

# MPUMALANGA PROVINCE

## STATE OF ENVIRONMENT 2001

### Summary of State of Environment Report and key environmental issues



Prepared for:  
Department of Agriculture, Conservation and Environment  
Mpumalanga Province

Prepared by:  
CSIR  
PO Box 17001  
Congella, KZN  
4013

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## INTRODUCTION

This report presents a summary of the contents of the 2001 State of the Environment Report (SOER) prepared for the Department of Agriculture, Conservation and Environment. It includes a number of key environmental issues that have been identified through reviews of appropriate documents and stakeholder consultation.

**Chapter 1** of the SOER provides an overview of Mpumalanga, which includes basic background information on the geographic location, climate, vegetation and socio-economic context of the province. **Chapter two** provides some background information on State of the Environment reporting, its roots and relevance in South Africa. **Chapter three** describes the drivers of environmental change and has been structured to provide background information on specific activities, such as mining, agriculture, forestry, industry, energy, transport, tourism and human settlements that contribute to environmental change in Mpumalanga. **Chapters four, five, six and seven** focus on the media air, water resources, geology and soils, and terrestrial resources. Each chapter describes the pressures on these resources; the current state and trends of resource change; impacts on these resources by specific activities; and the responses to environmental change through the development of management strategies, forums, programmes, policy and legislation. Finally, **chapter eight** is a summary and conclusion chapter that provides summary tables of the key sectors driving environmental change in Mpumalanga. Included in the tables are descriptions of the drivers, pressures, state, impacts and responses that each sector places on environmental resources.

### Main objectives in SOE reporting:

- ❖ To increase awareness and understanding of environmental trends and conditions, their causes and consequences;
- ❖ To provide a foundation for improved decision-making at all levels from individuals through to governments and international organisations; and
- ❖ To facilitate management of progress towards sustainability.

## SOE REPORTING FRAMEWORK

In order to determine the state of the environment in Mpumalanga, the D-P-S-I-R reporting framework was adopted. This approach is consistent with the approaches used for SOE reporting worldwide and is the approach adopted for the National State of the Environment Report, 1998.

The primary focus is from an environmental media (air, water, soils & geology and terrestrial) perspective. The D-P-S-I-R framework (definitions below), explores the pressures, state, impact and response to environmental change within each environmental medium.

**Driving Forces:** These are the underlying social and economic activities that lead to environmental change. Population growth, poverty, agriculture and industrial production are common examples.

**Pressures:** These are pressures on the environment which result from the driving forces, for example pollution of air, water and soil from industrial production, or depletion of fish stocks through human consumption.

**State:** This section describes the current state of the environment and recent trends in environmental quality.

**Impact:** These are the consequences of the pressures on the environment, for example reductions in biodiversity, soil degradation, poor human health, and lack of clean, safe water.

**Response:** This section describes the human responses to environmental change, including policies and management strategies to reduce environmental damage, rehabilitate damaged environments and encourage sustainable development.

(Source: National SOE : [www.environment.gov.za](http://www.environment.gov.za))

## **BACKGROUND TO MPUMALANGA**

Mpumalanga means “place where the sun rises” and is the second smallest province in South Africa. It occupies approximately 6% (79 490 square km) of the total surface area of South Africa and is bordered by Mozambique and Swaziland to the east, by the Northern Province to the north, by Gauteng to the west and by KwaZulu-Natal and the Free State to the south.

The province is divided into three regions, the Highveld, Lowveld and the Eastveld, each having its own distinct characteristics in terms of rainfall, temperature and topography.

The economy of the province is based primarily on mining, agriculture, forestry and tourism. The province is rich in natural minerals, of which coal is the most important. The province produces approximately 80% of the country's total coal production, which is primarily used to generate electricity. Other important minerals in the province are gold, chrome, magnesite, iron-ore, asbestos, vanadium, limestone, dolomite, silica, and construction materials.

About 44% of all commercial plantations in South Africa are in Mpumalanga, and more than 50% of the country's medium to high-potential arable land is found in the province. Mpumalanga's agriculture sector is of major importance for the whole country, as it produces about 25% of the country's maize, 30% of the dry beans, about 60% of tobacco and soya beans, and 30% of sub-tropical fruits and nuts.

Mpumalanga's high biodiversity makes it a favourable destination for tourism. The contribution of the tourism sector of the economy is increasing on an annual basis. South Africa's top twenty attractions include four of Mpumalanga's tourism assets, namely the Kruger National Park, the Blyde River Canyon, Pilgrim's Rest and private game parks in the province.

