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Testing the orthodoxies of land degradation policy in Swaziland

1. INTRODUCTION

Human-environment links are often oversimplified within policy, into causal relationships that lack empirical support but which have gained sufficient political backing to hold influence (Lambin et al., 2001). The status of these ‘myths’ (Thomas and Middleton, 1994), ‘orthodoxies’ (e.g. Forsyth, 2003) or ‘received wisdoms’ (Wood and Lenne, 2005) is maintained and perpetuated because they usually complement prevalent (often ‘scientific’) world views and serve the political and economic interests of powerful groups (see Leach and Mearns, 1996; Forsyth, 2003). This is despite the fact that they often conflict with contemporary micro-scale empirical models and findings, ignore contrasting interpretations of existing data sets and lead to the perpetuation of ‘crisis’ scenarios (Lambin et al., 2001).

Explanations for land degradation and desertification have often been based on orthodoxies or received wisdoms (Thomas and Middleton, 1994). These environmental problems have long been regarded as global ‘crises’ despite a number of uncertainties and differences in opinions associated with their identification, definition and measurement. Western scientific knowledge has been heavily utilised to justify and legitimate actions to address land degradation (Marcussen, 2002) but it is only fairly recently that the politicised nature of the use of science has been acknowledged, and other interpretations (e.g. local, indigenous) of what constitutes degradation have received wider recognition (Forsyth, 2003). As such, methodologies to bring together these different knowledge bases are still largely in their infancy (e.g. see Stringer and Reed, 2007). This can leave an unbalanced situation, since science is powerful and all too often accepted as fact, while the context from which the science was generated can remain unacknowledged within policy. As a result, scientific datasets have been used to perpetuate generalised (and often inaccurate) statements or ‘false ecologies’ of land degradation (Stott, 1998), which have gradually been absorbed into the large body of received wisdom that informs much of the developing world’s environmental policy (Wood and Lenne, 2005).

The purpose of this paper is to unpack two popularised orthodoxies about land degradation as perpetuated in Swaziland’s National Action Programme (NAP) to combat desertification. It explores how these orthodoxies relate to the local understandings of environmental change and land degradation, and considers why policymakers have continued to perpetuate these narratives. The orthodoxies that are considered are: 1) The presentation of degradation as a neo-Malthusian problem; that ‘too many people’ is a key driver of land degradation in

Swaziland; 2) The perpetuation of the view that it is the poor who degrade their environments primarily because they are poor, particularly in terms of forest overexploitation and soil erosion. In Swaziland's NAP, these orthodoxies are presented as serious yet interlinked elements at the root of the country's land degradation and broader sustainable development problems. I build on the livelihoods approach (Chambers and Conway, 1992) and use empirical micro-level fieldwork data to yield a more nuanced understanding of the gaps between international and national land degradation policy and local land use practice, as well as providing some insights into how this gap may be closed.

Unpacking the land degradation orthodoxies in Swaziland's NAP

The United Nations Convention to Combat Desertification (UNCCD, 1994) is the chief international agreement pertaining to issues of land degradation, desertification and drought. Its naissance has been reviewed extensively elsewhere (see Corell, 1999; Thomas and Middleton, 1994), however, it represents the first international Convention to take a people-centred approach and value local knowledge and experiences in actions to reduce land degradation. While the UNCCD has its own Committee on Science and Technology (CST) which provides scientific advice through a Roster of Experts (Long Martello, 2004), considerable scientific debate remains about what land degradation is and how best it should be measured, let alone how best it should be mitigated. As such, there are no formal scientific benchmarks or indicators that can be used to monitor progress towards meeting the goals of the Convention. This is an important consideration, because a lack of clarity on the issue is likely to be a central factor in explaining why orthodoxies like those considered in this paper have continued to be perpetuated.

Swaziland signed the UNCCD on the 26th July 1994 and ratified it on 7th October 1996. It came into force on 5th January 1997. For Swaziland, as for other signatories to the Convention who class themselves as "affected" countries, the principal tool of implementation at the national level is the development of National Action Programmes (NAPs). NAPs allow the formulation of strategies to combat desertification and land degradation that are appropriate to the individual context and circumstances of each country. They aim to 'identify the factors contributing to desertification and the practical measures necessary to combat desertification and mitigate the effects of drought' (UNCCD, 1994: 14), and should address local environmental priorities and livelihood needs. Swaziland was one of the first southern African countries to meet its obligations to the international community by producing a NAP that received cabinet approval in 2000.

The Swaziland NAP was the product of consultations with citizens who, through involvement in workshops, seminars and meetings held in each region, were given the opportunity to present their needs and priorities for the policy. Following a series of awareness-raising activities that sensitised the population to the desertification issue through the use of radio broadcasts (Okorie et al., 1999), consultation processes began. According to documents summarising the NAP process, chiefs, heads of community organisations, village elders, NGO representatives and government officials attended local-level workshops (GOS, 1998; GOS, 1999). Further workshops were facilitated at the regional and local levels by Inkhundla, Bandla ncane, and Umphakatsi, all of which are traditional, hierarchical administrative institutions (GOS, 1997). Despite the consultative processes that were followed in the creation of the NAP, the resulting policy document is based on scant contemporary scientific information and local empirical data on the extent of land degradation at the national level. Following an introduction to the study area and the methods and approach taken in the research, the orthodoxies within Swaziland's NAP are discussed in more detail.

3. STUDY AREA: SWAZILAND'S MIDDLEVELD

Swaziland is a small (17, 364 km²) country in Southern Africa. It is surrounded largely by South Africa but shares its easternmost border with Mozambique. The majority (69%) of its one million inhabitants live on Swazi Nation Land (SNL), which is held in trust by the king for the nation. This type of tenure constitutes 72% of Swaziland (Funnell, 1991) and is divided into 180 chiefdoms of various size and population (Mushala et al., 1994). Land is allocated to the head of each household within a chiefdom in order for agricultural activities to be pursued. Traditionally this is a married male who has professed allegiance to a chief (Funnell, 1991). The proportion of land assigned varies according to the household's need, age, social status and lineage. Any SNL that has not been allocated is communal and is used for grazing stock, hunting and gathering wild resources (e.g. fuel wood and grasses that are used for thatching huts and making mats- see Osunade, 1994).

The chiefdom selected in this study is located in Swaziland's middleveld (Figure 1). This band runs from north to south in the centre of the country. However, the middleveld is also the most densely populated part of the country and where sustainable natural resource use is considered to be most threatened (ECS, 1999). It is a hilly region with altitudes ranging from 300-1500 m and is categorised as upper middleveld hill grassland, with rolling to hilly topography and a slope range of 15-30° (Jansen *et al.*, 1994). Rains fall mainly in the period October to April, although the country inherently suffers from periods of both drought and rainfall variability (Manyatsi, 1997; Shongwe and Dlamini, 2002). Overall, mean annual rainfall ranges from 1450 mm in the highveld to less than 600 mm in the lowveld (GOS,

2001). Out of the past 33 years, 19 have received below average rainfall, with the worst drought¹ conditions occurring in 1982 and 1992, when annual rainfall receipts totalled 523.6 mm and 525.4 mm respectively at the middleveld Matsapha station. This indicates an increasing problem in the face of global climate change and indeed, the country is considered to now be experiencing its 7th consecutive year of drought (IPCC, 2007).

