



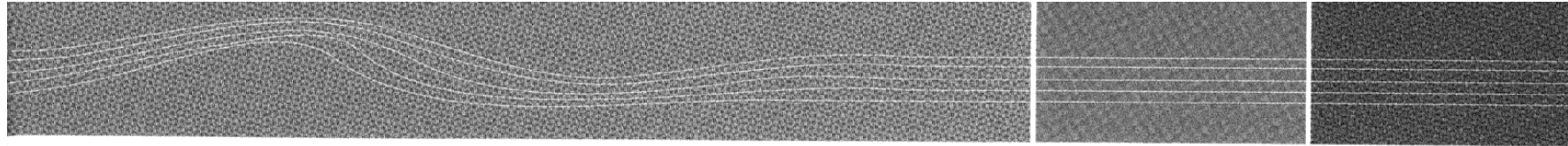
## INTRODUCTION

Only about 23% of South Africa's land is suited to cultivation (Schoeman et al, 2002). This highlights the importance of effective conservation of potentially productive land in order to ensure food security. In 2001/2002, there were 940 815 paid employees in the agricultural sector, of which 211 808 or 22.5% (the highest percentage) were in the Western Cape (Stats SA, 2004). In addition, the same census data indicates that the gross farming income from commercial farms in the Western Cape was R10 653 332, about 20% of the total income earned by the sector in the country (R52 971 232). The Western Cape also had the highest farming debt (23.7% of the total for the country) (Stats SA, 2004). These figures indicate the importance and vulnerability of agriculture in the Western Cape. The conservation of agricultural resources is therefore an important issue.

Unsustainable agricultural practices have had a role to play in the degradation of land on which agriculture depends. Of significance to the issue of land degradation is that, on 30 September 1997, South Africa ratified, the United Nations (UN) Convention to Combat Desertification in those Countries experiencing serious Drought and/or Desertification, particularly in Africa. In terms of this Convention, South Africa has an international obligation to develop a National Action Programme (NAP), the purpose of which is to "identify the factors contributing to desertification and practical measures necessary to combat desertification and mitigate the effects of drought (UN Convention to Combat Desertification, 1994, Article 10:1)". The Department of Environmental Affairs and Tourism (DEAT) is currently in the process of developing a NAP. The National Review of Land Degradation in South Africa (SANBI, 1999) was drafted to provide a scientific basis for the NAP.

**The priority issues reported on in this chapter are:**

- Soil and veld degradation; and
- The loss of land for agricultural use.



Land reform in the Western Cape is also a critical issue that affects the agricultural industry. In the Western Cape, as in the rest of South Africa, the Land Reform programme is driven by the National Department of Land Affairs. The Government hopes to redistribute approximately 30% of agricultural land in the country by 2015 (CNdV, 2004). The issue of land redistribution is discussed in Chapter Two.

## DRIVERS AND PRESSURES

The driving forces and pressures that affect land in the Western Cape are discussed below. It should be noted that although agriculture is discussed as a primary human influence on land degradation, there are secondary forms of human influence including, for example, the clearing of land for socio-economic uses such as urban settlements, recreation and infrastructure (Giliomee, 1994).

### Soil Degradation

**Climate and Topography** – Due to the climate and topography of the country, South African soils are predisposed to erosion (Garland, Hoffman and Todd, 1999). Soil erosion results in the selective removal of organic matter and clay minerals, which leads to a reduction in the water retention capacity of the soil. This often results in low yields and crop failures. It is suggested by Garland et. al. (1999) that the decrease in grazing lands in South Africa over the last 10 years is due, amongst other factors, to the erosion of top soil. Drought, floods and desertification are also partly the result of soil degradation caused by erosion (Garland et. al., 1999).

**Erosion** – in the Western Cape, sheet erosion<sup>19</sup> is the most common form of soil degradation (Hoffman and Ashwell, n.d.). The Province is also affected by wind erosion<sup>20</sup> (e.g. near Colesburg, Burgersdorp and Beaufort West), and some rill and

gully erosion<sup>21</sup> in the southern Cape (Hoffman and Ashwell, n.d.). In addition, salinisation affects certain croplands in the northeast of the Province.