The province has an extensive road and rail network making it highly accessible, with Nelspruit located 200km from the Maputo harbour in Mozambique and 330km from Johannesburg and Pretoria. A spatial development initiative (Mpumalanga Maputo Development Corridor SDI) was initiated within the Province and focused on the N4 freeway stretching from Witbank in South Africa to Recano Garcia in Mozambique. This initiative aimed to improve infrastructure and communication, and increase tourism in this region.

## **MPUMALANGA'S STATE OF THE ENVIRONMENT**

The following tables are adapted from chapter 8 of the 2001 SOER. They contain descriptions of the driving forces of environmental change, the pressures on natural resources from sector activities; the state of these natural resources; impacts of environmental change and responses to this change. Included are key issues identified in stakeholder workshops, which were held in all three regions (Nelspruit, 15/7/02; Witbank, 16/7/02; Secunda 17/7/02).

## The Forestry sector

Drivers	Economic development, good soils and land, climatic conditions, demand for timber, pulp and other wood products, conflicts over landuse			
	Air resources	Water resources	Geology & soils	Terrestrial environment
Key issues identified in stakeholder workshops	<ul style="list-style-type: none"> <li>▪ Lack of control over saw dust from saw mills</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>	<ul style="list-style-type: none"> <li>▪ Erosion caused by deforestation (particularly in the Highveld)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Afforestation of exotic tree species</li> <li>▪ Deforestation of indigenous trees</li> <li>▪ Increase in spread of alien invasives and loss of biodiversity</li> </ul>
Pressures	<ul style="list-style-type: none"> <li>▪ Paper and pulp industries</li> <li>▪ Afforestation</li> <li>▪ Deforestation</li> <li>▪ Poverty</li> </ul>	<ul style="list-style-type: none"> <li>▪ Over consumption</li> <li>▪ Disruption of water courses</li> </ul>	<ul style="list-style-type: none"> <li>▪ Degradation of soil resources</li> </ul>	<ul style="list-style-type: none"> <li>▪ Conflicts over landuse</li> <li>▪ Monoculture planting</li> <li>▪ Unsustainable use of forest resources</li> </ul>
State and Impacts	<ul style="list-style-type: none"> <li>▪ Air pollution (dust) from cultivating and harvesting</li> <li>▪ Air pollutants from sawmills and timber producers in the form of dust</li> <li>▪ Contribution to air emissions by transportation during harvesting</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reduced surface runoff</li> <li>▪ Reduced stream flow</li> <li>▪ Reduced groundwater storage</li> <li>▪ Degradation of wetlands</li> <li>▪ Contamination of surface and groundwater</li> <li>▪ Fertilizer and pesticides pollution</li> <li>▪ Siltation of watercourses</li> </ul>	<ul style="list-style-type: none"> <li>▪ Soil acidification</li> <li>▪ Nutrient depletion</li> <li>▪ Pesticide and fertilizer contamination</li> <li>▪ Soil compaction due to heavy machinery</li> <li>▪ Soil loss due to reduced vegetation cover</li> <li>▪ Degradation of sensitive ecosystems</li> <li>▪ Soil erosion</li> </ul>	<ul style="list-style-type: none"> <li>▪ Loss of biodiversity</li> <li>▪ Habitat fragmentation, loss and destruction</li> <li>▪ Infestation from alien invader organisms</li> <li>▪ Threat to biodiversity hotspots</li> </ul>
Response	<ul style="list-style-type: none"> <li>▪ Montreal convention on Climate Change</li> <li>▪ National Electrification Programme</li> <li>▪ Atmospheric Pollution Prevention Act, 45 of 1965</li> <li>▪ Act 108 of 1996 (S24 gives right to environment that is not harmful)</li> <li>▪ Growth, Employment and Redistribution strategy (GEAR) (1996), particularly eradication of poverty.</li> </ul>	<ul style="list-style-type: none"> <li>▪ National Water Act, Act 36 of 1998</li> <li>▪ Integrated Development Plans</li> <li>▪ Catchment Management Agencies</li> <li>• White Paper On Water Policy</li> <li>• Working for Water Programme</li> <li>• River Forums</li> <li>• South African River Health Programme</li> </ul>	<ul style="list-style-type: none"> <li>▪ National Forest Act, Act 84 of 1998</li> <li>▪ Soil Conservation Act, Act 76 of 1969</li> <li>▪ Forestry White Paper</li> </ul>	<ul style="list-style-type: none"> <li>▪ Environment Conservation Act, Act 73 of 1989</li> <li>▪ National Forests Act, Act 84 of 1998</li> <li>▪ Working for Water Programme</li> <li>▪ Community Natural Resource Management Programmes</li> </ul>