Soils comprise sandy loams with patches of acid clay (Jansen *et al.*, 1994), with arable soils being considered good to fair² in terms of production potential in the part of middleveld in which the study community is located (Mushala *et al.*, 1998). Of the study area's total 799 ha, 545 ha (68%) is used for livestock or grazing, with the remaining 255 ha categorised as crop land (JICA, 2001). None of the area is formally categorised as forest, orchard or gardens. Maize is Swaziland's key subsistence crop (Murdoch, 1970), although groundnuts, sweet potatoes and beans may also be grown (ECS, 1999). Whether these are intercropped or rotated with maize or not varies between households in the study area. The landscape condition, like the other social and environmental characteristics of the study area, is typical of much of the middleveld, and characterised by severe gullies in parts of communal areas. Primarily this is considered to be due to concentration of runoff along cattle tracks, particularly on the slopes close to the dip tanks (JICA, 2001). Gullies were also worsened by Cyclone Domonia, which swept through the area in 1984. Arable areas suffer from soil infertility, while widespread parasitic weed infestations, particularly of *Striga asiatica* (known locally as Sona or Witchweed) act as bio-indicators of degraded arable land (Stringer *et al.*, 2007). Table 1 summarises these key social and environmental characteristics and environmental degradation problems in the study area.

[Insert Figure 1: map showing location of the study area]

[Table 1: Social and Environmental Characteristics of the Study Area]

3. METHODS AND APPROACH

The Sustainable Livelihoods Framework (SLF) (Scoones, 1998) provided an important grounding to the research. Through its organising structure, the SLF sets out the main factors that affect people's livelihoods and illustrates the relationships between them (DfID, 1999). In doing so, it acts as a useful checklist of important issues. In this research it aided

¹ Drought is defined here as below average rainfall conditions.

² Murdoch (1970: 214-215) classifies Swaziland's middleveld soils as good (11%); fair (4%); poor (22%); very poor (9%) and unfit due to steep slopes (20%); unfit due to all slopes (34%). However, problems are recognised with these classifications and in relating them to the FAO soil classifications (see Remmelzwaal and Masuku, 1994).

considerations of how and why diversified livelihoods lead to the simultaneous degradation and conservation of different parts of the land resource, and allowed appropriate methods to be selected to explore the ways in which livelihood decisions link to perceived threats to people's asset bases.

Fieldwork was carried out over two field seasons, from May-October 2002 and March- June 2003. A multi-method approach incorporating both natural and social science methods was followed in order to yield insights that perhaps would not have occurred had either perspective been used alone. This is paramount in research that investigates mutually embedded social and environmental contexts as it can lead to better understandings of the complex and entwined relationships that exist (Thomas and Sporton, 1997), and provides the opportunity to triangulate and cross-check the results (Stringer and Reed, 2007). Such an approach also allowed all aspects of the Sustainable Livelihoods Framework to be addressed. The selection of methods that were used comprise: discourse analyses of Swaziland's NAP and other related policies (for example, the Swaziland Environmental Action Programme, Poverty Reduction Strategy, and National Development Strategy); interviews with members of the country's NAP steering committee (including NGO representatives), which was responsible for development of the policy document (n = 7); household questionnaires (n = 74; these were administered to all households in one chiefdom (see Figure 1)); transect walks and repeat semi-structured interviews (with representatives from three case study households); participatory techniques with key informants from each case study household (including the production of seasonal calendars and resource maps); and mapping of land cover change from time-series aerial photographs using a Geographical Information System (GIS) (based on photographs spanning a 15-year period, 1984-1999).

Case study households³ were selected on the basis of the length of time they had been established in the chiefdom, the number of household members and their relative wealth status given the overview obtained from the questionnaire data. This sample size is justified by time limitations given the multiple methods used. Table 2 synthesises the wealth status of each case study household. This was assessed using indicators from the questionnaires such

³ The household is not unproblematic as a unit of analysis, since productive, labour and tenure relations within households and based around gender play a key role in shaping land use and management decisions. Nevertheless, in this study the term 'household' is used in conjunction with the definition given by Guyer (1981:89), in which it is considered a "domestic unit with decision-making autonomy about production and consumption", therefore primarily linking to commodity flows. This was considered most appropriate given the nature of the investigation.

as the number of cattle owned, tractor and other farm machinery ownership, educational attainment, size of allocated land plot and employment status (cf. Ellis et al., 2003). One household from each wealth category (low, medium or high) was chosen for involvement in the research⁴. Informants from the case study households were all female, either because male household members were working elsewhere or because it was felt by other household members that the selected respondent would be able to best answer the questions.

[Table 2: Characteristics of case study households and their wealth level classification]

4. RESULTS

4 a) Unpacking the orthodoxies within Swaziland's NAP

This section first presents the land degradation orthodoxies as revealed through analyses of Swaziland's NAP and interviews with the Steering Committee members. The orthodoxies are presented as closely interlinked problems throughout the policy document, despite the lack of empirical information on which they are based. These policy and interview perspectives are then compared and contrasted with the empirical scientific data and everyday understandings of the people living with degradation.

Orthodoxy 1: Land degradation is a largely a result of population growth, which is placing excessive pressure on the land resource

This orthodoxy is based on Malthusian-type ideas, which suggest that human population growth will tend to outstrip the productive capabilities and 'carrying capacity' of the natural resource base. It neglects to consider the role of technological changes (Boserup, 1965) or possibilities for agricultural intensification (e.g. Wood and Lenne, 2005), providing a rather narrow focus for explanation. This orthodoxy emerges in several places within the NAP and is exemplified through statements such as:

...rapid population growth contributes to land degradation through increased pressure on land resources (NAP, 2000: 31); and:

...where population density is high, there is intensive utilisation of land and environmental resources. This may proceed to reach levels where the resources are depleted beyond a possibility of regeneration. As such, the total surface area of Swaziland cannot support the rapidly growing population (NAP, 2000: 6).

⁴ Of the 74 households in the survey, 32 households (43%) were categorised as poor; 29 households (39%) as medium and 13 (18%) as rich.

It is further supported in comments made by the Steering Committee interviewees (see Table 3).

[Table 3: Supporting the Orthodoxies: Comments from Interviews with Steering Committee Members]

However, Malthusian theory also suggests that ‘checks’ such as famine, disease and social and political factors including marriage rules and family size incentives act to reduce population growth and therefore pressure on resources. Sadly, the role of ‘checks’ relating to disease may be all too apparent in the context of today’s Swaziland. Although 2002 population growth rates were estimated at 2.7% (US Government, 2005), Swaziland is considered one of the world’s worst affected countries in the world in terms of the percentage of the population with HIV/AIDS (Mushala, 2003). This has led to population estimates for 2006 that suggest an overall decline, with growth rates at -0.23% (<http://www.indexmundi.com/swaziland/>, June 2006).

