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OECD Environmental Performance Reviews: South Africa 2013

BETTER POLICIES FOR BETTER LIVES

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Preface

Since the end of the apartheid era, South Africa has made enormous progress in improving the living standards of its people. However, growth has been sluggish since the global economic and financial crisis, and a variety of structural and social challenges must be overcome for the country to achieve its full growth potential.

Green growth should be at the heart of South Africa's economic strategy and its efforts to overcome these challenges. This is the main message from this first OECD Environmental Performance Review of South Africa, which builds on a series of OECD policy reviews and represents a further step in the deepening co-operation between OECD and South Africa.

South Africa hosts some of the world's richest biodiversity, but the country's economy is also one of the most energy- and carbon-intensive. According to the World Health Organization, approximately 16% of all deaths and one-third of diseases in children under the age of five are environmentally related. Inadequate sanitation and indoor air pollution are two key factors. In addition to the human tragedy, this imposes huge costs on the economy. These are some of the reasons why transitioning to a low-carbon, resource-efficient economy, protecting the natural asset base, and improving the environmental quality of life of its people should be among South Africa's core policy objectives.

South Africa has made impressive progress to meet some of these challenges. Environmentally related taxes generate revenues on par with many OECD countries. Subsidies for fossil fuel consumption are much lower than in many other emerging market economies. A Green Economy Accord was launched in 2011 to promote partnerships with the private sector and others to green the economy. In some areas, such as biodiversity, South Africa has developed pioneering laws and policies that are more advanced than in many OECD member countries. The human and financial resources allocated to the environment have been significantly strengthened, and an effective framework for enforcing environmental laws put in place.

Despite this good progress, much remains to be done. In addition to examining South Africa's main achievements and remaining challenges, the report presents 36 recommendations with a special emphasis on biodiversity, environmental governance and green growth. It recommends, for example, to assess how environmentally related taxes could contribute to a more pro-growth, pro-poor tax structure, while continuing to reduce explicit and implicit subsidies for electricity and coal consumption, as well as implementing the proposed carbon tax as soon as possible. The Review also calls for strengthening the integration of environmental considerations into sectoral policies, particularly mining, as well as for streamlining and strengthening financing mechanisms for environmentally related infrastructure. Human and financial resources in provincial and local environmental authorities also need to be strengthened. Finally, the Review

recommends to broaden and deepen initiatives to integrate biodiversity into economic and social development.

This Review is the result of a constructive and mutually beneficial policy dialogue between South Africa and the members and observers of the OECD Working Party on Environmental Performance. I am confident that this collaborative effort will be useful to improve understanding of how to tackle the many shared environmental challenges faced by OECD member countries and key partners like South Africa.

Angel Gurría

OECD Secretary-General

Foreword

The principal aim of the OECD Environmental Performance Review programme is to help member and selected partner countries to improve their individual and collective performance in environmental management by:

- *helping individual governments to assess progress in achieving their environmental goals*
- *promoting continuous policy dialogue and peer learning*
- *stimulating greater accountability from governments towards each other and the public.*

This report is the first OECD review of South Africa's environmental performance. Progress in achieving domestic objectives and international commitments provides the basis for assessing the country's environmental performance. Such objectives and commitments may be broad aims, qualitative goals or quantitative targets. A distinction is made between intentions, actions and results. Assessment of environmental performance is also placed within the context of South Africa's historical environmental record, present state of the environment, physical endowment in natural resources, economic conditions and demographic trends.

The OECD is indebted to the government of South Africa for its co-operation in providing information, for organising the review mission to Pretoria, Johannesburg and East London (5-13 November 2012) and for facilitating contacts both inside and outside governmental institutions.

Thanks are also due to all those who helped in the course of this review, to the representatives of member countries participating in the OECD Working Party on Environmental Performance and especially to the examining countries: Italy, the Netherlands and Norway. A representative of Brazil participated in the review mission as an observer. The preparation of the report would not have been possible without financial support from the Czech Republic, Germany, Italy, Japan, the Netherlands, Norway and Switzerland.

The team that prepared this review comprised experts from reviewing countries: Ms. Tineke Lambooy (the Netherlands), Mr. Øyvind Lone (Norway) and Mr. Aldo Ravazzi (Italy); members of the OECD Secretariat: Ms. Ivana Capozza, Mr. Brendan Gillespie, Mr. Reo Kawamura, Mr. Eugene Mazur, Mr. Krzysztof Michalak; and consultants: Mr. Eduard Goldberg, Mr. Andreas Kontoleon and Mr. Stephen Bass. Ms. Carla Bertuzzi and Ms. Elvira Berrueta-Imaz (OECD Secretariat) and Mr. Mark Foss (consultant) provided statistical and editorial support during the preparation of the report. The report also benefited from comments provided by: Mr. Sergio Margulis (Brazil), as well as Ms. Katia Karousakis, Mr. Geoff Barnard and other members of the OECD Secretariat.

The OECD Working Party on Environmental Performance discussed the draft Environmental Performance Review of South Africa at its meeting on 4 June 2013 in Paris, and approved the assessment and recommendations.

Table of contents

Tables

Figures

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General notes

Signs

The following signs are used in Figures and Tables:

. . : not available

– : nil or negligible

. : decimal point

Country aggregates

OECD Europe: This zone includes all European member countries of the OECD, i.e. Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

OECD: This zone includes all member countries of the OECD, i.e. the countries of OECD Europe plus Australia, Canada, Chile, Israel*, Japan, Korea, Mexico, New Zealand and the United States.

Country aggregates may include Secretariat estimates.

Currency

Monetary unit: South African Rand (ZAR).

In 2012, USD 1.00 = ZAR 8.21

Cut-off date

This report is based on information and data available up to the end of June 2013.

* The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Executive summary

South Africa's environment is rich and diverse, but subject to pressures

South Africa is among the 17 countries in the world with the richest biodiversity. It hosts some exceptional ecosystems and habitats, many endemic, and supports growing wildlife game farming and ecotourism. At the same time, South Africa is one of the most energy- and carbon-intensive economies in the world, about one-quarter of river ecosystems are critically endangered and pressures on limited water resources are high. According to WHO, approximately 16% of all deaths, and one-third of disease in children under the age of five, are environmentally related. Inadequate sanitation and indoor air pollution are two key factors.

Many environmental challenges stem from the legacy of apartheid. In this era, well-preserved areas that were rich in biodiversity and reserved for the privileged parts of society co-existed with extensive "hotspots" of serious environmental degradation. These hotspots were often caused by unchecked economic activities, in particular mining and mineral processing, manufacturing and energy production. Environmental pressures were magnified in overcrowded areas inhabited by the non-white population where uncoordinated urban development was widespread and infrastructure was poor or lacking.

Efforts to promote green growth are under way

The global financial crisis prompted a reappraisal of South Africa's carbon- and resource-intensive growth model. Among other things, the environment was a prominent feature in the fiscal stimulus package adopted in 2009. A Green Economy Accord was launched in 2011 to promote partnerships with the private sector and others to green the economy. A key challenge will be to fully engage the private sector and other stakeholders, while restricting the government's role to catalysing action. Hoped-for net employment impacts may prove overly optimistic. If this is the case, it should not detract from achieving the underlying goals of the Accord.

Revenue from environmentally related taxes has increased as a result of new taxes (e.g. on electricity and cars) and increases in the tax rates. However, there is scope to further extend the use of environmentally related taxes, while giving special consideration to how additional revenue could mitigate potentially regressive impacts. Substantial investments in infrastructure are also needed to provide environmental services to the population and to facilitate the transition to a low-carbon, resource-efficient economy. Promoting eco-innovation, including partnerships between public and private stakeholders at every

stage – from invention to diffusion – can increase the competitiveness of South Africa's economy, while reducing further environmental impacts.

Environmental policies have been significantly strengthened since the end of apartheid…

In the relatively short time since the end of apartheid and the first democratic elections in 1994, South Africa has developed a comprehensive policy and regulatory framework for environmental and natural resource management. In some areas, such as biodiversity, South Africa has developed a pioneering set of laws and policies that are more advanced than in many OECD countries. Legal provisions on access to environmental information, public participation in environmental decision making and access to courts are comparable with the best practices of OECD member countries. The human and financial resources allocated to the national and regional environmental authorities have been significantly strengthened. An effective framework for enforcing the new generation of environmental policies has been put in place. Since 1994, South Africa has also shown its resolve to be a responsible global citizen by taking the lead in a number of international environmental initiatives.

Despite the strengthening of environmental policies and institutions, the convening powers of environment authorities, particularly at provincial and local government levels, are still limited, and the capacity to negotiate and influence implementation in other policy areas is weak. This is partly due to insufficient financial allocations required for policy implementation at the provincial and local government levels. Although formal co-operation agreements have been signed with some government departments to implement the environmental policies, this process has not yet been completed for key sectors, such as energy, mining and transport.

… but implementation challenges at the sub-national level hamper progress

South Africa has undertaken an ambitious decentralisation programme. The functional expansion of municipalities (including responsibility for the provision of environmental services such as water supply, sanitation and waste management) is one of the country's most significant changes in governance since the end of apartheid. At the same time, provinces continue to play a crucial role in environmental governance, including oversight of local environmental programmes.

However, decentralisation is far from complete. Policy gaps impede the realisation of the ambitious role foreseen for municipalities in the environmental domain. Two issues need to be addressed to strengthen institutional capacity at the provincial and local levels: the shortage of qualified staff; and the lack of training for current staff, especially those in smaller municipalities, on implementing new environment-related regulations. Positive examples of capacity building by the national and provincial environmental authorities need to be scaled-up and made more systematic.

Better management of biodiversity remains a priority

South Africa's rich biodiversity and related habitats face pressures from a range of economic activities, particularly agriculture, manufacturing, mining and mineral processing, urban development, forestry and fisheries. The impacts from external factors are also growing, especially invasive alien species, illegal international trade of endangered species and climate change. One study has suggested that ecosystem services were equivalent to about 3% of gross domestic product (GDP), and that small reductions in these services could have large impacts on welfare, particularly within poorer, rural communities.

Although it is faced with pressing problems of poverty, unemployment and poor education, South Africa has assigned a high priority to the protection and sustainable use of the biodiversity within its borders and beyond. Its approach is grounded in the sustainable use of biodiversity and ecosystems, but also seeks to integrate biodiversity into economic development and to promote social justice. Although some inter-ministerial arrangements are in place, further efforts are needed to integrate biodiversity considerations into other sectoral policies, notably mining, energy, transport and coastal zone management. Further efforts should also be made to seize the opportunities that protected area expansion can provide for supporting the land reform agenda and the diversification of rural livelihood options, especially in agriculturally marginal areas.

PART I

Progress towards sustainable development

PART I

Chapter 1

Key environmental trends

This chapter provides a snapshot of key environmental trends in South Africa between 1994 and 2013. It highlights the country's main environmental achievements, as well as the remaining challenges on the path towards a greener economy and sustainable development. The chapter describes South Africa's progress in reducing the carbon, energy and material intensities of its economy; in managing its natural asset base, including water, biodiversity and mineral resources; and in improving the environmental quality of life.

1. A snapshot of key trends

This chapter provides a snapshot of key environmental trends in South Africa over the review period (since 2000). It highlights some of the main environmental achievements and remaining challenges on the path towards green growth and sustainable development. The chapter is based on indicators from national and international sources, and broadly follows the OECD framework for monitoring progress towards green growth. Accordingly, it summarises some key economic and social trends, and describes South Africa's progress in using energy and natural resources efficiently, in managing its natural asset base and in improving people's environmental quality of life. It provides a baseline for subsequent chapters that assess the effectiveness of South Africa's environmental policies in affecting these trends and in using environmental objectives to generate economic opportunities.

South Africa is the largest economy in Africa. For much of the last decade, it grew at a faster rate than many OECD member countries, but slower than other emerging economies. After a sharp fall in 2009, the economy rebounded, but growth remains sluggish. Per capita income has increased significantly, but in 2012 only amounts to about one-third of the OECD average (Box 1.1).

South Africa's environmental performance must be seen in the context of the transition from apartheid: the first democratic, multi-racial elections were only held in 1994. In recent years, frustration has been growing with the perceived slow rate of reform, including inadequate public service delivery and measures to combat corruption. A variety of structural issues and social problems need to be addressed in order for South Africa to achieve its full growth potential. Unemployment is extremely high, especially among youth. Income inequality is among the highest in the world. Life expectancy is about two-thirds the OECD average, though the downward trend has been reversed. The share of the population with secondary or tertiary education is very low by OECD standards. Addressing these issues, as well as investing in much-needed infrastructure will require increased public expenditure. Currently, public finances are in better shape than those of many OECD member countries, and government spending as a share of gross domestic product (GDP) is much lower than the OECD average.

South Africa is one of the world's leading mining and mineral-processing countries, and has significant deposits of several metals and coal. It is also one of the most energy- and carbon-intensive economies in the world. This is closely linked to the heavy reliance on coal and under-pricing of energy. South Africa is one of the world's top-20 emitters of greenhouse gas emissions (GHG). These emissions have broadly tracked economic growth, increasing over the last decade and falling with the economic crisis. GHG emissions per capita are higher than other emerging economies but less than the OECD average.

