between different days and weeks depending on factors such as number of people present in the household, occurrence of special occasions, and time available for collection. Estimates of firewood use were thus considered unreliable.

Fourteen households in Phahlamanoge collected wood for sale as well as for their own consumption. Prices quoted for sale of wood are given in Table 5.14 below:

Table 5.14: Firewood prices in Phahlamanoge

Short-base *bakkie*	125-300R (mean is 200R approx.; most popular format used by 6 households)
Donkey cart	200-350R (mean was 270R approx.)
Van	300R
Tractor trailer	1000R
Bundle	10-200R (depending on specific size).

Source: Fieldwork

Respondents found it difficult to estimate the frequency of sales, which are highly variable, but given that a bag of maize meal costs approximately R100 and that the minimum farm labour wage is R650/month, selling wood can clearly generate a significant level of income. Collection of wood by poorer households is however constrained to a certain extent by a lack of access to means of transportation.

5.3.2.3 Collection of wild fruit

Ninety three per cent of households in Phahlamanoge and 50% of households in Madibong collect wild fruit. Respondents in Phahlamanoge claimed wild fruits represent an important and often abundant source of food, although availability of fruit is affected by rainfall and grazing by livestock. In contrast, only five households in Soupiana out of 51 collected wild fruits due to the lack of fruit trees in its high mountainous location. To compensate for this shortage, many households cultivate fruit trees in homestead yards and in some cases extensive orchards. Fruit collection in

Phahlamanoge and Madibong was largely undertaken by women and/or children and, with the exception of one household that sold fruit to local people at a cost of 10R per 4kg, was almost entirely for own consumption. The ten most popular types of fruit identified by respondents are listed in Table 5.15 in order of frequency mentioned.

Table 5.15: Popular types of collected wild fruit and their uses

Local name	Scientific name	Uses
Mabrara		Direct consumption
Mabupudu		Alcoholic drink, porridge, direct consumption
Mabilo		Direct consumption
Morula	*Sclerocarya birrea*/Marula	Alcoholic drink, snack, jam, jelly, commercial uses of oil; seed as snack or part of meal; commercial use for cosmetics
Ditshidi		Direct consumption
Dinamane/ Monamane tree	*Cassine transvaalensis*/ Transvaal saffronwood	Direct consumption
Dithetlwa	*Acacia sp.*	Direct consumption
Foie	*Opuntia sp.*/Prickly pear	Jam, direct consumption
Dikgoto/ Mogoto tree	*Grewia microthyrsa*/Lebombo raisin	Direct consumption
Dinee		Direct consumption

Source: Fieldwork

Although the fruit of the Marula tree *(Sclerocarya birrea)* is not mentioned as frequently as some fruits, it is held in particularly high esteem by local people due to its numerous uses. Marula fruits can be eaten unprocessed, or made into jam, jelly, or a popular alcoholic drink. All these products have considerable nutritious value as the pulp contains four times as much vitamin C as orange juice (Mol, 1993). Each fruit also contains two or three seeds enclosing protein-rich oil that can be eaten raw or cooked with porridge. Demand has recently increased for use of this oil in cosmetics and a commercial Marula processing plant exists in Phalaborwa, approximately 150 kilometres to the northeast of Phahlamanoge. Potential for seasonal income generation from marula trees has been recognised in Phahlamanoge where a group has recently established a marula nursery to cultivate local varieties known to produce large amounts of fruit. Nevertheless, at the time of this study very few households in any of the settlements sold fruit as a means to generate an income, probably due to the availability of a free supply to any local people wishing to consume them.

5.3.2.4 Landcare programme

Working as a manual labourer on the Landcare project is a NR based formal employment opportunity in Phahlamanoge that could be classified somewhere between a 'productive' and a 'survival' activity (cf. Baber, 1998). Participation involves little or no capital outlay, is minimally remunerated and can involve short or longer-term periods of employment, depending on the role performed and stability of funding provided by government. The physically demanding nature of the labour is particularly difficult for elderly or under-nourished individuals, but there are few alternative sources of cash available. Thirty five per cent of surveyed households in Phahlamanoge included members who were either currently employed on the Landcare project, or employed in the past. Employees are supposed to be drawn from the poorest households in greatest need of income. This is borne out by data indicating that of the 35 households who reported having members employed by Landcare, currently or in the past, 26 do not receive pensions or migrant remittances. Twenty-eight of these households only produce enough grain for up to six months of the year.

5.4 Contribution of natural resource-based livelihoods to food security

Grain from sorghum, millet and maize provides the staple food for the vast majority of Sekhukhune District residents (e.g. findings of this study; Pardeller *et al.*, 1999; Baber, 1998). Livestock use is confined to a minority of households and most often is focused on poultry production. Whilst this may provide a substantial nutritional input to the diets of some households (e.g. shepherds), most households keep few chickens and slaughter them irregularly. Collection of wild fruits was also seen to provide an important seasonal supplement to diets in some 'deep rural' settlements. Diary entries for Phahlamanoge respondents indicated that daily food consumption was often limited to sorghum porridge with a relish of vegetables. Consumption of meat was non-existent or largely limited to cheap chicken heads and feet. This poor dietary composition clearly indicates livelihood stress. Findings were corroborated by survey results indicating that over half of the 100 households surveyed in Phahlamanoge (52%) had not eaten any meat, besides chicken heads and feet, over the previous four weeks. A further 36 households had not eaten meat on more than four days over that period; the mean was two days per month. Many respondents laughed when asked about meat consumption, commenting that it was something unknown to them, 'a strange thing'. The staple cereal crop clearly provides the bulk of food input and access to sufficient grain can thus be

used as a proxy indicator for food security. These findings closely reflect the situation in the 1960s described by Monnig (1967:177):

> "Although the Pedi are very fond of meat this is relatively scarce, and their diet is largely vegetarian. The normal Pedi diet consists of a cereal porridge with a side-dish or relish, which usually is a vegetable".

Surveyed households in Phahlamanoge were asked to estimate how many months their household could survive on the grain they harvested during the previous season. Thirty-two households stated they could survive for less than one month on the grain harvested and only five households claimed they could last the full year. The mean value was three months of food security. This value is consistent with the mean harvest of three bags of grain cited above, and with a study in the nearby village of Apel which considered three bags of grain to be equivalent to approximately three months of food for an average family of six (Pardeller *et al.*, 1999). Production levels of staple grains in Phahlamanoge are clearly well below subsistence levels. Respective means for Madibong and Soupiana were also low at four and five months of food security.

5.5 Economic and socio-cultural aspects of arable production

The mean yield harvested in the season prior to interview in Phahlamanoge was approximately 240kg of grain. Given that the purchase price of maize meal in 2002/2003 was approximately R100 per 80kg bag, the average harvested yield could have been purchased for approximately R300. Hiring a tractor to plough a field costs around R90 per *sepedi* hectare while a donkey team costs around R60 per *sepedi* hectare. Depending on the size of the field, ploughing as opposed to directly purchasing maize meal may therefore have resulted in an overall loss of income for many households. As a respondent from Madibong observed:

> "ploughing is too expensive and there is a lot of job in the field... money I can spend to plough can help me to buy some food"

Ploughing any of the ten fields measured in Phahlamanoge with tractors and reaping the mean yield would have resulted in an overall loss since even the smallest measured fields were bigger than four *sepedi* hectares, equivalent to a ploughing price of approximately R360. Views were mixed as to whether or not the season in question was a good or bad rainfall year, although as already discussed, there is a widespread

perception that rainfall has decreased over the last decade. This perception undermines confidence in generating future returns from arable production.

Such findings beg the question, why do people plough at all? This question is especially pertinent since not ploughing would free up time, funds and energy for pursuing other, potentially more lucrative strategies and tasks. First, however, it must be recalled that intercrops are not included in these estimates because land users were not able to quantify the size of these harvests. Yet as discussed above, they can provide an important means of nutrition. As McAllister (2001) observes, exclusion of intercrops from yield estimates in the past may be one reason why overall valuations of smallholder arable production in South Africa have been misleadingly low. Full quantification of all field crop yields might therefore indicate that the investments made are justified – "a rational choice made on economic grounds" (McAllister, 2001:69). Second, other motivations for crop production that may appear contradictory to orthodox economistic notions of livelihood strategies require consideration (cf. Twyman, 1997). A sense of identity linked to farming, and a sense of being part of a mutually supportive community which values its 'traditional' identity and lifestyle may also be an important contributory factor (McAllister, 2001). McAllister (2001) suggests that in South Africa's Transkei this cultural motivation is less important than the economic one, but he fails to differentiate between groups. McCusker (2000:27) reports that many elderly respondents in a settlement in the west of Sekhukhune District reported feeling the 'need to farm' because 'we have always farmed'. Others feared that farming would collapse altogether if they stopped because the youth lacked involvement in farming (cf. Bryceson, 2000).

These findings resonate with many elderly people's concerns revealed in this research about the laziness and lack of interest of younger, unemployed, unmarried people - 'youth' - in agriculture. Examples of comments include:

> "they [youth] say they don't like it [agriculture] and say [they] have the rights of saying no and us as old people we take the responsibilities of our field" (Soupiana respondent)

> "the young are less involved in fields, because they are discouraged by lack of rain. They don't want to lose their money when they don't harvest any crop" (Madibong respondent)

> "young people are not interested to look after cattle or work on fields, because to stay at the field [and] look for cattle is not a good or healthy life according to young people... they like working in the office" (Phahlamanoge respondent)

Whilst not wishing to essentialise the situation, such comments do suggest a tendency for elderly people socialised into an agricultural way of life and its importance for household survival to, unsurprisingly, be attached to these and related socio-cultural practices and arrangements, as indicated by frequent statements that 'its our culture'. In contrast, younger generations have spent less time learning land use skills and more time gaining a formal education and nurturing a desire for material gain and participation in the wider 'modern' economy (Agricultural extension officer, 2003, pers. comm.; Delius, 1996; Jaiyesimi-Njobe, 1995). A perceived lack of profitability of agriculture in former homeland areas is thought to be a significant cause of an alleged reluctance of young people to pursue farming as a career (e.g. LPDA representative, 2003, pers. comm.; Lipton *et al.*, 1996; Jaiyesimi-Njobe, 1995).

Missionary school education may also have served to directly undermine arable production. Jaiyesimi-Njobe (1995) claims that school children were sent to work in the gardens as a punishment, for example for being late for lessons, and that Africans were excluded from large-scale mechanised and profitable agriculture that they learnt of in school. This perception was also vocalised during interviews with extension officers who worked in the region. As a consequence, local agricultural practices and particularly use of animal traction were viewed, and perhaps continue to be viewed, by many children as antiquated practices. African graduates began seeing farming as 'getting their hands soiled' and involvement in agriculture became stigmatised (Jaiyesimi-Njobe, 1995:118; Department of Agriculture representative, 2003, pers. comm.). This process may also have undermined, and continue to undermine, efforts at protecting arable land since "rural people know that by the time they grow old nobody is keen to take over from them" (LPDA representative, 2003, pers. comm.).

The introduction of human rights in the new constitution may be facilitating value and behaviour change, since as alluded to in the first of the quotes above, young people know their rights and are often reported to use them as a threat to avoid having to participate in activities they dislike. In the same vein, other respondents complained that

young people could no longer be controlled because they are no longer allowed to use the *sjambok* - a form of whip - to punish them.

Ploughing is seen as a symbol of well-being for many rural residents, especially older generations. They enjoy seeing it, or participating in it, as it indicates sufficient rain has fallen and that households have sufficient money to hire tractors or donkeys and healthy, willing members to tend the crop. Yet informal interviews indicated that some older respondents practised farming largely because they feared being labelled as 'lazy' by others if they did not. Thus, there was a sense of a peer pressure to uphold the norm in the face of a world that appeared to many elderly people to be losing its culture and descending into an 'ungovernable way of living' and disaster.

The situation is however more complex than the comments of elderly respondents suggest. Interviews with 30 young people in Phahlamanoge revealed that their involvement in agricultural activities is still quite widespread (22 out of 30 respondents) and that their aspirations are diverse. Just under half of respondents (14 out of 30) claimed they would like to live in an urban area in the future primarily because of better employment prospects, and to a lesser extent, because of better education, better or more entertainment and access to infrastructure and services lacking in Phahlamanoge (e.g. electricity, running water and tar roads). These respondents aspired to professional, 'modern' employment as engineers, technicians, and accountants and sometimes disparaged farming, supporting elderly respondents fears; e.g. "In the future the people do not go to the fields because its only the old people that go to the field".

Young people's answers to the question 'why do some young people not like to work on the land?' also corroborated the perceptions of older respondents quoted above, as shown in Table 5.16.

Table 5.16: Youth perceptions of reasons for lack of youth involvement in land based livelihoods

Reason for lack of involvement in land-based livelihoods	Number of respondents
Land-based livelihoods involve strenuous, dirty, undesirable work	10
Land-based livelihoods provide little income	6
Land-based livelihood practices are out-dated and unscientific	4

Source: Fieldwork

Yet the majority of respondents who wished to live in an urban area (13 out of 14) wished to maintain contact with their family in Phahlamanoge and most (11 out of 14) claimed they would like to return to live in the village with their family when elderly. The most commonly stated reasons for returning to the village when old included a lack of need or interest in entertainment when old, the fact that Phahlamanoge is home, and the need to be taken care of by your children who would stay in the rural area. Moreover, ten of 11 respondents who thought they would return to the village also claimed that they would like to be involved in arable and/or livestock production. Rural areas are thus perceived to provide a cheap and secure base for growing up and retirement (cf. Baber, 1998), with migration to urban areas during adulthood not necessarily implying a permanent departure from land-based livelihood activities. A desire to move to urban areas is clearly linked to a particular stage in the lifecycle, perhaps reflecting to a degree the way in which young people's parents may have sought out migrant work in the past when they were sufficiently old to do so.

The 17 respondents who stated that they would like to continue living in the area cited the following benefits of living locally: Low cost of living (e.g. free firewood and wild fruit), low crime rate and the simple fact that it was home. Half of the young people who wanted to stay in the village were interested in agricultural activities, indicating not all young people want to escape land-based livelihoods. Other livelihood aspirations were varied, including running a shop, nursing, teaching and working for a steel company. Of particular pertinence was a small minority of young people who wanted to stay in the village because they wished to 'improve it' in some way. Five people expressed such a desire. Illustrative comments include:

> "[I want to] improve village... by improving the standard of soccer, improving the method of farming... [by] grouping them together... Teaching them about good farming, I mean commercial farming... For me to live is because of farming."
>
> "many people are not educated. As for myself, I would like to show them how they should live."
>
> "if I make a lot of money, I can... create some jobs."
>
> "[I want to live here] at my home to promote my village... doing farming and water engineering."
>
> "when I leave it, this rural place will become less productive. I want to improve it... have [a] garden, call people to work there, sell vegetables, give money for help.... because without farming we cannot live."

Clearly some educated young people are still optimistic about opportunities to work together to enhance agricultural production, create projects and job opportunities and raise the overall standard of living in the village. Fourteen out of 30 respondents foresaw Phahlamanoge receiving key services and infrastructure such as electricity, piped water and a tar road within the next 50 years. The outlook for rural livelihoods may therefore not be as gloomy as elderly respondent's comments imply. On the other hand, seven out of 30 youth respondents predicted that agriculture will decline or stop entirely in Phahlamanoge over the next 50 years. Perceptions amongst youth are evidently diverse and contradictory. Young people's aspirations can be dismissed as naïve and unrealistic or as expressions of what they feel they ought to do rather than what they will really end up doing. Future behaviour is ultimately largely unpredictable.

Sensitivity to financial losses due to unreliable rainfall was frequently identified as a principal, and, as indicated by calculations above, perhaps a perfectly logical reason for some individuals, young and old, turning away from agriculture in a highly risk-prone dryland environment. Yet the availability of alternative opportunities to make a living is extremely limited, as will now be explored.

5.6 Other livelihood strategies: The critical role of pensions

Households in Phahlamanoge that were unable to survive for 12 months on their harvested grain (95 out of 100) were asked how they obtained additional food. The ten most frequently stated coping strategies are given in Table 5.17. These included relying on monthly pensions, financial or direct food supplements from a relative outside of the household or selling wood. However, 12 of the 95 respondents (13%) reported having no effective strategy and stated that when harvested grain ran out, it was a 'disaster'.

Table 5.17: Strategies for obtaining food in Phahlamanoge

Number of households	Coping strategy
38	Rely on household pension
23	Rely on relative outside household for money or food
12	No strategy – simply a 'disaster'
11	Sell wood
9	Rely on remittances
7	Piece work (e.g. labouring, cooking)
4	Sell animals
4	Rely on own business (e.g. shop or cobbler)
3	Hire out donkeys for ploughing or transporting materials
3	Rely on collected food

Source: Fieldwork

The importance of monthly pension payments is seen to be central to purchasing food to supplement limited harvests in Phahlamanoge (cf. Pardeller *et al.*, 1999). Pensions are revealed to be even more fundamental to many households survival when it is realised that many relatives from outside the household that are relied upon for assistance are often those in receipt of a pension income rather than a migrant remittance or local wage. South African pensions were R700 per month at the time of fieldwork. Africans in South Africa have been entitled to pensions since 1944 but conditions for entitlement were only equalised with those for whites in 1996 (Barrientos, 2003). The programme absorbs 60% of social security expenditure (Committee of Inquiry into a Comprehensive System of Social Security for South Africa, 2002), but the findings from this research indicate that pensions continue to represent an extremely important source of subsistence income for many rural households.

Pensions were also important for food security in Soupiana where the most popular strategy was to ask for assistance from neighbours or relatives, often those in receipt of pensions, followed by dependence on own pension payments and third, wage incomes from formal employment (e.g. as a teacher). In Madibong reliance on household pensions was also the most frequently reported strategy for accessing food, followed by income from employment in a variety of local enterprises (e.g. teachers, taxi drivers, sales, engineers), dependence on child support grants and requests to relatives and remittances from migrants. Poor families receiving a monthly income of less than R200 per month in Madibong were also supposed to receive welfare food parcels, although some households were reported to have been excluded from this process. Provision of food parcels was introduced several months before the local elections, prompting some respondents to suggest the government was attempting to 'buy votes'.

The importance of pension payments and the general lack of access to regular remittance flows or local income generating opportunities is corroborated by the responses of households in Phahlamanoge and secondary study sites to questions about overall dependence on different income sources, shown in Table 5.18 overleaf.

Table 5.18: The percentage of households in Phahlamanoge, Soupiana and Madibong depending on different income sources

Income source	Phahlamanoge	Soupiana	Madibong
Local income-generating opportunities	32%	26%	25%
Remittances from outside area	17%	16%	23%
No income from local income-generating opportunities or remittances	55%	63%	55%
Welfare:			
Pensions (R700/month)	41%	35%	41%
Child support grant (R340/month)	32%	28%	38%
Disability grant	5%	2%	6%
No income from welfare	36%	47%	27%
Households where welfare is the only livelihood	36%	39%	45%
No income from local income-generating opportunities, remittances or welfare	16%	27%	9%

Source: Fieldwork

The relatively large proportion of households in Soupiana receiving no income from local income-generating opportunities, remittances or welfare can partly be explained by the higher rainfall and consequently larger and more reliable yields reported to be harvested at this settlement. These reduce expenditure on purchasing grain, making financial capital available for other purposes and thus perhaps reducing the pressure on household members to find employment.

The term 'local income generating opportunities' here refers to a variety of more and less formal arrangements ranging from formal employment as a government worker or teacher, working in or owning a shop or driving school, to selling various produce and services including firewood, vegetables, bricks, dresses, and tractor or donkey power. Although a small number of households have managed to have members employed on contract, the vast majority of income generating strategies involved less secure and irregular income flows. Baber (1998) attempts to divide income generating strategies into 'productive' enterprises requiring a considerable capital base and operating throughout the year providing a substantial and stable income, and 'survival' activities requiring a small capital input but providing intermittent, short-term and poor returns. This dichotomy is over simplistic. Income-generating strategies are spread along a continuum from more stable and productive enterprises to more irregular and unproductive ones, with relative positions likely to be unstable over time. For example, ownership of a taxi can be seen as a more secure and a potentially more lucrative year-round incoming generating strategy than collection and sale of firewood. Yet if the taxi breaks down and inadequate savings have been accumulated to undertake repairs, as

reported by one taxi owner in Madibong, the loss of income flow is a sudden shock. The taxi owner possessed a large, expensive-looking house constructed from concrete and roofed with tiles, yet with the loss of ability to use his taxi and no land, his family had been forced to survive on two child support grants. Asset ownership can clearly provide an unreliable indicator of poverty status and vulnerability trajectory (cf. Osbahr, 2001). This underscores once again the need to attend to households' abilities to effectively utilise their assets, both now and in future, not merely their possession of assets.

Although 47% of households surveyed in Phahlamanoge had at least one non-resident household member, only 17 of these households had received remittances in the form of either money or goods from non-resident members over the 12 months prior to interview. The proportion of households receiving remittances in Soupiana and Madibong was also found to be small. Non-remitting non-resident members were often unemployed and said to be 'looking for work' in an urban area. This lack of remitting migrants contrasts sharply with earlier research by Baber (1998) in the nearby village of Mamone where 70% of households had migrant members and 70% of these migrants contributed remittances to the resident household unit. It does accord with estimates that around 80% of the population earns below a 'subsistence' wage (District Municipality of Greater Sekhukhune, 2002a). A possible explanation for the discrepancy between this study's findings and those of Baber (1998) is that Mamone village is somehow unique in its employment characteristics. However, there seem no obvious characteristics to differentiate Mamone from the study sites. A second possible explanation is that respondents were providing misleading answers in order to present themselves as exceptionally needy in order to better capture any support they thought might result from my presence. Whilst the latter is possible to some extent and the detailed studies of income and expenditure undertaken in Baber's (1998) study - allowing cross-checking of figures provided by respondents - were beyond the scope of this study, cross-checks within the questionnaire used for this research did allow a degree of verification and the follow up of irregularities. The consistency of answers across households and across different study sites also lends support to this study's findings. A third and arguably most probable reason for the discrepancy in findings is simply a continued decrease in formal sector employment and hence migrant remittances over the seven years since Baber's fieldwork in 1995, as claimed by many respondents in the study settlements.

5.7 Discussion: Livelihood assets, effective use and livelihood outcomes

The vast majority of households in the study sites have access to arable land, yet few produce enough food to survive until the next harvest. Low and unreliable rainfall, parasitic weeds, stalk borers, low soil fertility and the cost of tractor hire place severe constraints on production. A widespread demand for additional land is not evident since many households are not able to utilise all of their current holdings. Access to common land is effectively unregulated but the majority of households own no cattle and only small numbers of goats. Poultry are the most popular form of livestock. Livestock theft is a widespread problem in the region and lack of winter grazing, herding labour, fodder supply or medicines further undermines productivity. Low income means that people are unable to replace stolen or deceased livestock.

For a minority of households, kin or friendship links facilitate access to cheap ploughing services or borrowing/renting land. For the majority of households effective utilisation of NRs is constrained primarily by a lack of financial capital. This limits their ability to hire a tractor to plough arable land, purchase livestock - or medicines or hired herders to maintain healthy animals - in order to maximise personal returns from commons usage, or use a vehicle to collect and sell firewood. Social and political relations are thus arguably of less importance for accessing NR assets and effectively using them than is having access to the means to use such assets productively. Rights to utilise *primary* capitals do not necessarily imply that people have the *secondary* capitals, or capabilities, necessary to use them productively.

Access to financial capital depends on access to government welfare, local jobs or migrant remittances. Job opportunities are perceived by many respondents to have declined over their lifetimes. The present lack of job opportunities locally and nationally means pensions are often the main income source. Provision of rural credit is being attempted in Sekhukhune but it seems that where irrigation is not available, the risk involved in dryland farming will make credit provision unviable. Widespread dependence on hired tractors and the concomitant need for financial capital make it difficult to conceive of arable production as a 'safety net' for the poorest rural households, even if they are fortunate enough to have access to land. The need for financial capital to undertake arable production could be reduced by increasing access to animal draught power. However, problems of labour availability, theft and limited

winter grazing pose major obstacles, as do some perceptions of draught power as out-dated and 'backward' and of donkeys as environmentally destructive.

It is consequently unsurprising that the need for increased employment opportunities is ranked highly by local respondents in PRA sessions discussing overall needs. Unemployment and lack of financial capital are seen to be fundamental constraints on access to means of utilisation of assets and thus on land-based livelihoods as a whole. Lack of financial capital also constrains attempts at diversification into alternative income generating opportunities in order to reduce risk associated with climatic and economic shocks and stresses.

Differentiation in the study settlements is constrained by the lack of opportunities for accumulation and by enduring beliefs in sharing wealth. Households seen to be successful are frequently the object of jealousy and even witchcraft claims, leading ultimately to sabotage. For example, a vegetable project in Phahlamanoge was undermined after jealous outsiders stole the engine that powered the irrigation pump. There is nevertheless a clear distinction between those few households able to secure formal employment either locally or remotely and the majority who cannot. Houses without employed members or access to government grants have least financial capital and often also fewest assets and least ability to mobilise them effectively. On the other hand, households having members who were formally employed in the past may have invested in expensive houses and other assets, yet they may also lack financial capital to mobilise assets effectively. As Twyman *et al.* (2004:83) state:

> "It is not therefore wealth or poverty per se that emerge as the key to secure livelihoods, but a household's ability to mobilise and use productively those assets that it does have to off-set risk and sustain livelihoods through times of stress"

Table 5.19 overleaf shows characteristics of 'rich' and 'poor' households identified in a PRA exercise conducted in Phahlamanoge with four women and one man.

Table 5.19: Locally identified characteristics of 'rich' and 'poor' households

Rich households:	Poor households:
Large house	Lack proper shelter
> 10 cattle	No cattle
Vehicle	No vehicle
Invest in a shop or other small business as a more reliable way to prosper than through land use	No income
Two children only - keep a tight household budget	Many children - they do not think of the cost
Can afford education for children up to tertiary level	Unable to afford school fees
	Struggle to obtain food
	Lack clothing for their children

Source: Fieldwork

Respondents stated that most households in Phahlamanoge are 'poor', rather than 'middle' or 'rich', as a result of high unemployment. Differentiation in wealth was thus underplayed with most considered to be struggling to make a living. On the other hand, respondents suggested that when they were young there was less of a difference between 'rich' and 'poor' households because wealth in the past was measured in terms of number of livestock, especially number of cattle, whereas now it is associated more with disposable income. In the past households invested only in cattle, but today 'rich' households keep relatively fewer cattle and invest more in physical assets. This was believed to be due to high rates of livestock theft and lack of rainfall, both of which make investment in cattle a risky undertaking. Nevertheless, a substantial number of households in Phahlamanoge did still wish to acquire cattle, primarily as a form of insurance to sell for income in times of greatest need.

Respondents perceived that households become 'rich' by converting financial capital from formal employment or an employment-related pension into physical assets such as large houses, shops (cf. Delius, 1996), and vehicles. The latter two forms of capital can also provide the household with the means to generate further income through buying and selling products and offering transportation services. Financial capital is also invested in building human capital through the education of children.

The above data suggest that perceptions of wealth and corresponding perceptions of risks, constraints and opportunities are clearly shifting towards the dominant government-sponsored market-centric worldview. Access to financial capital through formal employment is perceived as the fundamental basis of livelihoods in Phahlamanoge and their improvement. The previously dominant 'cattle economy' has declined due to the combined threats of theft, lack of labour and low rainfall (cf. Delius,

1996). No reference is made to arable land in the wealth characteristics identified above. Confidence in investing in this natural asset appears to have declined due to perceptions of poor rainfall and lack of market access. Formal employment in Sekhukhune is seen as the most reliable means to build wealth and reduce poverty through income generation, as it is in Lesotho (Turner, 2001). These findings are consistent with opinion polls conducted by political parties before the 1994 general elections which revealed a broad consensus on the ranking of things which people felt a democratic government should achieve. Jobs were ranked above all else as the key priority, followed in rural areas by water, houses, peace and, only fifth, land (Lodge, 2002:57). These perceptions of wealth also reflect a focus in the research literature on 'deagrarianization' and the negative impacts of 'modernity' on smallholder farming systems (e.g. Buch-Hansen, 2003; Bryceson, 2000).

Buch-Hansen (2003:3) claims that the 'break up' of local communities by young generations is a global phenomenon due to their reluctance to take over the labour intensive work of small-scale agriculture from their parents when they view attractive alternative lifestyles in the Western world or in urban centres on television and wish to experience them. Rigg (2001:51) conducted surveys among school leavers in different regions of Southeast Asia on their perceptions of farming as an occupation and the majority expressed their views in negative terms as 'hard work', 'boring', 'low income', while only 20% were more positive. However, views expressed in this research in an admittedly small survey of Phahlamanoge youth were more diverse with substantial numbers of respondents interested in working in urban areas also wanting to return to rural areas and even farm in later life.