While the distribution of the population may be a real problem for sustainable land use in densely populated areas, absolute population numbers are an inappropriate basis for contemporary land use and degradation mitigation policy. Population census figures from 1999 were used in the preparation of the NAP (2000), as well as the 2004 Report on the Implementation of the NAP in Swaziland. These historical trends of population change do not provide an adequate basis for contemporary policy given the broader HIV/AIDS-related processes of social change that are taking place. The time-lag that inevitably passes between the collection of information and development of policy needs to better account for population trends and trajectories and not assume the continuation of past tendencies. Even so, the development of a population policy is one of the priority areas within the NAP and is mentioned in subsequent reports to the Conference of the Parties of the UNCCD (GOS, 2001; 2004).

If population distribution is considered a primary cause of unsustainable land use, it is important to work backwards and examine why the population has favoured settlement in some areas over others, and explore why the middleveld region is considered particularly threatened. A review of the literature indicates that current settlement distributions can be traced back to the colonial times. In 1902, Swaziland was declared a British Protectorate, staying as such until achieving independence in 1968. During this period, the British partitioned the land. This took place in order to exert more control over the indigenous

peasantry, and to optimise the availability of Swazi labour (Crush, 1980). At the same time, it deprived Swazi households and communities of all of their formal use-rights on two thirds of the territory of the country, while they gained no new rights on what came to be called the Native Areas (Lowe, 1998). The partitioning therefore had an unequivocal influence on population distributions of today and played a key role in determining the shape of the managed Swazi landscape.

Orthodoxy 2: Poor people are the cause of much of the land degradation in Swaziland, particularly in terms of forest overexploitation and soil erosion

Links between environmental degradation and the poor have long been acknowledged. For example, the Brundtland Report drew international attention to poverty as “a major cause and effect of global environmental problems” (WCED, 1987: 3) back in the 1980s. However, the precise nature of these links is unclear, as they rest upon a series of assumptions. The first assumption favours a simple, linear relationship: “if one is poor, one will degrade” (Broad, 1994; 812). This implies that the poor are more likely than the better-off to resort to activities that cause environmental degradation, primarily because they are poor. Second, the poor are often considered short-term maximizers (Moseley, 2001); they are assumed to be more concerned about present survival than taking a long-term view and do not think of the future consequences of their present actions. This locks them into a downward spiral of poverty and degradation, with important negative implications for sustainable development (understood as meeting the needs of the present without compromising those of the future). If the poor degrade, leading to further poverty, the result is further degradation and so on. Sustainable development then becomes an unattainable goal, as the poor are too poor to think ahead and invest in the future (Broad, 1994). The final assumption of this orthodoxy is that economic growth is a key element in breaking the downward spiral. If poverty is the cause of environmental degradation, it follows that if poverty can be eliminated then the environment can be saved. While increasing evidence is emerging to refute the first two assumptions of this orthodoxy, poverty reduction and environmental protection are increasingly viewed as complementary goals by international development agencies (e.g. Bojö et al., 2001; Bosch et al., 2001; Dasgupta et al., 2005) and remain strongly interlinked themes in several contemporary programmes and policies. This is despite emerging support for the view the rich use more resources and have a greater negative impact on their environments than the poor (e.g. Forsyth, 2003). For example, the World Bank states that ‘addressing poverty-environment linkages must be at the core of national efforts to eradicate poverty’ (World Bank, 2002: 2), while other programmes link conservationist and environmental protectionist ideas with the neo-liberal ‘improvement’ of livelihoods (e.g. Goldman, 2001). Nevertheless, these approaches rest on a generalised picture of the nature of livelihoods in poorer states and

still infer that there is a direct causal relationship between the livelihood strategies of the poor and the condition of the environment.

Deforestation and soil degradation are two key resource issues in which poverty is often blamed for environmental degradation (Forsyth, 2003) and both these phenomena are apparent in the study area. While policy in many developing countries has perpetuated this narrative, a strong body of research is emerging to counter it. For example, research in Guinea by Fairhead and Leach (1996) challenged the orthodoxy that poor local land users were responsible for degrading forest land, resulting in once-extensive forest being reduced to discrete forest patches. Archive data, oral histories and aerial photographs refuted this view of environmental change, showing forested areas to have increased due to effective local management, not to have decreased as had been previously assumed. Similarly, research in Asia by Forsyth (1996) has questioned the basis of claims made for widespread Himalayan deforestation and soil erosion, as 'poor people' were found to be actively improving their environments. Swaziland's NAP however, remains firmly linked to this orthodoxy through statements such as: Poverty is a major socio-economic challenge to combating land degradation (NAP, 2000: 11). It also asserts that:

Tree cutting incidents are common on Swazi Nation Land, particularly where land is being cleared for cultivation and settlements (NAP, 2000: 9); Poverty-stricken people tend to rely heavily on the exploitation of natural resources for their livelihood (NAP, 2000: 9).

And that:

Depletion of indigenous forests for fuel wood, building, wood carving and furniture-making takes places within poverty stricken communities (NAP, 2000: 9).

As a result, poverty alleviation strategies form another of Swaziland's government's priority activities to reduce land degradation⁵. Nevertheless, a subsequent NAP review by consultants in 2002 questioned these priorities and advocated a focus on promoting awareness, capacity

⁵ The NAP identifies a total of 14 areas for priority action. These are: 1) institutional arrangements 2) chieftaincy and chiefdom boundary disputes 3) promotion of awareness and capacity building 4) promotion of active participation of communities in land management programmes 5) reclamation and rehabilitation of degraded land to promote sustainable utilisation of resources 6) formulation of a national forestry policy and exploitation of forest products framework 7) research and technology 8) proper location of construction sites and physical infrastructure 9) development of alternative energy sources 10) improvement of livestock management practices 11) drought mitigation and poverty alleviation strategies 12) land use policy 13) settlement and resettlement policy 14) population policy (NAP, 2000).

building and participation; developing a land management, land use and land rehabilitation programme; and establishing a desertification research and technology programme. Despite these suggestions, the NAP document has not been updated and explanation for degradation remains largely based on the orthodoxies.

4 b): Understanding the rural livelihood context

Livelihood analyses based primarily on analyses of the questionnaire data were used to create a general picture of natural resource use in the study area, which was then used to explore patterns of land use, conservation and degradation. Subsequently, this information was compared with the orthodoxies and priorities within the NAP.

The primary sources of income for households in the study area are summarised in Table 4.