Shrubland and bushveld cover about half of the land and support growing wildlife game-farming and eco-tourism. Wooded land covers around 8% of the territory, including a small fraction of indigenous forests. South Africa is scarce in water resources and is

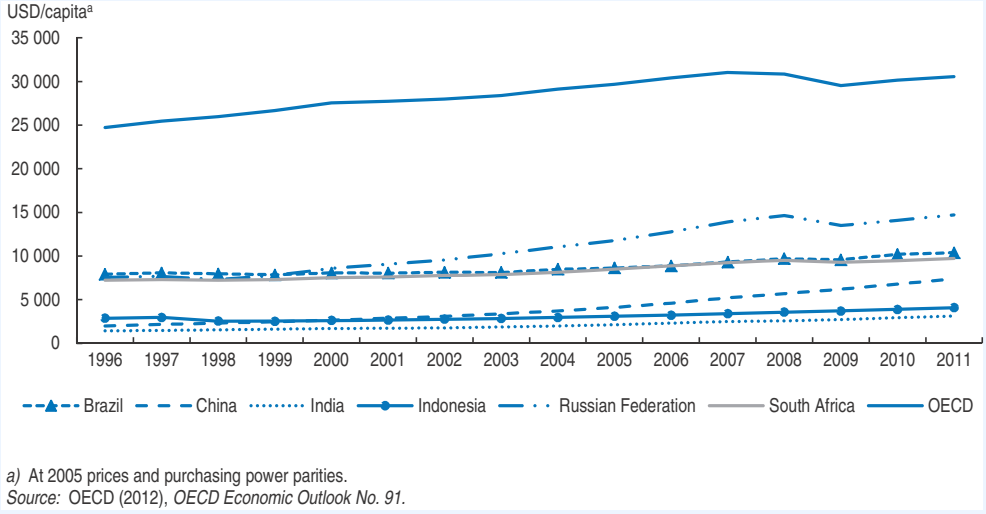
Box 1.1. **The economic and social context**

Economy

- South Africa's GDP grew at an annual average rate of 4.2% in the period 2000-08, higher than in most OECD member countries but trailing the most dynamic emerging economies.
- Following the global economic crisis, GDP decreased by 1.5% in 2009, but rebounded in 2010 (+3.1%), 2011 (3.5%) and 2012 (2.5%).
- Convergence towards OECD country per capita income levels has been slower than in most other emerging economies. Although average GDP per capita increased significantly between 2000 and 2012 (from USD 6 640 to USD 11 500 at current prices and PPP), it is still only one-third of the OECD average (USD 35 400).

Figure 1.1. **Per capita GDP in OECD, South Africa and major emerging economies**

1996-2011



a) At 2005 prices and purchasing power parities.
Source: OECD (2012), *OECD Economic Outlook No. 91.*

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- The share of services in value added increased from 65% to 67% between 2000-11, slightly below the OECD average of 74.4%; the share of industry, including construction, decreased from 31.8% to 30.6%, above the OECD average of 24.1% (Annex I.A). Agriculture's share decreased from 3.2% to 2.4% since 2000, but contributes to 10% of formal employment.
- Exports and imports accounted for 27.3% and 27.5% of GDP in 2011, respectively. These are well below the corresponding OECD average of 28.7% for exports and 29.4% for imports.
- South Africa is one of the world's leading mining and mineral-processing countries. Although mining's contribution to national GDP has fallen from 21% in 1970 to 6% in 2011, it still represents almost 60% of exports.
- Public finances are in better shape than those of many OECD member countries. For a middle-income country, South Africa has a well-developed and well-supervised financial system, and the banking system came through the 2008-09 recession in relatively good health. Core inflation is stable and within the central bank's target zone.
- Government spending stood at 35.1% of GDP in 2009, much lower than the OECD average (44.9%). Revenues as a percentage of GDP are also substantially lower: 27.4%, compared to the OECD average of 36.8%.

Box 1.1. **The economic and social context** *(cont.)*

Society

- South Africa's multi-ethnic population was 50.7 million in 2012, a 13% increase since 2000. The population growth rate dropped from 1.4% to 0.5% during this period.
- The population density of 41.3 inhabitants per km^2 is above the OECD average of 34.3 (Annex I.B). However, population distribution is highly uneven and has been affected by high levels of internal migration. Around 44% of South Africa's population lives in two provinces: Gauteng (which includes Pretoria and Johannesburg) and Kwazulu-Natal, which account for 9% of the country's territory. The density of Northern Cape province is one-fourteenth of the average.
- The unemployment rate has remained high during the 2000s. After a decrease from 26.6% in 2002 to 21% in 2007, it jumped to 24.9% in 2011, well above the OECD average of 8% (Annex I.B). Unemployment is extremely high among youth, reaching 49.8% compared to the OECD average of 16.2%.
- Income inequality remains very high, even though people living in extreme poverty (USD 1.25 per day) decreased from 26% to 14% between 2000 and 2009. The Gini coefficient increased from 0.58 to 0.63 in 2012, one of the highest in the world (Annex I.B). About 54% of South Africans live on less than EUR 1.5 per day.
- Around 4 million people live in informal settlements (shacks), many of them located on the outskirts of large municipalities. Only half of the population in informal settlements is served by municipal waste collection, 42% use electricity for lighting, 38% have access to piped/tap water and 22% have a flush toilet.
- Life expectancy at birth was 52.1 years in 2010, around two-thirds of the OECD average (79.7). It fell (by 2.7 years) through most of the 2000s, but the trend was reversed due to specific policy and programme changes in four of the so-called colliding epidemics (HIV and tuberculosis; chronic illness and mental health; injury and violence; and maternal, neonatal and child health). While infant mortality was reduced by 22% during the 2000s, it once was 10 times higher than the OECD average.
- Half of the South African population is less than 24 years old, many of whom should be attending an educational institution. At age 18, 71.5% of youth attended an educational institution in 2009, but the percentage of the population aged 25 to 64 who attained at least upper secondary education remains at a very low level (28% compared to the OECD average of 74%). Only 4% of the population aged 25 to 64 had tertiary education (one-eighth of the OECD average) (Annex I.B).

classified as medium to high water-stressed. High losses in the ageing water-distribution infrastructure exacerbate the problem. Irrigation accounts for more than 60% of water use although arable areas account for only about 10% of the land area. Since 2006, the biological and chemical qualities of water have declined, and about one-quarter of river ecosystems are critically endangered.

South Africa is one of 17 countries in the world with the richest biodiversity. In all, 6.5% of the land and 7% of the coastal marine territory was under formal protection in 2011. However, many ecosystems are not adequately represented in the formal protected area network. Almost half the wetlands area is critically endangered. Invasive alien species are a growing challenge to biodiversity, water and agricultural security. Illegal, unregulated and

unreported fishing led to a dramatic fall in fish catch between 2005-09, as well as to the collapse of some stocks. Illegal poaching and wildlife trade are posing an increasing threat to both terrestrial and marine species, including iconic species such as rhino, cycads and abalone.

According to WHO, approximately 16% of all deaths, and one-third of disease in children under the age of five, are environmentally related. Inadequate sanitation and indoor air pollution are two key factors. The environmental quality of life for the 4 million people living in informal settlements is particularly difficult, largely due to the inadequate provision of basic services such as waste collection and management, modern energy, accessible, and safe water, and sanitation services, particularly in poorer, more vulnerable and historically disadvantaged communities. Significant progress has been made to improve access to safe water and basic sanitation, though further progress is needed. Air pollution levels in many regions exceed acceptable ambient air quality standards set in South African law.

2. Transition to a low-carbon, energy- and resource-efficient economy

2.1. Carbon and energy intensities

Greenhouse gas emissions

- South Africa is one of the top 20 GHG-emitting countries in the world. Coal is the largest source of the country's GHG emissions, at almost 83% of the total in 2010.
- GHG emissions grew by 1.1% per year in the 1990s, and by 3% per year between 2000 and 2008, in line with rising energy consumption. However, emissions fell in 2009-11 as a result of the economic downturn (Figure 1.2).
- South Africa's GHG emissions per capita (9.1 tonnes CO_2eq) are high for a middle income country (higher than in China or Brazil), but below the OECD average (12.5 tonnes CO_2 eq). Energy-related CO_2 emissions per capita are also below the OECD average (6.92 and 10.1 tonnes CO_2 eq/capita respectively) (Annex I.C).
- The energy sector was the main source of CO_2 emissions in 2010, accounting for 69% of the total, and increasing by 27% since 2000. While industry decreased its emissions by 19%, the transport sector increased its emissions by 43% between 2000 and 2008, but then decreased by 23% in 2010. Residential and commercial sectors' shares of CO_2 emissions were small, but emissions increased by factors of two and three respectively.

Emission intensities

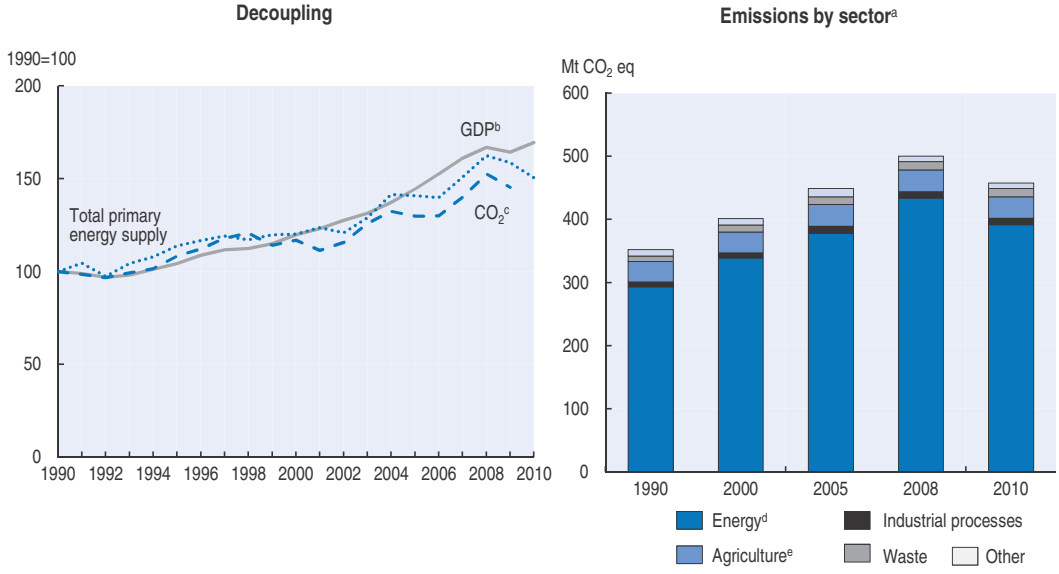
- During the 2000s, CO_2 emissions were relatively decoupled from economic growth but continued to increase (Figure 1.2).
- South Africa's energy sector remains high carbon-emission intensive. In 2010, CO_2 emissions per unit of GDP from the sector amounted to 0.7 kg CO_2/USD compared to 0.45 kg CO_2/USD for the world as a whole and 0.33 kg CO_2/USD for the OECD area, reflecting the coal-dominant structure of electricity supply (Annex I.C).

Energy mix

- The energy mix is dominated by fossil fuels (87% in 2010), particularly coal (74% of energy and 94% of electricity generation). Oil and gas account for 11% and 2% respectively.