**Human Activities** – Soil degradation is caused and/or accelerated through, for example, soil losses due to inappropriate road construction, forestry planting and harvesting practices, cultivation of crops, inappropriately located rural and informal settlements and walking/hiking (Garland et. al., 1999). Vegetation burning is also known to have an effect on erosion; however, the nature and degree of this effect is determined by a number of factors such as the timing of burning (soil loss has been shown to increase in the dry season) and the condition and properties of the soil surface (Garland et. al., 1999).

### Veld Degradation

**Change in plant species composition** – The grazing lands of the arid and semi-arid succulent Karoo and Nama-karoo biomes are particularly affected by a change in plant species composition, which is mainly due to the selective grazing patterns of livestock (Hoffman and Todd, 1999).

**Alien Plant Infestations** – Along the coast and in the mountains, alien plant invasions are the most common veld degradation problem (Hoffman and Todd, 1999). Invasions by alien plants are facilitated mainly by human activities such as agriculture, horticulture and afforestation (Hoffman and Todd, 1999; Le Maitre, 1999). Rapid colonisation and increases in the density of invasive plants are often linked to disturbances such as fires, floods and overgrazing (Le Maitre, 1999). Amongst the many effects of invasions by alien plants, is the ability of invaders to increase soil erodibility and erosion rates by suppressing the ground-layer so that the root mat no longer effectively binds the soil (Le Maitre, 1999). Additionally, once alien plants are removed effective rehabilitation does not always occur and the

cleared land is more vulnerable to erosion. Alien plant invasion is dealt with further, as an issue in the chapter on biodiversity.

### Unsustainable agricultural practice and the clearing of land for crops

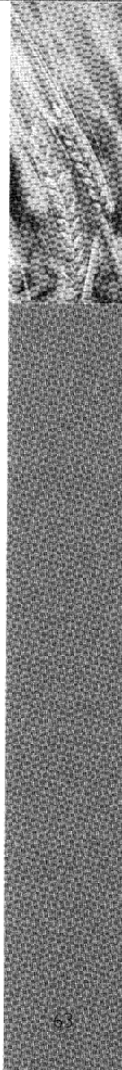
– One of the important contributing factors to land degradation in the Western Cape is the use of land for agriculture and the collection of plants for purposes such as fuel and building (Giliomee, 1994). The clearing of land for agriculture in the Western Cape is driven, inter alia, by the conversion of low production grazing areas for higher yielding crops (Hoffman and Todd, 1999). Agricultural practice leads to a lack of biodiversity as natural vegetation is removed and large tracts of land are covered by monocultures of, for example, wheat, vineyards and fruit trees (Giliomee, 1994). Birds, insects and rodents are also exterminated. This leads to invasions by alien plants (Giliomee, 1994). Regular ploughing changes the structure of the soil, resulting in soil compaction, characterised by slower water infiltration, increased run-off and higher rates of erosion (Giliomee, 1994). Intensive agriculture and loss of organic material, combined with overhead irrigation, contribute to crust formation, which has become a form of soil deterioration that is widespread in South Africa (Giliomee, 1994). The most serious impact on soils of the cultivation of crops is the increase in erosion potential (Giliomee, 1994). However, it should be noted that more and more farmers are now practising conservation farming and fields are not ploughed. It is estimated that 40% of wheat farmers and 80% wine and fruit farmers in the Western Cape are practising conservation farming (Venter, pers comm, 2005).

**Other factors** – There are a number of other pressures that are important on a more localized scale. These include recreational activities, the expansion of urban settlements (including the development of infrastructure, particularly along the coast) and un-rehabilitated quarries. The workshop participants in the

19. Sheet erosion is the selective removal of easily transported material from the soil surface by overland flow over a relatively large proportion of a homogenous surface (Moon and Dardis, 1988).