[Table 4: Primary Source of Household Income]

The majority of rural livelihoods are very diverse, spreading risk and reducing vulnerability to shocks (Chambers, 1997), as factors that create risk for one income source may not be the same as those that create risk for another (Ngugi and Nyariki, 2005). Arable production, which takes place on allocated land, represents a significant component of most livelihoods (even when it does not represent a form of cash income). Indeed, most rural Swazis view themselves as farmers first and foremost and invest their other sources of income in pursuing agricultural activities (cf. Shackleton et al., 2001). For example, several households spend large proportions of their financial capital on fertilisers, particularly for their maize fields. Of the 74 households interviewed, 85% apply manure to their fields, 66% apply fertiliser and 55% use both manure and fertiliser⁶. This increases the nutrients in the soil in discrete parts of the landscape and represents an active attempt to maintain soil fertility.

The temporary or permanent waged employment of one or more members of each household is commonplace (see Table 4), and provides vital financial contributions to the budgets of most families (cf. Holt et al., 1998). This often causes some members of the household to live in urban centres, away from their family, for much of the time. It is a commonly pursued

⁶ Usually compound NPK fertilisers in the form 2:3:2 (22) +Zn or 2:3:2 (38) +Zn were used. This is considered appropriate for crops like maize which require large amounts of nitrogen (Russell, 1988). However, it was difficult to ascertain the quantities applied: some people measured it in barrows, others in sacks and some by the number of spades-full that were put on the fields.

strategy despite the associated costs and risks (de Haan and Zoomers, 2005), one of which is the rising incidence of HIV/AIDS associated with increased migration (e.g. Mushala, 2003).

The harvesting of resources such as grass, fruit and wood poles from communal land is also important, particularly in the livelihood strategies of poorer households (cf. Shackleton et al., 2001; Cavendish, 2000). However, interviews with the case study households indicated that this activity is sometimes pursued as a result of market opportunities, not only due to a lack of other options. Wealthier members of the community own cattle and use the communal rangeland to graze their herds. Nevertheless, in the study area, cattle are not viewed commercially but instead are seen as a status symbol and source of manure, milk and draught power, as well as a form of rural bank (cf. Ferguson, 1994).

Households without any members in waged employment also participate in the wider market economy outside their chiefdoms by renting tractors and purchasing food and other items such as seeds and fertilisers. They too are subject to irregularities in market prices as well as the impacts of policy decisions and social change. Livelihood strategies and land use decisions are therefore influenced across a number of different landscape and institutional scales. They are the cumulative result of the interplay between not only household production and consumption objectives, but also of broader drivers such as drought, biophysical conditions (e.g. topography, geology, soils) geographical location, access to labour markets and the broader political economy.

4 c) Testing the orthodoxies in the NAP using empirical micro-level data

What support for Orthodoxy 1: is land degradation the result of too many people?

Rangeland areas provide grass for thatching, medicinal herbs and fruit to rural households, while the wealthier members of society who own cattle use the commons to graze their stock. The rangeland in the study area was considered by 72% of questionnaire respondents to be in poor condition, primarily due to excessive grazing, the loss of access to land due to new settlement and because of the impacts of drought (see Table 5). More than half of the questionnaire respondents (66%) thought the rangeland condition had significantly worsened over the past ten years, while 85% reported an increase in bare ground in the rangeland areas. These responses are supported by field observations, photographs and aerial photographs, in which large patches of sheet erosion and gulying were present (e.g. Figure 2). However, while the drivers of rangeland degradation are not straightforward to determine, they are also not as linear as the orthodoxy implies.

[Figure 2: Areas of erosion on rangeland parts within the study area]

[Table 5: Local Understandings of Rangeland Condition]

Population changes are leading to changes in land use, which has implications for both resource use and degradation. Increasing demands for land from both within the village and as people arrive from other places has resulted in land formerly used for grazing being allocated to families for use as arable land. In aerial photographs from 1984, 60 homesteads were counted. By 1999 this had increased by 35% to 81. Given the increasing incidence of HIV and AIDS throughout the country, it remains unclear whether the study area is still experiencing population growth, whether the national HIV/AIDS statistics mask diversity at the local level, whether there is a trend towards greater numbers of homesteads with fewer inhabitants, and whether these processes constitute short-term or long-term trends.

Furthermore, the impact of this is on population distributions (both spatial and demographic) is currently unknown, though a population skewed towards a majority of old and young people is likely to cultivate a smaller land area than a population dominated by healthy middle-aged people. Nevertheless, indications from the 1984 aerial photographs suggest the loss of rangeland to settlement usually has the effect of restricting access for the rest of the community over the long-term, as the majority of homesteads present in 1984 were still there in 1999, regardless of their number of inhabitants. Analyses of the problems on communal rangeland, supported by meteorological trends indicating increased frequency and severity of droughts (see Shongwe and Dlamini, 2002), therefore indicate that problems of soil erosion and gulying relating to land use change are driven by broad-scale biophysical and climatic processes, acting in conjunction with a combination of population distribution changes (not necessarily population growth), changing access to land, and overgrazing.

The largest impacts of the land use changes have been experienced by those that regularly use the communal areas. The overall effect for poorer households, who have been most severely affected, is a diminishing range of potential rural livelihood options (GOS, 2001; cf. Cavendish, 2000). Higher grazing intensities have, according to interviewees, resulted in decreased biodiversity and availability of some grasses and medicinal herbs, while the increasing extent of soil erosion and gulying also reduces the land area available for grazing, worsening degradation on the remaining land. For example, Lindiwe explained that:

“The types of grass are changing. Before there was lots of *Lucunga* [Latin name *Cymbopogon validus*: a type of grass popularly used for thatching] but now there is less. The gully on that side is getting bad as well and there are wattle trees that are destroying the grasses. The land is getting worse”.

While livelihood strategies may be decided upon at the household level in response to changing resource availabilities, it is the manner in which these decisions relate to each other at the community level that determines the environmental outcomes of the particular activities that are pursued (Birch-Thomsen et al., 2001). In sum, there is little empirical support for the Malthusian orthodoxy that land degradation in the study area is largely a result of population growth. Instead, it is the interaction of various local and broader economic (livelihood), environmental, social and institutional factors that together have an impact on the landscape.

What support for Orthodoxy 2: do poor people cause soil degradation and forest loss because they are poor?

Wood is an important resource in rural Swaziland (Lasschuit, 1994). It is used as fuel for cooking and as a construction material for people's homes. Some people also sell wood poles harvested from communal forests as part of their livelihood strategies. The questionnaire respondents and case study households reported a decline in access to forest land over the past ten years. This was largely attributed to demand exceeding supply. While many of the 'medium' and 'high' wealth households now buy wood (particularly for use as fuel), this is not a realistic option for the financially poorer households. Wealthier families suggested that if forest resources were still easily accessible and plentiful, they would continue to collect wood from the communal forest areas rather than buy it. This coping strategy is therefore chosen due to a lack of options, not as a matter of choice. The poorer households in the research respond to the lack of wood by pursuing alternative strategies that involve placing less pressure on their financial capital stocks. For example, they use dried cow dung or collect aloes (*Aloe marlothii*) for use as fuel (cf. Duraiappah, 1998).