Nevertheless a 'pressure of material needs' - a pressure to be 'modern' and hence a need to accumulate financial capital - may be increasingly hard to resist by young people as images of modernity confront them on trips to urban areas or through television (cf. Rigg, 2001). As James (2003) asserts, capitalism preys on people's comparison instinct, encouraging forms of comparison that inculcate a sense of dissatisfaction with oneself and a need to acquire material goods. Rigg (2001:45) suggests modernity means engagement in a 'clean', modern occupation, living in an urban area, wearing modern clothes and possessing a considerable degree of financial autonomy and freedom of action. Such views overlap with youth's perceptions of agriculture as dirty, out-dated

and financially unrewarding in this study. Yet processes of deagrarianization, often linked with neoliberal market reforms (e.g. Buch-Hansen, 2003), should not necessarily be judged as 'bad' changes. Deagrarianisation may complement rather than replace land-based strategies, strengthening the economic viability of the rural economy through diversification into migration and off-farm activity, or what Bryceson (2002) refers to as 'widespread occupational experimentation'. In Sekhukhune District residents have pursued the strategy of migration for employment as part of a diverse livelihood portfolio since as early as the 1800s (cf. Delius, 1996). Apartheid era policies only exacerbated dependence on these forms of livelihood over others (e.g. Turner, 2001). Local perceptions of formal employment as the path out of poverty are therefore likely to be deeply and historically rooted in local psyches (Turner, 2001), not simply attributable to more recent changes in access to education, democracy or economic policy. On the other hand, recent changes may have further encouraged a shift towards off-farm livelihood strategies, potentially leading to over-dependence on these strategies and increased vulnerability.

While Sekhukhune residents prioritise formal employment as a means of escaping poverty, they are very poorly equipped to capture jobs and few employment opportunities exist in the recently 'globalised' and highly competitive domestic economy. Confronted by this contradiction, many people are apathetic. There is an expectation amongst many residents that government should provide them with services and employment opportunities to which they feel entitled after weathering decades of apartheid exploitation and helping the ANC to power. Many rural people are less interested in abstract ideologies such as democratic rights and perceive democracy to have failed to live up to high expectations of jobs and increased access to services and infrastructure (cf. Bond, 2000a; Scott, 1985). Democracy arguably remains vulnerable in South Africa as a result (cf. Lodge, 2002). The government is seeking to encourage rural residents to become more active in generating their own opportunities and taking responsibility for their own development within a broader context of fiscal constraints on government spending imposed by neoliberal macroeconomic policy. Yet the government is having difficulty in tackling the 'dependency syndrome' and its interventions have so far failed to create job opportunities for the vast majority.

5.8 Summary

This chapter has analysed the dimensions and dynamics of livelihoods in the study area, giving considerable attention to the contribution of land-based practices to household incomes and food security. On the basis of the data provided, it might be concluded that the prospects for enhancing livelihoods in Sekhukhune look bleak. The majority of the population seem to be struggling to cope with the arid climate and the changes that democracy and economic reform have bought. Yet to characterise all Sehukhune residents as passive victims would be a gross error. Interviews with young people in Phahlamanoge revealed there is still hope for improving local livelihoods and some farmers were found to actively employ coping strategies such as use of a diversity of soil types to reduce risk and increase the likelihood of realising a return on arable investments. Moreover, some entrepreneurs and group-based projects have shown considerable 'success' in generating returns from use of local NRs and skills. The following chapter actively seeks out attempts by different entrepreneurial agents and institutions to access financial capital and create viable livelihood opportunities in order to produce a more refined account of poverty and livelihoods in the study area. Can the seeds for more widespread productive livelihoods be found in these initiatives?

Chapter 6: Individual and organisational dimensions of financial capital capture and livelihoods

6.1 Introduction

Chapter five painted a rather bleak picture of livelihoods and poverty in Sekhukhune. Income sources were found to be extremely limited and many households owned few assets or were unable to mobilise them effectively due to financial capital constraints. Yet a variety of external agents and local entrepreneurs are attempting to establish initiatives to generate substantial income streams whilst others have sought to reduce immediate financial capital requirements, for example by increasing production for their own consumption. This chapter explores such efforts by different organisations and individuals to respond to the current economic context and create more economically viable livelihood strategies. It draws on the analysis of interview transcripts and case studies of specific activities. In so doing it seeks to address Objective 2 and to some extent Objective 3, producing a more sophisticated account of poverty and livelihood dynamics in the study area.

The chapter begins by briefly introducing the external agents pursuing initiatives to increase supply of, or reduce demand for, financial capital in the study villages. The dominant form of development intervention implemented by external agents is identified as the group-based income-generation project. The rationale behind the demand-led, participatory approach used to implement these projects is analysed, paying particular attention to a perceived lack of entrepreneurial initiative, and problems of participatory process are discussed. A case study of the role of a local organisation in Phahlamanoge in establishing income generation projects funded by external agents is then used to explore the influence of the interface between external implementers and locals on project outcomes. Emphasis is placed on the human and social capital of specific individuals for mobilising others and capturing the necessary opportunities and resources to initiate income-generation projects within particular settlements. Problems of project implementation, such as financial viability, high expectations, jealousy and trust are also considered.

Capture of financial capital from external donors is not, however, the only pathway by which local people can accumulate income to establish new enterprises. In the second

half of the chapter, efforts by local entrepreneurs acting independently to establish income-generation or income-demand-reduction initiatives are analysed. Factors facilitating and constraining project initiation and expansion, and threatening ongoing management, are identified.

A concluding discussion draws out some tentative implications for policy by considering which type of activity - initiating group projects or assisting individual entrepreneurs with a proven record of success - is most worthy of donor investment if the aim of development interventions is to reduce poverty.

6.2 Key external development agencies in Sekhukhune

Development agents based outside the study settlements that were active in addressing problems of supply of and/or demand for financial capital are listed in Table 6.1.

Table 6.1: Active development agents in Sekhukhune District

Government sector departments	Limpopo Province Department of Agriculture (LPDA)
International donors	German Development Cooperation (GTZ) German Development Service (DED) Ministry of Foreign Affairs of Finland (MFAF) Japanese International Cooperation Agency (JICA)
Non-governmental organisations	*International:* Heifer International National: EDA Trust; Kagiso Trust *Regional:* Hlatlolanang Health and Nutrition Education Centre; Rural Women's Association

Source: Fieldwork

Interviews and local literature reviews indicated that the Limpopo Province Department of Agriculture (LPDA), assisted by various international donors, was the dominant implementer of interventions that impact directly on poverty and NR management in Sekhukhune District. This is unsurprising since Sekhukhune is a rural area that lacks any significant urban or manufacturing centres and is deemed to possess significant 'growth potential' in agriculture (District Municipality of Greater Sekhukhune, 2001). Numerous NGOs were also implementing small-scale income generation projects in the region, although their efforts were frequently undermined by a lack of secure funding (cf. Cloete, 1985). The analysis and discussion below will therefore focus on the views of representatives from different tiers of the LPDA, international donors embedded in the department, and the NGOs listed above.

6.3 Participatory interventions for group-based income generation

Policies for smallholder farming have been largely founded on the technology transfer approach that views Western scientific agricultural practices as the means for development (Ashley & Maxwell, 2001). However over recent years more participatory, 'bottom-up' and holistic approaches have been incorporated into policy throughout the developing world (e.g. Ashley & Maxwell, 2001). All of the development agents interviewed in Limpopo Province advocated a 'participatory' approach and a small but growing number of agricultural extension officers in Limpopo Province are currently being trained in participatory methods. A GTZ-sponsored programme aimed at developing participatory extension abilities seems to have been particularly effective in creating space for new forms of intervention process as a result of substantial funding and the capture of official endorsement for the approach through the demonstration of results (cf. Keely & Scoones, 2003).

Specific interventions currently implemented or proposed by external agents to improve productivity of land-based practices, reduce demands on income, and/or increase supply of income are listed in Table 6.2 below.

Table 6.2: Interventions implemented or proposed by external agents

Measures to reduce soil erosion and improve soil fertility (see following chapter)
Supply of improved crop seeds
Water harvesting for homestead gardens
Livestock camp systems
Education on appropriate use of fire
Formation of farmer cooperatives
Facilitation of small-scale income-generation projects e.g. vegetable or poultry production

Source: Fieldwork

The last form of intervention in Table 6.2, namely promotion of community-based income generation projects with small groups, is by far the most widespread in Sekhukhune District. Numerous vegetable gardens and poultry production schemes have been established in the region by the Department of Agriculture and NGOs such as EDA Trust, Hlatlolanang and Kgwana. The focus on small groups rather than individuals is a pragmatic one since it ensures that each intervention boosts the livelihoods of a larger number of people than would otherwise be the case. The participatory approach adopted in implementing these projects is described below.

6.3.1 Justifications for a demand-led participatory approach

Although the motivations for pursuing participatory approaches, and the specifics of these approaches, differ somewhat between different development agents, 'participation' is viewed by all in an instrumental fashion as a means for enhancing the likelihood of creating a specific project that achieves its aims, is 'successful' over the long term and is cost effective. As a report by the Foundation for Contemporary Research (2000:22) stated:

> "Our participation is around particular projects. There is not yet a system – and there seems to be no intention of starting an IDP process – to get community organisation to start thinking on a broader basis."

Such narrow but pragmatic conceptions of participation are supported by empirical research. For example, a study of the Department of Water Affairs and Forestry's (DWAF) rural water supply projects found that the primary determinant of the success of the projects was the degree of community engagement in their conception and management (DWAF, 1997).

External agents active in Sekhukhune District claim participation by beneficiaries in project design and implementation is important for several *specific* reasons. First, a recognition that many past project failures have been the result of a *lack of attention to local priorities and needs* has encouraged attempts to better understand people's needs, knowledge, practices and interests so that mistakes in project design can be minimised and interventions can be made more appropriate and affordable (LPDA representative, 2003, pers. comm.; cf. Chambers, 1997; Toulmin, 1993; Hudson, 1991). Second, there is a recognised need to reduce *jealousy* of those who appear to be succeeding in improving their standard of living since this can constrain information exchange and innovation and lead to conflict and sabotage (LPDA and NGO representatives, 2003, pers. comm.). As a representative of the LPDA explained:

> "...if you are doing anything and then you are succeeding then other people then become sceptical and think that you are really practicing some witchcraft.... they would not want to share their innovations with anybody because other people then suspect them".

The GTZ representative in the LPDA refers to this jealousy as 'tall poppy syndrome'. Where resources are scarce, people are forced to cooperate and form networks of mutual support in order to survive. However, the flip side of this situation is that people "don't

allow anybody to become bigger than the others, and as soon as they do, it happens like a tall poppy, if there is a strong wind they get flattened" (GTZ representative, pers. comm., 2002). Such contemporary perceptions reflect Monnig's (1967) observations of Sekhukhune from the 1960s. Monnig (1967:186) argues that increased wage earning migration and cash use led to increased possibilities for individuals to promote their own economic advancement, but this was restrained by 'communal responsibility' and 'fear of accusations of witchcraft'. Such 'great factors of equalization' (Monnig, 1967:186) appear to continue to depress entrepreneurship today.

External agents therefore identify a need to ensure that all community members interests are represented in the setting of intervention goals and that all are informed and have an opportunity to participate in projects implemented within the community (LPDA and NGO representatives, 2003, pers. comm.). The ideal is to implement a range of different projects in one settlement to serve the divergent needs of different groups (representative of the MFAF cooperating with the LPDA, 2003, pers. comm.). Numerous development scholars share these concerns with the social equity of development, as discussed in Chapter two.

A third and perhaps principal motivation for adopting participatory methods in Sekhukhune District has been recognition of a problem of *dependency* of local people on government assistance.

6.3.2 The central problem of dependency

Many NGO staff and government officials talked of a specific 'mindset', 'sickness' or 'dependency syndrome' amongst the rural black population. This inability or unwillingness of rural residents to take independent action was commonly related to past government interventions that involved 'top-down' imposition of externally planned and funded development projects. As a representative of the LPDA put it, "most of the things were done for the people and not with the people". Consequently, there is thought to be a widespread attitude amongst poor rural residents that addressing poverty is the government's problem and not their own.

The ANC chairperson in Phahlamanoge lends support to this understanding. He stated that:

> "people seem to be satisfied that they are free from so-called white domination... that things would just come rolling to them... they still have hope it is the duty of the government to supply everything. We need to change their kind of thinking... they must do things for themselves, and nobody should do things for them.... The major problem is that we were taught for over 200 years... farming was discouraged by the government of the time.... We need to instil love of manual labour, blue-collar jobs, not white-collar jobs... People are getting educated now, but not job-oriented education" (ANC chairperson, Phahlamanoge, pers. comm., 2003).

Such comments corroborate the assertion in the previous chapter that having survived the decades of apartheid exploitation, many residents of rural villages in Sekhukhune now expect the government they elected to provide them with services and employment opportunities. Yet whilst many have high expectations and are keen to gain formal employment, few opportunities are available.

The spread of a 'dependency syndrome', or as Bek *et al.* (2004) call it, a 'culture of entitlement', may have been facilitated by the behaviour of chiefs and homeland regimes during the apartheid years. Involvement of chiefs in mediating the relationship between community and the apartheid government and in many cases manipulating it to their own ends – what Mamdani (1996) referred to as 'decentralised despotism' – is reported to have constrained dynamic entrepreneurial activity, discouraged independent organizations, shattered the self-esteem of their subjects (Bek *et al.*, 2004; Liebenberg, 1999; Lahiff, 1997) and undermined trust and respect for local institutions (NGO and LPDA representatives, pers comm., 2003; cf. Ainslie, 1999).

Some elderly people were clearly nostalgic for a previous era when roles and responsibilities in society were relatively well-defined and established (cf. Stott & Sullivan, 2000). For example, an elderly Christian lady in Phahlamanoge, referring to the bible, claimed that "this era was prophesised when children would not listen to their parents, conflict would be everywhere, there would be an imbalance in nature, and death. Different forms of government will be at loggerheads like in Zimbabwe. All are faced with destruction". Such comments indicate a deep feeling of disempowerment and exclusion from current processes of socio-economic change and development.

Although chief disputes are believed to be common in Sekhukhune, both within communities and between communities (e.g. Nkuzi representative, pers. comm., 2002;

Pardeller *et al.*, 1999), the institution of the chief was widely supported in all three study-villages. This was despite rival chief candidates causing intra-community tensions in Phahlamanoge and some more recent rivals allegedly being less supportive of traditional authorities than long-term residents in Madibong. The history of an area clearly influences current power relations. While traditional authorities may in some instances have contributed to a 'dependency syndrome' through their actions during apartheid, and may lack the authority and respect they once possessed, it cannot be assumed *a priori* that they continue to retard development in the present.

6.3.3 The response to dependency

Given a general lack of local economic initiative, a widespread dependence on outside assistance and weak community-based institutions, in theoretical terms a lack of human and social capital, all intervention agents in Sekhukhune identified a need for an approach that ensures local people accept greater 'ownership' over and responsibility for their own situation. This understanding has encouraged a shift away from 'implementation' of projects involving early injection of funds towards the 'facilitation' of projects. Experts in facilitation are:

> "there to guide them, not to identify projects for them, because once you identify projects for them, that project will never work" (representative of the LPDA, pers. comm., 2003).

The specifics of facilitation vary between different donor-funded programmes in the LPDA and specific NGOs, but the process generally involves attempts at 'capacity building' to ensure that the institutional foundations, technical and financial management skills and commitment necessary for a commercially viable project are fully established *before* substantial funds are introduced (LPDA, Environmental Affairs and NGO representatives, 2003, pers. comm.; cf. Hudson, 1991). The emphasis on business training is especially important since all agents identified lack of financial management skills as a major reason for project failures.

Intervention agents active in Sekhukhune tended to emphasise the need for communities to pro-actively initiate projects and form groups and even management committees themselves, rather than waiting for government to drive the process. As an extension agent reported:

> "We are not so much selective. If at the community there is a structure and it is willing to work with us we are happy".

The onus is thus clearly placed on rural organisations or 'structures' to approach government departments for support. The assumption is that by working with self-motivated individuals who have already identified a need and organised themselves into groups, commitment and sense of ownership will be high and beneficiaries will recognise that they are responsible for project upkeep. This in turn is assumed to result in an increased likelihood of establishing a project which is self-sufficient once donors have provided financial support and sufficient training in technical, marketing and business skills (cf. Sirolli, 2003; Jacobs & Cleveland, 1999; DWAF, 1997). Ultimately, the idea is that successful entrepreneurs will encourage others through a demonstration effect, initiating a widespread change in attitudes from a perspective of hopelessness and dependence on outsiders to one of confidence, innovation and increasing economic activity (Jacobs & Cleveland, 1999).

A principal implication of this approach is that local people have to autonomously construct the social capital foundations deemed to be necessary for project 'success' before donors are willing to become involved. The approach is consistent with the neoliberal framework discussed in Chapter four which encourages downsizing of state services and spending, cost effective service delivery and privatisation of responsibility (e.g. Mercer *et al.*, 2003; Pieterse, 2001; Bond, 2000a). Yet requiring people to form groups and approach government for funding, presumably having heard that funding is likely to be available for certain types of projects, is arguably little different from government approaching a community with project ideas and asking interested people to form groups. Even if such a passive demand-led approach, "detaching the department from being the doer" (representative of the LPDA, pers. comm., 2003), does reduce problems of ownership and commitment by self-selecting the 'right people', it runs the risk of becoming too passive too quickly, especially if many local people are unable or unwilling to autonomously develop project ideas, form groups and make demands on government. As researchers working in other parts of South Africa have observed, a lack of social capital and entrepreneurial agency within a settlement undermines attempts at more passive and participatory approaches to implementation of development projects and encourages a shift back towards an 'expert'-led top-down approach (e.g. Bek *et al.*, 2004; DWAF, 1997).

It is not only local people that may need 'capacity building' to enable effective participatory interaction between external agents and rural residents. Widespread adoption of participatory methods by the LPDA still appears a long way off as training of extension officers has only recently begun and is on a small scale. The skills of NGOs in participatory methodologies may also sometimes be limited, due to problems of high staff turnover (e.g. Dunkhorst, 2000). The new Integrated Development Planning (IDP) process of local government, which seeks to enable each municipality to understand, plan for and fulfil its development responsibilities within the context of the Integrated Sustainable Rural Development Strategy (Republic of South Africa, 2000), was supposed to involve participation with local residents to understand their priority needs. However, the actual level of involvement of some groups may have been limited due to lack of local government capacity (representative of the LPDA, 2003, pers. comm.; Department of Local Government & Housing, 2002).

The ward councillor for Phahlamanoge claims that in the formulation of the Integrated Development Plan for the ward, all interested parties were invited to participate in public meetings to suggest what should be done in the village. Shortly prior to interviewing the ward councillor, another meeting was held on July 12th 2002 "so that people can say they still want those things they said before" (ward councillor, pers. comm., 2003). Yet while a process of ongoing public consultation appears to be occurring at Phahlamanoge, the *quality* of this participation is open to question. Respondents from the LPDA and NGOs suggested that brief community meetings sometimes fail to capture the views of the poor because they may not have felt able to articulate their views in these social situations (2003, pers. comm.).

The inappropriateness of the formal meeting format used to elicit community participation was clearly demonstrated during fieldwork in Soupiana. Whilst a one-to-one interview with the chairwoman of a proposed vegetable project revealed much knowledge about the project and many ideas about how it could be implemented and how potential obstacles might be overcome, in a formal meeting in which the project group sat in chairs facing a white government representative and an agricultural extension officer, both the chairperson and the group as a whole appeared much less confident and struggled to express any clear opinions about the project in response to questioning. Individual interviews with committee members and/or more informal

interactions with project participants would appear to be much more effective formats than formal group meetings for enabling the open and frank exchange of information between 'stakeholders', a critical component of the project design phase.

Such findings reflect those of McEwan (2003) who argues that poor African women in South Africa are often marginalized from the decision-making processes because they lack confidence to speak up and receive respect as equal participants in public discussions. Lack of access to appropriate information on which to make informed decisions and little available time to attend meetings may also tend to exclude women from such meetings (McEwan, 2003). Cultural norms relating to gender and other aspects of social differentiation clearly require greater recognition when designing processes and formats for community participation (cf. Kihato, 2004; McEwan, 2003).

6.4 Exploring the external-local development interface: SANCO in Phahlamanoge

While dependency on external agents and a general absence of an entrepreneurial culture may exist in many areas making more participatory interaction problematic, in some instances local 'champions' exist who have managed to capture donor funding and act as driving forces for project implementation. One such case is that of the local civic organisation in Phahlamanoge, considered below.

In Phahlamanoge a range of organisations have been established to pursue a variety of agendas, as Table 6.3 overleaf indicates.

Table 6.3: Organisations in Phahlamanoge

Formal institutions	Purpose	Membership
Chieftaincy (rival chiefs and associated factions)	Land allocation, conflict resolution, upholder of custom	Minority
Local government	Prepare and adopt IDP; coordinate development activities and popular participation	Minority
SANCO 'civic' organisation	Development activities, popular participation, conflict resolution	Large
Development forum	Development activities and popular participation	Minority
Livestock organisation	Reduction of livestock theft; bulk purchase of medicines	Most cattle and donkey owners
Community policing forum	Conflict resolution, link with police station at Apel village	Minority
Landcare committee	Management of Landcare project	Minority
Vegetable garden committees	Management of vegetable garden projects	Minority
Brick-making committee	Management of brick-making projects	Minority
Burial societies	Financial and practical management of funerals	Widespread
Zionist Christian church (ZCC) and various smaller churches e.g. Pentacostal, Anglican, Catholic	Religious activities	Large, especially ZCC
Mapogo-a-Mathamaga ('Colours of the Tiger')	Prevention of crime and punishment of criminals by flogging (movement has 50 000 members in Limpopo; Lodge, 2002)	Minority

Source: Fieldwork

The South African National Civic Organisation (SANCO) was second only to burial societies in terms of levels of membership amongst surveyed households; 46% of households in Phahlamanoge claimed membership. This finding reflects the active role of SANCO members in the village, particularly with regard to the establishment of income-generating projects. The critical question this case study seeks to address is how has the local SANCO organisation achieved such success? First the national SANCO organisation and its position relative to other political actors needs to be considered, before focusing on the local SANCO organisation in Phahlamanoge and the factors and strategies mediating its implementation efforts.

Considerable reference is made to the popular concept of 'social capital', defined by Putnam (1995:67) as "features of social organisation such as networks, norms and social trust that facilitate coordination and cooperation for mutual benefit", which was introduced in Chapter two. Following Woolcock (2001) and Bebbington & Perreault (1999), attempts are made to disaggregate the analysis of different forms of social

capital and analyse the ways in which key actors accumulate and use it to influence patterns of access to different forms of capital.

6.4.1 An introduction to national SANCO

SANCO is a national organisation which embodies the legacy of a tradition of lively community politics that was encouraged by the United Democratic Front (UDF) during the 1980s (Lodge, 2002). The organisation was originally established as a 'watchdog' for the interests of community organisations and at the outset SANCO insisted on being politically independent. However, it later resolved to support the ANC and became a major vehicle for national liberation politics (Lodge, 2002). Indeed, leading members of SANCO in Phahlamanoge were active in the ANC during the struggle for democracy.

Lodge (2002) suggests that after 1994 support for the ANC became a weakness for the national organisation, since it lost as much as 70% of its leadership to parliament and regional government positions (Lodge, 2002). However, the positioning of SANCO members in key government ministries can also be seen as an advantage, as will become clear below. Like many other NGOs and CBOs, SANCO suffered an additional shock during the late 1990s, namely a funding crisis as foreign funding was redirected to government programmes or the politically prestigious Nelson Mandela Children's Fund (Lodge, 2002). Further stresses on the national organisation arise from its alliance with the ANC which has plagued it for many years (Lodge, 2002). The ANC apparently felt SANCO should confine itself to the role of a 'developmental agency' and desist from competing with the party for popular political identity (Lodge, 2002:207). On the other hand, SANCO members wanted greater influence over ANC policy trends. Despite these shocks and stresses, national SANCO continues to function and to promote the developmental needs of communities, albeit at a much smaller scale, today.

6.4.2 SANCO in Phahlamanoge and the role of bonding and linking social capital

The SANCO organisation in Phahlamanoge has an elected committee composed of a secretary - effectively the organisation's leader - treasurer, and chairperson that manage its projects. Members of SANCO pay R10 per year, receive a membership card and attend regular meetings about the organisation's activities. Only members are allowed to sign up for projects initiated by the organisation, although if non-members are interested in joining a project they are claimed to be free to join SANCO and get

involved. SANCO members did however admit that not everyone is able to afford the fee to join the organisation. The poorest may thus be excluded from the projects that could be of greatest benefit to them.

Committee members claim to know the organisation's members very well, "we know their manner, we know they won't cause strikes", but they "fear to call others because they don't know their aim". A strong sense of *trust* therefore exists within the local SANCO organisation, built up over time through working together. Woolcock (2001) refers to such interpersonal in-group links as *bonding* social capital. Yet by its very existence and association with a bounded organisation this social capital also tends to exclude and dissuade inclusion of people from outside the group on whom information is more uncertain. Specific intra-settlement networks of trust are not extended to a broader sense of social trust, and thus membership in self-help groups like SANCO may not incubate the kind of beliefs and habits that strengthen democracy or broader-based community solidarity (Lodge, 2002; Putnam, 1995; 1993). Nevertheless, SANCO appears to provide a critical service for a substantial proportion of the population.

The network links between community level SANCO members and those in national government *outside* the settlement also appear to be critical for village-based projects. Vertical links to well-positioned SANCO members, whose identities were not disclosed, enable village-level SANCO organisations to short-circuit intermediary levels and gain direct access to 'close funding' from government for project implementation (Phahlamanoge SANCO leader, pers. comm., 2003). The development forum lacks such *linking* social capital (Woolcock, 2001) and perhaps partly as a result encounters considerably greater difficulties in capturing funds. The smaller number of donor-funded projects in Soupiana and Madibong may be also at least partially explained by an absence of strategically networked SANCO representatives in these villages.

6.4.3 The complementary role of capable agency

It is not only the stock of advantageous network links or social capital that may assist the SANCO organisation in Phahlamanoge to stand out as an effective project implementation agent. To benefit from the numerous funding opportunities provided by government, NGOs and other donors requires knowledge about the grant system and the ability to complete complex application forms and produce convincing business plans.

These are skills, or forms of human capital, which many rural dwellers lack but which educated individuals such as the leader of the Phahlamanoge civic organisation possess.

As a youth member of SANCO and ANC the civic leader was active in the struggle for democracy in South Africa. Bierschenk *et al.* (2002:21) suggest that experience of political activism is a critical source of essential competences for a would-be 'development broker', enabling familiarisation with:

> "contexts 'other' than those found in the village, thus providing him with the know-how, appropriate jargon and behaviour which enable him to adjust to partly heterogeneous cultures, and which can be reinvested or recycled in brokerage".

After democracy the civic leader trained as a teacher, further enhancing his competences in self-expression, organisation and management of interpersonal relationships. As a consequence, when the government decided to implement a project in the village to provide incomes to the poorest families during a drought year, the civic leader was the strongest candidate for foreman. Experience of working with government on this project and training received on writing business plans to gain new funding for the scheme eventually established the civic leader as a useful contact person for both local people interested in gaining funding for projects and, increasingly, for external development agents interested in implementing projects in the village.

This 'spin-off' impact of the Landcare project on the local SANCO leader's skills, on enhanced links between SANCO and outside agencies, and also perhaps on SANCO's organisational capabilities, is easily neglected. Yet these contributions to local human and social capital provide SANCO with a critical advantage in the competition for development funding. The knowledge, skills, and perhaps also a 'modernising tendency' (Krishna, 2000), gained from working on the Landcare project, in conjunction with his contacts with government officials and his consequent knowledge of their development language, procedures and practices enabled and motivated the local SANCO leader to assist people to organise and represent themselves in the specific ways that were most likely to capture projects and/or maintain commitments of assistance from external agents (cf. Krishna, 2002, 2001).

His position and role were probably also supported by state officials keen to organise villagers in order to implement agency objectives (Krishna, 2002). As Krishna

(2000:46) observes, educated and unemployed individuals provide a 'near-ideal' set of village-based intermediaries upon whom government officials can rely:

> "They are educated, so they can be relied upon to maintain records and accounts. They are unemployed, so they can work long hours, supervising construction on public works. They will continue to live in the village, so they cannot hope to get away easily if they conspire with officials to cheat, exploit, or under-pay villagers. And they establish their status and leadership in the village by providing regular employment opportunities to labourers... so they are keen to keep faith with government officials who control this work and who appoint the village supervisor".