Figure 1.2. **GHG emissions**

1990-2010



a) Excludes emissions/removals from land-use change and forestry other than forest and other vegetation fires.
b) GDP at 2005 prices and purchasing power parities.
c) CO_2 emissions from energy use only; sectoral approach; excludes international marine and aviation bunkers.
d) Includes fugitive emissions.
e) Includes emissions from burning of forest, other vegetation, peat and waste.
Source: OECD (2012), *OECD Economic Outlook No. 91;* OECD-IEA (2012), *CO_2 Emissions from Fuel Combustion;* OECD-IEA (2012), *World Energy Balances.*

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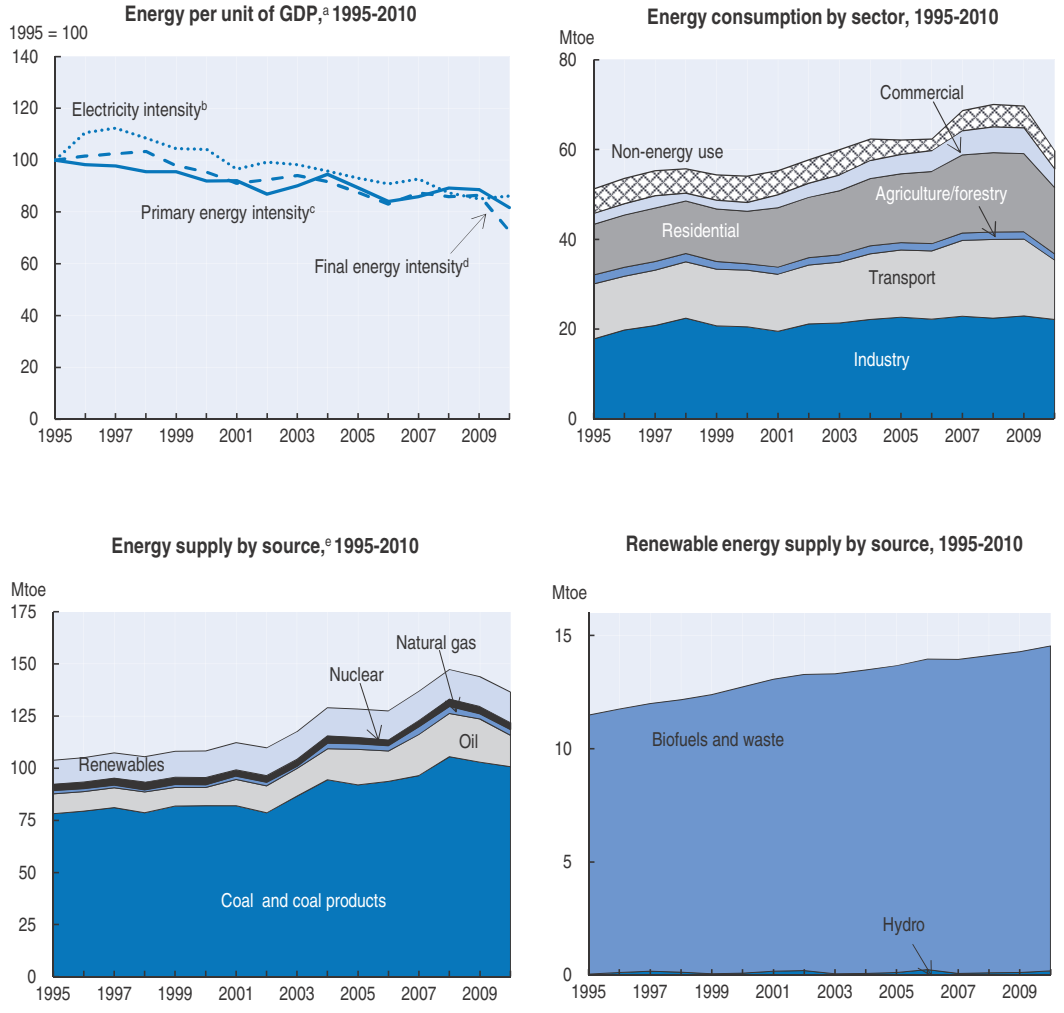
Nuclear energy's share in total primary energy supply (TPES) was about 2% for the last decade and contributed to 5% of electricity generation (Figure 1.3).

- Despite high potential, the share of renewable energy sources in TPES remained at 11% during the 2000s. Most renewable energy comes from biomass and waste (98%) (Figure 1.3).
- Renewable electricity accounts for only 1% of total electricity generation. About 87% is produced by hydropower plants, 11% from biofuel and waste burning and only 2% from solar and wind.

Energy intensity

- Energy consumption increased rapidly between 2000 and 2008 (+25%), especially in the residential, commercial and transport sectors, but the increase was lower than GDP growth. As a result of the economic downturn in 2009/10, energy consumption fell by 13% (Figure 1.3).
- Similarly, TPES increased, although South Africa has experienced a relative decoupling of TPES from economic growth (Figure 1.2) and energy intensity improved by 11% between 2000 and 2010.
- However, at the level of 0.29 tonnes of oil equivalent (toe)/1000 USD, South Africa's energy intensity still remains among the highest in the world and is well above the OECD average (0.14 toe/1 000 USD) (Annex I.A).

Figure 1.3. **Energy intensity and consumption**



a) GDP at 2005 prices and purchasing power parities.
b) Electricity consumption per unit of GDP.
c) Total primary energy supply per unit of GDP.
d) Total final energy consumption per unit of GDP.
e) Total primary energy supply. Breakdown excludes electricity trade.
Source: OECD (2012), *OECD Economic Outlook No. 91;* OECD-IEA (2012), *World Energy Balances.*

StatLink http://dx.doi.org/10.1787/888932878686

2.2. *Resource efficiency*

Material productivity

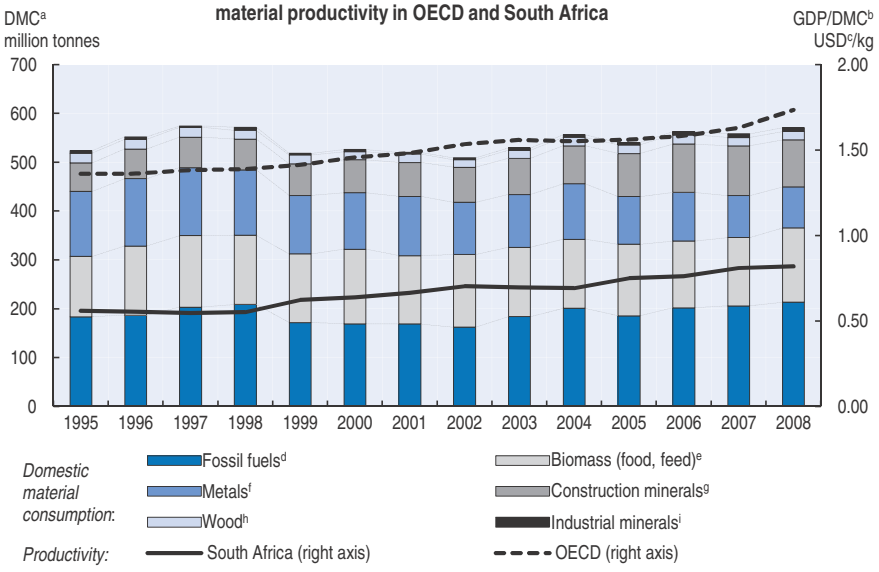
- Domestic extraction is the main source of material inputs to the economy. South Africa's domestic material consumption (DMC)[1] increased by 9% between 1995 and 2008. The DMC per capita (11.6 kg) is lower compared to the OECD average (17.8 kg), reflecting the remaining gap in income level.
- Between 1995 and 2008, GDP grew faster than DMC, and material productivity improved by 47% – high compared to the OECD average of 28% (Annex I.C). The improvement was made despite significant increases in the use of fossil fuel and construction materials. However, South Africa's material productivity is still only half of the OECD average

(Figure 1.4). In addition, DMC does not give complete insight into environmental pressures associated with materials use because it accounts neither for unused materials associated with the extraction of raw materials (particularly high for coal and metals) nor for pollution nor for waste that occurs upstream in a production process.

Figure 1.4. **Material productivity**

1995-2008

Composition of domestic material consumption and material productivity in OECD and South Africa



a) Domestic material consumption (DMC) designates the sum of domestic (raw material) extraction used by an economy and its physical trade balance (imports minus exports of raw materials and manufactured products).
b) The material productivity of an economy is defined as the amount of GDP generated per unit of materials used (DMC).
c) At 2005 prices and purchasing power parities.
d) Coal, crude oil, natural gas, peat and traded derived products (e.g. plastic and rubber).
e) Domestic production from agriculture and fisheries, plus trade of raw and processed products from these sectors.
f) Domestic extraction of metal ores, plus trade of metal ores (e.g. bauxite), metal concentrates (e.g. nickel matte), refined metals (e.g. steel, aluminium, copper), products mainly made of metals (e.g. vehicles, machinery, electronics and electrical equipments) and scrap.
g) Domestic extraction and trade of minerals used in construction (e.g. sand, gravel, stones).
h) Domestic production from forestry, plus trade of raw and processed products from this sector.
i) Domestic extraction and trade of minerals used in industry (e.g. salts, potash, phosphate rocks).
Source: OECD (2013), *Material Flow Database*.

StatLink http://dx.doi.org/10.1787/888932878705

Waste generation and treatment

- It was estimated in 2011 that approximately 460-560 million tonnes of waste is generated every year.[2] Mining operations generate the highest amount – between 350 and 450 million tonnes per year. Gold mining contributes almost half of the total.
- Approximately 110 million tonnes of non-mining waste was generated in 2011. About 63 million tonnes was classified as general waste and 48 million tonnes as unclassified waste. While the 2011 figure is not directly comparable to the previous estimates of 1997, calculations show a waste generation growth rate between 1.6% and 3.9% per year.
- Around 1.3 million tonnes of hazardous waste is generated each year. The actual figure may be significantly higher as some unclassified waste may be hazardous.

- At about 250 kg per capita per year, municipal waste generation is still well below the level of most OECD countries (Annex I.C). More than 60% of all municipal waste is generated in two provinces: Gauteng and Western Cape.
- Of the estimated 15.4 million tonnes of municipal waste generated each year, 7.4 million tonnes is recyclable, which includes plastic, paper, glass, metal and tyres. However, landfilling continues to be the predominant type of municipal waste treatment, accounting for over 90% of the total. The share of landfills that meets minimum safety and sanitary requirements is estimated to be only 10%.
- The 2007 capacity assessment estimated the number of waste-handling facilities to be more than 2 000, but 1 500 were not licensed. The situation improved recently; in 2011, only 300 waste disposal sites operated without appropriate licences.
- More than 80% of municipalities have initiated recycling, but these programmes are often not maintained due to lack of capacity and funding. In 2010, only 4.5% of waste collected from households was recycled.
- Good progress has been made in recovering specific waste streams: around 40% of all packaging and paper consumed is recycled. Much less progress has been made in other areas, e.g. tyres.
- Statistics regarding recovery and recycling rates of industrial waste are not reliable, but there are some indications that levels are low, except for scrap metals.

3. Managing the natural asset base

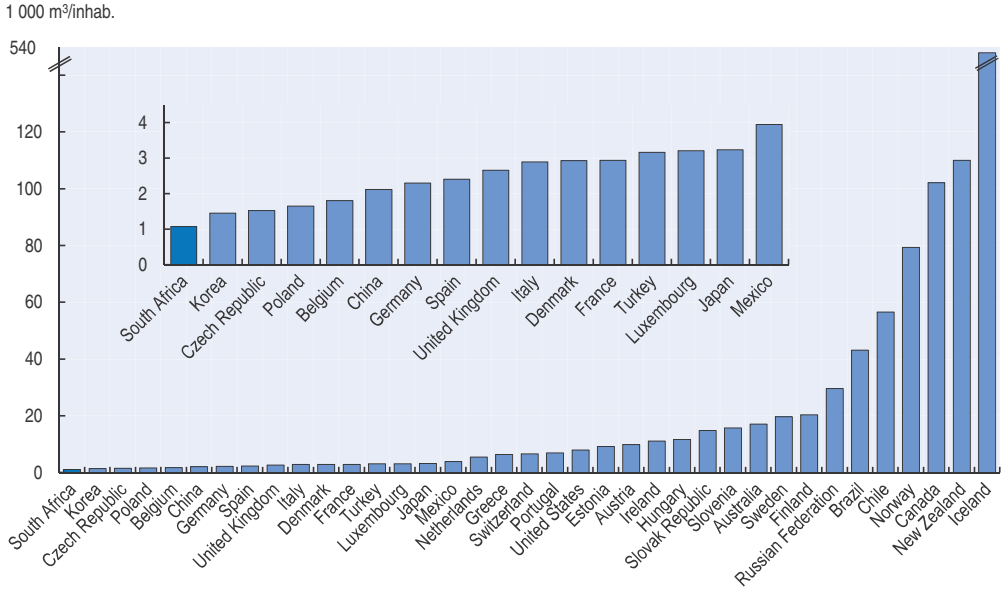
3.1. Renewable stocks

Water resources

- South Africa's total renewable water resources (1 100 m^3 per capita) are lower than those in most OECD member countries (Figure 1.5). They are not evenly distributed among seasons and regions.
- South Africa's water abstraction per capita (300 m^3 per capita) is only one-third of the OECD average, but the country uses almost 25% of total available resources, which makes it a medium-high water-stressed country according to the OECD classification (Annex I.C).[3]
- In 2011, half of the 19 water management areas were in water deficit, and alleviated by inter-basin transfers, including from transboundary rivers. In seven out of nine provinces, these transfers provide more than half of the water used. Retention in dams, which have a storage capacity of two-thirds of mean annual runoff, contributes to securing water, but has negative effects on aquatic ecosystem integrity.
- Irrigation accounts for about 62% of total water use, even though arable and permanent cropland accounts for only 10.5% of South Africa's territory. About 23% of water is used for public water supplies, about 7% is used by the industry sector[4] and the remaining 8% is shared by other sectors, such as energy production and commercial forestry (Figure 1.6).
- Groundwater resources, important as an additional buffer against drought and climatic variability, are about the same as surface water run-off. While groundwater use is increasing, it accounts for only around 10-15% of overall water use, in the eastern and north-eastern parts of the country and in the Western Cape.