Both the purchasing of wood and the collection and use of dried cow dung have knock-on environmental effects that could lead to degradation, since they both involve further extractive and potentially environmentally unfavourable practices (Ngugi and Nyariki 2005). Depending where the purchased wood is sourced, forestry and cutting practices may be unsustainable and could lead to problems of deforestation and subsequent erosion in other areas beyond the study chiefdom. The collection and use of dried cow dung by poorer households is also potentially environmentally problematic, as it prevents nutrients from being naturally returned to the soil. Therefore both the richer and poorer households could be degrading the environment and causing problems other than deforestation, albeit with spatially distinct consequences, emphasising the patchy nature of landscape degradation. For those households that continue to harvest wood from the communal forests in their chiefdom, greater time investments are needed, as it takes far longer to source the required volume of

wood than it did ten years ago. However, finding new, exploitable woodland areas and harvesting the products in a sustainable way that permits re-growth could mean that this response has the fewest negative environmental impacts. In examining whether people attempt to conserve the woodland in their chiefdoms, it was found that neither rich nor poor families reported having planted new fuel wood trees on communal or allocated land. However, many households had planted fruit trees within their homestead compounds. Questionnaire responses indicated that this does not necessarily represent a conservation measure. Rather, it is an activity undertaken largely to improve household diets.

Despite these local reports of declining woodland across the study chiefdom, land-use mapping from aerial photographs presents a very different situation. Analyses of time-series photographs from the study area in 1984 and 1999 showed forest areas to have increased by 17%, particularly in gullied parts of the landscape. This is illustrated in Figure 3.

[Figure 3: Forest Cover in 1984 and 1999]

However, when analysis was taken to the species level during transect walks with key respondents, the increase in woodland is found not to be synonymous with an increased abundance of fuel wood species. Guavas (*Psidium guajava*) were found to have proliferated more than species such as *Acacia davyi*, *A. robusta*, *A. gerrardii* and *A. karroo* which are widely used for fuel wood, hence the local perception of declining forest area.

This section has so far demonstrated that despite increasing woodland area, shortages of fuel wood may still be a problem for households across the wealth continuum. Increased demand for fuel wood, and restricted access to land, were identified by local people as the main drivers of the problem. However, poor infrastructural development whereby there are no facilities for electricity provision also restricts household options. Richer households tend to purchase wood whereas poorer households draw on their other types of capital and use dried cow dung and aloes, which could have other negative environmental impacts. While neither group (rich or poor) actively conserves trees, a variety of different responses are undertaken in conjunction with available and accessible assets. This can lead to further degradation, sometimes of a different kind.

With regard to questions of soil degradation, it is important to consider each part of the land use system separately, as soil loss on communal rangeland is interpreted very differently to soil degradation on arable crop land. The interview and questionnaire results show that erosion and gullying of rangeland areas appear to be intensified by the wealthier cattle owners

within the boundaries of biophysical and climatic processes (refer back to Table 5). Individual attitudes are a key factor in determining whether degradation on communal land is allowed to proceed unchecked or whether behaviour is modified in the light of the degradation that occurs (e.g. changes to grazing practices as a result of gullying). However, it is the poorer households that suffer most acutely from the impacts of rangeland degradation, since livelihood strategies of the poor are more dependent on products from communal land, for both household consumption and as a source of income (cf. Duraiappah, 1998; Boyce, 1994).

On allocated arable land however, the decision to pursue environmentally degrading activities is a trade-off between the availability of and accessibility to different types of capital, in combination with the farmer's attitudes and preferences. Short-term soil degradation may allow farmers to do better in the long-term (Anderson, 1999; Barbier, 1997). For example, maize production is undertaken with both short- and medium-term considerations. One of the key informants in the research, Dudu, explained how she aims to produce enough maize to feed her family until the next harvest, plus a little extra to sell. She knows that if she stops adding fertilisers to the soil, nutrient levels (especially nitrogen) will decline and the parasitic weed *Striga asiatica* is likely proliferate over the medium- to long-term. Consequently, every year, she spends the little income she has on applying fertilisers to her maize crop. Similarly, because Dudu's land is severely gullied in parts, each year her household invests human capital in gully blocking measures. These include using stones to build small dams and planting vegetation to prevent gully expansion. Ditches are also dug to divert water away from vulnerable areas. Again, despite her financial poverty, Dudu draws on her other capital stocks to aid longer-term planning by taking action to rehabilitate degraded land.

The second major component of Dudu's livelihood strategy is the informal trading of home-grown sweet potatoes. Despite her knowledge that soil nutrients need replenishing regularly, over the short-term, she chooses not to add fertilisers to her sweet potato fields:

“We didn't add any fertiliser to the field this time. We are having sweet potatoes and if you put fertiliser with them, it makes them lose their taste - they taste all watery”.

The scientific explanation for “watery” sweet potatoes may be attributed to high soil nitrogen levels, which can encourage vine growth at the expense of tuber quality and quantity (Purseglove, 1987). This demonstrates how Dudu may be maximising over the short-term due to the composition of the NPK fertilisers to which she has easy access. She has observed that use of these fertilisers has an impact on yield quality and made an informed decision (probably based on experimentation in light of biophysical realities) not to use them. The

literature also notes that sweet potatoes respond favourably to organic manures (Purseglove, 1987). However, Dudu has no cattle. While she therefore seems to pursue environmentally unfavourable practices through one component of her livelihood strategy, her overall decision-making may be considered rational. Dudu also trades sweet potatoes locally in return for maize. This is particularly important when her maize yields are insufficient to feed her family. She explained that if she trades inferior quality sweet potatoes within the community, she is risking the possibility that during the next year her trading partners will go elsewhere. In this respect, she is thinking with a long-term outlook by preserving and building social capital, albeit at the short-term expense of her natural capital e.g. (Reardon and Vosti, 1995). Furthermore, Dudu practises crop rotation and recognises that different crops place different demands on the soil. Thus, if her sweet potato field is used for maize during the subsequent growing season, fertilisers will once again be applied. Also, if the sweet potato tubers are harvested but the vegetative parts returned to the soil as green manure or mulch, then nitrogen, phosphorus, potassium and zinc losses will be minimal, and the soil organic matter – which can be depleted under maize cultivation – can be improved (cf. Russell, 1988).

Barbier (1997) argues that it is fundamental economic concerns that determine farmers' willingness to adopt environmental improvements and not a quest for sustainability. However, much also depends on farmer attitude and personality. This shows how the decisions that are made are reflections not just of environmental understandings but also of broader scale influences and multiple motives (Serageldin and Steer, 1994). Whilst the logic and reasoning behind some decisions may appear myopic and irrational to others, decisions like those made by Dudu are the product of the evaluation of the entire resource network, with consideration given to multiple processes and biophysical realities operating over a variety of timescales. It is therefore not necessarily the case that poor people cause soil erosion and other forms of land degradation, as supposed by the orthodoxy. Nor is it the case that they will always conserve it. Management decisions for both rich and poor households are the result of broader scale factors (e.g. opportunities for non-agricultural livelihoods and access to inputs such as manure), inherent soil erosion and climatic risks, as well as political economic processes (such as high fertilizer prices).