By taking up a marginal position at the interface between development providers and potential beneficiaries, with support from both groups of stakeholders, the leader of the Phahlamanoge civic organisation was thus able to establish himself as a powerful gatekeeper between networks or 'actor spaces' (cf. Marsden & Murdoch, 1995; Arce *et al.*, 1994), ultimately enacting perhaps *the* key role in the great hunt for project funding in South Africa (cf. Bierschenk *et al.*, 2002).

In summary, while the social capital of the SANCO leader and his organisation are important, they are not sufficient by themselves to generate development 'solutions'. The skills, or human capital, that the leader is able to draw on in order to strategically manipulate cross-scale networks of social relations and channel specific claims, materials and information through certain nodal points of interaction are also critical (Long & van der Ploeg, 1994). As Krishna (2001) argued, social capital is not sufficient by itself to achieve high 'development performance'; rather, stocks of social capital must be drawn on if benefits are to be realised and this requires 'capable agency':

> "Social capital represents a potential - a propensity for mutually beneficial collective action. But potential needs to be activated, and agency is important for this purpose" (Krishna, 2001:934).

6.4.4 Strategic management of networks: A crucial skill of a capable agent

Civics and other social movements are sometimes criticised for being built around strong dominant personalities and dependent followings (e.g. Lodge, 2002). The leader of SANCO in Phahlamanoge certainly fits this profile, but without such strong agency it seems unlikely that problems of trust and jealousy, claimed by key informants to be widespread in the community, could have been kept under control or that community members could have been effectively coordinated and aided to select and agree upon shared objectives that are desirable and feasible (cf. Krishna, 2002). The construction of

local social capital in Phahlamanoge was clearly enabled by an effective capable agent. Local SANCO members appeared to be satisfied with their elected leader and the projects that he had bought to the village. Given that he is an elected leader, SANCO members retain an ability to remove him from his voluntary position should his performance become unsatisfactory. However, any potential for misdemeanours or rent seeking is minimised by the fact that his position depends on his reputation and another organisation, the Development Forum, might seek to compete for his position if allowed the opportunity. The SANCO leader appears to be moved by a social or political purpose, acquiring status and respect through seemingly selfless work on the part of the community. As Krishna (2002) observes, these gains may be sufficient reward in themselves, or the hope of acquiring a future private or political position via established connections may also provide an incentive.

The 'piling up' or sedimentation of a variety of local political institutions over time, from traditional authorities to recent local government institutions, partnerships for service delivery and increased emphasis on participatory approaches, has created new opportunities for 'development brokers' to bridge the information and access gaps between villagers and the centralised state and market (cf. Bierschenk *et al.*, 2002; Krishna, 2002, 2001). Such opportunities are only broadened by the lack of authority and capacity of many traditional authorities and local governments. Yet 'development brokers' must be politically astute in their management of networks and alliances if they are to benefit from these openings.

In Phahlamanoge, SANCO exists alongside the Development Forum, tribal authority and local government. These institutions all trade on the public interest, 'the welfare of the village', as the basis of legitimacy (cf. Bierschenk *et al.,* 2002). Given the limited capabilities of local government in South Africa at present, the skills of the local civic leader in writing business plans and the advantageous links of the organisation with government departments, the leader of the local SANCO clearly fills a niche and provides a competence in great demand. His career is built on the basis of success in winning development projects, but maintaining this position requires constant efforts to negotiate and manage local power relations, groups and values, demonstrate his effectiveness in improving local circumstances and keep powerful institutions onside (cf. Oerlemans & Assouline, 2004).

This constant struggle for influence and legitimacy is illustrated by comments from leaders of SANCO and the Development Forum. The SANCO leader disparages the Development Forum as a 'mouth piece for the chief', claiming that it has been taken over by supporters of the present chief and is thus biased in the interests it serves. On the other hand, the secretary of the development forum claims that SANCO works with the ANC during elections and is effectively a 'political wing' of the ANC. Despite these antipathies, the two organisations claim to work closely with each other, *kgosis* (chiefs) and government to bring development projects to Phahlamanoge.

The local political arena is thus seen to be fluid with different actors having to constantly renegotiate their legitimacy, refine their competences and adjust their strategies within local and wider networks of differentially positioned actors. Bierschenk *et al.* (2002) suggest that there are three possible strategies that brokers can adopt to defend or strengthen their positions. These strategies are described in Table 6.4 below. Examples of actors in Phahlamanoge that appear to adopt each of these strategies, including the civic leader, are included in the table.

Table 6.4: Strategies adopted by key brokers in Phahlamanoge

Strategy	Description	Actors adopting strategy in Phahlamanoge
Anchorage	The broker is an outsider in terms of the local political arena and seeks to build a patron-client network in the village using skills and assets at his disposal so as to gain social status and recognition	Ward councillor - only elected in 2000, he seeks to win local support by implementing highly visible projects such as housing
Enhancing village power	Established local authorities use brokerage to enhance their capabilities and audience, often forming a broker's club with the necessary competences	Chief - through establishing a development forum that is biased towards his faction
Neutralisation	The broker claims to have no political ambitions and seeks to ally himself with local political actors or neutralize potentially hostile forces by acting in ways to gain approval or show respect. Neutralisation may disguise a strategy of anchorage but it can serve as a means of bringing about a peaceful cohabitation between 'people in power' and 'people in development'.	Local SANCO leader - employs a legitimating rhetoric, frequently asserting that he and his organisation is focused on 'making love' with the chiefs and on enhancing the welfare of villagers and is not interested in politics.

Source: Fieldwork data; framework adapted from Bierschenk *et al.* (2002).

Political tensions and ambiguities around the activities of national SANCO, discussed earlier, are reflected in the neutralisation strategies adopted by the leader of the Phahlamanoge civic organisation. The organisation claims to be non-political and

explicitly focuses on delivery of development projects rather than political action in an attempt to maintain good relations with the chiefs. Yet its leader also admits to working closely with the African National Congress (ANC) on development issues. The leader of the SANCO organisation in Phahlamanoge reported this relationship was sometimes problematic because the two organisations have very different approaches: "maybe sometimes we don't understand each other. They use force, we just use peace" (pers. comm., 2003). Nevertheless, he has to maintain the relationship, whilst simultaneously playing down its significance and affirming its neutrality, in order to secure the development outcomes in the village on which his position depends.

This case study of the capture of development projects in Phahlamanoge by the local SANCO organisation, spear-headed by a highly capable agent, has many parallels with examples provided by Bierschenk *et al.* (2002) from other parts of Africa. Such case studies are valuable in that they focus attention on the micro-scale interactions between specific 'beneficiaries' and external develop agents at location-specific development interfaces, indicating that:

> "the seemingly bounded entities of the state (at both the local and central levels), of 'civil society' [and community] and of formal local political organisations are in reality traversed by networks, are overlapping and are marked by phenomena of alliance and rivalry, which renders these 'bounded' categories less efficient as means of understanding the nature of the changes under way" (Bierschenk *et al.*, 2002:36).

In so doing, these case studies allow a more nuanced understanding of why development projects may be more or less effective in some areas than in others. Local and extra-local social networks are found to be critical to capturing and managing development projects, but capable agency is also required to nurture such capital and to utilise it effectively (cf. Oerlemans & Assouline, 2004).

Yet the possession of high levels of capable agency and social capital does not necessarily imply the implementation of 'successful' projects. A range of problems can prevent an established project from producing and maintaining benefits for its participants, as analysis of case studies of projects implemented by SANCO in Phahlamanoge will illustrate.

6.4.5 Problems of SANCO projects in Phahlamanoge

The civic organisation in Phahlamanoge manages three projects in the village, introduced in Table 6.5 below.

Table 6.5: SANCO-led projects in Phahlamanoge

Projects	Activities
Landcare project	Members are paid to implement measures to protect and rehabilitate the soil in a large erosion gully
Brick-making project	Members construct and sell bricks to generate income
Vegetable garden project	Members produce vegetables for their own consumption and sale

Source: Fieldwork

The Landcare project is the principal employer of persons from poor households in Phahlamanoge. It is a public works project that involves construction of physical barriers and planting of vegetation aimed at reducing soil erosion and rehabilitating NR productivity in a large erosion gully close to the village. This project will be discussed in detail in Chapter seven since its aims include environmental management as much as poverty alleviation. It is sufficient here to note Turner's (2001:62) observation that:

> "While the number of short term jobs created by public works programmes has never been nearly enough to satisfy demand, the number of schemes has been sufficient to fuel the expectation that government can (and should) create jobs for people in rural areas".

Public works programmes such as Landcare may therefore reinforce a perception amongst rural residents that government will provide employment and assistance, further discouraging self-help efforts. This outcome is especially problematic since such programmes cannot be funded indefinitely, hence employees may eventually be left in a more dependent position than prior to programme intervention. On the other hand, a greater focus on transferring vocational skills to employees that may assist them to find employment would go some way to justifying government's intended expansion of public works programmes.

For many small-scale income-generation projects in Sekhukhune District, economic viability is a central problem (e.g. Wigley, 2002). A typical example of this shortcoming is the brick-making project in Phahlamanoge, outlined in Box 6.1 overleaf.

Box 6.1: Case study of a brick-making project in Phahlamanoge

Members of the civic organisation initiated a brick-making project in Phahlamanoge in February 2002. The project produces bricks for sale to Phahlamanoge residents and surrounding villages. It is sited on land near to the river so that members have easy access to water to make the bricks. The land was not used and was given to the project by the owner free of charge on condition that if the project should collapse, the land would be returned. The project was initiated by distributing a publication around the village that advertised the project and invited people to join. Project participants had to belong to SANCO and were asked to pay R25 joining fee. A committee (treasurer, secretary, chairperson, and deputy chairperson) was elected at a meeting of all project members. The group then submitted a business plan to potential funders and successfully acquired financial support from the National Development Agency (NDA). Returns to members from participation in the project depend on the number of bricks sold and the profit generated, if any, after paying for sand and cement.

Initially the project was full at 40 members, but at the time of interview in 2003 the project officially had 29 members and membership was in decline. The principal problem faced by the project was a fundamental one: Financial viability. All bricks produced had been sold, but market demand had been relatively low leading to a lack of financial returns. The members are losing interest in the project as a consequence - "now people don't want to work, there's little money". Falling membership means that more money is required from each remaining member to buy sand and cement, further discouraging continued involvement. The price charged per brick cannot be raised because of tough competition from cheap bricks supplied by shops and outside builders. The treasurer believes that if the project can get funding to buy cement and sand then it will be 'sustainable', but this is doubtful. A further injection of funding may help to produce more bricks, but if demand is not sufficient to generate worthwhile returns from participation then it appears that no amount of increased funding or improved management of funds will save the project from collapse.

This case study illustrates that if market demand for products generated by a project is not sufficient then even high levels of social capital and capable agency will be unable to make it a viable venture. The existence of such projects suggests a lack of rigorous analysis of business plans on the part of funding bodies and/or over optimistic assessments of financial viability and market demand. Such shortcomings, together with a lack of effective training provision to community-based projects, are often blamed on departmental pressures to spend funds on projects in the short term or risk a reduction in project funding (e.g. Breslin & Bethuel, 2000). However, a respondent from the LPDA claimed that new budgetary mechanisms had recently been introduced to allow for longer-term budget planning, implying such pressures should be reduced in future.

Problems of economic returns not matching expectations are also exemplified by the third project managed by SANCO in Phahlamanoge, a vegetable production enterprise, outlined in Box 6.2 overleaf.

Box 6.2: Case study of a vegetable garden in Phahlamanoge

The vegetable project initiated by the SANCO leader in Phahlamanoge was established in November 2001 with the first planting taking place in May 2002, approximately one year prior to interview. The same approach to project establishment was followed as that above. The project group acquired access to land free of charge, advertised membership for R25 each, elected a committee, produced a business plan and captured funding from the NDA. The project aims to relieve poverty by growing and selling vegetables for profit. Twenty-one people work together on *shared* plots, as opposed to individual plots in another project in the village. A problem with a communal management approach is that some members are often more active than others, leading to disputes over distribution of the benefits of any production (representative of DED, pers. comm., 2003). However, the chairperson claimed the group was very cooperative and that if someone did fail to contribute their share of the workload, the committee would discuss the issue with them and if the problem continued, that individual would be suspended from the project. Individual joining fees were deposited in a new bank account, to which NDA then added R181,000. These funds have financed borehole construction and purchase of all necessary infrastructure and materials to begin production. When vegetables are sold, members plan to deposit the returns in the bank account. "If the money is in a high rate we are going to pay for the people who are working in the project... when it is in a good way... maybe by 100 Rand per person" (project secretary, pers. comm., 2003). This plan for managing finances is vague. Members receive financial rewards for their efforts only if sales are sufficient to accumulate sufficient capital to pass an unknown threshold. Specification of a threshold would give members a target to work towards that might help to motivate them. However, some members may not be able to tolerate a long wait before receiving returns from labour and income invested in the project.

The project secretary recognised this problem but proposed no solution, only perseverance: "if the people can tolerate, then maybe after they can have the money.... Perseverance is the mother of success... but people are not willing to wait... the people from South Africa need money before job, that's why they can't tolerate... can't wait for a long time. They need money fast". Indeed, although it was claimed that all 21 members are active, the secretary stated that some workers are sometimes not coming to work in the project. Each member is supposed to periodically contribute money to pay for diesel for the generator used to pump irrigation water into the storage tank, but some members are unwilling or unable to pay and so they stay away. "Lack of commitment is the big problem", claims the secretary. This lack of commitment may relate back to the 'dependency syndrome'. People join a project because they understand that things will be provided for free, but once the initial benefits have been enjoyed and the requirements for own investment of income and labour increase, people withdraw, especially if they do not realise the returns they had expected. As the SANCO leader states: "This democracy made people have expectations, now they don't want to do anything themselves". Presumably if the returns were above some threshold level people would be more motivated to continue.

On one occasion thieves got into the project and picked the onion crop. Whether or not the theft was motivated by 'tall poppy syndrome' – jealousy of those who appear to be succeeding – is unknown but inter-household jealousies were reported to be common in Phahlamanoge, allegedly leading to the theft of the pump from another project and sometimes culminating in witchcraft accusations (key informant, pers. comm., 2003). Loss of produce through theft only served to further reduce returns from invested capital and labour and thus undermine commitment.

Provision of effective training in financial management and business skills and additional training in technical aspects to boost productivity may contribute to reducing such problems in some projects, but without improved road infrastructure to enhance access to markets, training of farmers will have little impact (Manstrat development strategists, 2002). One respondent who had left the vegetable project also stated conflict over committee positions and decision-making as a reason for leaving. This reflects more widespread problems of jealousy mentioned above; indeed, several committee

members of projects in Phahlamanoge voiced concerns about project members distrusting their management of project funds and spreading rumours about them.

These findings underline again the importance of strong leadership and the possible need for training in conflict resolution skills for some projects (cf. Manstrat development strategists, 2002). They may also relate to a lack of sufficient investment in financial training and 'capacity building' by donors (Wigley, 2002; DWAF, 1997), a primary cause of the collapse of a poultry project in a village neighbouring Phahlamanoge and a bakery project in Madibong. The Madibong project is worth brief consideration here because it illustrates the ultimate consequences of a loss of confidence in project leadership (see Box 6.3 below).

Box 6.3: Case study of the Tsogang bakery project

The Tsogang bakery project was established in early 1999 using funding from the Open Society Foundation for South Africa to supply bread to a crèche. However, at the time of interview the project had ceased operations. Shared profits had not been sufficient to maintain the project and all funds initially allocated had been spent. Whether or not failure was due simply to financial mismanagement or to more fundamental problems of economic viability, related perhaps to cost of electricity and ingredients and tough competition on price from a large commercial bakery based in neighbouring Jane Furse, is unclear. However, many members were reported to believe that the committee failed to manage the project correctly because it lacked financial and planning skills or access to information on marketing of products and purchase of materials. When members perceived the project was close to collapse in 2001, and that they were unlikely to realise any tangible benefits from their investment of time and labour in its operations, they allegedly stole all the movable equipment from the project. This outcome appears to represent an extreme case of project participants perceiving that they have not received the material benefits entitled to them on the basis of their investment in a project and thus acting to recoup some return by illegal, but perhaps to them justifiable, means.

Impacts of the loss of trust in project leadership were not confined to theft of project assets. A new committee was established in early 2000 to try and recreate some projects at the same building, but distrust amongst former members has led to demands that rather than working as 'volunteers', they should be paid for participating in a project. Given members' past experience of presumably considerable investment of time and energy in a project with limited or no returns realised, this demand is entirely logical. Indeed, it could partly explain more widespread preferences, especially amongst the young, for seeking out paid employment rather than investing time and effort in group-based projects that have been experienced to frequently generate uncertain or meagre returns.

The potential impacts of project collapse and/or a loss of trust in project leadership are seen to be substantial and highly significant to the likely success of future projects in the same area. Such findings reiterate the importance of funding and implementing only those projects that can be rigorously justified on economic grounds and that can be guaranteed to meet local expectations of reasonable returns and investments without undermining commitment to other projects. If such precautions are not taken, then

repeated project failures are likely to lead to a loss of faith in local leaders/development brokers and their supporting networks. The key point here is that agents and social capital are ultimately useless if there is nothing of value to communicate, negotiate and coordinate. The above findings also underscore the need for effective training and support to project groups over sustained time periods to ensure that the potential of such well-designed projects, and their associated social capital, is realised and sustained in practice, as opposed to being squandered and impacting negatively on future intervention efforts (cf. Pretty, 2003). In short, implementation of any specific income-generation project in a poor community can have far reaching effects and should not be undertaken lightly or without thorough forward planning.

6.5 Local entrepreneurial enterprises

Submitting claims to donors is not the only pathway through which rural residents can access substantial financial capital stocks and initiate private enterprises. Some individuals in the study-villages have successfully established commercial enterprises independently of external donors. The chapter now turns to an analysis of such projects and the factors enabling and constraining their autonomous initiation and threatening their long-term management.

6.5.1 Financial capital: The critical precursor for entrepreneurial development

Whilst apathy and a 'waiting for government' attitude appear to exist amongst many rural residents (cf. Turner, 2001), and buying power and opportunities for successful entrepreneurial businesses are believed to be extremely limited in many areas of Sekhukhune (cf. Department of Local Government & Housing, 2002), a small proportion of households have managed to autonomously assemble their assets in a productive manner, creating their own work and in some cases also additional work for fellow community members. Often these households included members who had possessed jobs in the formal sector and thus had acquired sufficient financial capital to invest in local enterprises. For example, a man in Phahlamanoge, referred to here as John, reported how in the 1970s he had utilised kin and friendship networks stretching between urban and rural locations to find employment in factories and mines in Gauteng Province (cf. Baber, 1998). Through these jobs he was able to accumulate sufficient savings to purchase two tractors which he now rents out for ploughing and transportation of materials. Whilst income flows from tractor hire are highly seasonal

and maintenance costs could represent a substantial shock to his livelihood, John was satisfied with the income stream he was able to generate from his investment and claimed he was able to support his family on the earnings.

This, and similar findings of men purchasing other assets after periods of formal employment such as shops or taxis that also generated substantial income, suggest that it is business men and civil servants who are most likely to be involved in locally-based, economically viable commercial enterprises rather than 'subsistence' farmers who have managed to build assets through working the land (cf. Delius, 1996). In a semi-arid and highly variable climate, financial capital is most easily accumulated through off-farm employment rather than through expansion from a 'subsistence-oriented' agricultural base. Sequential linkages between types of livelihood strategy are thus critical. Investments of off-farm income in local enterprises can generate local employment, in the case above for individuals able to drive tractors. Yet it may also lead to increasing differentiation between the wealthy minority able to secure formal employment and thus assemble sufficient capital to start a business and the poorer majority reliant on land use and government grants and unable to surmount this critical barrier to involvement.

Other entrepreneurs in the study villages have invested in specialised production of cash crops such as trees, vegetables and tobacco on a range of spatial scales. Availability of financial capital was again frequently the critical factor in enabling or constraining such schemes, as the case studies of a tree nursery and a large vegetable garden indicate.

Box 6.4: Case study of a tree nursery in Madibong
David established a tree nursery in Madibong after being retrenched from factory work in Gauteng province in 1988. For the last 16 years David has been cultivating tree seedlings in old condensed milk cartons filled with sandy soil from his garden or a nearby plot of land which he has used to expand production. Seedlings are irrigated with tanks of water bought for R12 for 210 litres. Two are consumed per day. When he lacks money to buy water, he uses buckets of water transported in a wheelbarrow from a nearby stream. His production activities now represent his household's main income source. Trees and bushes cultivated include mango, peach, apricot, fig, guava, orange, lemon, avocado, grape, mulberry, 'shade trees', 'ornamental trees' and roses. He travels to surrounding settlements most days by foot or taxi to sell the trees, priced at R10 each for fruit trees and R9 each for 'ornamental trees'. He has also started producing vegetables such as cabbages and tomatoes. Market demand is apparently good and his main constraints include lack of transport, fear of crime, lack of fencing and principally lack of water. David feels the weather in the region is becoming hotter and drier each year, making cultivation of seedlings very difficult and leading to increased problems with pests such as aphids and red spiders that attack vegetables. He would like the government to provide him with a fence so he can better protect his garden, as well as irrigation equipment to obviate his reliance on unreliable rainfall and purchase of water. In return for this support, he feels he can help the government by "empowering other people by employing them".

Box 6.5: Case study of a large-scale vegetable producer in Madibong
Examples of groups or individuals specialising in the production of vegetables are found in all three study villages but by far the largest project was that initiated autonomously by Philip near Madibong with no financial assistance from any external agents. The local chief made land available to anyone wishing to start a project and Philip took up the opportunity. Philip ploughs the land using his own tractor and irrigates the land twice a day using water propelled from a dam in the nearby river - built by himself in the dry season when the water was low - by a pump driven by the tractor's engine. A pipe connected to the pump is directed by hand to different hand-made furrows until the whole area is irrigated, a time-consuming and labour intensive job but an apparently effective method. Philip ploughs all year round, producing cabbages in winter and a mixture of carrots, beetroots, tomatoes, watermelon, pumpkin, maize and sugar cane in summer. He precisely applies fertilisers every year by hand, placing it in a hole close to each young vegetable, a method Philip says he learnt from visiting a commercial farm. Philip sells most of his produce at the nearby taxi rank in Jane Furse, keeping transport costs low. Market demand is said to be excellent and people even bring *bakkies* directly to his project to buy crates of cabbages and tomatoes, indicating high product quality and quantity. Prices charged for vegetables depend on quantity purchased; individual cabbages sell for R2.50 each whilst cabbages bought in crates sell for R1.20 each. At the time of interview Philip was involved in building a shop in Jane Furse to increase his market penetration. Philip says his main problem is lack of space to produce more vegetables. Other problems included cabbage-eating beetles and a lack of water for irrigation in the summer months that forces him to stop irrigating every day. Philip plans to expand to two different sites next year using water from more self-constructed small dams on the river, but he feels there is still greater potential. However, he is having difficulties convincing the chief to allocate him more land and has taken him to court to try to access unused land.

Possessing the financial capital to purchase water or acquire access to the means to extract water from available sources is clearly a critical limiting factor that excludes or at least reduces the involvement of poorer households in many commercially oriented NR based enterprises. Yet enhanced abilities to utilise water could lead to problems of overuse and environmental management.

6.5.2 The partial substitution of labour for financial capital

Some enterprises do not require large start-up investment. Other vegetable projects initiated autonomously by individuals in Madibong, Soupiana and Phahlamanoge on a much smaller scale than the project outlined above have made the most of locations close to streams to allow irrigation by hand using buckets, as David sometimes did in the tree nursery case study above. Such projects enable households without access to large financial capital reserves to participate in small-scale income generation through vegetable sales. Moreover, production can be diversified to other irrigated cash crops with a local market demand such as tobacco, as produced and sold at pension markets by a woman in Soupiana for R20 per resin block. However, the size of operations is constrained by the availability of cheap *labour* for intensive irrigation activities that can be substituted for economic investment in irrigation technologies. This will ultimately depend on the size of the household and the willingness of household members to

contribute their labour to an enterprise. Substantial expansion of production ultimately only seems possible if sufficient income can be saved to invest in a pump or to purchase water directly from suppliers where these exist. On the other hand, if the state eventually establishes a reliable reticulated water system to provide water sources close to homesteads in the study villages, this could revolutionise vegetable production by facilitating production in irrigated homestead gardens.

Other examples of labour-intensive enterprises that seem to offer potential for income generation without large upfront investment of financial capital include craft making and dress making (see Box 6.6 below).

Box 6.6: Case Study of a group of clay pot makers in Soupiana
A small group of around 10 women in Soupiana construct and sell clay pots for storing grain, water and sorghum beer in order to generate income. Production and marketing requires very little financial capital making it possible for poor women to be involved. Clay is excavated from land just below the village and the pots are formed by hand before being hardened on open wood or dung-fuelled fires using methods learned from their grandmothers. During the winter season when the road to the village is passable and the demand is highest, the pots are transported by hired tractor or car to markets in large nearby settlements such as Jane Furse or Steelpoort where they are sold for around R160 each depending on size. The women normally make two trips each season - when they have sufficient pots to fill the tractor trailer or car - and stay for long enough to sell all the pots on sale. Market demand is apparently high and the only limit on income generated appears to be the number of pots the women are able to manufacture. This is primarily constrained by the small number of women presently manufacturing pots. The two women interviewed both identified the income generated from making and selling clay pots as their households' most important source of income, indicating the important contribution that an apparently simple income generating strategy can make to poor rural households. The income generated from selling pots is used to hire transport and to purchase food for makers' families. Some of the women also manufactured reed mats and brooms for sale, constructed from reeds and grasses collected locally.

The above case study suggests that the handicraft micro-industry offers considerable potential for expansion and hence increased poverty impact. The possibilities of increasing the number of women involved in the village so as to increase production levels and turnover, or of offering training to interested groups in other villages, as well as the possibilities of investing in a low-cost kiln for improved product quality all merit further investigation. Any potential markets beyond the local region also warrant analysis. Whilst manufacturing products of interest to local people is clearly important, it may also be possible to tap into the tourist market. Locally designed pots are sold to tourists as souvenirs in the former homeland area of Venda in the north of Limpopo Province, and pottery from all over South Africa is marketed to tourists at Johannesburg International Airport. There is no obvious reason why Pedi designs could not find a niche in this market.

Another form of labour-intensive enterprise that offers potential for income generation with minimal initial financial investment is dress making (see Box 6.7 below).

Box 6.7: Case study of the Kompula dressmaking project
Mary established a dressmaking project on her own initiative in 1982. The building housing the project was constructed by her cousin from bricks and roofing materials left over from construction of her own house. Total costs were approximately R800, compared to an estimated R3000 if an outsider had completed the job. The owner, Mary, had learnt dressmaking in school and with the assistance of her husband, purchased a sewing machine in 1982 for approximately R700. Since then she has been manufacturing school and society uniforms, wedding dresses and tracksuits for anyone willing to make an order and place a deposit. The deposits help to cover the initial expenses of buying fabrics (R15-40 per metre) and paying for electricity (an R50 coupon lasts three weeks on average). By 2000 the business was well established and the owner called other poor women to join her as employees. The project now employs ten women, eight of whom lack dressmaking skills and are currently being trained by Mary. Employees are paid around R150 per month, depending on sales. The main constraint Mary identifies is a lack of funds to purchase new sewing machines to enable increased production. Using funds from past sales Mary was able to purchase two electric sewing machines before she started hiring employees, but she would like to acquire more machines to further increase production. She hopes the government can assist her with funds. The project appears successful in terms of generating sustained income and employment for its members. Besides possible expansion of production, there also appears to be potential to offer further training services to women in the local area wishing to start their own sewing initiatives.

While the dressmaking project introduced above did require financial capital investment to initiate it, individuals could work from home so the only cost is acquisition of a sewing machine, fabric and perhaps training for those not skilled in sewing. There may be potential here for a credit in kind service that provides sewing machines and training to individuals in return for eventual payment through income earned. A major limit to replication of such projects is the need for electricity to power sewing machines, although foot-powered machines would represent an option for off-grid areas.