20. Wind erosion is the process of wearing away exposed rocks by the abrasive action of particles carried by the wind (Moon and Dardis, 1988).

21. Rills are temporary microchannels several centimetres in width and are associated with sheetwash or sheet erosion (Moon and Dardis, 1988). Gully erosion: Gullies are more permanent than rills. The size, shape and degree of activity of a gully varies according to the processes involved, and is governed by the properties of the material into which the gully is incised as well as the nature, frequency and magnitude of the flow draining into and through it (Moon and Dardis, 1988). Gully erosion: Gullies are more permanent than rills. The size, shape and degree of activity of a gully varies according to the processes involved, and is governed by the properties of the material into which the gully is incised as well as the nature, frequency and magnitude of the flow draining into and through it (Moon and Dardis, 1988).



National Review of Land Degradation in South Africa (SANBI, 1999) noted the expansion of settlements as a factor in veld degradation for nearly every magisterial district. However, their perception was that the rangelands of the country were under more threat from grazing, deforestation and alien plants, amongst other factors, than from settlement expansion (Hoffman and Todd, 1999).

#### Other Drivers and Pressures

**Limited water resources** – water is a scarce commodity in the Western Cape and is unevenly distributed. The agricultural sector needs water for irrigation, especially the fruit industry. With an increase in urbanisation there is increasing competition for water, which is greatest in areas with relatively poor soils.

**Uneconomic sub-divisions** – Uneconomic subdivision and fragmentation of agricultural land can result in agricultural land no longer being viable to farm. The Subdivision of Agricultural Land Act 70 of 1970 was enacted to prevent the fragmentation of agricultural land into uneconomic units. However in terms of land redistribution it is problematic, as it prevents groups of individuals from owning undivided shares in farmland.

## ISSUE: SOIL AND VELD DEGRADATION

Land degradation is broadly defined as "...any form of deterioration of the natural potential of the land that affects ecosystem integrity either in terms of reducing its sustainable ecological productivity or in terms of its native biological richness and maintenance of resilience" (World Resources Institute, 2000). It is estimated that land degradation costs South Africa R2 billion per annum.

## STATE

### Combined land degradation index

There are two forms of land degradation: soil degradation and veld degradation. The combined land degradation index is a measure of the rate of severity of soil and veld degradation combined.

The perception of workshop participants in the National Review of Land Degradation in South Africa (SANBI, 1999)

was that soil degradation is less of a problem in the Western Province than in most of the other provinces (Garland et. al., 1999). The Western Cape had the second lowest provincial soil degradation index (Hoffman and Ashwell, 1999: [www.nbi.ac.za/landdeg/](http://www.nbi.ac.za/landdeg/)) in the country (Table 7.1). Soil degradation was rated as insignificant in most agricultural lands in the Province, with the exception of some commercial grazing areas in the Little Karoo and around Vanrhynsdorp (Garland et.al., 1999).

Veld degradation was assessed as moderate, with the most degraded areas being Hermanus on the southern coast, and

**Table 7.1:** Comparative land degradation statistics for the provinces of South Africa (Source: Hoffman 2002b)

Province	Area (km <sup>2</sup> )	SDI*	VDI*	CDI*
Eastern Cape	169 600	200	116	316
Free State	129 480	48	86	134
Gauteng	18 810	113	31	143
KwaZulu-Natal	92 180	253	187	440
Mpumalanga	78 370	143	81	223
Northern Cape	361 800	92	140	232
Limpopo Province	123 280	255	189	444
North West	116 190	149	122	270
Western Cape	123 370	77	93	170
TOTAL	1 219 080			

Note: \*SDI: Soil Degradation Index; VDI: Veld Degradation Index; CDI: Combined Degradation Index

## IMPACTS

Land degradation can have the following impacts:

- Loss of land capability and agricultural potential.
- Decrease in crop and grazing production.
- Loss of biodiversity, including loss of habitats of high conservation value, such as those that are a part of the Cape Floristic Kingdom.
- Sedimentation of rivers and estuaries.



Montagu, Oudtshoorn and Calitzdorp in the Little Karoo.