Figure 1.5. **Total renewable water resources per capita**

2011

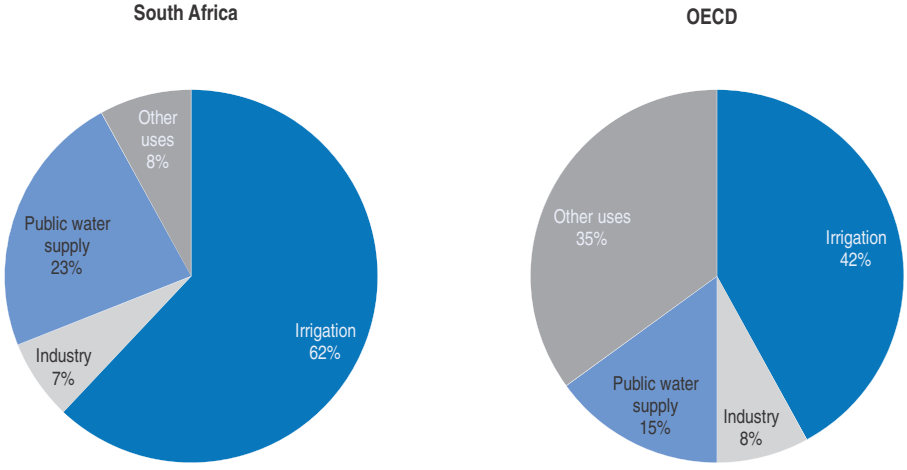


Source: OECD Environmental Data.

StatLink http://dx.doi.org/10.1787/888932878724

Figure 1.6. **Water abstraction by major use**

Late 2000s



Source: OECD Environmental Data.

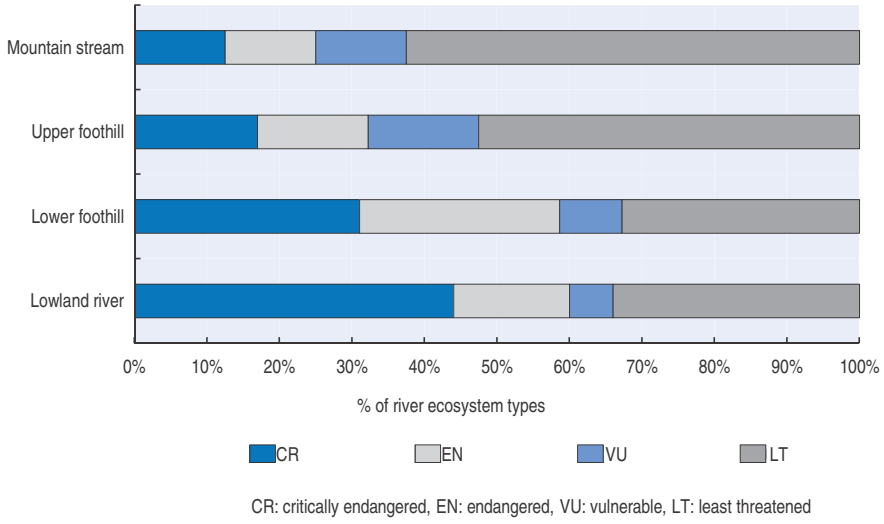
StatLink http://dx.doi.org/10.1787/888932878743

- The proportion of "non-revenue water" – leakages from ageing infrastructure, illegal abstraction, and poor maintenance and operation – is high (40% or more in many municipalities) and continues to increase.

- The results of water monitoring, available since 2006, show a steady deterioration of the biological and chemical quality of freshwater. Only one-third of mainstream rivers are in good condition. About 25% of river ecosystems are critically endangered, but the share reaches 46% if the assessment is limited to main rivers, excluding tributaries (Figure 1.7).

Figure 1.7. **River ecosystem threat status**

2011



CR: critically endangered, EN: endangered, VU: vulnerable, LT: least threatened

Source: Driver et al. (2012).

StatLink http://dx.doi.org/10.1787/888932878762

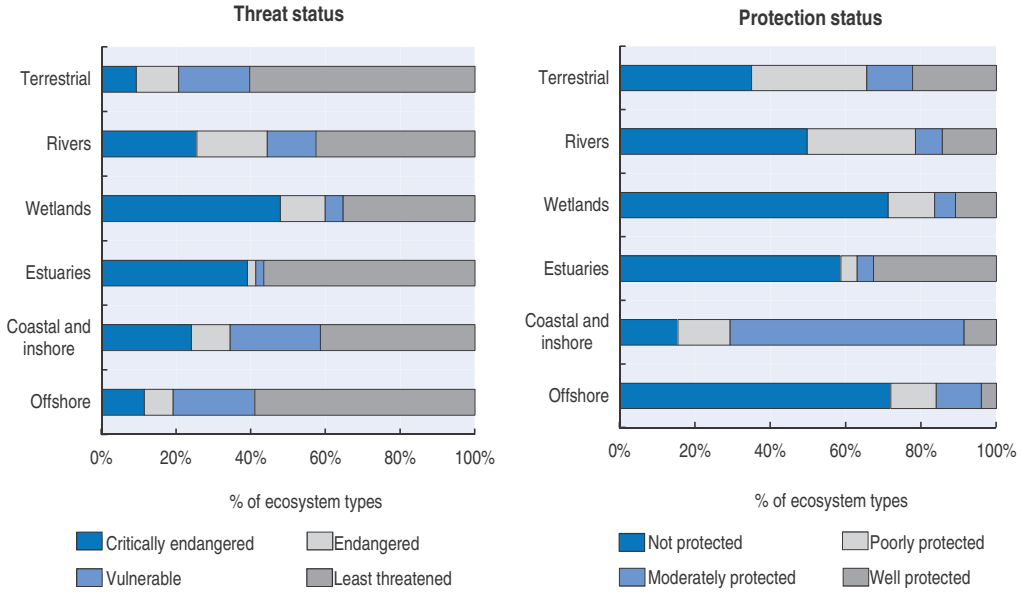
- The quality of surface water is particularly poor around urban areas. About 55% of wastewater treatment plants, especially smaller ones, do not meet effluent standards and some do not measure effluent quality. Agricultural runoff[5] and effluents from industry contribute to the poor quality of freshwater. About one-third of water held in strategic storage is no longer fit to drink without costly purification.
- High water-yield areas make up less than 4% of the country's area, but only 18% have any kind of formal protection. These "water factories" of strategic importance for water security include sub-quaternary catchments in Centre-East and North-West in which mean annual runoff is at least three times more than the national average.
- Acid mine drainage (AMD), where groundwater and surface water become contaminated by strong acidic water that contains high concentrations of metals, sulphides and salts from the flooding of closed mines, has recently emerged as a serious threat to water quality, particularly in Gauteng province. The other sources of AMD include runoff and discharges from open pits, ore stockpiles and mine tailings.
- Existing groundwater monitoring systems are inadequate to identify the status and trends of groundwater quality, but some indications point to growing levels of pollution, especially from mining and untreated sewage, storm water runoff from urban settlements (especially informal) and return flows from irrigated areas.

Biodiversity and ecosystems

- South Africa is one of 17 mega-biodiverse countries. It contains some 10% of the world's total known bird, fish and plant species, and over 6% of the world's mammal and reptile species. Many of them are endemic.
- South Africa's seas also include an exceptional range of habitats, from cool-water kelp forests to subtropical coral communities. The coastal areas are home to almost 15% of known coastal marine species, including 270 of 325 marine fish families.
- Wetlands, which make up only 2.4% of the country's area and represent high-value ecological infrastructure, are the most threatened of all South African ecosystems, with 48% of wetlands being critically endangered. The rates of critically endangered ecosystems are also high in relation to estuaries (39%), coastal (26%) and terrestrial ecosystems (24%) (Figure 1.8).

Figure 1.8. **Threat and protection status for ecosystems**

2011



Source: Driver et al. (2012).

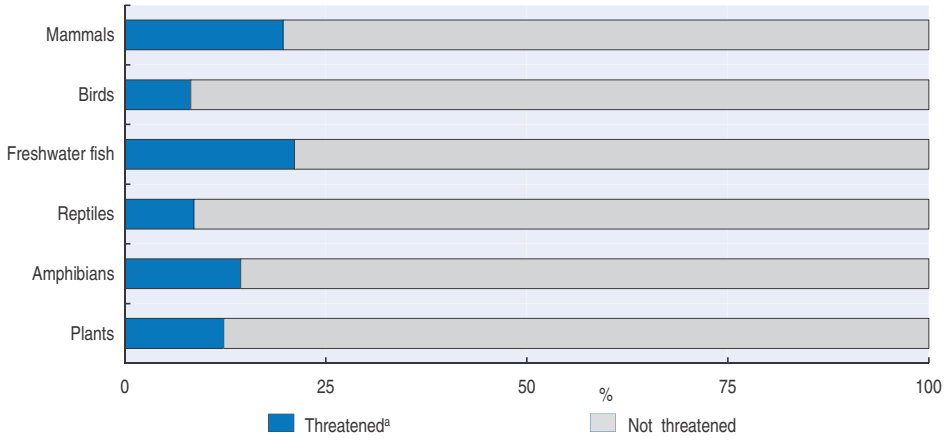
StatLink http://dx.doi.org/10.1787/888932878781

- Shrubland and bushveld (grassed plains with dense clusters of trees and tall shrubs) cover about 52% of South Africa's territory. They are inhabited by wildlife that forms the cornerstone of game farming and eco-tourism. Some, such as the bushveld in Limpopo province, are also the most mineral-rich regions of the world.
- Terrestrial protected areas covered 7% of the national territory in 2011, a lower share than in most OECD member countries (Annex I.C). While this share has been stable, the size of marine protected areas almost doubled since 2001 and covered 6.5% of territorial waters in 2011.
- However, 70% of wetland ecosystems, 60% of estuaries, almost 50% of freshwater and 35% of terrestrial areas remain completely unprotected, leaving many representative samples of all ecosystems outside the protected area network (Figure 1.8).

- Compared to OECD member countries, the share of threatened freshwater fish and mammals is high, average for vascular plants and relatively low for birds, reptiles and amphibians (Figure 1.9, Annex I.C). Some species are of special concern: white rhinoceros has been subject to an unprecedented level of poaching; and cycads are the most threatened plant group in South Africa and globally.
- Invasive alien species present a growing challenge to South Africa's biodiversity. Not only do invasive species threaten indigenous biodiversity, they also have serious socio-economic impacts including threats to water security, reduced productivity of rangelands, increased fire risk and impacts on agriculture.

Figure 1.9. **Threatened species**

Late 2000s



a) IUCN categories "critically endangered", "endangered" and "vulnerable" in % of known species.
Data refer to the number of species known to be threatened within those species that have been assessed to date.
Source: DEA (2012), *Environmental Indicators Database.*

StatLink http://dx.doi.org/10.1787/888932878800

Forest resources

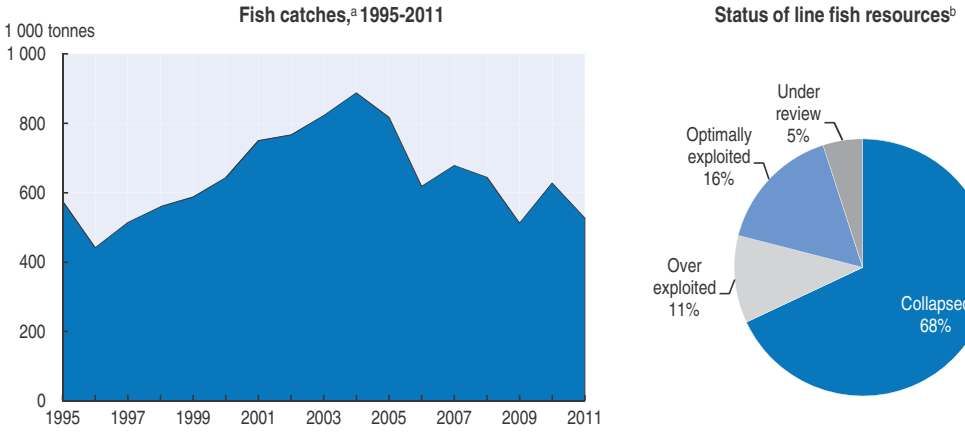
- While woodland accounts for 8% of South Africa's territory, natural evergreen forests cover only about 0.4%.[6] The natural forests are concentrated along the southern and eastern coastline and in mountainous regions towards its eastern borders with Swaziland and Mozambique. This biome is the most vulnerable, smallest and fragmented, and faces escalating pressure from strip mining, coastal and urban development, agriculture and illegal commercial and subsistence harvesting.
- Forest plantations, mostly composed of non-native species, cover around 1.4% of the total area. Most of them (80%) are located in three provinces: Mpumalanga, KwaZulu-Natal and Eastern Cape.

Fish resources

- The South African coastline extends over 3 200 km. The western coastal shelf has highly productive commercial fisheries, while the east coast is considerably less productive but has highly diverse species.

- The fishing industry contributes to 0.5% of GDP and accounts for 0.6% of world fish catches (Annex I.C). Fish catches grew by 27% between 2000 and 2005, but dropped by 37% between 2005 and 2009 (Figure 1.10). Illegal, unreported and unregulated fishing is believed to have contributed to this drop and the collapse of the traditional line fishery, abalone and Patagonian toothfish stocks.

Figure 1.10. **Fish resources**



a) Fish catches in inland and marine waters, including freshwater fish, diadromous fish, marine fish, crustaceans, molluscs and miscellaneous aquatic animals. Excludes marine mammals, crocodiles, coral, pearls, sponges and aquatic plants.
b) Commonly caught and commercially important line fish species.
Source: FAO (2013), *FAOSTAT Database*; DEA (2013).