6.5.3 Knowledge, commitment and land: Other critical means of enterprise development

Knowledge of management practices is also a critical factor in entrepreneurial projects, yet it seems that many of the individuals in the case studies above managed to establish their projects without formal training, relying instead on experimentation, improvisation and communication with experienced producers. This pioneering and innovative approach reflects a *strong commitment* on the part of these individuals to their chosen enterprises, contradicting generalised claims of 'dependency syndrome' and providing evidence of albeit isolated practices of reflection, planning, active learning and problem solving that demand attention and possible promotion and 'upscaling' (cf. Hagmann, 1997). High levels of commitment are also reflected in the labour-intensive methods of

production and marketing adopted and sustained in the projects described in Boxes 6.4 and 6.5. Indeed, whilst the vegetable project (Box 6.5) was reported to have offered employment opportunities to people in Madibong, many were said to have 'run away' from the project because they found the work in a remote location too tough to endure.

Since the small-scale vegetable projects discussed above offer the possibility of generating reasonable returns without substantial financial capital investments, it is perhaps odd that more people are not using plots near to streams to grow vegetables or tobacco rather than joining group projects where a regular payment to power a pump is often required. This outcome may be linked to problems of accessing *land* that is both close to perennial water courses and within what is perceived to be a comfortable walking distance from settlements as projects in Madibong and Soupiana were located at considerable distance from owner's homesteads. It may also relate to a lack of *knowledge* about vegetable or especially tobacco production or a general feeling of apathy or *dependence*.

Why some individuals actively commit to risky projects whilst others remain passive is however difficult to understand because although it may be predominantly determined by specific and quantifiable economic circumstances, it is also likely to be influenced by a complex of hard-to-measure social-psychological variables including specific individual's personalities, aspirations, knowledge, skills, personal histories and perceptions of risk.

6.5.4 Economic stagnation and environmental uncertainty: Threats to local enterprise

Many of the enterprises autonomously established by entrepreneurs in the study villages appear to be generating substantial and sustained income streams and so may be considered 'success stories'. However, changes in the national economy, at least partly related to the neoliberal policies of the present South African government discussed in Chapter four, and possible environmental changes may threaten the future performance of many of these enterprises.

Mathew, a shopkeeper in Phahlamanoge, stated that despite generating enough income to support his whole family and send his one daughter to college, he was not satisfied

with living off the returns from the shop and was seeking another formal job. This desire to continue pursuing multiple livelihoods seems to reflect a general tendency for people from poor backgrounds to try to keep a number of options open in order to spread risk and enhance the likelihood that they can maintain a smooth income stream in the face of livelihood shocks (cf. Scoones, 1996). Yet Mathew had been unsuccessful in securing a new job in the formal sector despite considerable previous experience. His perceptions of a decline in employment opportunities are corroborated by numerous researchers and secondary data (e.g. Lodge, 2002; DFID, 2000; May *et al.*, 2000) and also by the understandings of economic dynamics shared by another Phahlamanoge shopkeeper, whose background, situation and opinions are summarised in Box 6.8.

Box 6.8: Case study of shop owner in Phahlamanoge
Luke travelled to Johannesburg in 1970 to look for work but he struggled to find a job and a place to sleep. People from the homeland areas were not allowed to stay in Johannesburg at the time without a permit, so he says "people were after us day and night". Luke started working for 9R per week in a factory, out of which he had to pay for rent, transport and food, but he tolerated it because there was "nothing to eat at home" and he needed to make a living. He worked in Johannesburg in various factories from 1970 to 1989, trying to save a little all the time. When the factory was closed in 1989 Luke "thought of coming home and making a living... [because] life was not as bad as before". Life was different because, he says, there were labour strikes and conflict and white investors 'felt unsafe' and were pulling out. Luke therefore decided to return to Phahlamanoge. He found a building in the village with a bankrupt owner and rented it for a shop that he opened the same year, using his savings to establish the business. The business has survived to the present day, but Luke reports that the rent on the shop has been getting increasingly difficult to pay because "most people are not working so the business is not as before". Luke feels the employment situation is going to degenerate in the future, further threatening the viability of rural businesses: "Things are going to a worse place now".

As Luke is well aware, retrenchments and lack of formal employment opportunities in the national economy are threatening to affect the economic viability of small rural businesses by reducing already limited local buying power. Market viability may be further undermined by saturation of the marketplace due to the uncoordinated funding, by both local entrepreneurs and external agents, of large numbers of individual and group projects producing a similar product in the same region. Poor national economic performance, specifically lack of employment creation, also reduces the opportunities for would-be entrepreneurs to accumulate capital to initiate new projects. For these reasons, the scattered instances of successful private enterprise in Sekhukhune District reviewed here may be increasingly exposed to economic collapse. These insights only reinforce the need to diversify income generation activities across sectors and geographical locations in order to reduce risk of catastrophic livelihood shocks. Yet whilst local people such as Mathew may understand the importance of such strategies,

opportunities to pursue them remain extremely limited and consequently many small-scale enterprises may be vulnerable to economic stresses and shocks.

Those enterprises that draw directly on NR stocks and flows may also be threatened by changes in the physical environment. For example, the impacts on the local water table and on downstream users of substantial uptake of river water for irrigation are unknown. Soil salinisation could also pose a problem for these enterprises, as reported for other irrigated vegetable projects in Sekhukhune (Wigley, 2002). Both economic and environmental factors therefore require further investigation and more intensive monitoring. Nevertheless, many of the entrepreneurial projects investigated in the study villages and outlined in the case studies above appear to be successful if assessed narrowly in terms of generating a sustained income stream at the present time.

6.6 Discussion: Individual and organisational aspects of development

The emphasis on explaining action through institutional processes represents a widespread trend in the social development literature (Twyman, 1997). However, such an approach tends to reify what are considered to be central tendencies and masks diversity and variability (cf. Twyman, 1997; Long & van der Ploeg, 1994). This chapter has investigated and emphasised the impacts of such individual behaviour, particularly in the case of so-called development brokers and entrepreneurial agents. In group projects, building consensus around a shared purpose and coordinating and managing collective action does not happen automatically, especially in areas where a 'dependency syndrome' may discourage efforts at self-help; rather, it requires strong leadership and supportive institutions (i.e. norms and behaviours that persist over time by serving socially valued purposes) at the local level (Uphoff, 1992). These were exemplified by the local civic organisation's development efforts in Phahlamanoge.

Uphoff (1992:12) suggests that an intervention agent can only create organisations (systems of roles), not institutions - "To the extent that they [organisations] effectively meet people's needs and expectations, they become the former". This is significant since it implies that the much-neglected area of research on building social capital should focus on organisational precursors, particularly building capable agency to facilitate and drive social enterprise (cf. Krishna, 2001). Indeed, the NGO Kagiso Trust and the Landcare programme in the national Department of Agriculture are both already

experimenting with such an approach in Limpopo Province. Focusing on key individuals rather than organisations, they are training selected community members to act as 'change agents' to advise community members on project opportunities, disseminate information and serve as a communication link between community organisations and outside agencies (cf. Hitchcock, 1995). Use of such agents is hoped to not only increase group 'ownership' of projects but also reduce costs and reduce demands on overloaded extension officers. Provision of payment and training to selected individuals by external agencies could also create tensions with local elites and place 'change agents' in difficult social positions where they must negotiate multiple allegiances. Yet as the case study of the SANCO leader in Phahlamanoge illustrated, appropriately skilled individuals are able to constantly negotiate such ambiguous and contradictory relationships while simultaneously bringing benefits to local people.

Successful initiatives do not, however, need to be based around organisations, defined here after Uphoff (1992) as structures of recognised and accepted roles. An alternative approach, 'use-management' (Uphoff, 1992), involves individuals managing and using a resource within certain cultural and social norms that are not enforced by any formal authority; it thus involves institutions but not organisations. In Sekhukhune, this approach is represented by the coordination and use of NRs by individual entrepreneurs within a context of weak local organisations (e.g. chiefs and local government) that lack effective enforcement capabilities. Indeed, such weak organisations may provide the space for entrepreneurs, as well as 'development brokers', to emerge. For example, the owner of the large-scale vegetable project in Madibong was able to take the chief to court to gain access to additional land and was able to dam a river in order to divert water exclusively for his own use, implying the traditional authority lacked complete control over NR allocation and use. However, the divide between organisational and individual approaches may not be a solid one. As individual efforts evolve and where successful, expand, then such individuals begin employing others and thus forming organisations with defined roles, as seen in for example the sewing project above.

Given problems of dependency, lack of commitment and ownership, a policy shift has been identified towards a more hands-off approach to *facilitating* the initiation of project organisations. This is an entirely rational policy shift. As Uphoff (1992:12) states, once local groups have identified and prioritised problems and "made serious

efforts to solve priority problems by their own initiative and with their own resources, they are in a stronger position to get assistance from higher levels to deal with problems that cannot be addressed locally". Yet findings from this research suggest that many projects that have been initiated with support from donors as group-based organisations continue to struggle due, amongst other things, to problems of expectations versus realised returns on investment, mistrust or, to basic problems of financial viability. Improved provision of business planning, financial management, conflict management and book keeping training to beneficiaries may go some way to resolving these problems, although 'capacity building' cannot overcome obstacles of poor transport, infrastructure and lack of market access (Manstrat development strategists, 2002).

More rigorous and realistic assessment of the financial viability of project applications is also required to enable more cost-effective allocation of funding to those projects that are viable. It is in this context that a focus on enterprises initiated by individual entrepreneurs might be particularly worthwhile. By drawing on local and/or contemporary knowledge and a range of capital assets, such enterprises have often demonstrated success in generating returns on investments and in some cases have also begun employing other local people as their operations expand. They may therefore represent more reliable targets for financial and training support from donors.

Such successes, albeit on a small-scale, encourage greater optimism for the future of livelihoods in Sekhukhune than was suggested by the prior chapter. An important implication of these findings is that the government focus on 'emerging farmers' in many agricultural policy documents (e.g. Department of Agriculture, 1996) may be more defensible than some researchers have argued (e.g. Turner & Ibsen, 2000). This may especially be the case if a necessary condition for an entrepreneur to gain donor funding was the provision of some threshold level of employment generation or training to vulnerable groups, and if such interventions were combined with heavy investment in social welfare payments (cf. Kihato, 2004), enhanced support to 'subsistence' farmers in low potential areas and increased investment in other income generation and vocational training schemes (e.g. SALGA, 2003). Coordination of funding to entrepreneurs in different geographical locations and sectors would however be essential, and might require complementary investment in the capabilities of government and private sector

service providers, in order to ensure that the market for a particular product is not saturated and established producers are not detrimentally impacted.

Given the problem of deciding how to balance investments in different forms of intervention in a particular region, the multi-faceted nature of local households' livelihoods, and the variety of different intervention agents attempting to bring development to Sekhukhune, there remains an urgent need to enhance the coordination of interventions and the transparency of decision-making in the integrated development planning process. This should arguably include involvement of local people in weighing-up and trading-off of growth and development/welfare oriented intervention measures as opposed to leaving such strategic decisions to experts insulated from citizens by an opaque technocratic discourse (cf. Kihato, 2004). Enhanced public participation would require use of experienced facilitators rather than only technical experts, and would also demand more sensitive attention to appropriate formats for the participation of different groups. Efforts to educate people about their rights and responsibilities in a representative democracy may also be important (Turner, 2001).

A renewed development planning process should also attend to the environmental impacts and sustainability of new enterprises in Sekhukhune and elsewhere. The impacts of increasing withdrawals of surface or ground water to irrigate rapidly proliferating and expanding cash-crop production projects both on current ground water stocks and downstream users are currently unclear, yet such demands on NRs could both undermine future livelihoods and create conflicts between water users if not managed appropriately. Increased year-round production of cash crops could also lead to nutrient mining, water pollution due to misuse of chemical fertilisers, or increased soil erosion. Thus, whilst some entrepreneurs seem to have established economically productive enterprises, whether or not these represent relatively sustainable forms of livelihood in terms of ecological processes remains uncertain.

6.7 Summary

Chapter five described a somewhat austere socio-economic situation in the study settlements. This chapter sought to highlight more positive livelihood dynamics using case studies of a variety of external agents and local entrepreneurs who are attempting, with differing degrees of success, to establish economically viable poverty-reduction initiatives. Policy implications were drawn out and the environmental dimension of livelihoods and interventions was raised. The following chapter explores this environmental side to policy and livelihoods by investigating different local stakeholders' perceptions of environmental change and their implications for interventions. Biophysical evidence of environmental change is also analysed. Perceptions of environmental change, and environmental change itself, are important to understand because they can both have far reaching consequences for interventions and livelihoods.

Chapter 7: Environmental change in Sekhukhune: Challenging dominant narratives and rethinking intervention strategies

7.1 Introduction

Knowledge of the biophysical implications of current patterns of NR use is required if the aim of development interventions is to improve *sustainable* livelihood opportunities for poor rural households, rather than alleviating poverty over the short term. Limpopo Province has been rated as one of the most environmentally 'degraded' regions in South Africa (Hoffman and Ashwell, 2001). Government and NGO personnel in the province identify soil erosion as the principal form of environmental change in the region and Sekhukhune District is frequently singled out as the most severely affected area. This chapter extends and grounds the analysis of national level soil erosion narratives in Chapter four by critically evaluating the regional variants of these narratives and their implications for interventions. It addresses the environmental aspect of Objective three by investigating the justification for interventions provided by these narratives and the efficacy of these interventions in changing environmental processes. Special emphasis is given to the Landcare programme as the key government intervention for sustainable development in the region. Through analysis of a case study of a Landcare project at Phahlamanoge, the approach is investigated and problems limiting its impact on environmental outcomes are explored.

The chapter also contributes to meeting Objective two by attending to local understandings of environmental change. Similarities and divergences in local and official understandings of environmental change are explored and where possible, the biophysical basis of these perceptions is investigated.

7.2 Framing the soil erosion problem: Justifying intervention in Sekhukhune

Representatives of government departments and NGOs that focus on environmental goals are listed in Table 7.1 overleaf.

Table 7.1: Environmental intervention agents in Sekhukhune District

Government sector departments	Limpopo Province Department of Agriculture (LPDA) Chief Directorate of Environmental Affairs (CDEA) Department of Water Affairs and Forestry (DWAF)
International donors	German Technical Cooperation (GTZ) Japanese International Cooperation Agency (JICA)
Non-governmental organisations	Environmental Development Agency Trust (EDA) Environmental Justice Network Forum (EJNF)

Source: Fieldwork

These environmental intervention agents tended to view environmental problems from an anthropocentric perspective, consistent with the national level narrative identified in Chapter four, as processes that must be addressed in order to sustain or enhance human well-being. Environmental problems were therefore often viewed as a subset of development problems. Understandings of key environmental processes were widely shared and largely consistent across different state and non-state intervention agents, although as will be seen they did not necessarily agree with local people's perspectives.

Soil erosion by water or wind and closely related processes of loss of grass cover and deforestation were the principal environmental changes identified by intervention agents in Sekhukhune District. Each of these processes was thought to be driven by a variety of possible causal chains, culminating at their most distal points at factors such as lack of local government ability and agricultural extension advice, communal tenure and/or breakdown of community controls on NR use, local people's 'cattle complex' and the top-down approach of the apartheid government which, as previously discussed, was believed to have undermined local 'ownership' of environmental management (cf. March *et al.*, 1999). Within this complexity, three causes of environmental change, all human, were most frequently and widely identified. These causes were poverty/food insecurity, population pressure and lack of local awareness or knowledge of environmental change.

Poverty and population pressure were both deemed to be fundamental distal causes that lead to increased pressure on, and exploitation of, local NRs. This process ultimately results in a decline in the productivity or availability of crucial elements of the environment, including increased soil loss. Lack of local knowledge of environmental change was widely held to explain a lack of action by land users to combat or effectively reduce key processes of environmental change. This lack of 'awareness'

thesis may represent the continued existence of a politically correct derivative of colonial and apartheid era narratives of land user ignorance discussed in Chapter four.

These main causes of environmental change identified by external agents are broadly consistent with 'received wisdoms' - ideas sustained by labelling and grounded in policy paradigms (Leach & Mearns, 1996) - about poverty and environmental destruction discussed in the context of international debates around sustainable development in Chapter two and South African narratives of soil erosion in Chapter four. However, perhaps because of the need for policy to simplify and make legible intricate social and ecological realities (Scott, 1998), the complexity of proximal causes and linkages identified in interviews with provincial and district level agents was much greater than those discussed in national level documentation.

The consequences of soil erosion, loss of grass cover and deforestation were understood to include reduced income and food security and reduced access to firewood supplies due to a deterioration in productivity or availability of NRs. On-site impacts on poor rural residents dependent to some extent on use of local resources were emphasised while off-site impacts were rarely mentioned.

7.3 Implications of the problem frame: Types of environmental intervention

The principal distal causes of soil erosion and related processes of deforestation and loss of grass cover in Sekhukhune identified by officials were population pressure, lack of awareness of environmental change and poverty. A critical question is how do practical intervention efforts relate to official understandings of the causes of environmental change?

The vast majority of interventions sought to improve environmental management within the constraints imposed by high population-land ratios. Population pressure, although identified as a key cause of soil erosion, was not generally addressed, perhaps because in the light of heavily resisted apartheid era attempts at relocation of communities, contemporary interventions for the movement of people are considered politically treacherous. Exceptions include the proposed Spatial Rationale strategy for redistributing the rural population (Department of Local Government & Housing, 2002), and the work of advocacy NGOs such as Nkuzi who seek to assist rural residents

making land claims under land redistribution and restitution legislation. However, neither of these processes had impacted on people in the study settlements at the time of research.

Officials related human population pressure closely to livestock pressure. Numerous respondents from government departments and NGOs claimed loss of grass cover and soil erosion were largely the result of a concentration of grazing pressure around water sources and a lack of controls on livestock movement and distribution. Yet whether overgrazing is due predominantly to the total number of animals increasing or due to the total area available for grazing decreasing, as a result of the expansion of settlements or arable lands due to population increase, was debated. Perhaps for similar political reasons as above, no interventions aimed at reducing livestock pressure were evident in the study region. Deforestation, a second contributory process to soil erosion, was also often linked to population pressure. However, few projects addressed deforestation in Sekhukhune because of perceptions that viable alternatives to cutting of wood for fuel do no exist (CDEA representative, 2003, pers. comm.).

Based on the belief that land users' lack appropriate knowledge, all intervention agents identified a need to provide education about environmental processes in order to persuade or 'empower' them to take responsibility for care of their environment (cf. Kellner, 2000; Kellner & Shabangu, 1998). To quote a LPDA representative:

> "They are supposed to be taught that things have changed and the benefit they will get and the damage that can happen if they are not responsible".

The resonances here with apartheid narratives of 'backward' African farmers and the perceived need to introduce 'betterment planning' and improved agricultural methods are obvious, although there may be other more subtle causes of this mindset, such as a need for 'experts' to defend their position (e.g. Swift, 1996). This process of education, framed through notions of 'empowerment', is an inherently ideological and political process involving attempts to change people's values, priorities and ultimately behaviour to fit those favoured by government (cf. Blaikie, 1985). The prime example of an intervention in Sekhukhune District designed to address this perceived cause of soil erosion is the Landcare project, discussed further below.

The third principal cause of environmental change in Sekhukhune identified by external agencies was poverty. If poverty leads to environmental change, then one implication is that the income-generation projects implemented by the LPDA and others, discussed in the previous chapter, can be understood as having a potential indirect and positive environmental impact by easing dependency on local NRs outside of the project for producing food and income. Projects in operation in Sekhukhune at the time of fieldwork that had *explicit* environmental goals *and* sought to reduce poverty included a small number of scattered woodlot projects established by a variety of external agencies and the Landcare programme administered through the LPDA. Woodlots are briefly considered below before focusing on the Landcare programme.

7.3.1 Woodlots: A means for poverty reduction and environmental protection?

While no woodlot projects existed in the study villages of Phahlamanoge or Madibong, one did exist in Soupiana. A case study was made of this project in order to explore the efficacy of this form of intervention in addressing deforestation and soil erosion whilst simultaneously reducing poverty. Details are summarised below.

Box 7.1: Soupiana Woodlot Case Study

The woodlot project seeks to produce straight trees that can be sold for roofing poles. The project was established in 1986 when the government planted young 'blue gum' trees (*Eucalyptus* sp.) in the village. The chief sells poles for around R15 each and deposits all earnings in the bank account of the tribal authority. Exactly how the chief invests the funds generated from this 'community' project was however ambiguous. The price charged is competitive and people from surrounding villages visit to purchase poles. However, market demand is constrained by reliance on 'word of mouth' advertising. If the road to Soupiana is improved, participants hope the poles can also be sold in nearby towns. Trees insufficiently straight for roofing poles are cut and dried for firewood and offered free of charge to villagers. The community as a whole is supposed to share responsibility for irrigating the trees and protecting them from thieves and fires. These collective controls seemed to be effective as no instances of theft of wood were reported and the woodlot appeared to be well maintained.

The project has achieved a measure of success in that it has generated an income stream, at least for the chief, and continues to be sustained 17 years after its inception. However, there are inevitably problems. First, woodlot projects have a marked life cycle with long periods when they generate no income (cf. Mapedza *et al.*, 2003). At the time of research, the community had felled all of the big trees suitable for roofing poles, so there is now a considerable time lag before the project again produces income. Second, there are fears that the project will fail over the longer term because the youth are not interested or willing to be involved in the tough manual work of irrigation necessary to sustain the project. Both issues are probably related in that the 'lumpiness' of income flows combined with the lack of direct individual benefit from involvement in the project discourage the active participation of young people. As with many projects analysed in the last chapter, the critical problem seems to be generating sufficient income flows to motivate individual involvement. Educated youth, perhaps holding more individualistic values and greater material aspirations than their forebears, may be particularly sensitive to such economic incentives. These findings imply that even where apparently strong local ownership and management of a woodlot project exist, problems of economic sustainability may still threaten the collapse of such projects, just as they have led to the failure of numerous other woodlots throughout Southern Africa (e.g. Campbell *et al.*, 1991).

The focus of the woodlot project in Soupiana is seen to be primarily on income generation. Yet whilst tree cover is sustained for this purpose, the project also serves a subsidiary role in terms of binding soil together and providing vegetation cover, potentially reducing soil erosion from an exposed mountain site. However, such projects provide very limited sources of firewood so the impact on the process of deforestation thought to be occurring throughout the region is minimal. Its environmental impacts are therefore constrained to a very small spatial area. The planting of blue gums is often discouraged by CDEA because they consume huge quantities of ground water. The limited benefits of this form of project in terms of income and soil erosion mitigation may therefore be outweighed by these losses (e.g. DEAT, 2002), although accurately determining the net effect of planting in any given site is highly complex (Jagger & Pender, 2003). Establishing transparent and equitable management systems is important to ensure project participants are motivated to contribute their energies to the maintenance of woodlots, but if the woodlot concept is to be pursued for meeting sustainable development goals the fundamental issue is arguably one of finding, or genetically engineering, more appropriate and less-demanding tree species.

7.3.2 Landcare: The key programme for sustainable development

The LPDA's Landcare programme was the most active implementation effort in Sekhukhune District, and in Limpopo Province as a whole, aimed at enhancing environmental management. The draft National Action Plan for Combating Desertification (NAPCD) in South Africa emphasises that the Landcare programme is closely aligned with its objectives and may represent a 'major implementation mechanism' (DEAT, 2002). Landcare is thus positioned as the key present and future programme for achieving the sustainable management of NRs in South Africa.

The Landcare programme was initiated in South Africa in 1997 and, through the national Department of Agriculture, has spent over $4 million to establish 200 projects and train agricultural extension workers in participatory methods (O'Donnell, 2003). Its goal, as summarised in the Landcare Implementation Framework (2001:3), is:

> "[To] optimise productivity and sustainability of resources so as to result in greater productivity, food security, job creation, and a better quality of life for all".

Sustainability here refers to ensuring, 'as far as is practicable', that NRs are consumed at a rate within their 'capacity for renewal', that 'irreversible damage' is minimised or avoided, that biodiversity is maintained and that 'ecological integrity' is maintained or enhanced (Landcare, 2001). How practicable it is to ensure management of NRs proceeds in this manner is however open to question (see Chapter two).

Landcare seeks to address two of the three principal causes of soil erosion identified in Sekhukhune District, namely poverty and environmental awareness. Motivation for uptake of responsibility for environmental management and adoption of appropriate methods is supposed to come both from the creation of a 'conservation ethic' through education and awareness raising initiatives driven by newly trained agricultural extension officers, *and* from economic incentives. While the latter are likely to be highly attractive to poor land users, their use may have the additional benefit of broadening the project's environmental impacts by reducing dependence on exploitation of other NRs for income generation (cf. Twine, 2002). This approach is consistent with recommendations made in the Convention to Combat Desertification and other sustainable development literature that poverty alleviation and NR conservation should be integrated (Turner, 2000; UN, 1994).

Landcare ultimately aims to establish a network of relatively autonomous user groups, as its predecessor, established approximately ten years earlier in 1988, has done in Australia (O'Donnell, 2003; Landcare, 2001; Campbell, 1994). These groups, it is planned, will be able to make their own decisions about NR use and management with support when necessary from a range of public and private service providers; thus, importantly, they will be less dependent on direct government funding. The approach reflects a conviction, now widely held by environment-development agencies throughout southern Africa, that local communities should be 'empowered' to take responsibility for managing local NRs (e.g. Shackleton *et al.*, 2002; Isaacs *et al.*, 2000). Such a participatory approach also fits neatly with the demand of an overriding neoliberal macroeconomic framework for a contraction of public expenditure (e.g. Bromley, 1994). Within this context, participation is viewed simply as 'an efficiency device' (Michener, 1998:2115). However, it remains to be seen whether or not this psycho-social shift can be achieved using a model imported from the very different socio-economic and political context of Australia, if the government will be willing to

devolve genuine decision making power to rural communities backed up by appropriate legislative reform, and if communities can be convinced to take on such responsibilities. The latter is seriously hampered by a stigmatisation of 'nature conservation', which is associated with environmental management policy, linked to experiences of forced removal from protected areas under apartheid (CDEA representative, 2003, pers. comm.; Beinart & McGregor, 2003; Wilson & Ramphele, 1989). Building up trust may therefore take a long time. To quote Hulme and Mumphree (2001:376):

> "one should assume long time frames; and keep in mind that conservation in Africa – and other continents – have been illegitimate for generations. Community conservation has created opportunities for conservation to begin to develop a local constituency, but the task of creating a conservation policy that is embedded in African society, rather than imposed from above, will be the work of generations".

Landcare is only seven years old in South Africa so it is perhaps too early to judge the programme's success or failure to achieve its goals. Empirical research of specific projects can, however, explore the efficacy of the approach and suggest improvements to enhance the likelihood of meeting these goals. The chapter now explores implementation of a Landcare project in Phahlamanoge in order to investigate how dominant framings of soil erosion in Sekhukhune are translated into practice.

7.4 Landcare in practice: A case study of the Phahlamanoge project

In this section the aim of the project at Phahlamanoge, its initiation, methods and management practices are all discussed. The following section then analyses the problems with this approach.

7.4.1 Project aim and initiation

The Phahlamanoge Landcare project, like a third of all South African Landcare projects, focuses on highly visible erosion gullies (O'Donnell, 2003). The site consists of a large gully approximately one kilometre long, 300 metres wide and up to 10 metres deep, with numerous tributary gullies. The project is aimed at 'rehabilitation' of productive potential rather than conservation. To quote Phahlamohlaka (2000:3):

> "The entire concept of this project initiative is to find ways and means to not only conserve and protect the environment, but to increase production and inculcate a spirit of responsibility and accountability on the part of the community. This can be achieved with hands on participation and experience".

The focus on enhancing productivity as well as environmental management, and on building an environmental ethic, is consistent with the Landcare literature and with the official conceptualisation of the soil erosion problem, and its solution, in Sekhukhune. The emphasis on transferring responsibility for environmental management to local people through education and participation also reflects the emphasis of the dominant Sekhukhune District soil erosion and Landcare narratives on raising awareness.

The project was initiated in 1992 during a national drought when a government Drought Relief fund was established to provide temporary employment for residents in communal areas. Spies (2000) and Phahlamohlaka (2000) state the 'community' applied for funds to combat soil erosion in the area, but whilst the idea may have originally come from the community, it was the Agricultural Engineering Directorate of the then Lebowa government that assessed the site and designed the approach. Respondents in Phahlamanoge tended to rate job creation as their top priority (see Chapter five). If community members did initiate the project by approaching the LPDA, it therefore seems likely they did so primarily to gain employment opportunities rather than to protect the environment.