What are the main land degradation problems affecting rural livelihoods and how are these explained and addressed in the NAP?

The main land degradation issues that have been considered so far are some of the key problems highlighted in the NAP. Explanation has been sought for why and how soil degradation and fuel wood shortages occur and it has been suggested that the process leading

to these unfavourable environmental changes are much more complex than is acknowledged within policy. However, it remains to consider what the main land degradation problems affecting rural livelihoods are, and whether these are adequately addressed within the NAP.

According to the questionnaire data, weed infestations, in particular of the parasitic weed Striga asiatica, were viewed as the single most significant constraint to agricultural production. As suggested by one of the case study household representatives: “The main problem is the sona [S. asiatica] weed. The yields would be much greater without it because everywhere the weed is, the yield is less. It gives something bad to stop the maize growing up”. Due to the timing of the fieldwork (following harvest) it was impossible to measure the extent of S. asiatica abundance. However, it was clear from the questionnaire and participatory data that S. asiatica was a major problem for both rich and poor households alike, and the main environmental constraint to the agricultural production component of rural livelihoods.

S. asiatica is widely regarded by scientists as a biological indicator of land degradation and its parasitic activities and impacts on the maize crop are well documented (for example, see Nickrent and Musselman 2000; Emechebe et al., 2004; Parker and Riches, 1993). It grows primarily in soils with low fertility levels, since it is a poor nitrogen metaboliser, yet its presence in the study area is indicative of a deeper land degradation and soil quality problem (Press and Gurney, 2000). Analysis of the Swaziland NAP and other related policies, reveal that parasitic weeds (and weeds per se) are not even identified as a problematic form nor symptom of land degradation, despite grave local concerns about their impacts on rural livelihoods. Instead, soil erosion and gullying on communal grazing land form the focus of the policy, with explanation for these being based primarily on our two orthodoxies. This mismatch between policy and local priorities is an important oversight with potentially serious implications. It suggests that orthodoxy-based policy not only seeks inadequate explanations for environmental degradation but also that the strategies and intervention it advocates are misguided and lacking in empirical support. As such, the NAP focuses primarily on visible degradation problems, which are not necessarily central to local livelihoods (particularly those of the poor). Meanwhile, patchy invisible degradation in the form of soil quality change and parasitic weed infestations continue unchecked at the policy level, despite the important impacts these problems have in shaping both livelihood strategies and future patterns of resource use.

5. DISCUSSION AND CONCLUSION

This research has revealed that households operating across the wealth spectrum undertake livelihood activities that both damage and conserve the landscape in different ways. Some parts of the landscape are degraded at a particular point in time and space, other parts may be conserved. Different components of the livelihood strategy are undertaken for different reasons on different parts of the landscape, while choices about different strategies are made across many levels of society, depending on risks and opportunities. What results is a dynamic montage of interpenetrating biophysical, socio-political and economic outcomes, mediated by land user agency and resource use decisions. Household actions are also carried out over various simultaneous time-horizons and are dependent on a number of local and broader scale dynamics. The environmental degradation that ensues depends on people's responses to sudden 'shock' changes (e.g. drought) and gradual processes (e.g. slowly rising fertilizer prices), as well as the cumulative results of the interaction of different households' livelihood strategies. The extent and severity of degradation is also linked to the inherent physical environmental characteristics and vulnerability to the various processes of degradation (particularly in the cases of soil erosion and gullying). However, the exploration of changing fuel wood availability demonstrated that environmental problems have a spatial dimension and that, for example, deforestation in one area can intensify the occurrence of environmentally degrading practices in other areas.

In reconciling the empirical field data with the policy analyses and interview data, it is clear that both orthodoxies, and more importantly, Swaziland's NAP, provide an overly simplistic, linear view of the on-the-ground situation. The empirical results show that at the national level, population numbers are declining, not increasing, while the absolute number of people is not necessarily problematic- it is the cumulative effects of their distribution, the characteristics of the resource base to which they have access and the myriad ways in which it is used that are the key factors. The presentation of population growth as a problem within the NAP is somewhat naïve, as it lacks historical context and focuses on the number of people as the key target for change, regardless of current population trajectories. It neither considers the root cause of the issue, nor finds ways to address its drivers. In addressing the second orthodoxy, the results have demonstrated that while poorer families can suffer most profoundly from the effects of degradation, it is not necessarily the case that poor people cause degradation. Indeed, erosion and gullying on communal rangeland appear primarily to be the result of richer households' activities – particularly their unsustainable grazing practices in the context of the prevailing environmental characteristics. So, while poor people may bear the brunt of the land degradation in the study area, they do not necessarily drive it. Even when they do cause it, it is not necessarily because they are poor. There are not clear 'winners' and 'losers' in terms of environmentally destructive actions (Scruggs, 1998).

Indeed, such simplistic notions are both harmful to the landscape as well as unhelpful to local people, since interventions not only lack empirical support but more importantly, divert attention away from the main environmental challenges to rural livelihoods. Policymakers therefore need to evaluate more critically the outdated and simplistic degradation orthodoxies on which the NAP is based.

These multiple, complex considerations make the development of effective policy highly challenging, and the NAP is not alone in presenting an over-simplistic approach. The other policies that were reviewed in the research also often neglect to appreciate the full spectrum of diversity. They fail to recognize that much of the Swazi population base their livelihood and resource use decisions on the basis of past experience (indeed, this is one of the primary ways in which local knowledge is accrued (Sillitoe, 1998a; 1998b; 2004)), not on an ideal future scenario that they strive to attain (de Bruijm and van Dijk, 2003). Policies also often overlook the environment's natural strengths and vulnerabilities when proposing alternative livelihood options, while local people perhaps have a more astute awareness of the distribution of degradation and the areas at risk than is largely acknowledged. Stronger links therefore need to be made between scientific and policymaking communities, while more credence should be given to land users' own knowledges, perspectives, concepts and categories surrounding issues of soil conservation and degradation (cf. Johnston and Soulsby, 2006). It is both necessary and urgent for policymakers to move beyond the simplistic orthodoxies of society-environment relationships to identify real local knowledges and practices, on which they can base a number of flexible policy alternatives. These should embrace uncertainty and become real possibilities for both rural livelihoods and landscape conservation as changing socio-economic and political circumstances permit (Bryceson, 2002). For example, appropriate policy for Swaziland's middleveld may involve building on the land-based livelihoods on which most rural people currently centre their activities (cf. Shackleton et al., 2001), since any interventions should be sensitive to people's capabilities and constraints. Given the importance of social capital to the poor as exemplified in Dudu's case, social and human assets should also be afforded a central role (cf. Goldman, 2003).