StatLink http://dx.doi.org/10.1787/888932878819

3.2. Non-renewable stocks

Mineral reserves and mining

- South Africa is one of the world's leading mining and mineral-processing countries. It has the world's largest deposits of platinum group metals[7] (88% of world total), manganese (80%), chromium (72%) and gold (30%). It is also the world's leading producer of diamonds, gold, vanadium and titanium.
- South Africa also has abundant coal reserves, estimated at 4% of the world's total deposits. It is currently the world's fifth largest coal-producing country and the third largest exporter; 27% of its production is exported.
- While South Africa's oil and natural gas reserves supply less than 10% and 35% of its annual consumption respectively, the production of synthetic liquid fuels from coal and natural gas meets 33% of domestic oil needs.
- According to initial studies, South Africa has potentially rich, recoverable resources of shale gas. Environmental concerns regarding hydraulic fracking led to a moratorium on the exploitation of shale gas in April 2011, which was lifted in September 2012.

4. Improving the environmental quality of life

Air quality

- Data on ambient air quality, available only since the mid-2000s, show concentrations of PM_{10}, NO_2, O_3 and SO_2 exceeding ambient limit values in areas of heavy industrial development; these are usually associated with urbanised areas.
- South Africa's rate of private car ownership (11 per 100 persons) is only one-fifth of the OECD average. However, emissions from a growing number of vehicles contribute to photochemical smog in areas that experience high traffic density. This is especially true in Gauteng province (which accounts for nearly 40% of all vehicles) and in Cape Town (where car use is believed to be responsible for incidents of brown haze). Transport-related air pollution also comes from the use of unpaved roads, which account for 80% of the total road network.
- Emissions from burning coal, paraffin and wood for heating and cooking by households are a major contributor to poor indoor and outdoor air quality in many residential areas. The situation is particularly serious in informal settlements where over 60% of households rely on burning coal for cooking and heating in small-scale, poorly vented stoves.
- Illegal burning of waste is also a major concern. At Cape Town International Airport, black smoke from the burning of tyres to recover scrap metal reportedly impairs aircraft operations.
- Mine tailings in areas of intensive mining, such as Gauteng, have become a source of wind-blown dust. This can contain noxious compounds, such as residues of cyanide (used during gold extraction) and arsenic (which is enriched by a factor of 50 in gold-bearing ores).
- Wild fires of velds, or open rural spaces covered in grass or low scrub, contribute to air pollution incidents, in addition to posing risks to life and damaging property. Veld fires have been a natural phenomenon that helps regenerate grassland species, but humans are now responsible for most incidents. In 2008, KwaZulu-Natal province identified sugar cane burning during the harvest as a significant source of air pollution.

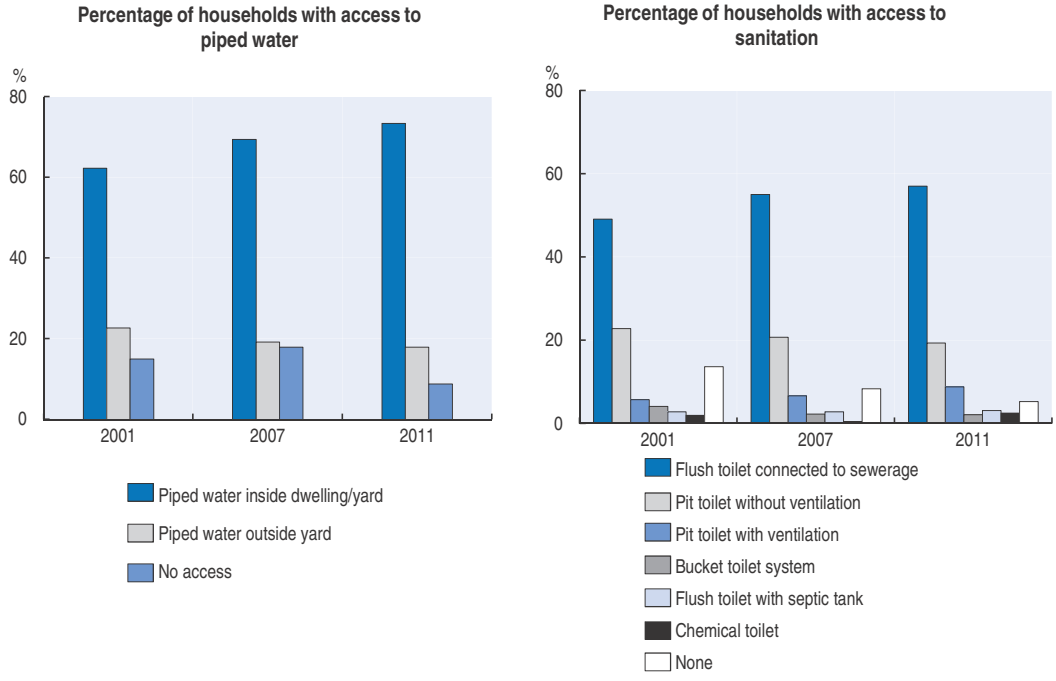
Water supply and sanitation

- At the beginning of the transition from apartheid, about 15 million people were without safe water supply and over 20 million without adequate sanitation services.
- Since 1994, universal access to an improved water source has been achieved in most urban areas, with 89% access to piped water in their premises. However, in some provinces, such as Eastern Cape, access rates are still below 80%. Between 1995 and 2011, access to improved water supply in rural areas increased from 67% to 79%. Overall, the percentage of the population with no access to improved water decreased from 18% to 19% between 2001 and 2011 (Figure 1.11).
- The Blue Drop Certification Programme for drinking water quality management, introduced in 2008, helped improve the quality of drinking water, but progress varies. In 2011, 95% of households in Gauteng and 94% in Western Cape rated the quality of water services as good, while this share was around 65-70% among residents of Free State and Limpopo.

- According to the 2011 census, access to sanitation increased from 83% to 91% between 2001 and 2011, including shared and individual pit latrines, as well as chemical toilets.[8] The share of households with access to flush toilets connected to sewerage system increased from 50% to 57% between 2001 and 2011 (Figure 1.11). Despite progress, around 12% of South Africa's population use unimproved sanitation methods, such as bucket toilets, or practise open defecation.

Figure 1.11. **Access to piped water and sanitation**

2001-11



Source: Stats SA (2012a).

StatLink http://dx.doi.org/10.1787/888932878838

Waste collection

- In 2011, 60% of households were covered by regular (at least once a week) waste collection services by local authorities. However, significant regional disparities remain: while about 80% of households in Western Cape and Gauteng provinces are regularly serviced, this is only true for 45% of households in Eastern Cape and KwaZulu-Natal and 16% in Limpopo. Lack of waste collection in informal settlements, particularly within the metropolitan municipal areas, leads to widespread illegal disposal.

Access to electricity

- The share of households using electricity for lighting increased from 58% to 85% between 1996 and 2011, while those using paraffin and candles decreased over the same period.[9] The proportion of households using electricity for cooking instead of paraffin, wood and coal increased from 48% to 74% between 1996 and 2011.

Health effects

- According to WHO, approximately 16% of all deaths are related to the state of the environment, with an estimated 69 disability-adjusted life years (DALYs) per 1 000 persons lost due to the environmental burden of disease.[10] More than one-third of disease in children under the age of five years is due to environmental hazards. These hazards include inadequate sanitation, which results in an estimated 1.5 million cases of diarrhoea in children under five years; and the paraffin and coal use for cooking in households, which causes 2 500 deaths, including 1 500 children under five years. However, due to lack of reliable health and environmental data, these figures likely underestimate the health impacts of environmental damage.

Notes

1. Domestic material consumption (DMC) is the sum of domestic (raw materials) extraction used by an economy and its physical trade balance (imports minus exports of raw materials and manufactured products).
2. Waste statistics rely on estimates.
3. Water stress is defined as the intensity of use of freshwater resources, expressed in terms of gross abstractions as a percentage of total available renewable freshwater resources (including inflows from neighbouring countries) or as a percentage of internal resources (i.e. precipitation-evapotranspiration). Medium-high water stress (20-40%) implies the management of both supply and demand, and conflicts among competing uses need to be resolved. It should be noted, however, that national water-stress levels may hide important variations at sub-national (e.g. river basin) level, particularly in countries with extensive arid and semi-arid regions.
4. However, mining is the major user of water in areas where mining activities are concentrated.
5. Livestock manure is the main source of nitrogen and phosphorus inputs. The use of nitrogen fertilisers (0.4 tonnes/km^2 of arable land) remains well below the OECD average (2.23 tonnes/km^2).
6. Woodland includes areas ranging from wooded grasslands (between 5% and 10% tree canopy cover) to dense thickets (areas with over 75% tree canopy cover but not meeting other criteria required to be defined as natural forest).
7. Platinum group metals include iridium, osmium, palladium, platinum, rhodium and ruthenium.
8. According to estimates by the WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation based on survey and census data, access to improved sanitation shows much slower progress: from 71% (1990) to 75% (2000) to 79% (2010).
9. The use of paraffin and candles for lighting also decreased from 13% to 3% and from 29% to 11% respectively, between 1996 and 2010.
10. The burden of disease is measured by WHO in disability-adjusted life years (DALYs), which is the number of years lost due to ill health, disability or premature death.

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PART I

Chapter 2

Policy-making environment

This chapter reviews the main strategies and initiatives launched during the period 1994-2013 in the areas of sustainable development and environmental management. It examines South Africa's regulatory framework for environmental protection and the instruments used to systematically monitor and evaluate the environmental impacts of economic and sectoral policies, programmes and projects. The chapter also reviews the institutional framework for environmental management, the application of mechanisms to improve horizontal and vertical co-ordination, and programmes to ensure compliance with environmental requirements. Progress in promoting environmental democracy, through open access to information and improved public participation in decision making, is also discussed, along with mechanisms facilitating access to courts on environmental matters.

Assessment and recommendations

In the relatively short time since the end of apartheid and the first democratic elections in 1994, South Africa has developed a comprehensive policy and regulatory framework for environmental and natural resource management. The 1996 Constitution includes a provision establishing the basic human right to a clean, safe and healthy environment in the context of the protection of the natural resource base and sustainable economic and social development. A comprehensive National Environmental Management Act (NEMA), adopted in 1998, is a progressive piece of environmental legislation that contains a number of provisions at the cutting edge of good international practices. The NEMA has been amended several times and complemented by a number of subsidiary policies and legal acts on specific environmental issues, including biodiversity and nature, air, water, waste and coastal area management.

Despite significant progress, South Africa's environmental policies, legislation and regulations are still at an early stage of development. Effective implementation only got under way from the mid-2000s. There are areas where policies and executive regulations have not yet been established (e.g. wastewater and waste) and where the legacy of apartheid is still present (e.g. land-use planning). With time, regulations established in the late 1990s, such as for the water sector and environmental impact assessment, need revision to ensure effective management in light of changes in the economy and human settlement patterns, or to streamline regulations.

The human and financial resources allocated to the national Department of Environmental Affairs (DEA) have been significantly strengthened, as have project and contract management and performance evaluation.

An innovative system of performance agreements signed between South Africa's president and all cabinet ministers strengthens accountability for the delivery of 12 Government Outcomes, including one on the environment. This has resulted in significant mainstreaming of environmental considerations into the policies, measures and programmes of other government departments.

Despite the mechanisms in place at the national level, the convening powers of environment authorities, particularly at provincial and local government levels, are still limited, and the capacity to negotiate and influence implementation in other policy areas is weak. This is partly due to insufficient financial allocations required for policy implementation at the provincial and local government levels. Although formal co-operation agreements have been signed with some departments to fully implement the Government Outcomes, this process has not yet been completed for key sectors, such as energy, mining and transport. Better co-operation with these sectors is needed, especially with regard to mining operations, which are currently exempt from some of the key provisions of the NEMA. While some policy and legislative steps have been taken to apply the NEMA to the mining industry, and there is an agreement to do so, they have not yet been implemented.

The introduction of instruments such as environmental impact assessments (EIA) and media-specific licences was an important step to account for environmental considerations at the project level. However, the fragmentation of processes and authorities across the three different administrative levels limits their effectiveness. Media-specific licences are issued pursuant to separate, lengthy application processes and based on sometimes conflicting criteria. In addition, permitting-decisions by different competent authorities, even located within one ministry, are not always consistent. Lengthy processes and staff shortages in environmental offices have led to a large backlog of EIAs at the provincial level and consequently to the "unlawful commencements of a listed activity". Existing EIA requirements feature a provision (Section 24G of the NEMA) intended as a transitional measure between the apartheid era regulations and the NEMA; it specifically allows for operators to apply for retroactive authorisation of illegal activities in exchange for payment of an administrative fine, subject to the approval of the authorities. The abuse of this provision as a legal loophole has become the most prevalent environmental offence in the last five years.

Although several mechanisms for policy evaluation have been put in place, the evaluation of costs and benefits and the effectiveness of policies and instruments are still limited. The strategic environmental assessment (SEA) of policies, plans and programmes has been undertaken, but on a voluntary basis, and its use has been confined to the sub-national level. Cabinet has recently approved a requirement to conduct regulatory impact assessments.