7.4.2 Project methods

The main, and most expensive, method used to reduce erosion and run-off is construction of large gabion structures (Spies, 2000). Biological methods such as planting of Mexican aloe (*Agave mexicana*), Vetiver grass (*Vetivaria zizanioides*) and the establishment of indigenous tree species in rows of old tyres were also experimented with as means of reducing runoff and trapping silt (Spies, 2000). These methods are implemented and maintained by twenty to forty workers employed on a wage of R25 per day, plus a foreman paid R40 per day. Workers are recruited from the local community with preference given to people from households without any employed members, thus furthering poverty alleviation aims. Most workers are rotated to give more people a chance to be involved in the project and benefit financially. The wage paid is significantly lower than the R30-45 per day paid to labourers on the Working for Water scheme (Binns *et al.*, 2001), another environmentally oriented public works programme. Yet the higher wages involved in the Working for Water programme are alleged to disrupt local economies, for example, bringing business closures as

entrepreneurs take up more lucrative opportunities offered by the programme (Aliber, 2002).

Visits to the project by community representatives, conservation experts and school groups are used to promote environmental education. Development of environmental awareness and an environmental ethic is also attempted through distribution of posters representing the same rural location twice, one with 'land care' depicting healthy crops, stored water and fenced grazing supporting healthy cattle, and one with 'no care' depicting drought, poor crops, unhealthy livestock and damaged infrastructure. The explicit message conveyed is that environmental change is due to a lack of care by local people, or mismanagement of local resources. The assumption that local people are to blame for the state of their environment, with little role ascribed to natural factors, and that they can be assisted to manage it more effectively, is consistent with the dominant problem framing in Sekhukhune described above. It is also expressed in the Landcare Implementation Framework (2001:3) which targets groups "associated with exploitative farming practices and limited resources for implementing corrective measures".

Ongoing work funded since 1998 by Landcare has focused on maintenance of the main gabion structure and the establishment of new trees and tyre rows (Phahlamohlaka, 2000). A dam for a livestock watering pool was constructed in 2002 to replace a collapsed earth dam using the gabion making skills learned on the project. Livestock owners expressed great satisfaction with the results. This project is particularly impressive because it appears to have been undertaken on the initiative of local people and unlike the measures implemented at the original project site, has contributed to direct visible benefits for a group of NR users. It is therefore more likely that this structure, as opposed to those depending on exhaustible government funds, will be maintained over future years, although siltation of the dam could become a major problem if action is not taken to reduce upstream soil erosion.

7.4.3 Project management practices

Despite conflict within the community over finding a successor to their recently deceased chief, a local project management committee was successfully elected in 1996 through meetings with the community-based civic organisation (SANCO), with equal representation of both factions (Spies, 2000). Spies (1995) notes that attempts were

made from the start of the project to form a committee with whom discussions could be held, but nothing was accomplished until 1996, possibly he suggests because the work was always regarded as temporary. This observation reinforces the importance of consistent and visible returns on labour investments, identified in the prior chapter, for ensuring participants' commitment to and confidence in an enterprise is strengthened and sustained over time, thus enhancing the potential of the project to survive over the longer term. The appointment as project foreman of one member of the new committee, the local SANCO leader, was also noted by Spies (1995) to have substantially enhanced the cooperation of all involved parties, underlining the potential significance of key individuals in project 'success' highlighted in Chapter six.

Responsibility for implementing the project lies, somewhat ambiguously, "with the community, and local, provincial and national authorities" (Phahlamohlaka, 2000:8). The need, but not the specific means, is asserted for involvement of the community in project decision-making at all stages. Project workers are employees of the government and leadership of the project ultimately lies outside the community and above the level of the project committee. Community participation thus appears to be limited to project implementation, motivated primarily by payment, and local level management, with little involvement in project design and planning. This interpretation is supported by reference to a project business plan where Phahlamohlaka (2000) defers to government experts for strategic planning whilst stating that the community is responsible for implementation. This is significant as projects that do not take account of local knowledge and priorities are unlikely to effectively improve livelihoods or achieve longevity (e.g. Vedeld, 2002). On the other hand, interviews with current project workers, including committee members, indicate a strong feeling of project 'ownership' with the local committee identified by the majority of interviewees as the managers and responsible agents for the project. A representative of the LPDA supported this view of project management, claiming that the local committee has now taken charge of how project funds are spent, with the LPDA monitoring progress and intervening to provide advice when mistakes are made with technical aspects of implementation.

Arnstein (1969) produced one of the earliest classifications of 'participation'. She recognised that it can be used by the powerful to appease rather than involve citizens in decision-making. Arnstein's (1969) ladder of participation parallels more recent

classifications (e.g. Michener, 1998; White, 1996; IIED, 1994), ranging from manipulation (planner-centred/non-participation/nominal) to consultation (a degree of tokenism) to full citizen control (people-centred/transformative). Participation in the Landcare project could be categorised on one level as 'manipulation' (Arnstein, 1969) or 'passive participation' (IIED, 1994), through provision of financial incentives and persuasion of the importance of environmental protection goals set by outsiders. Yet arguably the project management committee now possess a considerable degree of citizen control over project decision-making and implementation, albeit with external financial support and within limits monitored by the project donors. Thus, participation could also be categorised as close to 'full citizen control (Arnstein, 1969) or as moving towards 'active participation' (IIED, 1994), where real active participation refers to a concerned community carrying out NR management without outsiders' intervention.

This ambiguous and constantly negotiated balance of power (cf. White, 1996) in the Phahlamanoge project allows officials to make claims of 'empowerment' and 'participation' to satisfy international donors whilst simultaneously remaining in a background, controlling role, the latter legitimated by the dependency narrative discussed in previous chapters and perhaps supported by a need to avoid voluntarily working themselves out of a job (Michener, 1998). Simultaneously, the participatory approach serves the interests of local people by providing the opportunity for local representatives to manipulate relationships and bargain with the external agency over the extraction of more resources (Michener, 1998). Direct benefits include income, the physical manifestation of soil conservation measures, and education in conservation through practical experience. More subtle and indirect effects, yet perhaps more important given concerns about project longevity, include the 'empowerment', to some extent, of project participants. Project committee members gain confidence in their abilities to exert their will on powerful environmental processes, work effectively as a team, and interact with government officials on a more equal footing. Such 'soft' impacts may be long lasting, unforeseen and much more widespread than any direct and immediate gains, as in the case study of the rise of the local SANCO leader as a capable 'development broker' outlined in the previous chapter. Spies's (2000:37) claim that the project has shown local communities can be empowered to practice conservation is therefore difficult to refute, but it masks important social complexities and dynamics.

7.5 Problems with the justification for, and efficacy of, the Landcare approach

The investigation of local perspectives and analysis of biophysical data reveal three major problems with the approach of the Phahlamanoge Landcare project that undermine its impact on environmental outcomes. These relate to:

- the assumption that land users do not act to conserve soil because they lack knowledge of soil erosion processes;
- the assumption that soil erosion is an urgent problem requiring immediate and effective combative action; and
- the forms of economic incentive and disincentive offered by the project.

7.5.1 Land users' knowledge of soil erosion

Officials in Sekhukhune tend to assume that land users are not taking responsibility for managing the environment because they lack the necessary knowledge to manage their resources in a more environmentally sustainable manner. It follows that increased awareness of the importance and vulnerability of NRs will encourage wider public involvement in conservation (cf. Tacconi, 2000). Yet knowledge of soil erosion processes was found to be deep and widespread in Phahlamanoge, including amongst people with no knowledge of the Landcare project, implying a lack of awareness of environmental change was not a major constraint on NR conservation in the village.

7.5.1.1 Local knowledge of soil erosion on arable land

Approximately half of all households surveyed in Phahlamanoge (51%) reported erosion gullies (*moedi* or *lopie*) on the arable land they cultivate. Sixty per cent of households also reported some degree of soil loss from their arable land. The extent of arable land perceived by land users to be affected by sheet, rill or gully erosion was therefore considerable, supporting external agents' perceptions that erosion is a major problem in the region. In Soupiana and Madibong soil erosion was also claimed to affect large numbers of fields with 30% of surveyed households in Madibong and 86% of households in Soupiana reporting soil loss on the land they cultivate. The vast majority of survey respondents attributed soil loss solely to intense rainfall.

A semi-structured group discussion conducted with four land users in Phahlamanoge explored in greater depth local understanding of possible causes of soil loss on arable lands. Intense rainfall was seen as the major cause of soil erosion, but soil loss was

thought to vary between soil types with the most rapid losses occurring on lightweight soils that are easily washed away, a view also expressed in on-field interviews with farmers. Steep slopes and pathways linked to the movement of people or cattle were also thought to exacerbate soil loss, whilst trees were understood to reduce rainfall impact and slow water run-off. Intervention agents often pointed to inappropriate practices, particularly ploughing down the slope of a field, as the cause of soil erosion on arable land in Sekhukhune, but all farmers in Phahlamanoge questioned in on-field interviews about land management recognised the need to plough across the slope to disrupt water flow, as did two interviewed tractor drivers. Local knowledge of soil erosion on arable land thus appears to be more developed than many external agents realise.

7.5.1.2 Local knowledge of soil erosion on communal land

Interviews with elderly people in Phahlamanoge indicated shared perceptions that the extent of soil erosion gullies on communal land had increased substantially over their lifetimes, implying that gullies are still actively developing in the area. These oral testimonies were corroborated by observations of plant pedestals and exposed rock on mountainsides that provided direct evidence of soil erosion in some areas around the study villages. A lack of vegetation cover and preponderance of loose sediment forming V-shaped cross sections in portions of the larger gullies also implied ongoing processes of erosion in some areas, confirming local accounts (Dardis *et al.*, 1998). However, other data sources contradicted local people's knowledge. While the poor quality and scale of available aerial photographs excluded the possibility of detailed measurements of changes in erosion gullies over the last 50 years, visual comparison of photographs of Phahlamanoge and Madibong from the 1950s/60s and 2000 indicates that changes in the extent of the largest erosion gullies have been small, as shown in Figures 7.1-7.4 below.

One interpretation of these findings is that the largest gullies in the region may have reached a relatively stable state, perhaps due to a decline in erosive rainfall, as some livestock herders in Madibong claimed, or due to soil being eroded down to the underlying rock. Alternatively, change may be ongoing in these gullies but largely confined to a deepening rather than a lateral expansion and thus invisible in the aerial photographs. Smaller erosion gullies and rills may also be more dynamic and widespread than the large gullies referred to here.

Figure 7.1: Phahlamanoge erosion gully, 1954

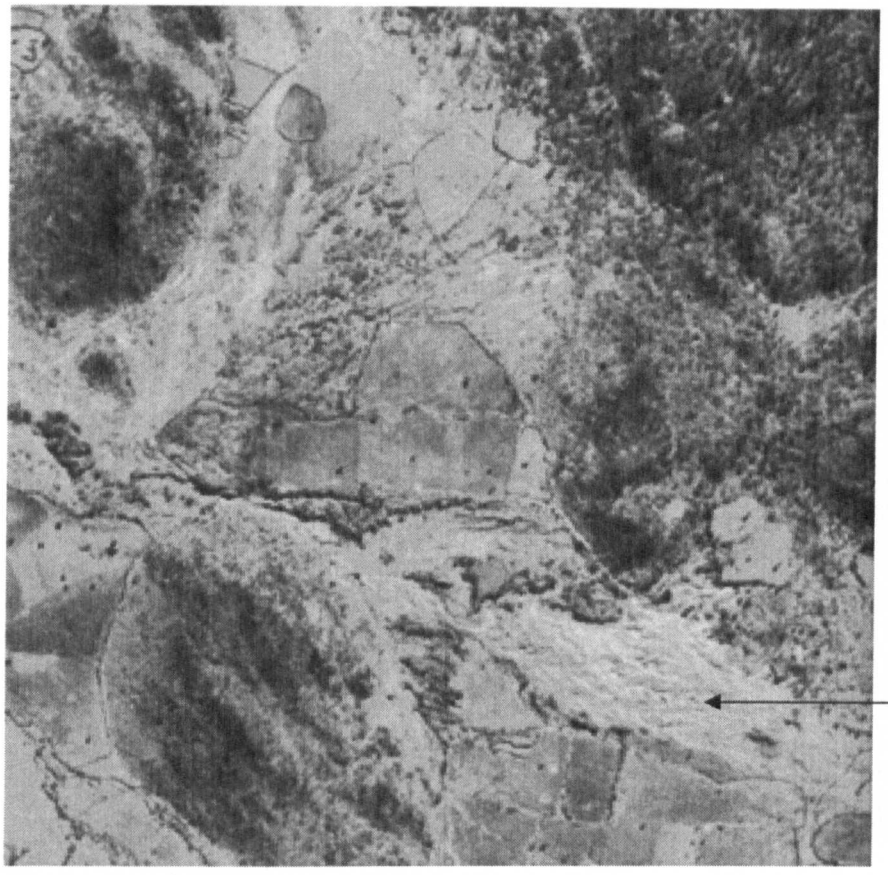
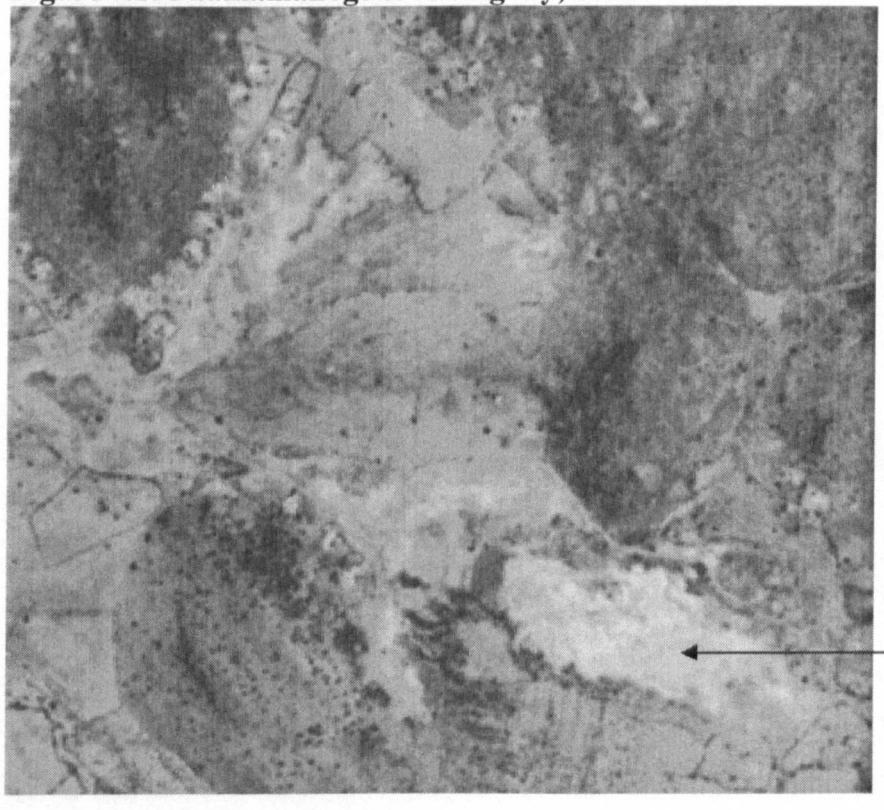


Figure 7.2: Phahlamanoge erosion gully, 2000



Extent of heavily eroded area has changed little from 1954 to 2000

Figure 7.3: Madibong, 1964

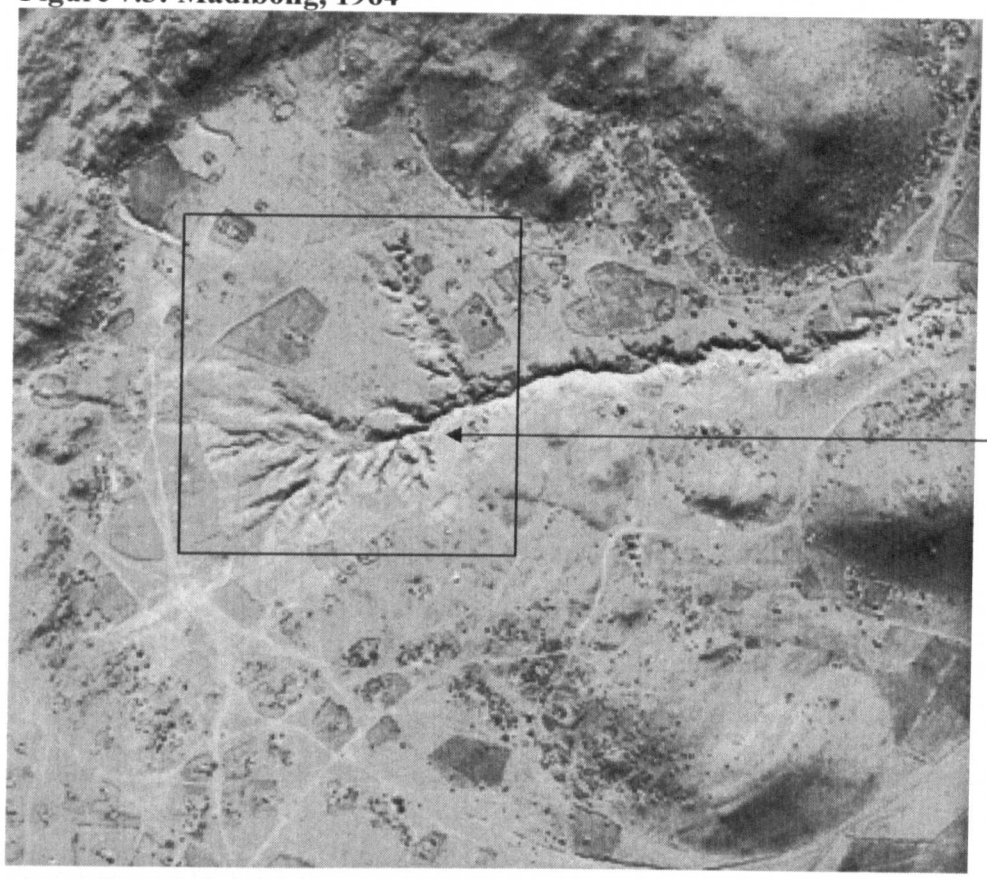
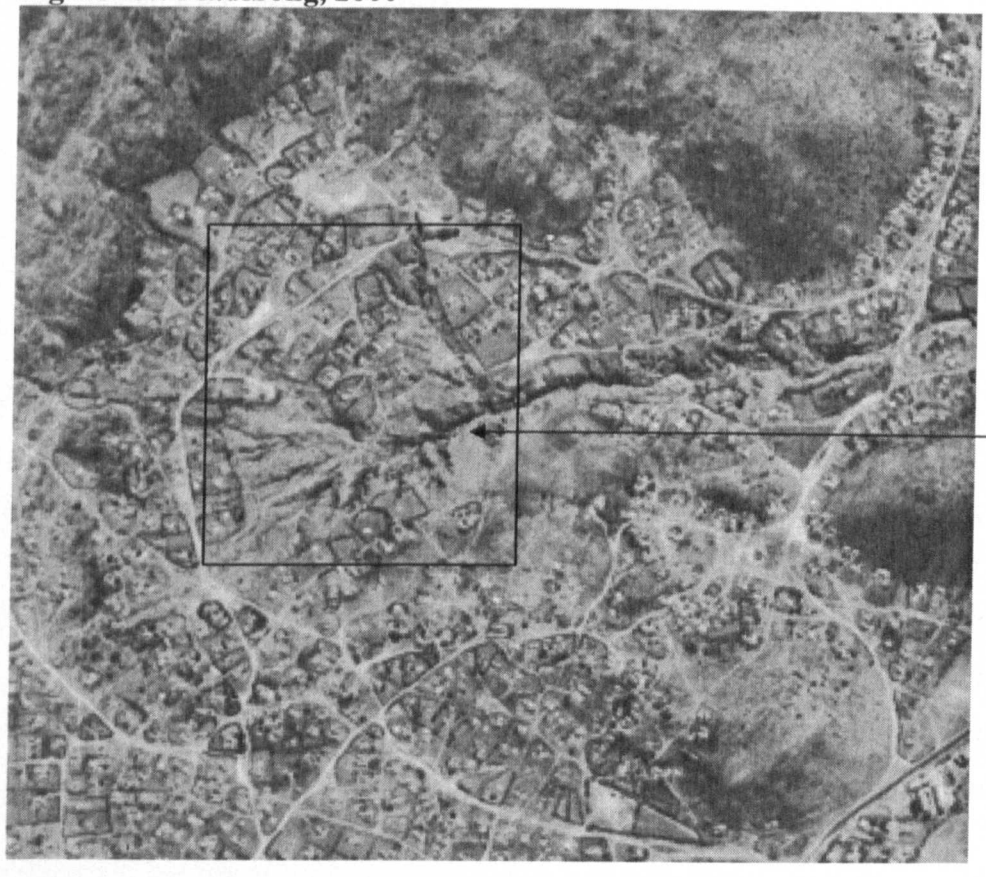


Figure 7.4: Madibong, 2000



Soil erosion on communal land, like that on arable land, was blamed largely on natural factors. Approximately two-thirds (20 out of 31) of herding households in Phahlamanoge claimed very serious soil erosion had occurred on grazing land since 1994 and a further six households reported serious soil loss. Livestock herders saw communal land soil erosion as a problem because it results in a decline in grazing and can lead to the injury of cattle when they fall into erosion gullies. The main reason given for erosion on communal land was the intensity of rainstorms (24 households), which was believed to have increased at the same time as overall rainfall has decreased. The rainfall changes exacerbate soil erosion because long dry periods leave soil exposed to the erosive impact of intense storms. Rainfall was also identified most frequently as the main cause of erosion in Madibong and Soupiana, although some livestock herders in Madibong suggested that erosion had decreased in recent years due to a lack of rain to remove soil. Key informants in Soupiana claimed erosion gullies had been exacerbated by the construction of new roads, but it was not possible to test these assertions against aerial photographs due to the quality and scale of the images.

Direct access to a reliable precipitation time-series for the villages in which fieldwork was undertaken proved impossible. Baber (1998) compared a mean of 559mm per annum averaged for the years 1929-1986 to a mean of mean of 459mm in the 1993-1994 season, acquired from a weather station in Jane Furse immediately adjacent to Madibong, but given high inter-annual variation in rainfall in dryland areas, the latter cannot be cited as evidence of a long term decline in rainfall. Moreover, high spatial variability in precipitation in semi-arid area implies that data from rain stations in one part of the region may not be easily generalised to other parts of the same region. A more recent study by JICA (JICA, 2003) on the same watershed in which this research was undertaken quotes figures from the DWAF – the exact source was unclear but they probably represent extrapolations from weather stations close to the area – indicating that the '5-year mean rainfall' between 1910 and 1960 ranged between 490 and 750 mm of rainfall, as compared to a reduced range of 300 to 550 mm between 1960 and 1980. JICA (2003:6) claim that these data indicate a "tendency of long-term decreasing rainfall". However, the lack of data subsequent to 1980 undermines such claims and leaves no reliable rainfall data with which to test respondents' reports of rainfall decline.

Some locals and officials posited a causal link between deforestation and a decrease in rainfall in Sekhukhune District. The World Meteorological Organisation (WMO, 2002) states that localised drying and warming of the climate can occur as a result of the clearance of land because this reduces surface evapotranspiration and increases reflectance. The use of modern building materials that change the thermal properties of the land surface can also contribute to such changes (WMO, 2002), implying that the widespread switch in roofing materials in Sekhukhune District from thatch to corrugated iron could also be a factor. However, the absence of reliable and location-specific rainfall data means this remains only speculation.

Secondary causes of soil erosion on communal land identified by local people were deforestation and livestock impact.

7.5.1.3 Local knowledge of deforestation

The vast majority of households that collected wood in Phahlamanoge (90 out of 93) shared the officials' belief that deforestation is occurring in the region, as did respondents in Madibong and Soupiana. Phahlamanoge respondents' perceptions of the causes of deforestation are shown in Table 7.2 below.

Table 7.2: Causes of deforestation in Phahlamanoge

Cause of deforestation	Number of households
Consumption by locals for fuel	47
Outsiders cutting	36
Consumption by locals to sell	23
Increase in population	15
Cutting with saws	8
Lack of rain	3
Burning of veld	3
Cutting green wood	1

Source: Fieldwork (n=100)

Consumption of wood fuel was the most popular reason reported for deforestation, both in Phahlamanoge and the other study sites, reflecting the understanding of officials. Some respondents explicitly linked this to a growing local population, as did intervention agents. The second most frequently stated cause of deforestation in Phahlamanoge was a purported destructive influence of 'outsiders' on tree and bush cover. The director of a CBO in neighbouring Manganeng village lent support to this claim, stating that people from his village have visited Phahlamanoge to collect wood

for many years. In Soupiana and Madibong the extent of common land with bush or tree cover is much smaller, perhaps explaining the lack of mention of cutting by outsiders. In these villages most respondents blamed high levels of domestic consumption for deforestation, although in Madibong 20 respondents also suggested that a lack of rainfall was causing many trees to die off.

Other evidence suggests that deforestation is not, however, occurring uniformly in all areas. In Madibong, for example, sand olive (*Dodonaea viscosa*) - a perennial alien species often used as an ornamental plant - has taken over large areas of disturbed ground. Some local people view its proliferation as a problem because they believe it suppresses and even 'poisons' other vegetation, but others see it as a ready and conveniently situated source of firewood. Mol (1993) states that sand olive germinates easily and is used in various parts of the world to consolidate sand, implying that it may also be inadvertently reducing soil erosion in Madibong. On a smaller spatial scale, reforestation is also occurring in many household plots where people plant fruit trees and ornamental plants. This process is underscored by the high market demand claimed to exist for trees sold by an entrepreneur in Madibong (see Box 6.4 in previous chapter).

Reforestation, here defined broadly to include bush as well as tree cover, is also occurring due to encroachment of acacia bushes onto abandoned fields, visible on aerial photographs of Phahlamanoge, and, in a small number of cases, through woodlot projects. Changes in communal land bush and tree cover were not reliably distinguishable on available aerial photographs due to the quality and scale of the images. Although rules on not cutting fruit trees were allegedly transgressed by some individuals, the cutting of fruit-bearing trees is often avoided because of their locally recognised value. A general trend of deforestation may not therefore lead to a decline in highly valued trees such as fruit trees (cf. Wilson, 1990). Moreover, whilst officials claimed that the clearing of land for cultivation can contribute to soil erosion, it is important to recognise that often a small number of trees are left standing in fields in order to provide shade for grazing animals or workers or to provide fruit (cf. Elliott & Campbell, 2002). While changes on an aggregate scale may therefore approximate a linear process of historical deforestation as suggested by locals and officials, on smaller scales the dynamics of tree cover change are spatially and temporally complex, consisting of spatially differentiated patches of deforestation, sometimes highly

selective of species that are removed, and, albeit covering smaller areas and/or occurring less frequently, reforestation (cf. Elliott & Campbell, 2002).

7.5.1.4 Local knowledge of livestock impact on soil erosion

Whilst some Phahlamanoge residents suggested that the formation of cattle tracks might concentrate run-off and lead to the formation of erosion gullies, most did not mention livestock impact as a contributing factor and others suggested human pathways were more significant than cattle tracks. Similarly, in Soupiana and Madibong herders tended to ascribe changes in grazing availability and increases in soil erosion on communal land to rainfall rather than livestock. This viewpoint contradicts the significant impact officials believe livestock grazing has on grass cover and soil erosion.

No attempts are made in the study villages to control grazing on communal land. Opportunities for accumulating fodder for the winter, conserving fodder during droughts, or resting specific areas of rangeland to allow grasses to recoup their nutrient reserves after defoliation are consequently lost (cf. Cummins & Rootman, 2003; van Oudtshoorn, 1999). The latter is particularly important, since without physiological resting highly palatable perennial grasses will weaken and die off, resulting in areas of bare ground, replacement by less productive pioneer or sub-climax grasses and greater erosion due to reduced vegetative cover (Cummins & Rootman, 2003; van Oudtshoorn, 1999; van Rooyen, 1998). Evidence of this environmental change in the study settlements was gleaned from herders who identified the grass species that were most valued by cattle for grazing. Those grasses it was possible to identify were all pioneer or sub-climax grasses, as shown in Table 7.3 overleaf.

Table 7.3: Grass species with high grazing value in the study settlements

Local name	English/Latin name	Characteristics as perceived by herders	Characteristics from literature*
Sedilane / Sehlwa / kweek grass	Couch grass / *Cynodon dactylon*	Identified as one of the most popular grass species for cattle in both Soupiana and Phahlamanoge, although less prevalent than other palatable grasses identified.	Pioneer; perennial; found in disturbed places e.g. cultivated land; resilient to heavy grazing; average/good pasture; excellent soil stabiliser
Sweet grass	*Eragrostis lehmannia*	Identified as one of the most commonly found grasses grazed by cattle in Madibong, but was rated least prevalent out of the three palatable grasses identified	Subclimax; perennial; prospers on disturbed ground; high palatability – hence 'sweet' - especially in winter, as produces palatable growth after fire; due to low production is of limited overall grazing value
Namele	Spear grass / *Heteropogon contortus*	Popular with cattle in both Soupiana and Phahlamanoge; most prevalent grass in Soupiana but more difficult to find in Phahlamanoge; leads to high milk production; very resilient to fire and rain even over long periods	Subclimax; perennial; good indicator of disturbed places where dense stands grow; can grow in poor soil and offers good resistance to fires; average grazing value

*Literature sources: Van Oudtshoorn, 1999; Van der Walt & le Riche, 1999.

