

Environmental Sustainability Indicators

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Environmental Sustainability Indicator Report

Environmental Sustainability Indicators 2008

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For further information, please contact

Department of Environmental Affairs and Tourism

Private Bag X447

Pretoria 0001

Republic of South Africa

Web site: <http://www.environment.gov.za>

Web site: <http://soer.deat.gov.za>

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Team for preparation of the Environmental Sustainability Indicators 2008

Director: Dr Rudi Pretorius

Contributors: Ester Koch, Leanne Hart, Anna Mampye, Ngodiseni Madadzhe

Cover and layout design: Indima Njongo Marketing and Communications

Designer: Karine Diedericks

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Quality Review:

Dr Rudi Pretorius (Department of Environmental Affairs and Tourism)

Leanne Hart (Department of Environmental Affairs and Tourism)

Graphic design and layout:

Indima Njongo Marketing and communications

Graph editing and formatting:

Leanne Hart (Department of Environmental Affairs and Tourism)

Map editing and formatting:

Deon Marais (Department of Environmental Affairs and Tourism)

Cecily van der Berg (Department of Environmental Affairs and Tourism)

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INTRODUCTION

Since the publication of the Brundtland Report in 1987, attempts have been made to capture the concept of sustainable development in statistics. Policy makers on all continents are trying to identify indicators that would reflect prosperity, well-being and sustainability.

The Department of Environmental Affairs and Tourism has contributed to this movement by participating in testing indicators of sustainable development proposed by the United Nations Commission on Sustainable Development, and by developing both national and local environmental indicators for environmental reporting in South Africa.

Environmental sustainability indicators

This document integrates 9 datasets into a set of 20 indicators of environmental sustainability. The purpose of these indicators is to provide information on our ability to protect our environment over the next decades. In addition, the indicators reflect key factors determining the state of the environment, and show whether we are moving towards environmental sustainability or not.

The indicators and variables build on the “Pressure-State-Response” (PSR) environmental policy model and the DPSIR variant that includes Driving Forces and Impacts, both of which are also used for reporting on the state of the environment. The indicators and variables used were selected through an extensive review of international and national environmental literature, assessment of available data, consultations through MINTEC Working Group 3 and by hosting a National Workshop on 15 April 2008 to discuss and reflect on potential indicators and variables. In selecting these indicators, existing indicators from the following national and international sources were considered:

- Sustainable development indicators from the United Nations Commission on Sustainable Development
- Environmental Vulnerability indicators developed by the United Nations Environmental Programme
- Indicators used in the Environmental Performance Index developed by Yale University
- Indicators related to the Millennium Development Goals
- Indicators from the Johannesburg Plan of Implementation
- Indicators developed under International Environmental Agreements for example the Convention on Biological Diversity, the Montreal Protocol etc.
- Indicators from the Government Wide Monitoring and Evaluation System
- Environmental Indicators for National State of the Environment Reporting
- The set of Local Environmental Indicators developed by the Department of Environmental Affairs and Tourism
- The Key Performance Indicators developed by the Department of Provincial and Local Government

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- Coastal and Marine indicators developed as part of the State of the Coast Initiative
- Indicators used in the latest National State of the Environment Report
- Indicators used in the National Spatial Biodiversity Assessment and the Millennium Ecosystem Assessment
- Draft biodiversity indicators currently developed by the South African Biodiversity Institute

The environmental sustainability framework

The indicators and variables included in this document focus on the state of environmental systems. They also measure stresses on environmental systems such as natural resource depletion and pollution. There are also indicators that measure impacts and responses and human vulnerability to environmental change. In addition, there are indicators that track society's capacity to cope with environmental stresses and our contribution to global stewardship.

In order to present the indicators and variables in a meaningful way, they have been grouped into five components of environmental sustainability.

The concept of environmental sustainability, in its broadest context, can be separated into the following five components which are considered necessary conditions for environmental sustainability. These components include:

- **The state of environmental systems.** Environmental sustainability can only be realized if vital environmental systems are maintained at healthy levels.
- **The stresses on environmental systems.** Environmental sustainability can only be realised if levels of human impacts are low enough not to cause harm to environmental systems.
- **Human vulnerability to environmental change.** Environmental sustainability can only be realised if people and social systems are not vulnerable to environmental change.
- **The social and institutional capacity to cope with environmental change.** Environmental sustainability can only be realised if the necessary institutional capacity and underlying social patterns of skills, attitudes and networks that foster effective responses to environmental challenges exist.
- **The ability to respond to the demands of global stewardship.** Environmental sustainability can only be realised if there is cooperation with other countries to manage common environmental problems.

Each of the components, in turn, encompasses between two and six indicators of environmental sustainability. These 20 indicators are the fundamental building blocks of environmental sustainability – and it is these 20 indicators and their associated variables that provide us with some measure of environmental sustainability.