## The Agriculture sector

<b>Drivers</b>	Economic development, good soils and land, increasing demand for agricultural products, conflicts over landuse			
	<b>Air resources</b>	<b>Water resources</b>	<b>Geology &amp; soils</b>	<b>Terrestrial environment</b>
<b>Key issues identified in stakeholder workshops</b>	<ul style="list-style-type: none"> <li>▪ Burning of sugar cane fields resulting in particulates, visibility and health concerns</li> <li>▪ Pollen from citrus farming (in the Lowveld and Eastveld)</li> </ul>	<ul style="list-style-type: none"> <li>▪ The construction of weirs and dams threatening aquatic species (particularly trout farmers)</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>	<ul style="list-style-type: none"> <li>▪ Destruction of natural vegetation, particularly through the expansion of the sugarcane industry</li> <li>▪ Sensitive ecosystems affected by frequent burning</li> <li>▪ Overgrazing from livestock farming affecting biological diversity</li> </ul>
<b>Pressures</b>	<ul style="list-style-type: none"> <li>▪ Export needs</li> <li>▪ Population growth and the need to feed more people</li> <li>▪ Competing land use e.g industry vs agriculture</li> <li>▪ Availability of arable land</li> </ul>	<ul style="list-style-type: none"> <li>▪ Over utilization</li> <li>▪ Need for irrigation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Degradation of soil resources</li> </ul>	<ul style="list-style-type: none"> <li>▪ Conflicts over landuse</li> <li>▪ Use of arable land</li> <li>▪ Need to introduce fertilizers</li> <li>▪ Biotechnology and demand for superior plant species and biological disease control</li> </ul>
<b>State and Impacts</b>	<ul style="list-style-type: none"> <li>▪ Air pollution from cultivating and harvesting crops</li> <li>▪ Air pollution from dirt roads for access into farms</li> <li>▪ Settlements on farms</li> <li>▪ Air pollution from burning e.g during harvesting of sugar cane</li> <li>▪ Air pollution from boom spraying to control pests in citrus, mangos and other fruits.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Impact of impoundments on flow regimes and mobility of fauna</li> <li>▪ Channelisation of watercourses</li> <li>▪ Removal of riparian vegetation</li> <li>▪ Overgrazing</li> <li>▪ Alien invasives</li> <li>▪ Increased surface runoff, increased erosion</li> <li>▪ Decreased stream flow</li> <li>▪ Siltation of watercourses</li> <li>▪ Contamination of surface and groundwater</li> <li>▪ Eutrophication of water resources</li> <li>▪ Wetland Degradation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Soil salination due to excessive use of fertilizers</li> <li>▪ Soil loss due to overstocking, overgrazing, inappropriate crop rotations and site characteristics</li> <li>▪ Soil erosion due to inappropriate soil conservation planning</li> <li>▪ Degradation of sensitive ecosystems</li> <li>▪ Soil compaction due to machinery</li> <li>▪ Contamination due to pesticides and fertilizers</li> <li>▪ Acidic deposition from atmospheric pollutants due to excessive burning</li> <li>▪ Loss of soil fertility and nutrients</li> </ul>	<ul style="list-style-type: none"> <li>▪ Habitat destruction</li> <li>▪ Loss of biodiversity from overgrazing and clearing of natural vegetation</li> <li>▪ Prevention of natural stream flow from dam and weir construction</li> <li>▪ Infestation of alien fish stocks</li> <li>▪ Threat to biodiversity from genetically modified organisms</li> </ul>
<b>Response</b>	<ul style="list-style-type: none"> <li>▪ Air pollution Liaison</li> </ul>	<ul style="list-style-type: none"> <li>▪ Conservation of Agricultural</li> </ul>	<ul style="list-style-type: none"> <li>▪ Conservation of Agricultural</li> </ul>	<ul style="list-style-type: none"> <li>▪ Conservation of Agricultural</li> </ul>

	<p>Committee (Apolcom)</p> <ul style="list-style-type: none"> <li>▪ Montreal convention on Climate Change</li> <li>▪ National Electrification Programme</li> <li>▪ Atmospheric Pollution Prevention Act, 45 of 1965</li> <li>▪ Act 108 of 1996 (S24 gives right to environment that is not harmful)</li> </ul>	<p>Resources Act, Act 43 of 1983</p> <ul style="list-style-type: none"> <li>▪ White Paper on Water Policy</li> <li>▪ Soil Conservation Act, Act 76 of 1969</li> <li>▪ Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, Act 36 of 1947</li> <li>▪ National Water Act, Act 36 of 1998</li> <li>▪ Integrated Development Plans</li> <li>▪ Catchment Management Agencies</li> <li>▪ River Forums</li> <li>▪ South African River Health Programme</li> </ul>	<p>Resources Act, Act 43 of 1983</p> <ul style="list-style-type: none"> <li>▪ Soil Conservation Act, Act 76 of 1969</li> <li>▪ Convention to Combat Desertification</li> </ul>	<p>Resources Act, Act 43 of 1983</p> <ul style="list-style-type: none"> <li>▪ Environment Conservation Act, Act 73 of 1989</li> <li>▪ Mpumalanga Medicinal Plant Programme</li> </ul>
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## The Mining sector