In addition, the wide disparities in understandings of land degradation within policy and local communities highlight the importance of developing a clear definition of exactly what land degradation is. Once that is established, steps should be taken towards the development of suitable, broadly-applicable benchmarks and indicators, for identifying, assessing and monitoring land degradation. These should bring together local and scientific knowledges at local, national and international levels in order for future land use planning to be more sustainable. Similarly, land use policy needs to be firmly grounded in up-to-date empirical

assessments of the state of environment and understandings of how and why that state came about. This requires a nuanced knowledge about people and the environment, as well as the ways in which they interact with each other. Moreover, it requires the further development of participatory approaches towards the definition, management, monitoring and assessment of land degradation. Without these kinds of changes, popularised orthodoxies will continue to provide a basis for inappropriate land policy.

The use of multiple methods in this study both broadened and deepened the understandings that could have been attained using single, disciplinary techniques and the refinement of this approach is vital to the further unpacking of poverty-environment linkages and their policy relevance. The sustainable livelihoods framework provided a useful anchor-point and allowed exploration of the dynamic and sometimes contradictory relationships between livelihoods and environmental degradation. However, it insufficiently accounts for diversity in farmer attitudes and these were found to be central to the decision-making process and the ensuing level of environmental degradation. It also offers little scope for exploring socio-environmental histories which are important in learning about the types of conditions and decisions that lead to different types and rates of environmental change (Klepeis and Turner II, 2001). Further empirical and interdisciplinary research is needed to improve understanding of biophysical and decision-making processes across scales, space, time and institutions. With this information, rural people across the spectrum of wealth might then be engaged as partners in the sustainable management of the environment, and could benefit from the support of more appropriate land use policies.

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Table 1: Characteristics of the study chiefdom

Characteristic	Detailed information
Location	Upper middleveld, approximately 30 minutes by car along gravel roads from Manzini, Swaziland's largest urban settlement. However, transport is irregular and too expensive for many local people to use, so the study site does not commonly function as a commuter location. Access to services, markets and information therefore remains limited.
Population	Population of 734 people, living in 80 homesteads and operating as 74 household units. Most households (77%) have male heads, however many were working away from home on commercial forestry and sugar cane plantations in other parts of the country, leaving their wives in charge of day-to-day decision-making. The majority of heads are aged between 31 and 65 years. Household sizes range from 4 to more than 21 members.
Environmental characteristics	Rolling to hilly topography; slopes ranging from 15-30° (Jansen <i>et al.</i> , 1994). Soil comprises sandy loams with patches of acid clay (Jansen <i>et al.</i> , 1994) and land is classed as good to fair in terms of production potential (Mushala <i>et al.</i> , 1998). 85% of households apply fertiliser to the land and 66% apply manure to arable fields.
Livelihood strategies	Income sources are predominantly from waged employment (51%). This is considered typical of a middleveld community (cf. JICA, 2001). 18% of households reported the sale of arable produce to be the mainstay of their livelihood. Other sources of income include the sale of natural resources harvested from communal areas (mostly fruit and grass), assistance from family members in other chiefdoms, handicrafts and pension payouts. Sale of cattle was not reported as the primary form of income for any of the families but is considered a component of the overall rural livelihood strategy.
Arable production	Maize is grown, often in conjunction with groundnuts, sweet potatoes and beans.
Livestock ownership	Cattle are kept by 68% of households. They are viewed primarily as an indicator of social status (cf. Ferguson, 1994), although herd sizes are small. 68% of cattle owners reported a decrease in herd size over the last 10 years, primarily as a result of drought. Goats are owned by 49% of households.
Degradation problems	The topography and a slope range of 15-30° (Jansen <i>et al.</i> , 1994) predisposes the land to erosion. Communal land is severely gullied in parts due to concentration of runoff along cattle tracks, particularly on the slopes close to the dip tank (JICA, 2001). Gullies also worsened in 'Cyclone Domonia', which swept through the area in 1984. Soils have medium to low levels of N, P and K and widespread parasitic weed infestations indicate degraded soils in arable areas. Woodland areas supporting species used as fuel wood have decreased over the past 10 years but overall woodland areas have increased.

Table 2: Characteristics of case study households and their wealth level classification (Note: names have been changed to protect identities)

Name of representative	Sara	Lindiwe	Dudu
Date of settlement in current homestead	1952	1972	1995
Number of household members	19	19	11
Number of cattle owned	35	11	0
Access to farm machinery	Basic implements owned but tractors rented	Basic implements owned but tractors rented	Basic implements owned but tractors rented
Highest educational attainment of household members	Form 3 (secondary education)	Form 5 (secondary education)	Form 4 (secondary education)
Approximate size of allocated plot	2.5 ha	2.5 ha	1 ha
Household livelihood and resource use strategies	Several household members work in Mbabane and send remittances for their children. Maize and vegetables from a family vegetable garden sold locally. Communal rangeland is used to graze cattle. Wood from communal forests is used as fuel and wild fruits are harvested for household use.	Some household members work in Mbabane and send remittances for their children. Female household members harvest grass from communal areas, make it into mats and brooms and sell the secondary products. Subsistence farming is pursued. Any excess maize is sold. Traditional medicines are made from herbs collected from communal areas and sold within the village. Rangeland is used to graze cattle. Cows have been sold when cash was urgently needed. Wood from local forests is used as fuel and wild fruits are harvested for household use.	There are no household members in full time employment. Income is raised through the cultivation of sweet potatoes, which are swapped for maize (that is then sold onward) and through the sale of home-grown maize. Scraps of textile waste are collected and made in to children's clothes, which are then sold. Wood from communal forests is used for fuel and grass for thatching is harvested from communal areas.
Wealth designation	High	Medium	Low

Table 3: Supporting the orthodoxies: Comments from Interviews with NGO Representatives and Steering Committee Members