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The set of environmental sustainability indicators and variables presented in this report is provisional as it needs national testing, evaluation and further discussion, including discussion on what additional indicators may be necessary to describe environmental sustainability more comprehensively. Due to data gaps and conceptual limitation, the indicator set falls short of the ideal. The indicators presented here should therefore be seen as a first step. Over the following years, the set needs to be improved to enable us to measure environmental sustainability more fully.

More information with regards to environmental sustainability indicators can be viewed on the environmental indicators website hosted by the Department of Environmental Affairs and Tourism on <http://enviroindicator.deat.gov.za>

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Indicator Framework

	Indicator number	Indicator	Variable number	Variable description
Environmental systems	1	Air quality	1	Domestic fuel burning
	2	Biodiversity	2	Threatened bird, mammal amphibian and reptile species (known)
			3	Threat and protection status of vegetation types per biome
			4	Degraded and transformed land
	4	Marine	5	Status of west coast rock lobster
			6	Catches of selected marine species (harvesting)
			7	Marine protected areas
	5	Freshwater	8	Available water per capita
			9	Capacity and levels of dams in South Africa
			10	Freshwater quality
	6	Groundwater	11	Groundwater quantity
			12	Groundwater quality
13			Coal consumption	
Reducing environmental stresses	7	Air pollution	14	Vehicles in use per populated area
	8	Ecosystem stress	15	Invasion of alien species
			16	Percentage change in projected population, 1950-2050
	9	Population pressure	17	Total fertility rate (TFR)
			18	Migration
			19	Ecological footprint
	10	Waste and consumption pressures	20	Energy use
			21	Grazing capacity
			22	Fertilizer sales
	11	Water stress	23	Water stress
24			Households with access to sanitation	
25			Access to water	
Reducing human vulnerability	12	Basic human sustenance	26	Access to refuge removal
			27	Death rate from respiratory diseases and tuberculosis
			28	HIV prevalence
	13	Environmental health	29	Malaria
			30	Under 5 mortality
Social and institutional capacity	14	Eco efficiency	31	Energy efficiency
			32	Hydropower and renewable energy production as percentage of total energy consumption
	15	Environmental governance	33	Percentage of total land area under protected status
			34	Percentage of variables missing from the "Rio to Joburg Dashboard"
	16	Private sector responsiveness	35	Environmental management systems
			36	Budget for the environment
			37	Digital access index
	17	Science and technology	38	Number of researchers per 1 000 total employment
			39	Budget for research and development (R&D)
			40	Gross tertiary enrolment rate
41			Education (primary, secondary and adult basic education and training)	
Global Steward Ship	18	Greenhouse gas emissions	42	Carbon emissions per capita
			43	Multilateral environmental agreements
	19	Participation in international collaborative efforts	44	Production and consumption of CFCs
			45	Transfrontier conservation areas (TFCAs)
20	Reducing transboundary environmental pressures			

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Goals and Targets

South Africa adopted both the Millennium Declaration and the Johannesburg Plan of Implementation, both important initiatives designed to promote sustainable development.

The Johannesburg Plan of Implementation identifies sustainability effects and outcomes in the form of implementation plans which promote the integration of the three components of sustainable development – economic development, social development and environmental protection. Plans relevant to the South Africa context include:

- Poverty eradication
- Changing unsustainable patterns of consumption and production
- Protecting and managing the natural resources base of economic and social development
- Sustainable development in a globalizing world
- Health and sustainable development
- Sustainable development in Africa
- Means of implementation
- Institutional framework for sustainable development

Each of the indicators addresses one or more of the sustainable development plans of the Johannesburg Plan of Implementation.

Embedded in the Millennium Declaration of 2000, which was adopted by 147 heads of state and 189 countries, are eight Millennium Development Goals, including 18 time-bound targets. These goals are:

- Goal 1:** Eradicate extreme poverty and hunger
- Goal 2:** Achieve universal primary education
- Goal 3:** Promote gender equality and empower women
- Goal 4:** Reduce child mortality
- Goal 5:** Improve maternal health
- Goal 6:** Combat HIV and AIDS, malaria and other diseases
- Goal 7:** Ensure environmental sustainability
- Goal 8:** Develop a global partnership for development

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The goals and targets are interrelated with the overarching goal of creating an environment that is conducive to development and the elimination of poverty. Although environmental sustainability is captured in Goal 7, environmental dimensions are contained in all the goals. Goal 7 is underpinned by three targets and eight indicators, of which 5 have been included in this set of indicators. This set of environmental indicators also relates, directly or indirectly, to 5 of the targets identified in the Plan of Implementation for the World Summit on Sustainable Development.

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