Drivers	Economic development, abundant mineral reserves, demand for mining and mineral ores, sources of employment, conflicts of landuse			
	Air resources	Water resources	Geology & soils	Terrestrial environment
Key issues identified in stakeholder workshops	<ul style="list-style-type: none"> <li>▪ Asbestos dust causing respiratory health problems</li> <li>▪ Burning coal dumps (particularly in the Highveld)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Over utilization of water resources</li> <li>▪ Contamination of water from heavy metals</li> <li>▪ Contamination from acid mining</li> <li>▪ Contamination of groundwater from abandoned mines</li> </ul>	<ul style="list-style-type: none"> <li>▪ Exploitation of the resource from sand mining</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>
Pressures	<ul style="list-style-type: none"> <li>▪ Over-exploitation of resources</li> <li>▪ Need for expansion of mining activities leads to mining occurring in ecologically sensitive areas (e.g coal mines at Wakkerstroom?)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Over utilization</li> <li>▪ Disruption of water courses</li> </ul>	<ul style="list-style-type: none"> <li>▪ Exploitation of non-renewable resources</li> <li>▪ Degradation of soil resources</li> </ul>	<ul style="list-style-type: none"> <li>▪ Destruction of natural vegetation</li> </ul>
State and Impacts	<ul style="list-style-type: none"> <li>▪ Easily erodible mine tailings resulting in dust</li> <li>▪ Asbestos tailings from unrehabilitated mines</li> <li>▪ Coal tailings prone to spontaneous combustion producing noxious gases mainly CO<sub>2</sub>, CO, SO<sub>2</sub></li> <li>▪ Bye products such as slimes and waste rock dumps with a low pH, which when combined with associated high sulphate concentrations form hydrogen sulphide</li> <li>▪ SO<sub>2</sub> from gold mines</li> </ul>	<ul style="list-style-type: none"> <li>▪ Over utilization of resource</li> <li>▪ Impacts on soil and rock structure</li> <li>▪ Erosion</li> <li>▪ Lowering of water table</li> <li>▪ Acid mine drainage</li> <li>▪ Contamination of surface and groundwater</li> <li>▪ Heavy metal pollution</li> <li>▪ Degradation of sensitive ecosystems</li> </ul>	<ul style="list-style-type: none"> <li>▪ Contamination of soil and soil water</li> <li>▪ Loss of soil due to open cast mining</li> <li>▪ High extraction rates result in surface cracking, ponding, loss of groundwater and soil erosion</li> <li>▪ Unrehabilitated mines and unstable tailings dumps result in soil contamination</li> </ul>	<ul style="list-style-type: none"> <li>▪ Destruction of riverine ecosystems through acid mine drainage</li> <li>▪ Habitat destruction and degradation of sensitive ecosystems</li> <li>▪ Loss of biodiversity</li> </ul>
Response	<ul style="list-style-type: none"> <li>▪ Air pollution Liaison Committee (Apolcom)</li> <li>▪ Montreal convention on Climate Change</li> <li>▪ National Electrification Programme</li> </ul>	<ul style="list-style-type: none"> <li>▪ National Water Act, Act 36 of 1998</li> <li>▪ Minerals Act, Act 50 of 1991</li> <li>▪ Mines and Works Act, Act 27 of 1956</li> <li>▪ White Paper on Water Policy</li> </ul>	<ul style="list-style-type: none"> <li>▪ Minerals Act, Act 50 of 1991</li> <li>▪ Mines and Works Act, Act 27 of 1956</li> <li>▪ Soil Conservation Act, Act 76 of 1969</li> </ul>	<ul style="list-style-type: none"> <li>▪ Environment Conservation Act, Act 73 of 1989</li> <li>▪ Mines and Works Act, Act 27 of 1956</li> </ul>

	<ul style="list-style-type: none"> <li>▪ Atmospheric Pollution Prevention Act, 45 of 1965</li> <li>▪ Minerals Act 50 of 1991</li> <li>▪ New Minerals Bill</li> <li>▪ Act 108 of 1996 (S24 gives right to environment that is not harmful)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Integrated Development Plans</li> <li>▪ Catchment Management Agencies</li> <li>▪ River Forums</li> <li>▪ South African River Health Programme</li> </ul>		
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## The Industrial sector