As indicated in the table below, overall the Western Cape has the third lowest combined degradation index, but does have a serious alien plant infestation problem.

### ISSUE: LOSS OF LAND FOR AGRICULTURAL PRODUCTION

The two indicators used in this section describe the status quo of land used for agriculture, i.e. land potential and area of land currently under agriculture. Although no trend data are yet available for the two indicators, monitoring changing land potential and the area of land being used for agriculture over time, will provide a good measure of the loss of agricultural potential.

#### STATE

##### Land Potential

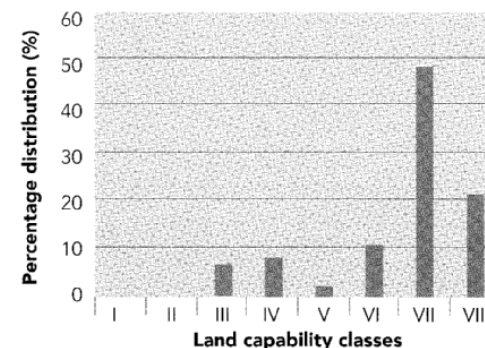
According to a 2002 study for the National Department of Agriculture undertaken by the ARC-Institute for Soil, Climate and Water, 13.9% of the land in the Western Cape is suitable for cultivation (Schoeman et. al., 2002). The graph below indicates the percentage of land in defined land potential (or capability) classes and shows that most of the prime farmland in the Province was classified as Class VII and VIII land (ARC, n.d). This means that most of the land is unsuited to cultivation and its use is primarily limited to grazing, woodland and wildlife (Schoeman et. al., 2002). The limited land available for cultivation places pressure on the agricultural sector and emphasises the need for effective land management if food security is to be assured.

**Table 7.2:** Classes of Land Capability (or potential) (referred to in the previous graph) (Source: Klingebiel & Montgomery, 1961 In: Schoeman et. al., 2002)

	Class	Characteristics
<b>Land suited to cultivation</b>	Class I	Land has few limitations that restrict its use. It may be used safely and profitably for cultivated crops.
	Class II	Land has some limitations that reduce the choice of plants or require moderate conservation practices.
	Class III	Land has severe limitations that reduce the choice of plants or require special conservation practices or both.
	Class IV	Land has very severe limitations that restrict the choice of plants, require very careful management or both.
<b>Land with limited use – generally not suited to cultivation</b>	Class V	Land has little or no erosion hazard but has other limitations that are impractical to remove, that limit its use largely to pasture, range, woodland or wildlife food and cover. The limitations restrict the kind of plants that can be grown and prevent the normal tillage of crops.
	Class VI	Land has severe limitations that make it generally unsuited to cultivation and limits its use mainly to pasture and range, woodland or wildlife food or cover.
	Class VII	Land has very severe limitations that make it unsuited to cultivation and restrict its use mainly to grazing, woodland and wildlife.
	Class VIII	Land has limitations that preclude its use for commercial plant production and restrict its use to recreation, wildlife, water supply or aesthetic purposes.

##### Area of land under agriculture

This indicator provides a direct indication of any loss or gain in agricultural land. This indicator is also important in determining any potential effects of climate change on agriculture in the future. Novers (2005) reports that climate models indicate that by the year 2100, temperatures could be 2-3 degrees higher if urgent action is not taken to reduce gas emissions. In terms of agricultural production, such temperature increases would affect dryland agriculture to the greatest degree.