Effective enforcement of the new generation of environmental policies was significantly strengthened by the creation of an Environmental Management Inspectorate (EMI). The Inspectorate has uniform powers at the national, provincial and local levels, including wide criminal enforcement powers similar to those of the South African police services. The number of environmental management inspectors (the "Scorpions") has nearly doubled since 2007. Specialised units have been established within provincial authorities in response to the involvement of organised crime in wildlife-related violations, and the increasing sophistication of criminal methods.

Despite having uniform powers, environmental management inspectors have taken uneven action. Provincial environmental inspectors are sometimes unwilling to enforce against unauthorised activities in rural communities because such activities support vital economic interests affecting the local population. The prosecution authorities are frequently unsuccessful in securing convictions for environmental crimes, especially for violators of biodiversity and conservation legislation. This is due to gaps in, and frequent changes to, the legislation, as well as the lack of skills and experience among prosecutors and judges.

South Africa's environmental legislation enables authorities to compel permit applicants to provide a financial surety that they can cover any expenses related to future clean-up operations. This practice already existed in the mining sector for post-closure remediation of mines. However, the application of this approach faces a number of challenges, particularly lack of detailed and adequate plans for remediation, and insufficient assessment of required funding. Although the two most recent strategic plans of the Department of Mineral Resources address these challenges, further efforts are needed to ensure greater compliance of mining operators. There is also no effective financial mechanism to support the government's responsibility to remediate damage to land and water resources where the responsible party cannot be identified or is unable to undertake remediation measures.

South Africa has made important progress in establishing systems for monitoring and evaluating the state of environment and policy responses. Monitoring systems have been expanded to measure the ambient quality of water and air, and the use of water. However, environmental trend analysis is still limited. National authorities produce state of environment reports every four years, although they are not mandatory. South Africa has also taken steps to establish a System of Environmental and Economic Accounts, though environmental information systems have not yet been accredited for use in the country's statistical system. An innovative approach has been applied to identifying emerging issues to guide policy interventions and inform the public. Environmental sustainability is becoming an integrated part of corporate governance reporting.

Legal provisions on access to environmental information, public participation in environmental decision making and access to courts are comparable with the best practices in OECD member countries and with the Aarhus Convention. The constitutional right of citizens to access information was an important step to reverse the legacy of secretive and bureaucratic approaches developed by the apartheid state. This right is not limited to information held by government but also applies to the private sector. Since the beginning of the transition, environment-related strategies and laws have been open to public consultation and discussed in various bodies. The very broad definition of legal standing enables citizens to challenge environmental decisions on a variety of grounds, including protection of the environment. Citizens that lose such cases may not be required to cover the defence costs if their action is considered to have been reasonable and in the public interest, and if they have no means to cover the costs.

Ensuring participation of the public in decision making nevertheless faces a number of obstacles. Information requests to public bodies are sometimes ignored, refused or answered only partially. Introduction of the EIA requirements boosted the participation of major non-profit organisations in decision making. However, the participation of poor, disadvantaged and rural communities, including women, youth, indigenous peoples and farmers, remains weak. Further steps should be taken to address the limited capacity both in government and civil society, the limited access to information by marginalised groups and limited funds for participation, particularly at the local level.

Recommendations

- Complete Memorandums of Understanding between the Department of Environmental Affairs (DEA) and key sectoral departments (mining, transport and energy) with a view to clarifying responsibilities; ensuring consistency and coherence of policies; and strengthening the implementation of Government Outcome No. 10 "Environmental Assets and Natural Resources".
- Implement the agreed reform to subject mining activities to environmental authorisations under the NEMA; and enable environmental inspectors to monitor and enforce compliance with environmental requirements in the mining sector.
- Adopt regulatory requirements to apply SEA to national policies, plans and programmes; update methodological and technical guidelines that specify how SEA should be carried out; and strengthen capacity to monitor the economic and social aspects of environmental policies.

Recommendations *(cont.)*

- Develop and implement a "one-window" process for obtaining integrated, environment-related authorisations, including EIA and environmental permits and licences; and designate provincial authorities to play the co-ordinating role, except in cases involving nation-wide or transboundary impacts when this should be done by the DEA.
- Amend Section 24G of the NEMA so as to prevent abuse of the provision concerning retrospective authorisation of illegal activities and increase administrative and criminal sanctions for operating without the required environment-related permits.
- Develop a Compliance and Enforcement Strategy for the Environmental Management Inspectorate, including a risk-based method for identifying priorities for proactive, as well as reactive, compliance monitoring and enforcement work; and systematically use outcome indicators to measure the effectiveness of compliance monitoring activities.
- Strengthen provisions for securing the financial resources for post-closure site remediation in the mining sector and provide clearer guidance on how mining operators should comply with the requirement; and establish appropriate financial mechanisms for the remediation of past damage to land and water resources, which could be financed by revenues from a tax on industries responsible for the damage, including mining.
- Continue to expand environmental monitoring networks, giving priority to monitoring ambient water and air quality, as well as waste management practices; integrate environmental statistics into the national statistical system and further develop the System of Environmental and Economic Accounts; and consider ways in which key environmental information should be communicated in a regular and timely manner to policy makers and to the public.

1. Policy and regulatory framework for environment and sustainable development

1.1. *Environmental policies and regulations*

Under apartheid, South Africa's environmental policies had two main characteristics. First, an extensive regulatory framework was developed in the area of nature and biodiversity protection; significant resources were allocated to preserving wildlife and the creation of game parks and biodiversity reserves (McDonald, 2002). Second, there were very few provisions for integrating economic and environmental policies by, for example, assessing the environmental impacts of sectoral policies, plans and individual investments. The lack of coherent regulatory enforcement mechanisms resulted in wide variations in environmental management practices across the country. As a result, well-preserved spots of rich biodiversity and well-tended areas for the privileged parts of society co-existed with extensive "hotspots" of serious environmental degradation. These hotspots were often caused by unchecked economic activities, in particular mining and mineral processing, manufacturing and energy production. Environmental pressures were magnified in overcrowded areas inhabited by the non-white population where uncoordinated urban development and lack or poor quality infrastructure were widespread.

Since the first democratic elections in 1994, South Africa has embarked on a process of overhauling the country's founding principles, policies and legislation, with the intention of achieving equitable access to resources, economic sustainability and social justice.

South Africa's 1996 Constitution and its Bill of Rights established the fundamental right to a healthy environment for all citizens, while allowing justifiable economic and social development to proceed.[1] The constitutional provisions were detailed in the White Paper on Environmental Management Policy for South Africa adopted in 1997, and in the first comprehensive framework environmental law – the National Environmental Management Act (NEMA) – adopted in 1998. The White Paper outlined the government's new vision for environmental policy "… to unite the people of South Africa in working towards a society where all have sufficient food, clean air and water, decent homes and green spaces in their neighbourhood enabling them to live in spiritual, cultural and physical harmony with their natural surroundings" (DEAT, 1998). The White Paper identified a set of environmental policy principles, strategic goals and supporting objectives together with specific responsibilities of different spheres of government and civil society.

While the White Paper expressed policy objectives agreed upon after a wide-reaching consultative process, the NEMA created a legal framework for environmental management comparable with good international practice. It replaced the apartheid-era, largely declarative Environment Conservation Act (No. 100 of 1982, replaced by No. 73 of 1989) and repealed 36 other environment-related laws. It shifted from a preservationist approach to "towards people" conservationist policies and institutions; introduced instruments based on the precautionary and "polluter pays" principles; and established a regulatory framework for enforcing environmental requirements. The Act also provided for engaging business and civil society in joint efforts towards sustainable development, with the Department for Environmental Affairs (DEA) charged with co-ordination and leadership.

The White Paper envisaged the development of the National Environmental Strategy and Action Plans that would set targets and implementation timeframes, as well as identify resource needs. Several subsidiary strategy documents were developed during the 2000s, supplemented by legal acts and amendments to the NEMA. Their preparation followed a rigorous procedure[2] and focused on priority elements of environmental management (Box 2.1).

Box 2.1. **Key environment-related strategies and laws**

Water: the Water Services Act (No. 108 of 1997) and the National Water Act (No. 36 of 1998) were among the first comprehensive laws established in South Africa. The first act established a regulatory framework for local authorities to supply water and sanitation services, while the second regulates water resources management, including water abstraction and quality issues. The ambient water quality standards were set in the 1996 Water Quality Guidelines. Growing concerns about water availability led to the adoption of a National Water Resource Strategy in 2004 and a National Groundwater Strategy in 2010. A consultation paper for the renewed Water Resource Strategy was published in 2012.

Forestry: the National Forests Act (No. 84 of 1998) and the National Veld and Forest Fire Act (No. 101 of 1998) established a regulatory basis for the protection of state forests, forest nature reserves and wilderness areas, including plant and animal life. The acts include provisions for management programmes to prevent soil erosion and fires; maintain natural genetic and species diversity; and control invasive plants and animals. The acts also provided for the control of, and reasonable access to, state forests for the purposes of recreation, education, culture or spiritual fulfillment, as well as prohibiting any person from damaging state forests or contributing to the threat of fire.

Box 2.1. **Key environment-related strategies and laws** *(cont.)*

Biodiversity: Following the adoption of the White Paper on Conservation and Sustainable Use of Biodiversity in 1997, the NEMA's Protected Areas Act (No. 57 of 2003) consolidated the system of protected areas and provided mechanisms for their management. The subsequent NEMA Biodiversity Act (No. 10 of 2004) created a framework for more sustainable indigenous biological resources management. It regulates, among others, the protection of endangered species, control of invasive alien species and monitoring of genetically modified organisms. The National Biodiversity Strategy and Action Plan (NBSAP), published in 2005, set out a comprehensive framework and long-term plan of action for the conservation and sustainable use of South Africa's biodiversity, and the equitable sharing of benefits derived from such use. The NBSAP was complemented in 2009 by the National Protected Area Expansion Strategy (NPAES) to achieve cost-effective expansion of protected area for ecological sustainability and increased resilience to climate change.

Air: The NEMA's Air Quality Act (No. 39 of 2004) provides standards for both ambient air quality and emissions, which are set in consultation with national, provincial and local government stakeholders. The 2007 National Framework for Air Quality Management defined mechanisms, systems and procedures to promote integrated air quality management by preventing and minimising pollution at source, and through impact management of the receiving environment from the local to international scales. National ambient air quality standards for common pollutants (sulphur dioxide, nitrogen dioxide, PM10, ozone, benzene, lead and carbon monoxide) were set in a 2009 regulation. In 2010, a DEA regulation set sector-specific air emission standards for 10 categories (and multiple sub-categories) of industrial facilities. These standards are established for a few pollutants most relevant to each type of industrial activity.

Waste: The 2000 White Paper on Integrated Pollution and Waste Management established key principles, objectives and requirements for waste management, which were translated into the consolidated NEMA Waste Act (No. 59 of 2008). In 2011, the Minimum Requirements Series of Standards and Procedures established requirements for landfills; handling and disposal of hazardous waste; and monitoring at waste management facilities. The National Standards for the Collection of Domestic Waste set out rules and regulations for municipal collection of domestic waste. In 2011, the National Waste Management Strategy (NWMS) was adopted to guide implementation of the Waste Act. The NWMS is structured around a framework of eight goals and targets for each goal that must be met by 2016.

Climate Change: The 2011 White Paper on National Climate Change Response provides the basis for the mainstreaming of climate-resilient development, with the intention of leading to a national climate change law.

Coastal and Marine Management: The Marine Living Resources Act, 1998 (No. 18 of 1998) established a framework for the long-term sustainable use of marine living resources, including through the Marine Protected Areas. The NEMA Integrated Coastal Management Act (No. 24 of 2008) established a system of integrated coastal and estuarine management to ensure that development and use of natural resources within the coastal zone is socially and economically justifiable and ecologically sustainable. It determined the responsibilities of organs of state in relation to coastal areas; established a system for controls of dumping at sea and pollution in the coastal zone; and gave effect to South Africa's international obligations in relation to coastal management.

Despite significant progress, some of South Africa's environmental policies, laws and regulations are still at an early stage of development. There are areas where policies and executive regulations have not yet been established and the legacy of apartheid is still present. For example, the national wastewater discharge standards (applicable to all effluent sources) for a number of organic pollutants and trace metals have not been revised since their establishment in the 1980s. Emission and ambient air standards do not cover all priority pollutants, while "extended producer responsibility" schemes with respect to waste have been ad hoc or voluntary due to an insufficient regulatory and implementation framework.

Insufficient progress has also been made in mainstreaming environmental considerations into sectoral policies and laws. One of the most critical areas is mining. The Minerals and Petroleum Resources Development Act (No. 28 of 2002) includes some provisions for the equitable access to, and sustainable development of, the nation's mineral and petroleum resources. However, regulations for an integrated authorisation process that would cover water-use licences, environmental impact assessment authorisations and waste licences are still being developed. Some policies related to climate change were developed in the early 2000s, such as the 2003 Renewable Energy White Paper or the 2005 Energy Efficiency Strategy; however, the White Paper on National Climate Change Response was adopted only in 2011 and requires substantive work to be translated into national legislation. Other priority areas with missing environmental provisions are transport and the management of oceans.