Drivers	Economic development, demand for industrial products, source of employment, conflicts of landuse			
	Air resources	Water resources	Geology & soils	Terrestrial environment
Key issues identified in stakeholder workshops	<ul style="list-style-type: none"> <li>▪ Metallurgical industries in the Highveld contribute to air quality problems</li> <li>▪ Asthma and other respiratory health problems experienced in the Eastveld</li> <li>▪ Bronchial problems experienced in the Embalenhle area</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>	<ul style="list-style-type: none"> <li>▪ Bioprospecting impacting on the terrestrial environment</li> </ul>
Pressures	<ul style="list-style-type: none"> <li>▪ Unemployment and pressure to create employment opportunities</li> </ul>	<ul style="list-style-type: none"> <li>▪ Over utilization</li> <li>▪ Contamination of water resources</li> </ul>	<ul style="list-style-type: none"> <li>▪ Soil contamination</li> <li>▪ Degradation of soil resources</li> </ul>	<ul style="list-style-type: none"> <li>▪ Generation of hazardous and non-hazardous solid waste</li> <li>▪ Abundance of indigenous species</li> <li>▪ Demand for indigenous species</li> </ul>
State and Impacts	<ul style="list-style-type: none"> <li>▪ Degradation of air quality from industrial emissions</li> </ul>	<ul style="list-style-type: none"> <li>▪ Over utilization</li> <li>▪ Contamination of water resources due to industrial effluent</li> <li>▪ Inadequate waste disposal</li> <li>▪ Acid mine drainage</li> <li>▪ Eutrophication</li> </ul>	<ul style="list-style-type: none"> <li>▪ Soil compaction due to heavy machinery</li> <li>▪ Deposition of atmospheric pollutants resulting in soil contamination</li> <li>▪ Acid deposition</li> <li>▪ Degradation of sensitive ecosystems</li> </ul>	<ul style="list-style-type: none"> <li>▪ Loss of aquatic invertebrates and destruction of riverine ecosystems</li> <li>▪ Habitat destruction and loss through clearing of vegetation for industry</li> <li>▪ Unsustainable trade of indigenous species</li> </ul>
Response	<ul style="list-style-type: none"> <li>▪ Air pollution Liaison Committee (Apolcom)</li> <li>▪ Montreal convention on Climate Change</li> <li>▪ National Electrification Programme</li> <li>▪ Atmospheric Pollution Prevention Act, 45 of 1965</li> <li>▪ Minerals Act 50 of 1991</li> <li>▪ Act 108 of 1996 (S24 gives right to environment that is not harmful)</li> </ul>	<ul style="list-style-type: none"> <li>▪ National Water Act, Act 36 of 1998</li> <li>▪ White Paper on Water Policy</li> <li>▪ Integrated Development Plans</li> <li>▪ Catchment Management Agencies</li> <li>▪ South African River Health Programme</li> <li>▪ River Forums</li> </ul>	<ul style="list-style-type: none"> <li>▪ Soil Conservation Act, Act 76 of 1969</li> </ul>	<ul style="list-style-type: none"> <li>▪ Environment Conservation Act, Act 73 of 1989</li> <li>▪ White Paper on the Conservation and Sustainable Utilisation of Biological Diversity in 1997</li> </ul>

## The Energy sector

Drivers	Economic development, available coal reserves, conflicts over landuse, source of employment, demand for energy related products			
	Air resources	Water resources	Geology & soils	Terrestrial environment
Key issues identified in stakeholder workshops	<ul style="list-style-type: none"> <li>▪ Dependence on coal as source of energy in rural households, resulting in air quality and health problems</li> <li>▪ Reliance on coal as cheap energy source results in regional and cross-boundary air pollution</li> <li>▪ Odours in the Eastveld region</li> <li>▪ Air pollution from Sasol causing air quality problems</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>
Pressures	<ul style="list-style-type: none"> <li>▪ South Africa's energy sector has to provide energy for both domestic and international needs</li> <li>▪ Lack of electricity in a lot of areas in the province</li> </ul>	<ul style="list-style-type: none"> <li>▪ Over utilization</li> </ul>	<ul style="list-style-type: none"> <li>▪ Degradation of soil resources</li> </ul>	<ul style="list-style-type: none"> <li>▪ Generation of solid industrial and hazardous waste</li> <li>▪ Demand for servitudes for power lines</li> </ul>
State and Impacts	<ul style="list-style-type: none"> <li>▪ Green House Gases</li> <li>▪ Fly ash waste products</li> <li>▪ Gaseous emissions</li> <li>▪ Acid rain</li> </ul>	<ul style="list-style-type: none"> <li>▪ Over utilization</li> <li>▪ Contamination of surface and groundwater</li> <li>▪ Thermal pollution</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reduction of soil productivity due to deposition of pollutants from coal-fired power stations, burning mine dumps and rehabilitated spoil</li> <li>▪ Inappropriate disposal of industrial effluents</li> <li>▪ Degradation of sensitive ecosystems</li> </ul>	<ul style="list-style-type: none"> <li>▪ Habitat loss through clearing of vegetation for servitudes, power stations and substations</li> <li>▪ Electricution of birds by transmission cables</li> <li>▪ Stunted plant growth</li> </ul>
Response	<ul style="list-style-type: none"> <li>▪ Air pollution Liaison Committee (Apolcom)</li> <li>▪ Montreal convention on Climate Change</li> <li>▪ Electrification Programme</li> <li>▪ Atmospheric Pollution Prevention Act, 45 of 1965</li> <li>▪ White Paper on an Energy Policy for South Africa (1998)</li> <li>▪ Act 108 of 1996 (S24 gives right to environment that is not harmful)</li> </ul>	<ul style="list-style-type: none"> <li>▪ White Paper on Water Policy</li> <li>▪ National Water Act, Act 36 of 1998</li> <li>▪ Integrated Development Plans</li> <li>▪ Catchment Management Agencies</li> <li>▪ South African River Health Programme</li> <li>▪ River Forums</li> </ul>	<ul style="list-style-type: none"> <li>▪ Soil Conservation Act, Act 76 of 1969</li> <li>▪ Convention to Combat Desertification</li> </ul>	<ul style="list-style-type: none"> <li>▪ Environment Conservation Act, Act 73 of 1989</li> </ul>