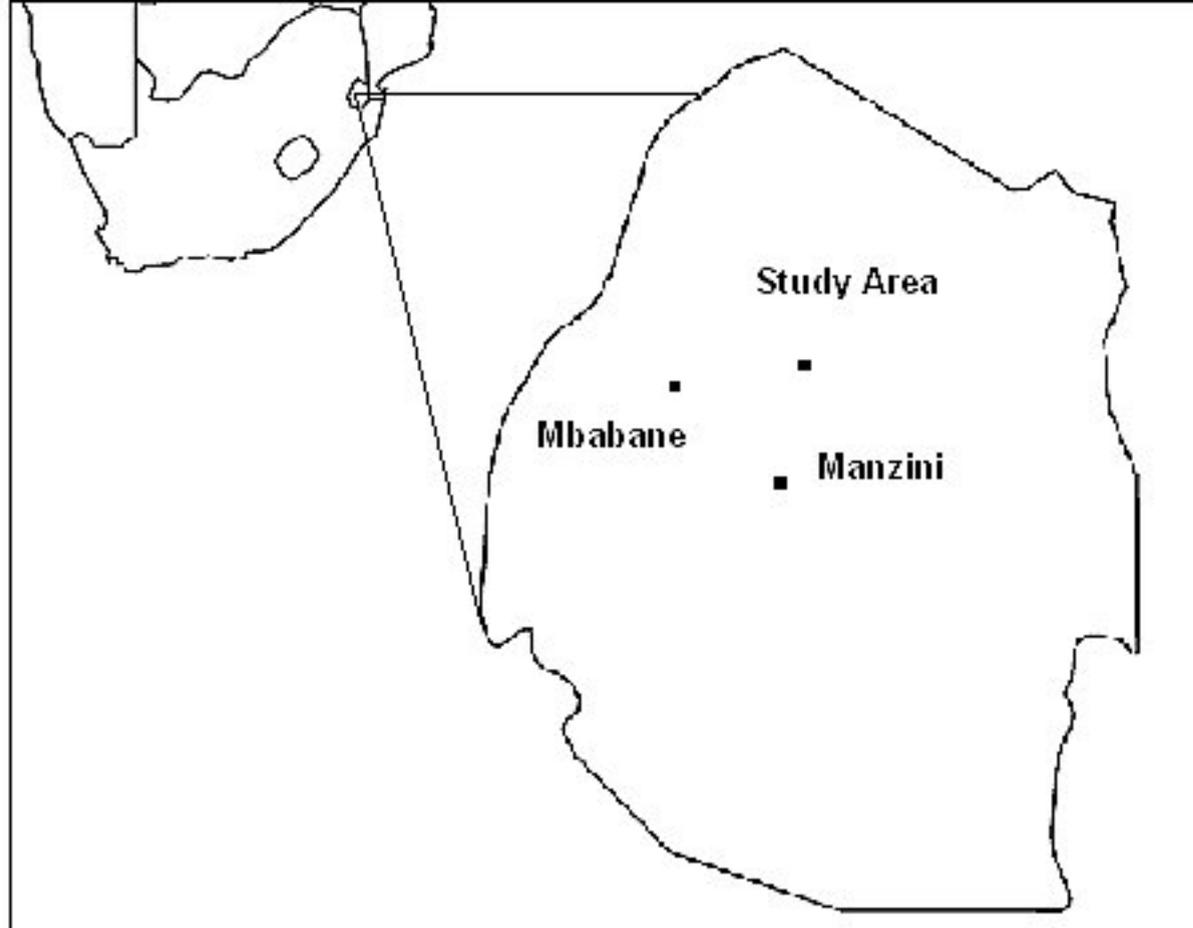
Interviewee number	Response to the question: 'What are the main causes of land degradation in Swaziland?'
1	'Degradation occurs due to lack of food, lack of shelter, lack of water, lack of sustainable incomes and poverty. People believe resources are given to them by God for them to use but because the population is growing, they use them too fast because they are poor and have no alternative, which is why there are big dongas and we are having soil erosion'
2	'Population contributes a lot because deforestation is occurring largely due to people wanting to settle in new places'
3	'Degradation rates are in actual fact increasing as population is increasing. We are seeing that there is more and more land that has been cleared every year'
4	'Most of the degradation is because of population and animal pressures, over-harvesting of trees and overexploitation of arable land'
5	'Our problem is the population. Population increases and the degradation gets worse. Once a son is married he has to go out there, build his own hut, live with his own family, with his own animals, and so now the land is getting finished'
6	'As we need to fit more people, we need to harvest more of the natural resource base and so we need to find ways of meeting their expectations. Economic performance at the moment is not bright and creation of jobs is not good. Poverty issues are becoming worse'

Table 4: Primary sources of household income (based on 74 household questionnaires)

Sources of income	Number of households	% of households
Sale of arable produce	13	18
Seasonal or permanent job	43	58
Sale of resources from communal areas	11	15
Family assistance	4	5
Other	3	4

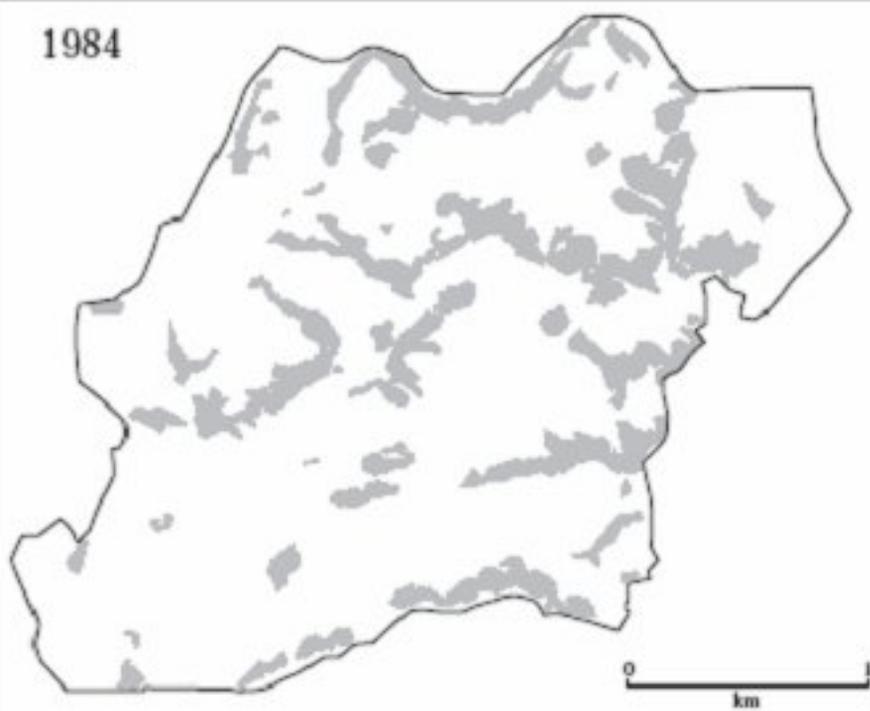
Table 5: Local understandings of rangeland condition (based on questionnaire survey responses)

Question	Responses	Number	(%)
What is the quality of the rangeland at present?	Good	17	22
	Poor	53	72
	Don't know	4	6
What makes the rangeland condition poor?	Drought	8	11
	Cattle tracks	4	6
	Poor soils	2	3
	Excessive grazing	41	56
	Bare ground and gullies	8	11
	Excessive new settlement	11	13
How do you recognise when it is in good condition?	Cattle are fat	22	30
	Lots of good grasses are present	43	58
	No gullies	5	4
	Don't know	4	8
How do you recognise when it is in bad condition?	Short grass	1	2
	Many cattle use it	1	2
	Bare ground and gullies	47	64
	Thin/dead cattle	17	22
	Cattle don't like to graze there	3	4
	Don't know	5	6
How has the rangeland changed over the past 10 years?	Better	5	6
	Worse	49	66
	Same	13	18
	Don't know	7	10
How has the amount of bare ground on the rangeland changed over the past 10 years?	Increased	63	85
	Decreased	1	1
	Same	10	14





1984



1999