Legal and institutional disputes regarding established laws also prevent the creation of a stable policy framework. The Development Facilitation Act (No. 67 of 1995) is a case in point. Although the act laid down the general principles governing land development in the country, many of its provisions have been recently declared unconstitutional by the constitutional court, which decided they intruded on the power of local government to make land development decisions. The pending Spatial Planning and Land-Use Management Bill is expected to radically overhaul South Africa's land-use planning by establishing a much higher degree of national uniformity (Chapter 6).

Some regulations established in the late 1990s – including water management – are becoming obsolete and inadequate to ensure effective management in light of rapid changes in the economy. The 1998 National Water Act provided a legal framework for the right to access to sufficient water. However, there is a need to review its provisions to create a more effective system for water allocation, improve water resources institutional management and streamline regulatory processes. Similarly, the 1997 Water Services Act requires significant review to align with the provisions of newer acts, especially in the field of municipal finance. The second National Water Resource Strategy, submitted for public consultation at the end of 2012, is intended, among other goals, to overcome financial and human resource constraints by establishing more effective catchment management agencies and improving performance of the water supply and sanitation sector.

1.2. Policies for sustainable development and greening the economy

Sustainable development framework

Since 1994, South Africa's national economic development policies have been guided by a series of comprehensive plans. The first was the 1994 Reconstruction and Development Programme (RDP), followed by the 1996 Growth, Employment and

Redistribution Strategy and the 2006 Accelerated and Shared Growth Initiative for South Africa (ASGI-SA). These programmes included many elements of Agenda 21, but mostly address social inequalities from the apartheid era. Little emphasis was placed on environmental sustainability as critical for growth. Some issue-specific documents, such as on innovation and research and development, explored the concept of growth being driven by natural resource capabilities, but these did not have widespread impact. The NEMA contained a definition of sustainable development,[3] but it was considered primarily to reflect the approach of the DEA rather than the overall government.

The 2002 Johannesburg World Summit on Sustainable Development provided a platform to learn and develop sustainable development (SD) practices. Following the adoption of the Johannesburg Plan of Implementation (JPoI), South Africa's cabinet adopted the National Framework for Sustainable Development (NFSD) in 2008. The NFSD, which was developed on the basis of in-depth analyses (including trends and long-term projections for selected priorities, as well as policy and implementation implications) and through broad consultation (including public hearings, round tables and four consultative workshops) emphasised more effective stewardship of South Africa's natural, social and economic resources. However, completion of the NFSD, much later than the JPoI deadline of 2005, was marred by problems. It proved very difficult to gain sufficient support across various government departments. Opposition resulted in a framework rather than a full strategy. The ASGI-SA, which preceded finalisation of the NFSD and was issued directly by the president and key government departments, enjoyed far more visibility. The DEA's leadership in developing the NFSD contributed to the misconception that sustainable development is an environmental issue that happens in parallel with development initiatives in other sectors.

In 2011, in the run-up to the Rio+20 Conference, a five-year National Strategy for Sustainable Development and Action Plan (NSSD–1) was adopted. The NSSD–1 is comprehensive, covering a wide array of policies and institutions vertically and horizontally, and anticipates their short and medium-term SD needs. Yet it also strengthens existing planning frameworks by identifying longer-term trends that may influence (positively or negatively) their intended outcomes and thus shorten or lengthen expected time horizons. Its five priorities for strategic intervention include: *i)* enhancing systems for integrated planning and implementation, *ii)* sustaining ecosystems and using natural resources efficiently, *iii)* moving towards a green economy, *iv)* building sustainable communities and *v)* responding effectively to climate change. An important feature of the NSSD–1 was the identification of 20 headline indicators, aspiring to "change people's perceptions of what constitutes wellbeing". They are expected to guide all spheres of government to set targets and audit their implementation.

It is too early to assess the impacts of the NSSD–1 on other sectoral policies. So far, an inter-governmental National Committee on Sustainable Development (NCSD) has been established with two core elements: biennial ministerial meetings and a technical task team that co-ordinates and engages civil society, private sector, academia and multi-stakeholders into policy implementation, international co-operation, and monitoring and evaluation. A planned assessment of NSSD–1 in 2015 will show progress in achieving its objectives and will serve as a build-up to NSSD–2.

Green economy initiative

If it has taken several years for the sustainable development agenda to mature in South Africa, a green economy (GE) concept involving powerful economic sectors has emerged rapidly since 2009. This shift was induced primarily by the response to the international economic crisis. The New Growth Path (NGP), a new economic framework for 2010-20 announced in 2010, set out critical markers for employment creation and growth, which implied fundamental changes in production infrastructure to generate a more inclusive and greener economy. In November 2011, South Africa unveiled a Green Economy Accord (GEA), a unique approach to building a multi-stakeholder commitment for growth and green economy. The National Treasury has allocated ZAR 800 million in 2012-14 for South Africa's Green Fund, which finances high quality, high impact, job-creating green economy projects and mainstreaming activities that would not have been implemented without national support (Chapter 3).[4]

2. Evaluation of plans and policies

2.1. Strategic environmental assessment

Strategic environmental assessments (SEAs) of policies, plans and programmes have been undertaken in a number of sectors in South Africa. However, the use of this policy instrument remains largely voluntary and is confined to the sub-national level. The only area where SEA has some legal basis is spatial planning which, in the early 2000s, emphasised provision of environmentally and economically sustainable community services and ensuring a clean and healthy environment.[5] SEAs have been mostly externally funded and conducted by the private sector.

The work on SEAs was pioneered by the Council for Scientific and Industrial Research (CSIR) in the late 1990s. It highlighted the value of strategic-level assessment and explained the different roles and functions of SEAs and EIAs. In response to the growing uptake of SEAs, the DEA and CSIR produced a guidance document in 2000 that sought to "promote a common understanding of SEA in South Africa and assist in the development of best practice". The Department of Water Affairs and Forestry followed up with its own guidance on SEA for water-catchment management planning. The Department of Environmental Affairs and Tourism's (DEAT) guideline document was updated in 2004 and 2007 to provide step-by-step guidance on how to apply SEAs in different circumstances. However, the guidance considered a range of alternative approaches and their respective merits without stipulating a preferred or required process.

Experience so far suggests the lack of a clearly defined SEA procedure has resulted in a wide spectrum of applications. These range from SEAs applied to specific plans (which constitute more than 60% of cases), to stand-alone proactive SEAs (which provide for project-level decisions if a "void" exists at the policy level). A recent proactive SEA, for example, identified potential marine aquaculture development zones for fin-fish cage culture for the Department of Agriculture, Forestry and Fisheries. A similar approach was adopted for the expansion of the Addo Elephant Park. In such cases, involving assessments of large-scale projects, SEAs are more akin to EIAs.

Without a legislative requirement to act upon the findings of SEAs, their effectiveness and ultimate impact will be limited. Several analyses of SEA applications have shown they exert little influence on plans and programmes, or on decision making more generally, even though the quality of the SEAs was generally considered adequate. The 1998 NEMA, which introduced legal requirements for EIA, envisaged the promulgation of SEA

regulations, but this has not yet been achieved. The current emphasis on greening the economy reinforces the need for developing legal requirements and precise procedures for SEA of national-level plans and policies. Energy, transport or mining policies would be obvious areas to apply SEAs.

2.2. Economic and regulatory impact analysis of environmental policies

South Africa's environmental policies have increasingly been subject to economic assessments. Pioneering work in the area of biodiversity has focused on analyses of the aggregate economic value of South Africa's ecosystem services. More recently, the government has used cost-benefit analyses to calculate direct and indirect damage-related costs associated with extreme weather events, climate trends and water shortages. Fostering the institutions and researchers analysing the economic aspects of environmental policies would help develop the capacity for this type of analysis, and could ultimately contribute to the design of more efficient and effective environmental policies.

Increasingly, components of environmental policies are subject to analysis by other departments, such as the Treasury (e.g. environmentally-related taxes, charges and incentives) or the Development Bank of Southern Africa (on mainstreaming green infrastructure) with the view to devise policies that promote sustainable economic development and growth. By using more economic analysis, environmental policies became an important element of national development planning. A "Diagnostics Report" released by the National Planning Commission in June 2011 identified and analysed an over-reliance on natural resources as one of nine primary challenges facing South Africa's economy. The report formed the basis of the National Development Plan (NDP), a strategy through 2030, which cabinet endorsed in September 2012.

There are no formal requirements for regulatory impact assessment of government policies and regulations in South Africa; only a few selected policies have been subject to pilot studies in the mid-2000s. These studies focused on costs of regulations for the government rather than on costs and benefits for the economy and society. Taking into account the scope and potential implications of environmental regulations, the DEA might consider applying regulatory impact assessments to selected ordinances. These could test the procedure, showing potential gains and, when feasible, reducing administrative burdens on the regulated communities. However, the introduction of regulatory impact analysis is an issue for the government as a whole.

3. Institutional framework for environmental management

3.1. National level

At the national level, the Department of Environmental Affairs (DEA) has been charged with ensuring the protection of the environment and conservation of natural resources, balanced with sustainable development and the equitable distribution of benefits derived from natural resources. The DEA fulfils its role by formulating, co-ordinating and monitoring the implementation of national environmental policies, programmes and legislation. For more than a decade, environmental management was institutionally linked with tourism in the Department of Environmental Affairs and Tourism (DEAT). As part of the 2009 administrative reform, environmental and water departments were brought together under the Minister of Water and Environmental Affairs[6] to strengthen linkages between environment and water management.

Overall, the DEA has strengthened its capacities. Between 2004 and 2012, the number of approved posts increased from 1 000 to 1 400. At the same time, its budget increased significantly, from ZAR 1.1 billion in 2004 (excluding tourism) to ZAR 5.2 billion in 2012/13 (DEA, 2010, 2012a). Transfers and subsidies make up a significant component of the DEA's budget, taking up almost 70% of total allocations. These transfers go to a range of bodies managing national parks and gardens, fisheries, social responsibility projects, and weather services. A significant increase in the DEA budget, especially between 2009 and 2013, was linked to additional allocations to the Social Responsibility Programme (SRP); this is part of the DEA's share of the government's Expanded Public Works Programme (Chapter 6). The SRP is an important component of DEA support to environmental management at the sub-national level that promotes job creation, community training and infrastructure development.

To strengthen its project and contract management capacity, as well as improve monitoring of expenditure on a continuous basis, the department established a budget committee to review quarterly expenditures against performance and service delivery. A newly established business performance unit monitors performance of individuals and various parts of the DEA (based on performance agreements that stipulate tasks, as well as compliance criteria), strategic management, planning, and risk management. Rigorous annual reporting and planning contribute to increasing the DEA's performance. Numerous programmes provide training and skills development of employees. Through one such programme, for example, 100 interns join the DEA each year. However, the DEA experiences continuous problems with retaining skilled individuals and filling vacancies at the technical, engineering and scientific levels. Around 14% of DEA posts were not filled in 2012 due to lack of sufficiently skilled candidates, but also lengthy selection procedures (DEA, 2012a).

The implementation of the DEA's mandate has been supported by four statutory bodies: the South African National Biodiversity Institute (SANBI), South African National Parks (SANParks), the iSimangaliso Wetland Park and South African Weather Services (SAWS). Although these bodies have a long history of operation, the 1994 democratic changes led to a redefinition of their roles. For example, the NEMA's Biodiversity Act expanded the mandate of SANBI's forerunner, the National Botanical Institute, to include responsibilities for overall management of South Africa's fauna and flora, and to build internationally respected programmes in conservation, research, education and visitor services. Similarly, SANParks transformed itself into a leading conservation and management authority for all 20 national parks (covering nearly 4 million ha). It was charged with making the parks more accessible to tourists, while ensuring that conservation remains a viable contributor to social and economic development for the local population.[7]

The 2005 amendment to the NEMA provided for an Environmental Management Inspectorate (EMI) with broad inspection and investigation powers. Since its inception in 2007, the EMI has significantly expanded its role in environmental compliance assurance at the national and provincial levels (Section 4.3).

3.2. Sub-national level

Provincial authorities administer provincial environmental laws (e.g. Limpopo Environmental Management Act, 7/2003) and have powers to set provincial standards under various pieces of legislation. They oversee environmental impact assessments, issue

a range of environmental permits and manage provincial nature reserves. Under the NEMA, provincial governments prepare environmental implementation plans, which require working with municipalities to ensure consistency with municipal Integrated Development Plans (IDPs). Provincial spatial development frameworks (PSDFs) may also include environmental considerations.

Provincial environment departments are frequently part of a broader portfolio (e.g. economic affairs, development planning, tourism, agriculture) reflecting the principal interactions between different sectors in each province. Some provinces, such as Gauteng, Western Cape and KwaZulu-Natal are relatively better off in terms of human and financial resources. In practice, most provinces have declining environmental budgets and face human capacity constraints; environmental staff is often over-committed, with little capacity for interagency co-operation (Chapter 6).

Local governments (municipalities), whose powers have been significantly extended after 1994, have the constitutional competence for environmental issues such as air pollution, noise pollution, water supply and sanitation, storm water management, municipal waste collection removal and non-toxic solid waste management. These responsibilities are financed mostly through user fees and taxation. Local authorities also play an important role in regulating land use and development through monitoring and enforcing compliance with relevant zoning regulations.