## The Tourism sector

Drivers	Economic development, high ecotourism potential of the area, conflicts of landuse			
	Air resources	Water resources	Geology & soils	Terrestrial environment
Key issues identified in stakeholder workshops	<ul style="list-style-type: none"> <li>▪</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>	<ul style="list-style-type: none"> <li>▪ Use of indigenous trees for use in making curios</li> <li>▪ Deforestation of natural trees for use in constructing tourist lodges</li> <li>▪ Generation of waste from tourist sites</li> </ul>
Pressures	<ul style="list-style-type: none"> <li>▪ Availability of natural resources / good biodiversity</li> <li>▪ Poverty</li> <li>▪ Unemployment</li> </ul>	<ul style="list-style-type: none"> <li>▪ Over utilization</li> <li>▪ Degradation of water quality and quantity</li> </ul>	<ul style="list-style-type: none"> <li>▪ Soil resource degradation</li> <li>▪ Increased demand for tourism related infrastructure and activities</li> </ul>	<ul style="list-style-type: none"> <li>▪ Use of indigenous species for curios</li> <li>▪ Demand for eco-tourism</li> <li>▪ Demand for tourist resorts</li> </ul>
State and Impacts	<ul style="list-style-type: none"> <li>▪ Tourism now accounts for more than 60% of air travel and is responsible for a good share of emissions</li> <li>▪ Burning for the maintenance of veld condition emits CO<sub>2</sub>, CH<sub>4</sub>, NO<sub>2</sub> and particulate matter</li> <li>▪ Site clearance and construction activities for new tourist developments</li> </ul>	<ul style="list-style-type: none"> <li>▪ Exceeding carrying capacities of water resources</li> <li>▪ Contamination of water resources due to poor waste management</li> <li>▪ Contamination due to poor sanitation</li> <li>▪ Degradation of sensitive ecosystems</li> </ul>	<ul style="list-style-type: none"> <li>▪ Soil loss, soil compaction and degradation as a result of tourism related activities</li> <li>▪ Footpath erosion</li> <li>▪ Dirt road compaction and erosion</li> <li>▪ Destruction of cave formations</li> <li>▪ Degradation of sensitive ecosystems</li> </ul>	<ul style="list-style-type: none"> <li>▪ Preservation of “flagship” species through conservation in game and nature parks</li> <li>▪ Unsustainable use of resources for curios and furniture</li> <li>▪ Unsignificantly signboards</li> <li>▪ Destruction of archeological sites and artifacts</li> <li>▪ Disruption of natural river flow and wetlands through the introduction of trout for recreational fishing</li> </ul>
Response	<ul style="list-style-type: none"> <li>▪ Air pollution Liaison Committee (Apolcom)</li> <li>▪ Montreal convention on Climate Change</li> <li>▪ Electrification Programme</li> <li>▪ Atmospheric Pollution Prevention Act, 45 of 1965</li> <li>▪ White paper on the Conservation and Sustainable Use of South Africa’s Biological Diversity 1997.</li> <li>▪ Tourism White Paper 1996, Act 108 of 1996 (S24 gives right to environment that is not harmful)</li> </ul>	<ul style="list-style-type: none"> <li>▪ White Paper on Development and Promotion of Tourism in South Africa</li> <li>▪ National Water Act, Act 36 of 1998</li> <li>▪ IDPS</li> <li>▪ CMAs</li> <li>▪ Kruger National Park River research Programme</li> <li>▪ South African River Health Programme</li> </ul>	<ul style="list-style-type: none"> <li>▪ Soil Conservation Act, Act 76 of 1969</li> </ul>	<ul style="list-style-type: none"> <li>▪ Tourism Act, Act 72 of 1993</li> <li>▪ Environment Conservation Act, Act 73 of 1989</li> <li>▪ Mpumalanga Tourism Bill, 2001</li> <li>▪ World Heritage Draft Bill, 1999</li> <li>▪ Mpumalanga Nature Conservation Act, Act 10 of 1998</li> <li>▪ White Paper on the Conservation and Sustainable Utilisation of Biological Diversity in 1997</li> </ul>