**Figure 7.1:** Land Capability (Potential) in the Western Cape (Source: ARC (n.d.) Distribution (%) Classes per Province<sup>22</sup>)

22. [http://www.agis.agric.za/agisweb/?Mlval=land\\_capability](http://www.agis.agric.za/agisweb/?Mlval=land_capability), downloaded 15/04/05



## RESPONSES

The table below summarises some of the legislation and other initiatives that have been implemented in response to the land issues discussed below:

International	<ul style="list-style-type: none"> <li>• Stockholm Convention on Persistent Organic Pollutants</li> <li>• United Nations Convention to Combat Desertification, 1994.</li> <li>• Environmental certification of particular agricultural products.</li> <li>• Organic production of food products</li> </ul>
National	<ul style="list-style-type: none"> <li>• Conservation of Agricultural Resources Act 43 of 1983</li> <li>• The Agricultural Resource Conservation Regulations R1048 of 1984</li> <li>• Strategic Plan for South African Agriculture</li> <li>• LandCare Programme</li> <li>• The Integrated Sustainable Rural Development Strategy (ISRDS)</li> <li>• White Paper on South African Land Policy</li> <li>• National Department of Agriculture: Environmental Implementation Plan</li> <li>• White Paper on Land Policy</li> <li>• White Paper on Agriculture</li> <li>• Agricultural Policy in South Africa – A Discussion Document</li> <li>• Working for Water Programme</li> <li>• A National Action Programme (NAP) on Combatting Land Degradation</li> <li>• The National Environmental Management Act 107 of 1998</li> <li>• The National Environmental Conservation Act 73 of 1989</li> <li>• The Subdivision of Agricultural Land Act 70 of 1970</li> </ul>
Provincial	<ul style="list-style-type: none"> <li>• A Settlement Framework for the Western Cape Province</li> <li>• Framework Agreement on Growth and Development in the Western Cape</li> <li>• Provincial Spatial Development Framework (currently in progress)</li> <li>• Research and Development Programmes are being undertaken by the Department of Agriculture in the Western Cape on a number of issues including, for example, crop rotation systems; sustainability of crop production systems; assessment of veld management practices; grazing management strategies and sustainable fodder flow systems.</li> <li>• New initiatives include, for example, a study on the effects of climate change on agriculture in the Western Cape</li> <li>• Activities are also being undertaken by the Provincial Department of Agriculture to:               <ul style="list-style-type: none"> <li>– Promote and facilitate the change from conventional agriculture to conservation agriculture, in order to restore soil microbial activities, retain moisture and prevent erosion</li> <li>– Provide a planning and design service to farmers to prevent the pollution of soil and water resources.</li> <li>– Provide a planning and design service to land owners to prevent river bank erosion or restore river banks already eroded during floods</li> </ul> </li> <li>• The Policy for Farm Towns</li> <li>• The Dept. of Agriculture's LandCare Areawide Planning</li> </ul>

## LINKS

The theme of land links most strongly to:

**Biodiversity** (Fragmentation and loss of habitats and associated biodiversity and ecological services, invasion by alien species) – the Western Cape has the most serious problem in South Africa with the invasion of alien plants. This increases the erodability of soil and can lead to the loss of potentially productive land and the loss of grazing and livestock production. Lowland renosterveld has been almost completely transformed by agriculture and is highly threatened by agriculture.

**Economics and Poverty** - extensive land degradation has an impact on food security and can perpetuate poverty. The loss of agricultural land can directly affect the livelihoods of people in the rural areas relying on income from agricultural activities.

## CONCLUSION

Only about 17% of the Western Cape's land is available for agriculture, most of it for grazing. Nevertheless the agricultural sector plays an important role, provincially and nationally.

The Western Cape has the third lowest Combined Index (including soil and veld degradation) of land degradation in South Africa. However, the province has a serious problem with veld degradation due to invasive alien plants. Monitoring of the effects of land degradation on agriculture is important for ensuring food security and the protection of biodiversity. Currently this is difficult due to the limited data available. For effective future monitoring of the effect of land degradation on agricultural production, the area of land under agriculture, as well as the potential or capability of land in the Western Cape for various types of production should be monitored.

A key national initiative is the development of a National Action Plan (NAP) to combat desertification. The NAP is being formulated in terms of the UN Convention to Combat Desertification in those Countries experiencing serious Drought and/or Desertification, particularly in Africa. Additionally current legislation does prescribe farm care practices and allows for Land Care Committees that can undertake land care operations with Government support. Unfortunately these committees have had little success to date, due to a lack of funding and commitment.