Further evidence for 'overgrazing' in Phahlamanoge was provided by a livestock organisation committee member who stated that the best types of grass are found mostly in the 'far place', a remote mountainous area that has more water but is often avoided by herders due to risks of ambush and theft. He also reported that the availability of grazing had declined near to the village due partly to the formation of animal tracks. This observation implies a possible piosphere effect around the settlement due to concentrated livestock grazing and trampling intensity (Thomas & Perkins, 1993). Aerial photographs of Phahlamanoge reveal visible pathways across land close to the settlement. Areas of bare ground and an abundance of livestock tracks were also observed firsthand around the new livestock dam. However, the extent to which these localised livestock impacts influence silt load in waterways and overall grazing availability may be limited at a landscape scale (Thomas & Perkins, 1993).

Officials' views were mixed as to whether the total number of livestock in the region was increasing or decreasing, perhaps reflecting different circumstances in different locations. As reported in Chapter five, herders' views about total cattle numbers in Phahlamanoge were also very mixed with no clear majority either way. Perceptions of a decline in number of cattle herding households and total number of cattle owned were, however, more widespread amongst cattle owners in Madibong and Soupiana. These were blamed predominately on cattle theft and deaths due to lack of rain or unknown

causes. Changes in the absolute area of the grazing resource due to settlement encroachment were only mentioned by a small number of individuals in Madibong, although key informants in Phahlamanoge did suggest that a *de facto* decrease in grazing area may have occurred due to the cessation of use of grazing areas in the mountains where theft said to be a major problem. In summary, there was support for a thesis of a decrease in grazing pressure in Madibong and Soupiana, undermining official claims of overgrazing, whilst results for Phahlamanoge were uncertain.

Intervention agent's claims of overgrazing due to high numbers of cattle per unit area of grazing resource, whether due to a decline in grazing area or an increase in livestock numbers, are supported by estimates of the overall grazing pressure in Phahlamanoge. Livestock numbers were converted into an estimated total number of Tropical Livestock Units (LSU) for Phahlamanoge by extrapolating mean number of LSU per household to the total settlement size of 432 households. LSU figures weighted by livestock type were adopted from Baber's (1998) study of livelihoods in Mamone village, also in Sekhukhune District. Totals for Phahlamanoge were calculated at 1800 LSU, based on all livestock, and 1100 LSU, based only on cattle numbers. Both figures were calculated as official estimates tend to focus only on cattle numbers whilst neglecting the role of small stock, even though small stock tend to vastly outnumber cattle (see Chapter five). Accurately estimating the size of the grazing area is extremely difficult given the autonomous movements of individual herders and a lack of clear boundaries. There is also a question of whether or not to include arable lands, since these are available for grazing for half of the year. Baber (1998) does not state whether or not he included arable land in his estimate. A very generous estimate of potential grazing area based upon the space available between Phahlamanoge and neighbouring villages, including arable land, was a circle of 5km radius, giving an area of 78.5km^2 or 7850 hectares. Using this figure, the grazing area/LSU ratio is calculated at 4.4ha/LSU based on all livestock weighted by type, or 7ha/LSU based solely on cattle.

Loxton *et al.* (1972a) define six categories of grazing potential and related carrying capacities for Sekhukhune, ranging from 'not suitable for grazing' to 'moderately high', which continue to be used by the LPDA today. The area around Phahlamanoge is differentiated into three categories, as shown in Table 7.4 overleaf.

Table 7.4: Grazing categories in Phahlamanoge

Grazing potential	Carrying capacity	Grass type	Location in Phahlamanoge
'Very low'	12+ Ha/LSU	Grass type 'not differentiated'	Mountain ridges around village
'Low'	8-12 Ha/LSU	Dominant grass type is 'sweet'	Around stream beyond mountain where many animals reportedly graze
'Moderately low'	6-8 Ha/LSU	Dominant grass type is 'sweet'	Close to stream through village as well as on cultivated area

Source: Loxton *et al.* (1972a)

Comparing these figures to perhaps overly generous estimates of livestock pressure suggest that, based on Loxton *et al.'s* (1972a) standards, the area is 'overstocked', except on the higher potential area close to the stream if only cattle are considered. The appropriateness of these measures of carrying capacity in a dynamic and spatially heterogeneous dryland environment is however questionable (cf. Behnke *et al.*, 1993; see Chapter two). For example, the contribution of crop residues on arable land to forage is likely to vary widely between different years depending on factors such as number of fields cultivated and rainfall. Moreover, there are ongoing debates about underlying mechanisms such as the relative influence of grazing pressure and climatic variability on species composition and grazing value, as discussed in Chapter two.

Overgrazing may be contributing to significant levels of soil erosion, as intervention agents suggest. Alternatively, low and possibly declining rainfall may be the major cause of a decrease in grazing quality, as claimed by the vast majority (28 out of 31) of herding households in Phahlamanoge and by most of those in Madibong and Soupiana. Since insufficient data exists to reach any firm conclusions, the rival hypotheses of officials and locals remain open to further investigation.

Taken together, the above findings suggest many Phahlamanoge residents possess a sophisticated and extensive knowledge of soil erosion extent, dynamism and causality on both arable and communal land that is largely supported, or difficult to refute, by data from other sources. The widely held official assumption that land users do not take action to combat soil erosion because they lack knowledge of the processes involved and the concomitant focus of the Landcare project on raising awareness therefore appears to be mistaken, at least in the case of Phahlamanoge.

Local knowledge of soil erosion is often similar to that of external agents, but there are significant differences. Key amongst these is the emphasis land users place on natural causes such as rainfall and soil type as opposed to the focus of external agents on human mismanagement. This emphasis on rainfall as opposed to anthropocentric or livestock-related factors is analogous to the non-equilibrium perspective on dryland dynamics (e.g. Behnke *et al.*, 1993). Local people do not lack knowledge of environmental processes; rather, they possess a different understanding to intervention agents of environmental processes and of how best to manage the land (cf. Vanclay, 1997). Conflicting prioritisations of soil erosion are discussed further below.

7.5.2 Prioritisation of the soil erosion problem

A second assumption of the Landcare project is that soil erosion is a major problem requiring immediate and effective action. Do local people share this perspective?

7.5.2.1 Prioritisation of soil erosion on arable land

Local claims of the widespread presence of soil erosion on arable land, discussed above, lend support to the assumption that soil erosion is a priority problem. Two-thirds of those households in Phahlamanoge that reported a loss of soil on their land claimed that it was a 'serious' or 'very serious' problem (see Table 7.5 below). The subjective severity ratings assigned by respondents were consistent with the reported prevalence of rills or gullies on their fields, corroborating the findings.

Table 7.5: Severity of soil loss on arable land in Phahlamanoge

Severity of soil loss	Number of households reporting level of soil loss
Not serious	20
Serious	16
Very serious	24

Source: Fieldwork (n=60)

Of the 40 households that reported loss of soil to be serious or very serious, just over half (21 households) stated that this was because a gully was cutting the field in two, making it difficult to plough. A further 17 households stated it was because they were losing part of the area of their field and sown seed. These findings suggest many local people may share official views that soil erosion is a significant problem. Indeed, land users in Phahlamanoge were not only aware of soil erosion processes; 42 of the 60 households (70%) that reported loss of soil on the land they cultivated also took action

to try to reduce the problem. Methods of soil conservation mentioned are tabulated below.

Table 7.6: Actions taken to combat soil loss in Phahlamanoge

Action taken	Number of households
Plant aloes or sisal	28
Build stone walls	10
Place branches in eroded area	10
Plough along contour	8
Improvised sand bags	2
Construct contour ridge	1

Source: Fieldwork (n=100)

A substantial proportion of the population have experimented with anti-erosion methods. The most frequently mentioned actions included planting aloes and sisal, construction of small stonewalls, placing branches across gullies and ploughing across the slope. One innovative respondent improvised sand bags from maize meal sacks filled with soil, a cheap yet potentially effective response that deserves further study. The cost of measures was, not surprisingly, of central importance to local people given a general lack of financial capital. These findings corroborate those of Spies (2000) who found from a survey in Phahlamanoge that planting sisal was considered the best method for reducing soil loss because it is freely available in the local environment, whereas use of old tyres was considered too expensive and vulnerable to theft.

Many respondents commented that their soil conservation measures were often washed away in heavy rains. The ineffectiveness of their technologies partly relates to limited financial capital and lack of access to agricultural extension officers possessing relevant advice or technologies. While the Phahlamanoge Landcare project has involved considerable investment in physical engineering works and has demonstrated the ability to reduce soil erosion in a large gully, less attention has been given to promoting cheap, effective technologies that can be replicated and used independently by land users.

A lack of appropriate technologies for soil conservation may also be linked to a lack of confidence amongst some local people in their own abilities to experiment and develop effective measures to reduce environmental change, at least partly a legacy of apartheid era interventions. For example, when land users were asked what they could do to tackle particular problems, they often turned the question around, asking me for advice. Such experiences suggest a local mindset that environmental knowledge is an exclusive

preserve of 'experts' (cf. Mahiri, 1998), yet this worldview is maladaptive in a context where extension officers often lack knowledge of suitable and affordable technologies and practices for conserving NRs (cf. LPDA representative, 2003, pers. comm.). Poor access to technically and financially feasible methods for preventing erosion is a critical factor undermining local conservation efforts. These results parallel the findings of Shackleton (2000) from neighbouring Manganeng where farmers were highly aware of processes of soil erosion but lacked the technical options to tackle the problem.

A third factor that might contribute to a lack of effective anti-erosion technologies is certain local perceptions that discourage investment in more effective but labour-intensive or expensive soil conservation techniques. Examples include perceptions that soil erosion is largely due to natural factors beyond land users' control, such as light soils and intense rainfall (the latter thought by some elderly respondents to have been previously controlled through rainmaking rituals), or due to human-induced processes that cannot be easily avoided such as deforestation for firewood. As a representative of the LPDA admitted, local people "accept it as it is, they see the erosion and they think its natural. To them its not as bad as to us as conservation people". High levels of poverty and food insecurity in Phahlamanoge were also reported to act as a disabling factor, sapping people's strength, encouraging a short-term focus on meeting immediate food needs (cf. Redclift, 1992), and thus further undermining intensive investment in soil conservation.

In a small number of cases where fields are borrowed or rented from others, weak land tenure acts as a further constraint on action to combat soil loss on arable land (see Chapter five). Those not owning a plot feel no need to invest their labour in effective conservation efforts because they are unlikely to reap the benefits in future.

A focus on what are perceived to be more pressing constraints on crop production, namely, lack of rainfall, witchweed and the limited area of land ploughed because of lack of financial capital (Chapter five) may also direct efforts away from intensive soil conservation. Even on an arable plot where a deep gully cut the land in two making ploughing expensive, lack of rain and witchweed were viewed as more important constraints on yields than soil erosion. This focus on weeds by local people and soil erosion by government has striking parallels with the Landcare programme in Australia.

As Curtis and Delacy (1997) observed, erosion-focused activities of Landcare groups appeared to be driven more by top-down normative assumptions and associated funding priorities than by the priorities of local people. This *a priori* focus on highly visible processes of soil erosion excludes proper consideration of local people's priorities, and practices and leads to neglect of other less visible processes of change that may also be constraining productivity, and that may also go unrecognised by local people, such as the low levels of soil fertility discussed in Chapter five.

The impact of soil losses on crop yields cannot be easily disentangled, either by farmers or scientists, from the influence of numerous other highly variable processes such as rainfall, labour inputs, soil fertility dynamics, or pest and disease attacks, as highlighted in Chapter two. The absence of any reports of drastic reductions in soil depth on fields or the abandonment of fields due to erosion do nevertheless imply that erosion rates have not substantially reduced soil depths or already low nutrient levels to the point where yields are noticeably impacted. Secondary data also suggest that soils on the main cultivable area in Phahlamanoge are relatively deep and hence may be able to resist many years of erosion before productivity is impaired (SIRI, 1989). Soil samples taken from fields in Phahlamanoge in this research indicated no significant differences between mean total Nitrogen, Phosphorous or Potassium levels in the top and bottom portions of plots, indicating that the soil erosion reported on many fields may not be significantly affecting already low nutrient stocks. For many arable plots in Phahlamanoge, alternative constraints such as low rainfall, witchweed infestation and ability to plough may therefore represent more immediate constraints on productivity than soil erosion, as land users assert. Low soil fertility, a factor not widely recognised by local people, may also undermine yields in years when land users are able to afford to plough and rain is sufficiently abundant.

7.5.2.2 Prioritisation of soil erosion on communal land

On communal land, with the exception of the Landcare project activities, few actions to reduce soil erosion were reported beyond the occasional use of quick and easy methods in badly eroded areas such as the placing of branches or sisal leaves in gullies or on bare soil. A lack of appropriate regulatory or incentive structures appears to have undermined conservation efforts, as claimed by some intervention agents (cf. Aliber, 2002; Curtis *et al.*, 2000). Land users identified a lack of ownership and hence lack of

motivation to organise or take responsibility for action on common lands. A member of the Phahlamanoge livestock organisation stated that he believed cattle movements cause tracks that exacerbate soil loss, but he claimed that this was impossible to control because the community is fragmented and people fail to cooperate. While conflict exists and the chief's influence is limited, he felt there can be no cooperation for communal land management.

The 'institutional vacuum' surrounding common property NR management may be exacerbated by intra-community tensions and divergent interests in the use of the commons, for example between wealthy shop owners little dependent on land use to meet livelihood needs, poor households that struggle to cultivate to contribute to subsistence needs and owners of large cattle herds (cf. Kamara *et al.*, 2002; Ainslie, 1999). A widespread belief that political freedom and democracy imply an unbounded freedom in which people are entitled to do as they wish may also contribute to a lack of control over communal areas (cf. Twine, 2002). As a committee member of the Phahlamanoge livestock organisation stated: "At first we were under control of the white man, now everybody is for himself".

Landcare has managed to establish a competent local committee to coordinate project activities in Phahlamanoge by working with the capable local SANCO leader (whose activities and competences were highlighted in the previous chapter), but this organisation has little influence on land use and management outside the project site. 'Community' scale NR management has therefore yet to be realised. Use of simple measures to trap silt and reduce runoff at the head of gullies may be more effective than using the same measures down stream on individual fields where water flow is faster and in greater volume. However, unless benefits to individual downstream landholders can be demonstrated from acting upstream on gullies on communal land, it seems unlikely that people will take more effective action in these areas in the near future.

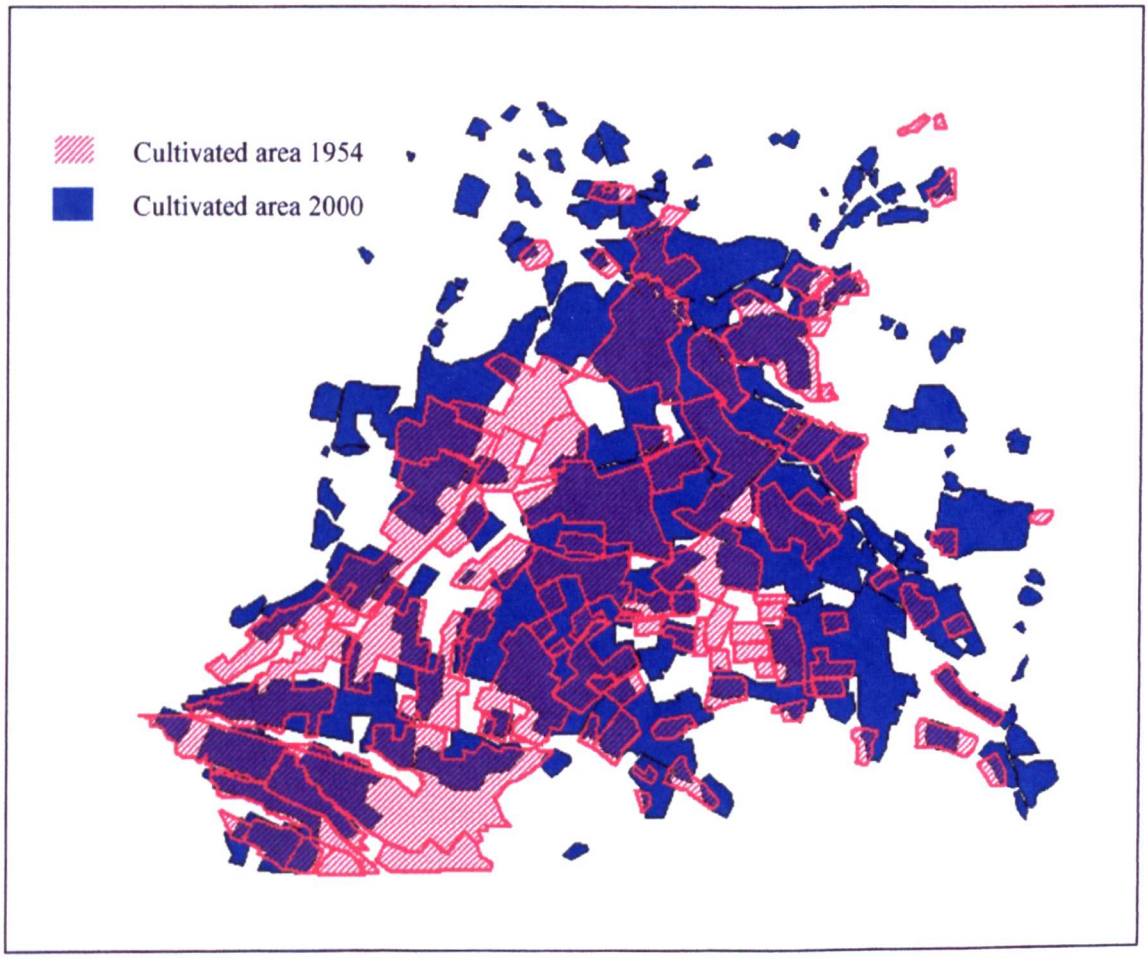
7.5.3 Broader constraints on investment in soil conservation

In the broader livelihoods context in which decision-making processes are embedded, investment of a household's resources in effective NR conservation, on communal or arable land, may also be discouraged by visions of the future. The focus of many rural residents on formal employment as opposed to land use as the primary means of

generating a livelihood, and widely held perceptions of a risky climate and possibly worsening rainfall trends discourage substantial investment in land conservation and management (cf. Batterbury, 2001; Curtis *et al.*, 2000; Maltitz & Evans, 1998), except in circumstances where there is the potential to derive a wage (Ainslie, 1999). The latter include irrigated vegetable projects or villages with higher agricultural potential. In Soupiana where rainfall is higher, the balance of economic costs of investment in land management against the potential benefits are more favourable. This is indicated by extensive construction of terraces and investment by those who possess sufficient financial capital in genetically engineered or hybrid grain.

Changes in aspirations and climate may also be discouraging involvement in land use *per se* as a livelihood opportunity. Analysis of aerial photographs indicates that the total area of fields being cultivated in Phahlamanoge in 2000, as indicated by lack of bush encroachment and maintenance of distinct protective boundary hedges, has declined by 25% since 1954 (see Figure 7.5 below).

Figure 7.5: Map of cultivated arable land in Phahlamanoge in 1954 and 2000



Since there was no major drought event in 2000 reported by local people that could have biased the results, this finding supports widely held perceptions that cultivation of arable land is declining. Changes in cultivation were not accurately discernable on photographs of Soupiana and Madibong. In Madibong many respondents reported a shift from cultivation of distant fields to cultivation in much smaller homestead plots in response to poor returns to efforts in remote fields, perceived to be largely the result of a decline in rainfall.

In summary, the above findings on the prioritisation of the soil erosion problem suggest that while many land users recognise the detrimental impact of soil erosion, especially on their ability to plough and produce crops, and while many implement simple methods on their fields to reduce soil loss, institutional constraints (particularly on common land), local perceptions and limited asset endowments and capabilities act to discourage more intensive investment in soil conservation on both arable and common land. Local people do not prioritise soil erosion, and the need to combat it effectively, as highly as do officials. Often this is for reasons based on their experience, yet these reasons are not fully understood by external agents.

7.5.4 The use and abuse of economic incentives for diverse ends

A third problem with the Landcare project is the forms of economic incentive and disincentive offered. The dominant framing of soil erosion in Sekhukhune assumes that poverty leads to high levels of dependence on NRs. In combination with high population pressure, this results in the overexploitation of such resources, especially firewood, to meet short-term survival needs. Hence, there is an identified need to increase incomes. Many people in the study villages lacked formal employment and were largely dependent on welfare payments and land use strategies to make a living (see Chapter five). Local people often shared official views that deforestation was related to high levels of poverty and a lack of affordable alternative fuel supplies. The Landcare programme literature suggests that interventions should aim to link to local people's need for income by identifying alternative land uses and creating businesses based on profitable utilisation of NRs (e.g. Landcare, 2001). However, at Phahlamanoge this approach seems to have been largely neglected, at least until recently.

Although cultural and moral values may be as important as economic considerations in determining what are acceptable means of production, as well as what are desirable ends (e.g. Tacconi, 2000), in Sekhukhune District the prime driver of action was often economic. Lack of money was the most frequently reported problem for living happily and healthily in Phahlamanoge by Landcare workers, unsurprising given the high levels of poverty and the need for cash to meet livelihood needs. The focus on employment and income generation as a top priority by local respondents, noted previously, is corroborated by a representative of the Ministry of Foreign Affairs of Finland (MFAF) who reported that a joint MFAF/LPDA project which set out to focus on conservation activities and agroforestry was forced to change to a focus on income-generation due to a lack of interest from local people.

The importance of ensuring local people receive a material benefit from the Landcare project was realised at the start (Spies, 2000), but it is not clear how local people were predicted to benefit from the project's conservation efforts, besides through direct payment of wages or through hire of local assets such as tractors and trucks. On the other hand, offsite beneficiaries were foreseen. By reducing soil erosion from part of a heavily eroded micro-catchment thought to contribute significant sediment load to the Olifants River, it was hoped the project would contribute to reducing siltation of dams used by numerous downstream water users for agricultural irrigation schemes, mines and other purposes (representative of the LPDA, pers. comm., 2003). The project therefore appears to have attempted to link itself to a number of different aims and interest groups, including local biodiversity conservation, local job creation, and reduction of silt load impacting on offsite users, perhaps at least partly in an effort to attract funding from different donors. These diverse aims are not always compatible. For example, Spies (2000) states that most of the work at Phahlamanoge was organised to provide employment for local people, hence the cheapest available methods were not necessarily used. Increasing local employment generation may therefore increase project costs, reducing the amount of funds available for the physical protection of the environment. The crucial question is whether or not the additional employment generated is considered to be a cost-effective use of resources relative to other potential investments such as construction of more extensive anti-erosion measures.

Goals of poverty reduction and improved environmental management may also clash due to the direct payment approach used to motivate involvement in the project. Spies (2000) argued that the government should not undertake conservation work because funds are limited and projects implemented would be viewed as government-owned and might not be maintained by local people as a result. Yet he suggests that neither can poor rural residents be expected to complete such work unless they receive some short-term gain from involvement. In line with this argument, a representative of the provincial Landcare team in the LPDA argued that temporary provision of a minimal wage - sufficient to buy food and household essentials - is necessary to encourage participation from poor people who would not otherwise be willing or able to become involved (cf. Hudson, 1991).

Many social researchers hold a different view, arguing that paying people to look after local NRs leads to increased dependency or a 'receiver mentality', reinforcing the perception that taking care of the environment is the responsibility of government whilst diminishing land user's own sense of ownership of the problem and of the resources themselves (cf. representative of the LPDA, pers. comm., 2003; Aliber, 2002; Ainslie, 1999; von Maltitz & Evans, 1998; Hagmann, 1997; IIED, 1994). Programmes like Landcare can therefore end up alienating people from their resources and undermining the very conservation ethic they aim to inculcate. To take the logic of the argument further, such programmes might even lead people to exacerbate erosion, since it becomes viewed as an asset for attracting much-needed employment opportunities. However, there was no evidence to support such activities from Phahlamanoge.

Given limited use of the project site prior to the existence of the Landcare project and income poverty, it seems likely that without the provision of payment local people would not have taken action to combat high rates of soil loss at that particular location. Yet as this 'empowerment' - this motivation to self-organise and act - is dependent on receiving a wage from government, the longevity of the process remains open to question. Nevertheless, a majority of current Landcare workers interviewed claimed they understood that the project aimed to protect the environment and that this was needed to protect the health of the 'community', perceived the environmental benefits (most frequently reported as reducing soil erosion followed by protection of trees) and would even continue working on the project if payment were to cease. This finding

substantiates Spies's (1995) claim that although at first people did not understand the project and saw it as a government-led initiative offering an income source, local understanding and pride in it developed as results were realised.

Such positive responses from Landcare workers may have been motivated by a belief that this was the 'correct', desired answer. It should also be borne in mind that future intentions, stated in good faith, may be subject to change once the reality of undertaking hard physical labour without immediate remuneration is experienced. Whether or not present in the community to a similar extent prior to the project, and whether or not strengthened by participation in the project, there does appear to be a strong environmental ethic amongst some members. Seven out of 20 interviewees expressed a desire to keep working for no payment in order to protect NRs. A qualification is again necessary, however, since the project could be expected to be self-selecting to a certain extent for such members. Ideally, studies pre- and post- Landcare intervention would be necessary to ascertain impacts on local conceptions of environment and on perceived needs for its protection and management.

The argument against direct payment might dissuade use of this form of incentive for conservation-type projects. Indeed, EDA Trust (Aliber, 2002) and representatives of GTZ working with the LPDA (pers. comm., 2002) argue that motivation should come from farmers and from short-term returns generated by the project itself. The study of soil conservation projects does not give a clear picture of the usefulness or otherwise of direct incentives, although a focus on interventions that generate their own productive returns is often argued to be the ideal (e.g. Hudson, 1991). This form of approach would be in keeping with the Landcare focus on sustainable utilization of NRs. Yet clarity of objectives is important. In instances where the primary 'beneficiaries' are off-site and downstream, a direct payment approach might be necessary and justifiable since local people would be essentially providing a conservation service for downstream stakeholders. The priorities of the Landcare project are unclear and consequently its approach is confused, combining both direct payment and, more recently, attempts to establish income-generation activities that might ensure the project's survival once government funds cease. Thus while the project is reducing soil loss in a highly visible gully and poverty amongst poor residents of Phahlamanoge over the short term, this may be conflicting with the government-driven focus on soil conservation in the area as

a whole. Moreover, in the long term, both poverty reduction and environmental conservation goals seem unlikely to be met if the project remains dependent on government financing.

7.6 Discussion: The criticality of appropriate technology

In the dominant environmental change narrative in Sekhukhune, as in the Landcare literature, attention is focused on the most highly visible phenomenon of soil erosion. This is probably due to a historical emphasis on this most easily observed form of environmental change, in conjunction with a lack of consultation with land users about their land use priorities. Whilst efforts are underway to retrain extension officers in participatory methodologies, these are still at an early stage. Consequently, many extension agents probably continue to promote a 'traditional' one-way knowledge transfer approach, either out of ignorance of alternatives or out of a wish to defend their expert status, which by definition requires that land users must continue to be viewed as inexpert. A defensive mindset may also result in unwillingness to admit mistakes, loss of opportunities for learning (Argyis, 2003; Horton & MacKay, 2003), and ultimately a search for problems, for example of soil erosion, to match available 'solutions', rather than attempts to better understand complex and dynamic realities.

Limited anecdotal evidence for the existence of these negative aspects of professionalism comes from interviews with NGO and government representatives. One NGO representative argued that the form of education given to extension officers has served to devalue local knowledge whilst a LPDA representative suggested that this education has led officers to see land as 'the property of the government', something that they are responsible for 'looking after'. Some extension officers were also said to have resisted adoption of a more participatory mode of interaction with land users. The attitudes of government employees, not only land users, may therefore need to be better understood and where necessary addressed if environmental management is to be improved, although as Argyis (2003) states, this is often no easy task.