## The Transport sector

<b>Drivers</b>	Economic development, infrastructure support for industry, mining, agriculture and forestry, conflicts over landuse, source of employment			
	<b>Air resources</b>	<b>Water resources</b>	<b>Geology &amp; soils</b>	<b>Terrestrial environment</b>
<b>Key issues identified in stakeholder workshops</b>	<ul style="list-style-type: none"> <li>▪ Air quality problems from vehicular transport on major roads (such as the N4)</li> <li>▪ Traffic (trucks and buses) producing diesel emissions</li> <li>▪ Dust from un-surfaced roads in squatter settlements and rural areas contributing to impaired air quality (eg. Elukwatini in the Eastveld)</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>	<ul style="list-style-type: none"> <li>▪ Soil erosion from the expansion of road networks (such as the Maputo Development Corridor)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Destruction of vegetation during expansion of road networks (such as the Maputo Development Corridor)</li> </ul>
<b>Pressures</b>	<ul style="list-style-type: none"> <li>▪ More cars on the road</li> <li>▪ Lack of good public transportation system increases the number of cars on the road</li> </ul>	<ul style="list-style-type: none"> <li>▪ Disruption of water courses</li> </ul>	<ul style="list-style-type: none"> <li>▪ Degradation of soil resources</li> <li>▪ Infrastructure development and increasing urbanization</li> </ul>	<ul style="list-style-type: none"> <li>▪ Infrastructure development and increasing urbanization</li> </ul>
<b>State and Impacts</b>	<ul style="list-style-type: none"> <li>▪ Motor vehicles emit CO, NOx and hydrocarbons</li> <li>▪ Fuel consumption by aeroplanes contributes significantly to air pollution</li> <li>▪ Diesel contributes more NOx than petrol</li> <li>▪ Unserved cars cause air pollution</li> </ul>	<ul style="list-style-type: none"> <li>▪ Over utilization</li> <li>▪ Erosion</li> <li>▪ Contamination of surface and groundwater from spills</li> <li>▪ Inadequate waste disposal of batteries, oil and other fuels</li> <li>▪ Degradation of sensitive ecosystems</li> </ul>	<ul style="list-style-type: none"> <li>▪ Leakage from fuel pipelines</li> <li>▪ Soil contamination</li> <li>▪ Fuel and oil spills</li> <li>▪ Degradation of sensitive ecosystems</li> </ul>	<ul style="list-style-type: none"> <li>▪ Domestic waste and littering of transit points</li> <li>▪ Loss of biodiversity</li> <li>▪ Introduction of invasive plant species on road islands</li> <li>▪ Fragmentation of habitats from roads</li> </ul>
<b>Response</b>	<ul style="list-style-type: none"> <li>▪ Air pollution Liaison Committee (Apolcom)</li> <li>▪ Montreal convention on Climate Change</li> <li>▪ Alternative modes of transport e.g reliable public transport</li> <li>▪ Atmospheric Pollution Prevention Act, 45 of 1965</li> <li>▪ Act 108 of 1996 (S24 gives right to environment that is not harmful)</li> </ul>	<ul style="list-style-type: none"> <li>▪ National Water Act, Act 36 of 1998</li> <li>▪ Environment Conservation Act, Act 73 of 1989</li> <li>▪ Catchment Management Agencies</li> <li>▪ Integrated Developemnt Plans</li> </ul>	<ul style="list-style-type: none"> <li>▪ Soil Conservation Act, Act 76 of 1969</li> <li>▪ Environment Conservation Act, Act 73 of 1989</li> </ul>	<ul style="list-style-type: none"> <li>▪ Environment Conservation Act, Act 73 of 1989</li> </ul>

## Human settlements

Drivers	Need for shelter, housing, food, warmth and employment, population growth, poverty			
	Air resources	Water resources	Geology & soils	Terrestrial environment
Key issues identified in stakeholder workshops	<ul style="list-style-type: none"> <li>▪</li> </ul>	<ul style="list-style-type: none"> <li>▪ Inappropriate siting of graveyards impacting on groundwater quality</li> <li>▪ Lack of basic sanitation and water supply infrastructure resulting in health hazards in informal settlements</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>	<ul style="list-style-type: none"> <li>▪ Unsustainable use of rare and endangered plants and animals for the muthi trade (particularly in the Lowveld)</li> </ul>
Pressures	<ul style="list-style-type: none"> <li>▪ Urbanisation</li> <li>▪ Lack of electricity</li> <li>▪ Availability of fuelwoods and other natural resources</li> </ul>	<ul style="list-style-type: none"> <li>▪ Increasing urbanisation</li> <li>▪ Lack of services such as sanitation facilities, reticulated water supply and waste water reticulation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Urbanisation</li> <li>▪ Settlements developing on marginalized sites</li> <li>▪ Lack of services such as sanitation facilities, reticulated water supply, and waste water reticulation</li> <li>▪ Domestic waste disposal</li> </ul>	<ul style="list-style-type: none"> <li>▪ Urbanisation</li> <li>▪ Clearing of vegetation on site prior to construction</li> <li>▪ Unsustainable use of terrestrial resources for fuel, medicinal use, or other utilitarian use</li> </ul>
State and Impacts	<ul style="list-style-type: none"> <li>▪ Air pollution from combustion of fossil fuels (such as paraffin or coal)</li> <li>▪ Air pollutants being deposited away from the source (such as sulphur deposition)</li> <li>▪ Air pollutants affecting human health</li> </ul>	<ul style="list-style-type: none"> <li>▪ Faecal pollution of rivers and streams</li> <li>▪ Denitrification</li> <li>▪ Destruction of riparian vegetation</li> <li>▪ Destruction of sensitive ecosystems</li> <li>▪ Over consumption of the resource</li> </ul>	<ul style="list-style-type: none"> <li>▪ Erosion</li> <li>▪ Compaction</li> <li>▪ Contamination of soils with organic matter</li> <li>▪ Leachate from domestic waste</li> <li>▪ Soil nutrient depletion</li> </ul>	<ul style="list-style-type: none"> <li>▪ Loss of biodiversity</li> <li>▪ Habitat destruction</li> <li>▪ Domestic waste disposal</li> <li>▪ Over consumption of the resource</li> </ul>
Response	<ul style="list-style-type: none"> <li>▪ Air pollution Liaison Committee (Apolcom)</li> <li>▪ Montreal convention on Climate Change</li> <li>▪ National Electrification Programme</li> <li>▪ Atmospheric Pollution Prevention Act, 45 of 1965</li> <li>▪ Minerals Act 50 of 1991</li> </ul>	<ul style="list-style-type: none"> <li>▪ Community Water Supply and Sanitation Programme</li> <li>▪ National Water Act, Act 36 of 1998</li> <li>▪ White Paper on Water Policy</li> <li>▪ IDPs</li> <li>▪ CMAs</li> <li>▪ Water Services Act, Act 108 of 1997</li> <li>▪ South African River Health Programme</li> </ul>	<ul style="list-style-type: none"> <li>▪ Soil Conservation Act, Act 76 of 1969</li> <li>▪ National Forest Act, Act 84 of 1998</li> <li>▪ Conservation of Agricultural Resources Act, Act 43 of 1983</li> <li>▪ Mines and Works Act, Act 27 of 1956</li> <li>▪ <b>Minerals Act, Act 50 of 1991</b></li> </ul>	<ul style="list-style-type: none"> <li>▪ Community Co-management programmes for the sustainable management of forest resources</li> <li>▪ Convention on Biodiversity</li> <li>▪ White Paper on the Conservation and Sustainable Utilisation of Biological Diversity in 1997</li> <li>▪ Environment Conservation Act, 73 of 1989</li> <li>▪ The National Forests Act, Act 84 of 1998</li> <li>▪ Mpumalanga Nature Conservation Act, Act 10 of 1998</li> </ul>

All three regions in Mpumalanga have both common environmental issues and specific issues of concern. These issues are described in more detail in the Key Environmental Issues Report (July 2002).

## **CONCLUSION**

The preparation of baseline information on the State of Environment in Mpumalanga prepares the foundation of knowledge on which future SOE reports will be based. Driving forces will continue to drive environmental change in the province and will include local, national and international forces. Pressures that arise from these driving forces will present challenges for National and Local government, policy makers and resource users alike to develop policies and strategies, management practices or sustainable resource practices so that Mpumalanga can support the increasing demands of urbanisation and industrial growth without compromising its valuable environmental resources.