This research has indicated that officials tend to assume that lack of awareness, poverty and population pressure are the main drivers of soil erosion and related processes of deforestation and loss of grass cover. The major programme implemented based on this understanding, Landcare, focuses predominately on raising awareness and reducing

poverty. In Phahlamanoge local people shared with officials the perspective that poverty and associated dependence on local wood supplies for fuel may be driving deforestation, but they disagreed about other causes of environmental change. Nevertheless, they possessed substantial knowledge of such processes. The Landcare project focus on educating people of environmental change therefore appears to be misplaced. As Curtis *et al.* (2000) observe, in areas where environmental productivity is low and practices are economically problematic, moral persuasion to bring about widespread environmental stewardship is optimistic. This research has shown that residents of the three study villages do not tend to view soil erosion as a top priority for action, a perspective that is at least partially supported by analysis of data from other sources. There was no evidence that high levels of poverty were driving a vicious cycle of degradation and deepening poverty. The Phahlamanoge Landcare project used economic incentives to try to encourage people to reduce soil erosion at the project site, a logical approach, yet the use of direct payment was found to be problematic because it tends to undermine the achievement of long term environmental and poverty alleviation goals.

The advantages and disadvantages of direct payment and alternative interventions for encouraging smallholder adoption of environmental conservation technologies in environments like Sekhukhune are listed in Table 7.7 below.

Table 7.7: Interventions for encouraging environmental conservation

Incentive	Advantages	Disadvantages
Positive financial incentives e.g. Landcare direct payment, subsidised fertilisers	Politically popular; targets specific activities	High cost; potential over-stimulation of activity; uncertain effects
Legal liability/'polluter-pays' principle e.g. duty of environmental care; natural resource damage assessment	Can provide strong incentive if legal recognition of liability and enforcement are high	High costs, especially in poorly policed and remote former homeland areas; estimating costs of damage may be extremely difficult; open to corruption
Voluntary programmes e.g. Landcare education programme	Relatively low cost	Uncertain participation and effects; presumes viable technologies are available
Support for development of environmental conservation technology industry e.g. fund research and development, provide physical infrastructure	Potentially applicable over large areas; can generate environmental benefits in circumstances where direct subsidies would not be warranted; can improve the leverage of public subsidies; if profitable then few problems encouraging adoption; added benefits from job creation; relatively low cost	Time lags of research and development;

Source: Adapted from Pannell, 2004.

Problems of incentives for environmental technology adoption can ultimately be circumvented if it is possible to develop management systems that are inherently profitable (Pannell, 2004). As the woodlot case study at the beginning of the chapter indicated, while there may be room to improve efficiency and equitability through redesign of procedures and rules, if the technology used to provide environmental protection generates limited direct benefits then the project is unlikely to achieve longevity. It may therefore be more beneficial to invest in the research and development of profitable land use management practices and technologies, challenging as this may be, rather than in measures to encourage adoption of unprofitable systems (cf. Pannell, 2004; Tacconi, 2000).

Increased research, development and demonstration of alternative 'sustainable production technologies' (Turner, 2000) that produce relatively immediate, onsite, substantial and certain positive consequences, require affordable inputs, minimise foregone benefits such as loss of land, avoid increasing risk and are socially acceptable is arguably critical (cf. Gabre-Madhin & Haggblade, 2004; Pannell, 2004; Hudson, 1991). The research and development of such technologies must ideally proceed in an iterative and interactive manner, involving close two-way communication between land users and scientists so that techniques can be based on land users' perceptions and priorities and tested in, and tailored to, specific sites and situations (cf. Cary *et al.*, 2002; Hagmann, 1997; Richards, 1985).

The focus of the Landcare project on a highly eroded gully system makes generating income from land management extremely difficult. A re-targeting of efforts towards less eroded land in the village that is already being used for production of useful crops (cf. UN, 1994) and a shift in focus from expensive anti-erosion technologies to much greater experimentation with and promotion of simpler and cheaper management techniques such as grass strips and mulches is arguably desirable. New and affordable technologies for enhancing both productivity and environmental management would clearly motivate individual action on arable land where tenure is secure. They would also contribute to enhancing the preconditions for collective action on communal land, especially if they could help to demonstrate to land users the benefits of acting upstream on common land to reduce or prevent soil loss effecting downstream arable plots, although here institutional interventions will also be important. An approach of

allocating erosion gullies to individuals for production, used in Lesotho (Turner, 2001), may be worth testing in areas like Sekhukhune as a means of generating individual incentives to invest in the land.

Investment in the creation or strengthening of community-based institutions may also be important to complement and coordinate the use of appropriate technologies within specific watersheds and communal areas (Aliber, 2002). The Landcare project in Phahlamanoge has focused on physical works to the neglect of such measures and consequently its spatial impact has been limited. It could seek to build capacity to manage NRs in areas outside the current project site, particularly those on common lands where people seem unwilling to act individually, by either attempting to build on local institutions such as SANCO or, if local politics and power struggles prove problematic, attempting to establish a new platform. However, both processes would be difficult and time-consuming and the latter could potentially undermine existing institutions (e.g. Vedeld, 2002).

There is a clear requirement for the devolution of legal powers of enforcement to local people in Phahlamanoge to enable them to establish and enforce, with appropriate support, by-laws on the use of tree and bush resources. Outsiders used to have to gain written permission to cut wood in the area, especially if collecting large loads with a vehicle, but this rule is no longer abided and the two local chiefs claimed they are unable to control outsider's use of local wood resources. When asked if they would like to prevent outsiders from cutting wood in Phahlamanoge, 60 respondents stated that they would like to do so. Approximately two-thirds of respondents (41 households) felt responsibility for enforcing such a ban should rest with the chief, while others suggested it should fall to the government or a combination of the chief and government. Given the lack of capacity and ability to enforce rules admitted by the chiefs, there is a clear demand, at least in Phahlamanoge, for government assistance to control harvesting of wood. Yet it is unlikely that institutional or legal changes would be sufficient to bring about sustainable management of wood resources. Rather, they must form part of an integrated approach that seeks to provide new technologies and livelihood options in order to reduce poverty and the associated dependency on local wood for fuel (cf. Twine, 2002; Twine & Siphugu, 2002).

Some Phahlamanoge residents, including the chief, argued that provision of electricity might lead to a reduced dependence on wood for fuel and hence reduced rates of deforestation and soil erosion. Electricity was available to people in Madibong but, due to poverty, the majority could not afford either the electricity itself, or the purchase of electric appliances; some individuals also voiced a preference for cooking on wood fires as opposed to gas or electricity (cf. Crookes *et al.*, 2000). Provision of electricity is clearly not sufficient to reduce deforestation where people lack the means to make effective use of this power source. Possibilities for enhanced management and controlled coppicing of bush and woodland, use of more efficient stoves, access to alternative sources of firewood such as nearby game reserves and 'commercial' farms, or subsidised provision of alternative energy sources such as solar cells all demand more serious consideration (Twine, 2002; Fakir & Cooper, 1995; Shackleton, 1994).

Comments from the Australian literature suggest a lack of attention by Landcare in South Africa to previous experience. As Barr & Cary (1992:284-285) state:

> "Perhaps our greatest concern is with a widespread belief that the most important task to achieve a more sustainable agriculture is the raising of community awareness and changing farmers' attitudes to their land... What is required are practical and profitable solutions, rather than a reliance on evangelical calls to better farming and changing community attitudes" (cf. Cary *et al.*, 2002; Davenport, 1997).

A neglect of local knowledge, practices and priorities, a lack of provision of appropriate and economically attractive techniques for land users to control soil erosion and boost productivity, and a lack of attention to albeit complex problems of community organisation and collective action on communal land, has resulted in the Landcare project's impact on soil erosion being isolated to one small remote area of the village. Such problems, especially economic efficacy, are common in soil conservation projects (e.g. Shackleton, 2000; Hudson, 1991; Blaikie, 1985) as well as in agroforestry projects (Pannell, 2004) and interventions for soil fertility enhancement (e.g. Gabre-Madhin & Haggblade, 2004; Giller, 2002). Enthusiasm for 'sustainable production technologies' (Turner, 2000) needs to be translated into rigorous evidence on the profitability of specific technologies and their suitability to different locations.

The balance of technological and socio-psychological elements in any intervention is a delicate one that requires adjustment to local circumstances and to the aims (e.g. to benefit offsite or onsite users) of a specific intervention. There may, however, be an

inherent bias towards educational approaches due to overriding financial considerations. As Tacconi (2000:95) states:

> "Due to the scarcity of resources available at the international and national levels, it is possible and unfortunate that the emphasis paid to changing local people's values (in the hope that they will endorse the agenda of the proponents of the specific conservation initiative) will continue to be much greater than that devoted to generating actual net benefits for the local people".

Even if advances in sustainable production technologies and complementary institutional innovations are achieved, they may be insufficient to maintain land-based livelihoods in certain dryland areas. If land use is on the decline in parts of Sekhukhune District due to changing aspirations and vulnerabilities, as local people's testimony and aerial photographic evidence suggest, and if this trend continues, then investment in enhancing NR conservation and productivity may become increasingly less attractive and effective. A shift in government funding priorities may be facilitated by neoliberal budgetary constraints and the existence of many other worthy investment targets, such as job creation, training provision and enhanced welfare payments. Low potential dryland areas may thus become more valued for their ecosystem services or for their provision of a form of retirement farming to a stable aged population of land managers than for their production potential (cf. Cary *et al.*, 2002), or they may become targeted for conservation in order to reduce their contribution to off-site silt load rather than to enhance or sustain local production.

Tough policy decisions are therefore required, within a context of considerable uncertainty, about inter-generational transfer of assets and withdrawing support for or discouraging certain types of land-based activities in specific areas (cf. Cary *et al.*, 2002). Such decisions must include reanalysing the goals of the Landcare programme and deciding who are the beneficiaries and what is the priority goal in any specific intervention – job creation or environmental protection. Where the former is more highly valued by local people than the latter, productive potential of the land is limited, and no strong arguments for conservation in terms of offsite benefits exist, then a purer form of enterprise development may be required that does not relate poverty alleviation to use of NRs. Yet adherence to a precautionary approach, as advocated in situations of limited scientific understanding by the United Nations Conference on Environment and Development (United Nations, 1992), would still promote the conservation of diverse

components of the NR base in order to keep open possible future use options and maintain life support functions for present and future populations (Tacconi, 2000).

Value-laden and fundamentally political choices about land use and environmental conservation priorities and the conceptualisation of problems should ideally be made only after an open and wide-ranging debate has been undertaken with representatives of all stakeholder groups. Such a debate must include consideration of broad questions of land redistribution and poverty alleviation as well as narrower questions of land management and examination of the land use and livelihood priorities of local people, the priorities of government within a specific locality, and a review of the available evidence on environmental, socio-economic and demographic dynamics. Mechanisms to enable diverse onsite and offsite interests to coalesce and/or resolve conflicts need to be designed on a case by case basis (Borrini-Feyerabend, 1996). However, power inequalities, including the political importance of downstream water users such as commercial agriculture and mines, may continue to cause problems and consensus may not be an outcome (Tacconi, 2000). Problems of defensive attitudes and negative aspects of professionalism (cf. Argyis, 2003; Chambers, 1986) may also inhibit the opportunities for a more equal exchange between 'experts' and locals.

A lack of reliable long-term data on variables such as livestock holdings, arable production and rainfall fundamentally constrains understanding of livelihood and environmental trajectories in Sekhukhune, and as Lahiff (1997) notes, in Limpopo Province more broadly. The socio-economic and biophysical complexities and uncertainties revealed by this research must be fully acknowledged in any public debate. As Warren *et al.* (2003:452) argue:

> "the debate might begin with an admission by the scientific community that there are still very many uncertainties in the argument about the importance of soil conservation, and that the farmers' indifference, at least to its long-term effects is almost as justifiable on the scientific evidence as is the agronomists' and policy-makers' anxiety".

A more open debate might include commissioning site-specific research to help to reduce some of these uncertainties and conflicts in understanding. Potentially useful studies include long-term investigation of rangeland composition and quality and soil erosion under different management and rainfall regimes, calibration of soil nutrient transfer functions for robust nutrient budget modelling, measurement of physical and

biological properties of soils and/or small-scale measurements of soil loss and its impacts on soil depth and productivity. However, even with reforms, it is doubtful whether the whole project-based approach to resource conservation and rural development in South Africa, of which Landcare represents a key element, will be able to bring about desired environment and livelihood changes on a landscape scale and at a sufficient pace to match demographic growth due to the limits on state funding imposed by the government's neoliberal economic policy (analysed in Chapter four).

7.7 Summary

This chapter has analysed environmental narratives and interventions in Sekhukhune and emphasised the critical role of appropriate technologies in supporting livelihoods that are both productive and more environmentally sustainable. It has also highlighted the difficulties in trying to understand complex environmental dynamics in a dryland region like Sekhukhune District. Some of the implications of these findings include a need for greater involvement of local people in identifying problems and defining priorities and a need for increased investment in the development of efficient production technologies and practices and in the intensive, site-specific investigation and monitoring of environmental change. More commitment from national government and donor organisations to participatory rural development interventions and public sector research is essential to redress apartheid inequalities and develop new opportunities for more profitable and environmentally friendly production.

Chapter 8: Conclusion: Livelihood enhancement in the new South Africa

8.1 Introduction

The aim of this research has been to examine the changing livelihood-environment links and opportunities for enhancing livelihoods in the poverty-stricken dryland region of Sekhukhune District. Individual chapters have presented and discussed the research findings in considerable depth. This chapter concludes the thesis by summarising and integrating a selection of the most pertinent findings on livelihood-environment dynamics in Sekhukhune under the three research objectives. Some important implications for practical intervention to enhance livelihoods in Sekhukhune and in rural South Africa more generally, and for further research, are reiterated, and broader academic and methodological implications of the research are also identified.

8.2 Summary of main findings

The objectives of this research were threefold:

1) To identify and critically evaluate narratives of development and land degradation in South Africa and their linkages to international directives;

2) To examine the dimensions and dynamics of contemporary livelihoods in the study area, with special regard to the contribution of land-based practices to broader livelihood portfolios and to local understandings of land use, land management and environmental change;

3) To investigate the justification for and efficacy of interventions grounded in dominant environment-development narratives in enhancing livelihoods and changing environmental processes.

To address Objective one, the historical development of two key overarching South African environment-development narratives, thought to exert considerable influence over interventions to redress the development and environment legacies of apartheid, were analysed: Neoliberalism and soil erosion. Adherence to the globally dominant neoliberal macroeconomic narrative in South Africa has resulted in fiscal constraints and pressure to accelerate economic growth, while raising concerns that goals of wealth

redistribution and poverty alleviation might be marginalized as interventions focused on backing 'winners'. Problems identified with the South African soil erosion narrative, which is both historically rooted in South Africa and in non-African historical events such as the Dust Bowl in America, and supported by contemporary institutions such as the Convention to Combat Desertification (UN, 1994), included its anthropogenic focus and its tendency to concentrate on proximal causes of soil loss such as land user ignorance to the neglect of more distal causes. The arrogance of external 'experts' led to many mistaken interventions in the apartheid era (due to neglect of local knowledge and important variables; e.g. Clarke, 2002) and continues to threaten the effectiveness of interventions today, although recent South African documentation and expansion of participatory training suggests this may be beginning to change. This research attempted to link micro-scale circumstances in Sekhukhune to these broad scale policy narratives, tracing the structuring impact these exert over local livelihoods and interventions. For example, the national economy and formal job market, fundamentally shaped by GEAR, was found to hugely influence the tightly linked and dependent - through migration-related financial capital flows critical for many purposes including establishing and sustaining local businesses - settlement-level livelihood system.

To address Objective two, a thorough analysis was undertaken of contemporary livelihood strategies in three settlements in Sekhukhune. While the vast majority of households in the study settlements had access to arable land, few produced enough food to survive until the next harvest. Low and unreliable rainfall, parasitic weeds, stalk borers, low soil fertility and the cost of tractor hire all placed severe constraints on production. For the majority of households effective utilisation of NRs was constrained primarily by a lack of financial capital. Rights to utilise *primary* capitals did not necessarily imply that people had the *secondary* capitals, or capabilities, necessary to use them productively. The present lack of job opportunities locally and nationally meant pensions were often the key contemporary income source. Houses without employed members or access to government grants had least financial capital and often also fewest assets and least ability to mobilise them effectively. Yet a small number of entrepreneurs, often ex-migrant workers, were found to have had considerable success in autonomously developing enterprises that generated significant income streams and in some instances also employed other poor people from the community.

While youth expressed diverse aspirations with substantial numbers of respondents interested in working in urban areas also wanting to return to rural areas and even farm in later life, a 'pressure of material needs' may be increasingly hard to resist by young people as images of modernity confront them on trips to urban areas or through television. Many Sekhukhune residents prioritise formal employment as a means of escaping poverty, understandable given the central importance of financial capital to livelihoods, but they are very poorly equipped to capture jobs and few employment opportunities exist in the recently 'globalised' and highly competitive domestic economy. Many respondents felt that government should provide them with services and employment opportunities, but government has contrasting aims; it is seeking to encourage rural residents to become more active in generating their own opportunities and taking responsibility for their own development within a broader context of fiscal constraints on government spending and efficiency concerns linked to neoliberal policy. Yet government is struggling to tackle the 'dependency syndrome' and facilitate job creation. Democracy is perceived to have failed to live up to high expectations of jobs and increased access to services and infrastructure and is seen by some as a destructive force, introducing individual rights but no responsibilities. Democracy arguably remains at risk in South Africa as a result (Lodge, 2002).

Many local people were found to possess a sophisticated understanding of environmental processes such as soil erosion and deforestation, although their perceptions of livestock impact differed markedly to that of many officials, more closely reflecting disequilibrium notions of rangeland ecosystem functioning, and many did not attend to problems of low soil fertility. This research focused on soil erosion because it was deemed the largest environmental problem in the district. Local people possessed considerable awareness of soil erosion processes and many implemented simple measures to attempt to reduce soil loss, but for logical reasons, in some instances supported by analysis of biophysical data, they did not view it as a top priority for action. Economic considerations (again reiterating the importance of financial capital), a lack of appropriate technologies, and, especially on 'open access' land, an absence of effective institutional arrangements were found to be critical constraints on land user participation in more intensive and effective soil conservation practices.

To address Objective three, interventions in Sekhukhune for both poverty alleviation and enhanced land management were investigated. Those focused on poverty alleviation are considered first. While the general status of livelihoods in the drier areas of Phahlamanoge and Madibong appeared bleak, some individuals and organisations were found to have achieved considerable 'success' in capturing donor funding for income generation projects and/or in generating returns from use of local NRs and skills. The dominant form of intervention in Sekhukhune implemented by external agents was the group-based income-generation project, designed to benefit a greater number of people than would individually targeted efforts. These were supposed to be implemented in a demand-led participatory fashion in order to avoid past problems such as 'dependency syndrome', but the micro-scale dynamics of participation were often complex and ambiguous. Case study evidence indicated the critical role played by specific individuals, referred to as 'development brokers', who possessed specific kinds of social and human capital, in organising others and capturing the necessary opportunities and resources to initiate income-generation projects within particular settlements.

The major intervention in the region for enhanced land management was the Landcare project in Phahlamanoge, although it aims were multiple (including onsite and offsite beneficiaries and poverty alleviation), somewhat contradictory and in need of prioritisation. The Landcare intervention was motivated by a belief that soil erosion in the area is an urgent problem being driven by a lack of environmental awareness amongst the local population and by poverty. Yet this research indicated that while deforestation, driven by poverty and dependence on local wood for fuel, is perceived by local people to be a problem, many locals had substantial knowledge of environmental processes and did not perceive soil erosion prevention as a priority. There was no evidence that high levels of poverty were driving a vicious cycle of degradation and deepening poverty. The fundamental question of whether or not soil erosion is a problem demanding government action is a difficult one to answer because it impacts on different people in different places in different ways. Biophysical science struggles to assist with addressing this question because the available historical evidence is limited and sometimes contradictory and collection of new evidence on contemporary states and dynamics requires highly intensive, and therefore expensive and time-consuming, site-specific research.

8.3 Implications for intervention in Sekhukhune and beyond

The implications of many of the findings from this research for intervention in Sekhukhune were discussed in the respective chapters where they were described. This section brings together some of the more significant implications of this research and adds value by identifying some specific proposals for Sekhukhune that may also be relevant to other regions with similar biophysical and socio-economic circumstances.

This thesis has argued that increased attention and funding should be given to the development of specific and appropriate technologies, practices and institutional innovations to address the, albeit partly socially manufactured (due to unequal power relations between and within countries), problems of poverty and environmental change in particular localities such as Sekhukhune District. An important and concrete outcome of this research is a list of specific interventions that are suggested as means for reducing poverty and/or vulnerability in Sekhukhune and enhancing peoples' adaptive strategies so that they can lead more secure, prosperous and environmentally sustainable livelihoods (see Table 8.1 overleaf).

The proposals in Table 8.1 are not limited to land-based livelihoods. In Sekhukhune District, as in many other poor and arid areas of developing countries, it is possible that the conditions are such that agriculture cannot be a viable driver for pro-poor economic growth (Dorward *et al.*, 2004). Indeed, livelihoods based on agriculture in Sekhukhune have for a long time been highly marginal in Sekhukhune (cf. Delius, 1996), although there are important exceptions including higher rainfall areas such as Soupiana and the intensive efforts of certain entrepreneurs. The latter demonstrate that whilst options for improving productivity and reducing risk in land use practices are fundamentally constrained by limited supplies of surface and ground water in many areas, it is possible to overcome these obstacles using innovative technologies, practices or just sheer hard work in some instances. However, if regulations on water extraction and payment for water used for commercial purposes are more strictly enforced in future, the viability of these operations may be tested. Moreover, the extent to which these schemes are environmentally sustainable, given potential problems of siltation and salinisation, is unknown. What is certain is that the current scarcity of water in Sekhukhune limits the development of land-based initiatives based on the exploitation of this resource. Non land-based initiatives may therefore deserve increased consideration. Yet both land-

Table 8.1: Proposals for interventions to enhance livelihoods and environment in Sekhukhune

Intervention aim	Description	Potential problems
Enhanced financial management of small businesses	Allocate experienced mentors from commercial enterprises to small businesses to improve management and build networks with suppliers and markets (BUEP, 2003).	Commercial self-interest may undermine approach
Enhanced tree cover	Distribution of tree seedlings and/or support to local nurseries to encourage tree planting	Irrigation requirements of seedlings; theft
Improved water harvesting for vegetable production	Collection of water from roofs using gutters and tanks and/or diversion of yard runoff water to planting pits to enable vegetable gardens within homestead compounds	Lack of rain; cost of materials
Reduced deforestation	Distribution of subsidised fuel and energy saving devices; devolve legal powers and build capacity at local level to manage woodland use and sell permits to outsiders	Cost; culture
Increased arable productivity	Subsidised inputs; research and development of farming practices, crops and technologies based on local and scientific knowledge e.g. prickly pear for own consumption, fodder, saleable jam; 'conservation tillage' methods; irrigation schemes for cash crops (e.g. JICA proposals; Department of Agriculture activities); Marula for own consumption, sale of nuts/oil/beer; integrated pest management/push-pull intercropping methods to reduce stemborer & witchweed; use of within field variability in soil/water/weeds	All marketing ventures are constrained by affordable access to markets beyond the village level where expendable income is very limited; problems of commitment associated with length of time investment is required prior to realisation of returns; scale of irrigation constrained by limited water supplies; sustainability concerns regarding salinisation; cost
Cheap, quality draught power for arable production	Offer affordable access to donkeys or subsidised tractor services and promote greater competition between service providers to ensure good quality service (cf. GTZ rep., pers. comm., 2003; Lahiff, 1997)	Livestock theft; limited dry season grazing; cultural values; perceptions of draught power as out-dated and of donkeys as environmentally destructive
Improved access to financial inputs	Institutional innovations for quicker/easier access to grants; credit/savings groups; public-private partnership contracts for commercial arable production	Limited administrative/financial capacity; corruption; costs; lack of water; exploitation of poor by private sector; land access
Reclaim erosion gullies	Allocate gullies on common land to individual households; form land user groups with fields affected by same gullies to prevent further soil loss by taking collective action higher upslope	Perceptions of costs and benefits
Craft making for income	Manufacture and sale of crafts (e.g. pots, mats) using local skills	Market demand, market access; competition from mass producers
Bees for income	Production of honey for consumption & sale	Market demand &access; ecology
Enhanced livestock production	Experiment with fodder production and stall-feeding systems for increased returns from livestock production	Jackals kill small stock; theft; lack of dry season grazing; lack of rainfall for fodder production
Expand use of arable land	Facilitate use of unused arable plots whilst defending ownership rights of land owner	Social acceptability
Tourism development	Develop tourism potential of Leolo Mtns e.g. Sekhukhune war memorial; hiking; habitat of rare Arum Lilly (*Zantedeschia jucunda*)	Cost; market demand
Specialised production of cash crops for supermarkets	Assist small producers to adopt new technologies/practices and aggregate outputs to meet cost, quality and quantity demands of supermarket procurement systems, based on success of Montagu Development Trust farm in South Africa; use 'social equity' for marketing (Weatherspoon & Reardon, 2003).	Quality and cost must meet tough standards; requires considerable investments in new technologies and practices for coordination, production, processing, packaging and transportation

based and non land-based interventions for poverty alleviation are limited by a lack of local buying power (besides schools, hospitals, civil servants), at least while job opportunities in the wider economy remain scarce, and by strong competition from powerful and established commercial bodies in markets outside the immediate locality.

Complementary developments, be they land-based or otherwise, must therefore be identified and coordinated in an integrated approach to avoid competition with other interventions or livelihoods, driving down prices and conflict. The fiscal costs of identifying and managing such opportunities and developing appropriate practices and technologies, in cooperation with potential users, while potentially significant, need to be weighed up against the fiscal and social costs of stagnation and provision of safety nets and welfare interventions to large numbers of poor people (Dorward *et al.*, 2004). The discovery that numerous projects, both land-based and otherwise, are struggling to generate income streams for their members in Sekhukhune implies more rigorous assessments of the economic viability of proposed projects prior to allocation of funding would be an essential part of a more integrated approach to rural development, especially since the impacts of failed projects on others in the vicinity was seen to be potentially catastrophic. In the context of such project failures a policy-focus on enterprises initiated by individual entrepreneurs with a proven track record was proposed as a more effective way of boosting economic activity and employment. By drawing on local and/or contemporary knowledge and a range of capital assets, often but not always acquired and used effectively due to substantial stocks of financial capital, entrepreneurs often demonstrated success in generating substantial returns on investments in hostile conditions. In some cases entrepreneurs had also begun employing other local people as their operations expanded. An important implication is that the government focus on 'backing winners' such as 'emerging farmers' in poverty-stricken regions may be justifiable, especially if a necessary condition for an entrepreneur to gain donor funding was the provision of some threshold level of employment generation or training to vulnerable groups. On the other hand, the number of jobs created by such interventions is likely to be limited relative to the size of the unemployed population.

Clearly there is no one panacea for complex problems of rural development, especially given socioeconomic and biophysical heterogeneity. Focusing on assisting

entrepreneurs to enlarge the small and medium sized enterprise (SMME) sector may be one useful strategy for reducing poverty but it must be carefully combined with others, including investment in non-market measures such as social welfare payments and enhanced support to 'subsistence' farmers in low potential areas. How to target and balance specific market and non-market interventions is however a tough question.

The neoliberal narrative demands separation of 'irrational' political decision-making and 'rational' economic spheres, with economics 'experts' making decisions in the latter (Williams & Taylor, 2000). Yet economics, values and hence politics are inextricably intertwined (e.g. Stiglitz, 2002; Williams & Taylor, 2000; Cerny, 1999). This research has shown that environmental problems and interventions also have hidden social and political foundations (cf. Forsyth, 2003). While a narrative of participation in soil conservation initiatives was evident in Sekhukhune, a case study of the Phahlamanoge Landcare project indicated that external agents are not fully recognising local people's knowledge, practices and priorities, leading to limited effectiveness in improving environmental management. More open, inclusive and democratic debate of intervention options and priorities is required, be they related to questions of rural development or environmental management in a specific locality or region, or to broader framing macroeconomic issues, to ensure that the selection and targeting of specific interventions is fully informed, transparent and as objective as possible.

Present attempts at institutionalising participatory practices, for example through the integrated planning process or training agricultural extension workers, may increase the power of the poor. Yet participation by local people is often constrained by government to a focus on local and instrumental ends. Decentralisation of implementation responsibilities to local government authorities or service providers tends to fragment broader-based political opposition that might be able to exert influence directly on central government to improve their material well-being. Moreover, given the heterogeneous nature of communities (e.g. different incentives and preferences for intervention) and the fact that implementing interventions necessarily brings change that can create winners and losers (e.g. Kamara *et al.*, 2002; Ainslie, 1999; Blaikie, 1985), participation may not resolve the contested nature of any 'visions' of what constitutes 'development' or what are acceptable environmental costs. As Simon (2003:26) states,

"Ultimately, the question still boils down to the relative weight to be attached to specific parameters and social groups, and who exercises effective choice".

Enhanced public participation requires use of experienced facilitators rather than only technical experts, the creation of forums for the debate of broader problems and priorities and inclusion of neglected viewpoints, and more sensitive attention to appropriate formats for ensuring the participation of different groups. Increased efforts to educate people about their rights and responsibilities in a representative democracy may also be important (Turner, 2001). However, problems of defensive attitudes may inhibit the opportunities for a more equal exchange between 'experts' and 'locals'. Moreover, local perspectives must not be romanticised. Increased scientific knowledge of the biophysical implications of current patterns of NR use is crucial if the aim of interventions is to improve the adaptive management abilities of local people and create more *sustainable* livelihood opportunities for poor rural households. The lack of reliable long-term data and hence knowledge of key variables must be fully acknowledged and where possible addressed through intensive site-specific research informed by local knowledge and practices. As Batterbury *et al.* (2001:129) state:

> "A more equitable identification of problems ... would allow new agendas to emerge to initiate the collection of environmental knowledge for more development-oriented objectives; plus the greater communication of alternative environmental knowledge to the policy arena... The challenge... is not just to construct a more informed and democratised explanation of externally real biophysical change; but also to ensure this knowledge is used to influence policy at various spatial scales to enable practical and equitable environmental management".

While consensus on a definition and criteria for measurement of 'degradation' or related concepts may not always be possible, within a specific locality where environmental change is thought to be a problem attempts can be made to identify and monitor components of natural capital, or interactions between these components, that provide functions that are currently important to a significant number of poor people's livelihoods. This approach would have the explicit political aim of better securing the supply of derived utilities for those in greatest need. Moreover, complementary interventions can be made to protect local resources thought to be of potential future use value (e.g. crop biodiversity) and to monitor the emergence of new land use and livelihood opportunities, both in the specific locality and further afield, due for example to changes in technology, climate or market forces. Such changes are important to understand since they may lead to the redefinition of what constitutes critical natural

capital in a particular area and thus which elements of the local environment, if any, require priority for monitoring and management.

Yet even with increased participation and research, it is doubtful whether the whole project-based approach to NR conservation and rural development in South Africa will be able to bring about desired environment and livelihood changes on a landscape scale and at a sufficient pace to match demographic growth due to the tight limits on state funding imposed by the national government's neoliberal economic policy. More commitment from national government and donor organisations to rural development interventions and public sector research is essential to develop new possibilities for more profitable and environmentally sustainable livelihoods.

There is evidently a need to explore intervention options that could enhance government's commitment to the poor. According to Lakshman (2003), good governance in terms of creating and implementing pro-poor agendas relies on three factors. These, their status in South Africa and possible interventions to enhance the pro-poor agenda are summarised in Table 8.2 below, based on findings from this research and supporting literature.

Table 8.2: Three factors for good governance, their status in South Africa and intervention opportunities to improve the pro-poor agenda

Factor	Status in South Africa	Intervention opportunities
Presence of political competition that leads to greater accountability to poor	Lack of political competition in South Africa as ANC is dominant and has no effective opposition, although the press and broadcasting retain editorial assertiveness	Difficult and slow to change as ANC is widely supported due to its involvement in the struggle for democracy and to Africanist advocacy of deference and respect for elders (Lodge, 2002)
Sufficiently high political cohesiveness of the poor leading to the representation of their interests in government	Poor fragmented by patron-client relationships, decentralised local government arrangements and a lack of strong civil society organisations	Federate civil society organisations and forge links with reformist elements within state to increase their voice and influence over government while ensuring they represent the poor (cf. Houtzager & Pattenden, 1999)
Creation and maintenance of a state capacity that is insulated from elite capture and yet 'tied in' to channels for transferring resources to the poor	Local government lacks capacity; government activity is arguably fundamentally influenced by an elite macroeconomic narrative of neoliberalism; civil service is politicised since positions are allocated to favoured individuals (e.g. Lodge, 2002)	Enhance funding and capabilities of local government; assess and where appropriate advocate alternatives to neoliberal policies for growth and poverty alleviation; ensure that civil service appointments are solely based on merit

Source: Research findings and cited literature

Federating groups and building horizontal networks incorporating key civil society and government actors appears to be one means to encourage government to open up policy debates, attend to neglected perspectives and adopt more proactive pro-poor policies that reposition 'attacking poverty and deprivation' as the first priority, as it was in the RDP (RDP, 1994). Enhancing the financial support and training provided to local government may be another less radical but no less important means for progress.

Yet the South African government may itself have limited room for manoeuvre, as do many developing countries. As President Thabo Mbeki has acknowledged, the international rules of the game "serve the purposes of our rich global neighbours" (cited in Everatt, 2003:89). Attempts to change international processes, such as removing import tariffs in OECD countries, have the potential to bring perhaps the greatest positive impact on poor rural Africans, in South Africa and elsewhere, but powerful vested interested mean any radical change is unlikely. Nevertheless, efforts at reform and innovative marketing arrangements such as Fairtrade should be expanded as far as is possible (cf. Gabre-Madhin & Haggblade, 2004; Gore, 2003).

8.4 Implications for further research

Some important suggestions for further research related to practical interventions have already been mentioned or hinted at above, for example the need to evaluate the appropriateness of different production technologies and practices for different locations and the need for intensive site-specific biophysical research in areas thought to be undergoing environmental change to better understand and monitor the complex processes involved. Given the lack of time series data in Sekhukhune, as in many developing countries, long-term studies of rangeland dynamics and erosion under different management and rainfall regimes may be especially important for better understanding 'sustainability'. The impacts on factors such as local agricultural biodiversity (e.g. through herbicide use and/or cross-pollination), soil erosion and yield size (including a full quantification of intercrop yields) of the cultivation of genetically modified crops (e.g. in Soupiana) and their demands on nutrients, water, income and labour, as compared to more traditional cultivars, also require attention in order to understand the benefits and costs of cultivating different crops for different rural households as opposed to purchasing grain direct from retailers. The advantages and disadvantages of different methods of sowing seed is a further topic worthy of applied

research. Such research should be designed in collaboration with practitioners and/or local people and presented in formats tailored to different audiences to ensure that it has practical relevance and maximum impact (e.g. Hovland, 2003; Edwards, 1989).

More research is also needed to better inform debates about macroeconomic policy, both in South Africa and other developing countries. Some researchers claim substantial economic evidence supporting a focus on a 'redistribution with growth' policy as opposed to a neoliberal one has been neglected or ignored by policy makers (cf. Everatt, 2003; Stiglitz, 2002; Pieterse, 2001). This research demands greater attention, investment and follow-up.

Intra-household dynamics have not been investigated in this study. Further research might seek to explore the impacts of participation in certain forms of livelihood such as migration or a group-based project, or changes in cropping practices on the division of labour and benefits to more precisely understand who wins and who loses as a result of different livelihood changes and interventions.

Whether or not research linked to practical intervention is conducted will ultimately depend on the political will of the South African government to alleviate poverty and address environmental problems experienced by the rural poor. Further research could therefore also seek to identify the opportunities for civil society organisations in South Africa to organise, federate and drive a more proactive, integrated, pro-poor policy agenda to replace GEAR, reduce apartheid era inequalities and stimulate job creation. Research on the experiences of groups in other countries such as the highland *quichua* speakers movement in Ecuador which successfully forced land redistribution in the 1960s and 1970s and created large political federations that managed to increase the force and prominence of indigenous communities in national politics (Bebbington, 1993) might also be valuable. Yet the constraints of social movements also require investigation. For example, since individuals of different gender, socio-economic status, livelihood or location tend to have differing priorities, problems of unity and representation often arise (e.g. Forsyth, 2003; Bryant & Bailey, 1997).

8.5 Implications for broader academic and methodological debates

The research presented in this thesis has also contributed to the academic literature on theoretical, conceptual and methodological levels. First, it has argued for and demonstrated the value of a cross-scale, hybrid, historical, mixed methods approach, including micro-scale comparison between settlements and households, for building a robust, holistic, contextualised, yet fine-grained understanding of livelihood-environment dynamics. This research has thus informed methodological and theoretical debates and promoted use of an integrated approach to socio-economic and biophysical analysis. By seeking to uncover both the inaccuracies and social framings of dominant explanations of environmental change and bringing alternative perspectives into view, the research has also challenged "the pretensions of orthodox science to achieve universal accuracy" (Forsyth, 2003:221) and confirmed the need to democratise science and attend to local people's knowledge, priorities, innovations and practices.

Second, it has devised and used a modified livelihoods framework that contributes to key theoretical debates discussed in Chapter two. The framework emphasises and enables the analysis of the roles played by both institutions and, more unusually, key individuals in shaping livelihood strategies and outcomes. This is important because, as this research has demonstrated, individual development brokers can play a fundamental role in converting the potential inherent in social capital into the capture of development projects and other benefits from donors. A critical implication of this research is that studies of social capital dynamics should attend more closely to the organisational precursors of effective institutions, particularly to building capable agency to mobilise social capital and facilitate and drive social enterprise.

A focus on key social actors, such as brokers and entrepreneurs, is also useful because it breaks down the simplistic categories of state and community, concentrating on the specific actions, strategies and cross-scale network relations of specific capable agents and how these give rise to particular livelihood outcomes in different locations. Therefore, this research affirms the value of actor-oriented and actor network approaches when pursued within the context of a broader multi-scale political economic analysis.

The modified livelihoods framework used here also has significant implications for environmental entitlements theory. The distinction made here between primary capitals (specific stocks or processes from which utility is directly derived) and secondary capitals (stocks or processes that are necessary in order to effectively derive utility from primary endowments) is a constructive development of the environmental entitlements framework. It has been argued in line with Sen (1999) that commodity holdings often indicate little about the nature and quality of people's lives or the vulnerability of their livelihoods to stresses and shocks. While effective rights of access to resources, be they formal or informal, are important to understand, the ability to convert capital assets into capability – an ability that may be constrained by, for example, lack of financial capital or physical disability - is also critical to well being. The framework used in this study emphasises this distinction between effective rights of access to assets and effective use of assets, thus clarifying the importance of two fundamental livelihood foundations that are confused in the entitlements approach.

Third, while this research concentrated on Sekhukhune District the implications for intervention outlined above have relevance far beyond this region, contributing to broader debates about relevant and effective pro-poor growth strategies. For example, the findings are important for wider debates about the contribution of agriculture to rural livelihoods, the contribution of agricultural development to poverty reduction and the best means to promote rural poverty reduction within a context of rural livelihood diversity, difficulties in raising agricultural productivity in harsh agro-climatic conditions, problems with accessing markets and declining world agricultural prices (cf. Dorward *et al.*, 2004:73). It also informs debates about the impacts of rural-urban migration and neoliberal economic policies on rural households. However, the findings should be generalised with caution since, as this research has emphasised, different people in different socio-economic, organisational and biophysical circumstances experience and value livelihood and environmental changes very differently and as a consequence, generalised narratives of change are often highly misleading.

Fourth, this research has highlighted the critical issue of scientific uncertainty, especially with regard to predicting environmental change in highly dynamic dryland environments, and its implications. The experimental scientific approach, which tends to involve experiments that simplify the situation in order to control and isolate a small

number of key variables, can be very useful for more precisely defining problems and understanding different processes (Thomas, 1997), but as the level of system complexity and dynamism increases, so does the scale of the task of comprehension and the level of uncertainty (cf. Scott, 1998; Richards, 1985). If an inability to reliably predict the future in spatially and temporally dynamic and complex dryland systems, at least without extremely intensive site-specific research and monitoring, is admitted, then a shift in approach is encouraged to a strategy of efficiently and effectively responding to changes (Lindblom, 1959). Charles Lindblom (1959) coined the expression, "the science of muddling through", to capture a practical approach to large-scale policy problems that could not be completely understood. Through a process of limited comparisons, trial and error, revised trials, reliance on experience, educated guess work and rules of thumb incremental progress is made. This approach is arguably similar to the way in which many rural people attempt to learn-through-doing, taking small, often reversible, steps to adaptively manage their land or to make a living through other improvised livelihood activities. Indeed, people living in dryland environments may be the 'experts' in this location-specific science of 'muddling through' as they have most experience of observing and interpreting early signs, a sense of possible surprises, and hence an ability to adapt more efficiently to changes (predicted or otherwise) in their biophysical and socio-economic environment, even if much of this competence is implicit (Scott, 1998).

Western science can be used to check these judgements and to reveal hidden processes that may not be recognised by local people, thus helping to build site-specific hybrid knowledge of system functioning and strengthen the ability of local people to maintain the buffer capacity or resilience of the system (Ekins *et al.*, 2003; Turner, 1993), but the precision use of such science is a slow, laborious, capital intensive undertaking that may not always be decisive (Scott, 1998). Consequently, there is a need to select which locations and groups should benefit from finite supplies of scientific support, a difficult decision that, like many of the problems discussed in this thesis, is highly political.

Biophysical, social, economic and geographical constraints to realising more secure and profitable on-farm and off-farm livelihoods in remote, dryland regions can be overcome. The degree to which national economic growth is transformed into pro-poor growth in areas like Sekhukhune District therefore ultimately depends on political will.

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Appendix 1: Key Livelihoods Terminology and Explanations

Term	Explanation
Capabilities	• Derived from Sen (1987; 1984) - "what people can do or be with their entitlements" - i.e. ability of an individual to realise his or her potential as a human being in the sense both of being (e.g. adequately nourished, free of illness, etc) and doing (make choices, develop skills, etc). • Broadens scope of livelihood outcome criteria to incorporate not just material concerns of food and income (e.g. South African White Paper on Land Policy, 1997) and human capital which allow people to do things, but also intrinsically valued elements of being and doing such as self-esteem, security and power which the people themselves can define (c.f. Chambers, 1997; 1989).
Assets	• To create livelihoods, people combine the assets, or 'capital' endowments, that they have access to and control over: *natural* capital (NR stocks - soil, water, air, genetic resources etc - and services - hydrological cycle, etc); *physical* capital (man-made production equipment, basic infrastructure, etc); *financial* capital (cash, credit, savings, etc); *human* capital (skills, knowledge, ability to labour, good health); and *social* capital (networks, trust, claims and access, affiliations, associations).
Coping with shocks	• Temporary adjustments in livelihood strategies in the face of a large infrequent, unpredictable disturbance with immediate impact.
Adapting to stresses	• Long term shifts in livelihood strategies to adjust to small, regular, predictable disturbances with a cumulative effect on livelihoods.
Vulnerable	• Those who are unable to cope with or adapt to change and therefore are unlikely to achieve sustainable livelihoods
Resilience	• Ability to cope with, adapt to and recover from stresses and shocks
Natural resource base sustainability	• Most rural livelihoods are dependent on the NR base - 'natural capital' - to some extent. Sustainability refers to the ability of a system to maintain productivity when subject to stresses or shocks. • Sustainability implies avoiding depleting stocks of NRs to a level which results in an effectively permanent decline in the rate at which the NR base yields *useful* products or services for livelihoods (based on Abel & Blaikie, 1989; see also earlier discussion of 'sensible sustainability').

Derived from: DFID (2000); Ellis (2000); Scoones (1998).

Appendix 2: Household Survey

Introduction

(Who I am – independent student, the research I am doing, why I want to speak to them; emphasise answers provided will be kept strictly confidential; emphasise that there are no right or wrong answers, all answers are of interest – I am here to learn; research results will be distributed to the Limpopo Province Department of Agriculture, explaining the most important needs and problems that local people identify; the hope that this research will help the government to assist in addressing some of the problems experienced by local people)
Would you be willing to answer some questions?

Name of interviewer
Name of interviewee
Brief description of homestead
Area of settlement

Household demographics

Number of people living in the homestead at present
(Age, sex, marital status, education)
Household head
(Age, sex, marital status, education)
Number of homestead members living outside the homestead at present
(Age, sex, marital status, education, location, occupation, remittances)

Do homestead members receive money or goods from anybody else?
(Age, sex, marital status, education, location, occupation, remittances)
Do any members of your household receive a pension, disability or child support grant?

Arable production

How many fields do you own, including any garden?
What is the soil type on these fields?
Last season, how much of your land did you plough?
If did not plough all of land: why did you not plough all of your land?
Do you own a tractor or plough of any kind?
What did you use to plough the land last season?
Have you ever applied any fertiliser, manure, or other inputs to your land?
If Y: how frequently?
Do you have sufficient labour to work your land?
Last season, what crops and vegetables did you plant?
Last season, did you grow any crops or vegetables on borrowed or rented land?
(Specify: borrowed/hired, soil type, amount of field ploughed, crops/vegetables grown)
Where did you get the seeds for the crops and vegetables you grew last season?
How many bags of grain did you harvest in total last season?
Was last season a good, average or bad year for crop production compared to previous years?
Did you sell any of your crops or vegetables last season?
If Y: what sold, quantity, price, location of sale
Did you exchange any of your vegetables or crops for other things last season?
If Y: what exchanged, quantities

What did you do with the crop residues from your land last season?
Have yields of sorghum/maize increased, decreased or stayed about the same since when you were a child?
Has the number of households growing crops increased, decreased, or stayed about the same since when you were a child?
What are the biggest problems you face for growing more crops and vegetables?
Are there any solutions to these problems?
Are you satisfied with the security of your land ownership?
If N: why?
Has the size of arable land covered by erosion gullies changed since when you were a child?
If Y: how and why?
Is there any soil loss on your fields?
If Y: Is this soil loss not serious, serious or very serious? Why?
Do you take any action to reduce the soil loss?
If Y: explain action taken
Who is responsible for protecting the soil on your fields?

Food security
For how many months could your household survive on the harvested grain alone last season before you had to get additional food?
How did you then get additional food?
How many times in the last month have you eaten read meat or chicken meat, excluding heads, feet or other non-meat body parts?
In a drought year like this year, what are the most important ways for your household to get food?

Fuel use and wild resources
What type of fuel do you use to cook with?
If use wood: where do you get wood from?
Has the availability of wood increased or decreased since when you were a child? Why?
Do you collect any other resources from trees or plants in the local area besides wood? (Specify most important local names)

Livestock production
Do you own any livestock?
If Y: how many of what types?
(Specify cattle, goats, sheep, donkeys, chickens, other)
Did you buy, exchange or sell any animals over the last year?
(Specify types/quantities)
Did you slaughter any animals over the last year?
(Specify types/quantities/reasons)
Did any animals die over the last year?
(Specify types/quantities/reasons)
Were any animals lost or stolen over the last year?
(Specify types/quantities/reasons)
What are the most important reasons for you keeping animals?
Do you ever buy fodder or medicines for your animals?
Who herds your animals, if anyone?

What are the biggest problems for livestock production you face?
Are there any solutions to these problems?
Do you have sufficient labour to look after your livestock?

If keep cattle: why do you keep cattle?
Has the number of cattle in the village increased or decreased since when you were a child? Why?
Has your herd of cattle increased or decreased in size since the 1994 elections? Why?
Has the availability of grazing increased or decreased since when you were a child? Why?
Are there any grazing areas where the number of bushes or trees has increased substantially?
Has the size of grazing land covered by erosion gullies increased or decreased since when you were a child? Why?
Is this soil loss not serious, serious or very serious? Why?
Is any action taken to try to reduce the soil loss?
If Y: explain action taken
Who is responsible for protecting soil and vegetation in the grazing areas?

Information and institutions
Are you satisfied with the present arrangements for protecting the environment in this area?
Do you think the environment in this area is in need of protection? Why?
What action is needed to protect the environment, if any?

Has anyone ever given you advice on crop or livestock production?
(Specify who and information given)

Does anyone in your homestead own a motor vehicle or television?
Can you borrow money from anyone if you need to?

What village groups, societies or organisations do homestead members belong to, if any?
Have you ever attended a meeting with the ward councillor?
If Y: what is his role?
Are you satisfied with his work?

The big picture
Are more or less young people involved in field and livestock activities compared to when you were young? Why?

Overall, what are the biggest problems for you to live happily and healthily in this area?

Thank you!
Any comments/questions?

Appendix 3: Phahlamanoge soil data

Seventy-one soil samples were taken from 12 fields belonging to ten case study households. Subsequent analyses (detailed in Chapter three) revealed the total levels of N, P and K shown below.

Total values of N, P and K for samples taken from 12 fields belonging to ten case study households in Phahlamanoge

Field (A, B, C, etc)	Total N (ppm)	Total P (ppm)	Total K (ppm)	Total K (meq/100g)
A1	29.8	144.4	277.8	0.7
A2	0	146.6	297.6	0.8
A3	0	133.7	204.4	0.5
A4	88.8	149.2	307.2	0.8
A5	58.4	134.4	248.8	0.6
A6	325.2	171.0	230.4	0.6
B1	92.5	103.4	191.2	0.5
B2	204.7	129.9	374.2	1.0
B3	118.9	127.1	243.6	0.6
B4	217.7	131.0	304.8	0.8
B5	138.1	145.6	253.2	0.6
B6	181.2	161.8	240.4	0.6
B7	37.1	108.1	152.0	0.4
B8	337.0	149.9	454.0	1.2
C1	236.7	125.6	173.0	0.4
C2	298.9	140.3	265.8	0.7
C3	136.0	156.7	203.6	0.5
C4	105.7	137.1	203.2	0.5
C5	275.7	130.0	161.8	0.4
C6	209.4	128.1	172.6	0.4
C7	95.4	107.8	158.4	0.4
D1	280.3	152.0	487.2	1.2
D2	525.2	188.8	1049.6	2.7
D3	811.0	194.7	789.6	2.0
D4	195.2	181.7	435.6	1.1
D5	223.6	167.9	346.0	0.9
D6	271.3	153.8	682.8	1.8
E1	181.4	153.8	571.6	1.5
E2	452.9	149.0	640.8	1.6
E3	349.7	131.0	581.2	1.5
E4	454.1	169.0	693.2	1.8
E5	302.3	141.5	633.2	1.6
E6	303.2	136.7	446.0	1.1
F1	4.5	89.4	66.0	0.2
F2	0	79.0	156.0	0.4
G1	316.5	3097.2	137.4	0.4
G2	319.4	3056.0	133.4	0.3
G3	336.6	3054.7	150.8	0.4
G4	246.7	3164.9	131.0	0.3
G5	301.2	3268.4	94.8	0.2
G6	329.8	3573.0	83.4	0.2
H1	192.3	125.5	203.2	0.5
H2	369.8	140.8	376.6	1.0

H3	368.5	152.6	297.8	0.8
H4	452.0	154.7	288.0	0.7
H5	441.2	153.0	283.2	0.7
H6	402.6	142.0	227.0	0.6
I1	314.6	131.4	206.2	0.5
I2	306.0	134.5	801.2	2.1
I3	444.7	1979.0	268.0	0.7
I4	447.0	136.6	144.4	0.4
I5	376.1	123.7	186.4	0.5
J1	217.9	5961.7	94.8	0.2
J2	250.2	5605.5	81.6	0.2
J3	337.0	9857.9	64.4	0.2
J4	339.1	9291.5	80.2	0.2
J5	359.1	10715.8	45.0	0.1
J6	406.1	10501.0	58.6	0.2
J7	465.4	6913.6	80.2	0.2
K1	365.9	4887.1	106.4	0.3
K2	458.4	2956.1	93.6	0.2
K3	472.1	3716.7	161.0	0.4
K4	327.2	3115.5	140.4	0.4
K5	443.0	4360.4	150.0	0.4
K6	650.2	3282.2	112.4	0.3
K7	394.5	3997.8	150.6	0.4
K8	394.1	3236.6	145.8	0.4
L1	278.2	122.2	72.8	0.2
L2	315.6	103.5	92.6	0.2
L3	323.8	117.1	89.0	0.2
L4	288.0	122.2	94.6	0.2

Source: Fieldwork

Mann Whitney U tests indicated no significant and systematic differences between total soil N, P and K levels taken from the upper and lower edges from within each sampled field. Hence there was no evidence that soil erosion was driving a shift in nutrient-rich soil down slope. Nor were there any significant differences found in total nutrient levels between areas identified by farmers as manifesting differences in important variables such as crop yield, soil loss and weed prevalence. This data was not included in the main body of the text because of the absence of statistically significant findings.

Mean total levels of N, P and K for each of the 12 sampled fields are shown overleaf.

Mean total nutrient levels of N, P and K for each of the 12 sampled fields

Field (A, B, C, etc)	Total N (ppm)	Total P (ppm)	Total K (ppm)	Total K (meq/100g)
A	84	147	261	0.7
B	166	132	277	0.7
C	194	132	191	0.5
D	384	173	632	1.6
E	340	147	594	1.5
F	2	84	111	0.3
G	308	3202	122	0.3
H	371	145	279	0.7
I	378	501	321	0.8
J	339	8407	72	0.2
K	438	3694	133	0.4
L	301	116	87	0.2

Source: Fieldwork

Field K with the highest calculated mean total N levels and some of the highest mean total K levels was reported to have the highest yields, implying that yields on other fields may be constrained by nutrient deficiencies (as discussed in Chapter five).

Appendix 4: Aerial photographic mapping methods

The original intention was to map changes in tree and bush cover, changes in arable land use and changes in the extent of erosion gullies. These data would then be used to triangulate, corroborate or refute respondent's accounts of change in land cover, erosion and land use (cf. Mapedza *et al.*, 2003; Elliot & Campbell, 2002). However, it proved impossible to map tree and bush cover shifts due to the poor resolution of the images and the thin dispersed distribution of the bush cover.

It *was* possible to distinguish changes in cultivation and gully erosion. Photographs of the study region were available from the South African government in a range of spatial scales. All of the photographs selected for use in the research were of a scale of 1:50000. Choosing photographs of the same scale minimised problems of distortion when matching up pairs using GIS software. Photographs were selected for maximum clarity. Photographs of the different study villages were available from a range of different years. In order to facilitate comparison between villages and to ensure that relatively long-term landscape changes could be detected, photographs were chosen to reflect the same 40-50 year period for all three sites. Photographs for Phahlamanoge and Madibong were captured in the early 1950s and 2000, while photographs for Soupiana dated from 1964 and 2000. The use of images from the year 2000 allowed changes to be mapped up to a few years prior to the fieldwork. This was important because it allowed cross-referencing with respondent's accounts of recent and ongoing environmental and land use change.

The months in which all of the photographs were taken were not known, but staff at the aerial photograph office suggested that they are usually captured in the dry season when ground visibility is greatest. The time of capture of photographs is critical to consider when analysing vegetation change since shifts in vegetation cover between wet season and dry seasons can be highly significant. However, in this case the focus was on extent of erosion gullies and area of cultivation, landscape features that could be reliably distinguished from their opposites - non-gullied land and non-cultivated land - both in wet and dry seasons, hence the lack of information on the specific month of capture was not disabling.

Pairs of aerial photographs for each study site were imported into the computer-based Arcview geographical information system. Each photo of each pair was geo-referenced to a 1:50000 digitised base map of the specific study village, also obtained from the South African government, using the ImageWarp software extension to apply a bilinear transformation to control points. Using six to ten control points well distributed across the area of each image allowed transformation errors to kept to a manageable level. Control points were unambiguous points identifiable on both the photographs and the base map, such as road junctions, buildings, or distinctive bends in rivers.

In order to map changes in cultivation, once each pair of photographs had been geo-referenced to the map, polygons were digitised over each photograph to delineate areas of arable land in active use. Strict rules for classification were developed based on knowledge acquired during fieldwork. Areas were only considered actively used arable land if, first and foremost, the ground was clear of bush or tree cover beyond individual trees. The justification for this rule is straightforward. While fields often have individual fruit trees left standing in them, farmers clear and burn bush cover prior to ploughing and sowing a crop, thus a cultivated field should be clear of patches of bush/tree cover. On the other hand, if ploughing is stopped, bush rapidly colonises fields, hence fields not recently cultivated tend to have dense bush cover. Second, if the shade and texture of the bounded area - be it representing a freshly ploughed field of bare earth or a growing crop - was less similar to reference areas of uncultivated common grazing land on the same image than it was to reference areas of cultivated land on the same image, and if it satisfied the above rule, then it was considered to be cultivated land. This comparative method was very useful in cases of any doubt, especially where resolution, image quality or lighting was poor. The existence of a clear border around a plot of land was also used as a triangulating factor since farmers tended to cultivate a hedge or build a barrier of thorny branches around their fields to protect them from cattle and goats.

Regarding gully erosion, the limited resolution and large scale of the available aerial photographs excluded the possibility of detailed measurements of changes in complex-shaped erosion gullies over the last 50 years. However, the arrangement of pairs of images of major erosion features in the 1950/60s and 2000 did allow a simple and striking visual illustration of the changes, or lack thereof, of major gullies in different sites over the 50 year period (as used in Chapter seven).