The legislation does not differentiate environmental responsibilities among all 278 municipalities; the functions they actually exercise depend on their size and capacity. The eight large metropolitan municipalities are usually well equipped to execute their environmental mandate and generally have fairly stringent by-laws on air pollution and waste management. They can generate their own revenues, borrow on the capital markets and attract and retain staff with the appropriate financial management skills. The district's municipality powers and functions are more limited, and its role is primarily co-ordination; this frequently leads to conflict around decision-making authority and allocation of resources. The situation is different in small rural municipalities where local revenues do not provide adequate support for effective administration. The provinces or district municipalities often assume certain regulatory responsibilities of municipalities that lack capacity to execute them (Chapter 6).

3.3. Horizontal and vertical co-ordination and co-operation

Following the constitutional principle of "co-operative governance", and the provisions of the 2005 Intergovernmental Relations Act, South Africa has established mechanisms and procedures to promote co-operation between the national, provincial and local governments and to facilitate the settlement of intergovernmental disputes. They include the MINMECs, which are standing intergovernmental bodies consisting of sectoral ministers and members of provincial executive councils responsible for functional areas similar to those of ministers. They are complemented by an equivalent at the executive level – MINTEC – which consists of the DEA's director-general and heads of provincial departments. The environment-specific MINMEC and MINTEC meet regularly and discuss collaboration between different levels of government. They work through issue-specific working groups, which are particularly effective in the areas of biodiversity and environmental compliance and enforcement.

The NEMA established the Committee for Environmental Co-ordination (CEC), a statutory body to promote the integration and co-ordination of environmental functions among relevant government departments. The CEC was chaired by the DEA's director-general, and attended by directors-general of national departments conducting activities affecting the environment, as well as heads of provincial environmental departments. The forum and its sub-committees review numerous pieces of national and provincial legislation, including those from the water, land, agricultural, and minerals and energy sectors. However, the CEC's role has been diminishing as its meetings attract junior officials from sectoral departments (SRK, 2005).

After the 2009 general elections, the South African government introduced an innovative system of intergovernmental co-ordination. As part of the Medium-Term Strategic Framework, which was an expression of the government's Programme of Action until 2014, South Africa's president and cabinet ministers signed a number of performance agreements on the implementation of 12 Government Outcomes. These agreements describe the contribution of respective ministries to the delivery of each Outcome and have already resulted in significant mainstreaming of environmental considerations into the policies, measures and programmes of other government departments.

Outcome 10 – "Environmental assets and natural resources that are well protected and continually enhanced" – covers most priority environmental issues (Box 6.4). It includes five outputs with specific targets elaborated in delivery agreements that the Minister of Environmental and Water Affairs signed in September 2010 with provincial environmental authorities. The DEA prepared Memorandums of Understanding (MoUs) with key government departments to identify priorities and clarify responsibilities related to ensuring the environment is considered in reaching sectoral outcomes. The delivery agreements and MoUs, once completed between the DEA and key sectors such as energy, transport and mining, should become an important instrument of horizontal and vertical co-operation. They also provide input into annual budgeting, which allocates funds to national and sub-national administration with the view to support priorities, facilitate their implementation and link with achieving expected outcomes (Chapter 6).

Co-ordination among local government is facilitated through the South African Local Government Association (SALGA), which implements an extensive programme of capacity building and exchange of good practices on a range of environmental issues among municipalities.

4. Environmental authorisations, compliance and enforcement

4.1. *Environmental authorisations*

One of the key regulatory requirements introduced by the 1998 NEMA was the "environmental authorisation" of economic activities. To date, 58 categories of such activities have been defined, most recently in 2010 (EIA Regulation No. 543 of 2010). The NEMA also specifies land-use changes that require an environmental authorisation in addition to any planning permission.

An environmental authorisation requires the developer to conduct an EIA as part of the application process. Depending on the category, this may be either a shorter "basic assessment", which does not require public consultation, or a more comprehensive EIA report, which has to undergo public review.[8] The environmental authorisation is usually conditional on the operator adopting and implementing an environmental management

programme (formulated at the application stage) that specifies impact mitigation measures. Before applying for environmental authorisation, an applicant must appoint an environmental assessment practitioner (EAP) to manage the application. The applicant must make sure the appointed EAP is independent, with the necessary expertise to perform the work and comply with the necessary legal requirements.

Although the introduction of authorisations was a good step to help minimise negative environmental impacts at the start of an economic activity, staff shortages in environmental offices have led to a large backlog of EIAs at the provincial level. In 2004-05, the consideration of nearly half of all submitted EIAs across the provinces was behind schedule (DEAT, 2006). The situation has recently improved due to hiring of additional staff, but the problem persists. The lack of capacity affects not only the decision-making timeframes, but also threatens the quality of regulatory decisions. Environmental officers responsible for EIA and permitting are often unable to review certain submissions critically due to lack of decision-support tools (guidance, policies, etc.) and inadequate training.

Decision making is also affected by low-quality applications, with many lacking the necessary information and not presenting alternatives to the proposed projects. While the NEMA's amendments provided for establishing a system of registration of EAPs, South Africa does not yet have a formal, statutory certification body and register for the task. The Interim Certification Board manages a voluntary certification scheme before the establishment of a new body, the Environmental Assessment Practitioners Association of South Africa (EAPSA). In the meantime, the DEA has agreed on a set of standards for EAPs with the assistance of the South African Qualifications Authority (SAQA).

Weakness of the EIA and environmental authorisation regime leads to the "unlawful commencements of a listed activity". This has become the most prevalent environmental offence, both at the national level and in almost every province (DEA, 2011a). The practice is reinforced by Section 24G of the NEMA, which is intended as a transitional measure between apartheid era regulations and the NEMA; the measure allows developers to "rectify" their failure to obtain authorisation prior to undertaking a listed activity. Once an illegal development is detected, the authority may advise the offender to apply for rectification and pay an administrative fine of up to ZAR 1 million. In turn, the competent authority may conditionally approve the activity, or direct the offender to cease the activity, either wholly or in part, and to rehabilitate the environment. The possibility of obtaining retroactive environmental authorisation undermines the purpose of EIA: a developer often sees it as an opportunity to avoid a lengthy and costly EIA process, especially when an authorisation is not likely to be awarded from the outset. The increasing number of "Section 24G rectifications" at the provincial level is a disturbing trend. Unlike criminal fines, S24G fines in many provinces end up in the regulatory authority's coffers, and not in the treasury. As a result, they could create perverse financial incentives for those authorities not to prevent this type of violation. To address this challenge, the DEA should significantly restrict the possibility for businesses to obtain a retroactive authorisation and increase administrative and criminal sanctions for operating without the required environment-related authorisation.

In most cases, environmental authorisations are issued by the provincial environmental authority. The exceptions include activities affecting more than one province or falling under the scope of an international convention, in which case it is the competence of the national DEA. However, the Department of Mineral Resources (DMR)

issues authorisations of mining activities, which covers, among other concerns, their environmental impact. This arrangement is of concern as the DMR is required to promote the mining industry while also regulating its activities by issuing and monitoring compliance with mining permits.[9] To address this concern, the South African government intends to make mining projects subject to the NEMA's EIA and environmental authorisation provisions. Both the NEMA and the 2002 Minerals and Petroleum Resources Development Act have been amended to clear the way for this change; a verbal agreement has been reached between the DMR and DEA, but it is yet to be implemented.

4.2. Other licences and permits

National and provincial regulations require a number of other environmental licences.[10] However, the DEA does not have a specific system to collect and maintain information about regulated entities with regard to their size and ownership or geographic and sectoral distribution. It relies on three separate databases (the National Environmental Authorisation System, the Waste Information System and the Atmospheric Pollution Prevention Registration Systems Database) that contain licence applications, but information is not well systematised.

While the law stipulates performance-based permitting[11], licences often dictate the use of specific technologies that will help ensure compliance with applicable standards. In practice, however, conditions of environmental authorisations and licences are often poorly defined, which complicates compliance monitoring and enforcement. At the same time, operators rarely appeal permit conditions because of the complexity and length of the process.

The main obstacle to effective environmental licensing is the fragmentation of processes and authorities across different administrative levels. Most activities require separate applications for various licences based on different criteria: a business may need up to 20 different environmental and other authorisations to start the activity. In addition, different competent authorities, even located within one ministry, may make contradictory permitting decisions. For example, the DEA may authorise a major energy development, but the DWA may refuse to issue a water-use licence because of its impact on the sustainability of water resources. Some progress has been recently made concerning large infrastructure projects identified under the government's Strategic Infrastructure Programme. The creation of a co-ordinating working task team, for example, enables departments with a mandate to give authorisations related to land, air and water to harmonise their approach to applications for individual projects.

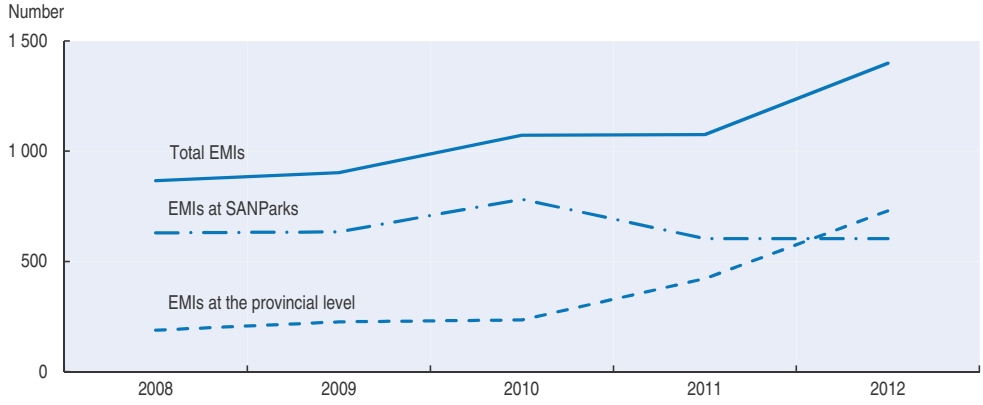
Currently, the licensing process imposes a significant cost and administrative burden on the regulated community. The best way to address this would be through substantive and institutional integration of the overall authorisation process. There is an urgent need to integrate environmental authorisation, creating a one-window process for a general environmental authorisation and a specific provincial environmental licence. In fact, the NEMA provides for consolidating different environmental permits; as well, the National Water Act already allows the DWA to waive the requirement for a water-use licence if it is satisfied that its purposes are fulfilled by the environmental authorisation. The integrated authorisation must ensure that conditions imposed by each competent authority are mutually consistent.

4.3. *Environmental compliance assurance system*

The 2005 amendment to the NEMA, which enabled the creation of an Environmental Management Inspectorate with broad inspection and investigation powers, was an important step in strengthening the environmental compliance assurance system. Since the inception of the EMI in 2007, the number of environmental management inspectors (EMIs, often informally referred to as "Green Scorpions") has nearly doubled, reaching 1 399 in 2012 (Figure 2.1). The vast majority of EMIs (603) work in South African National Parks (SANParks); just over 60 inspectors work for the DEA's Legal Authorisations and Compliance Inspectorate; and others work for provincial environmental departments, as well as parks and tourism authorities. A small number is assigned at the local level.

Figure 2.1. **Number of environmental management inspectors**

2008-12



Source: DEA (2010 and 2011a).

StatLink http://dx.doi.org/10.1787/888932878857

Environmental compliance assurance activities were historically undertaken by provincial institutions, which continue to play a central role. Between 2008 and 2012, the number of inspectors at the provincial level almost quadrupled from 188 to 730.[12] After completing the appropriate accredited training course, most inspectors are designated as EMIs by the competent national or provincial authorities that employ them. Accreditation enables them to check and enforce compliance with the national laws. Four provinces have established provincial biodiversity conservation institutions with compliance assurance functions: Cape Nature of Western Cape; Eastern Cape Parks Board; Ezemvelo KZN Wildlife; Mpumalanga Tourism; and Park Agency. In the other five provinces, these functions are fulfilled by officials employed directly by the relevant provincial department.

There are currently just a few local EMIs (designated by the competent provincial authorities), but their number is expected to grow rapidly.[13] Some metropolitan municipalities are actively participating in compliance assurance activities. For example, the Johannesburg municipality has trained 13 EMIs; it is inspecting local infrastructure projects and referring detected violations to provincial authorities.

The Green Scorpions conduct compliance monitoring and enforcement under the NEMA, the Biodiversity Act and the Protected Areas Act. In the case of organised environmental crime, their operations are often supported by the South African Police

Service (SAPS). In some anti-poaching operations, the military services are also often involved.

However, many important environmental laws remain outside the mandate of the EMIs, especially the regulation of water and mining pollution, which are enforced by other authorities with inspection powers:

- The Compliance Monitoring and Enforcement Directorate of the national DWA employs environmental inspectors ("Blue Scorpions") at its national and nine regional offices. These inspectors enforce compliance with water-use licences under the National Water Act. However, their number is clearly insufficient and they do not have the criminal investigation powers of EMIs.
- The Department of Agriculture, Fisheries and Forestry (DAFF) has a Directorate for Monitoring, Control and Surveillance with inspectors fighting against illegal fishing and other offences against the marine environment.[14]
- The Department of Mineral Resources (DMR) has its own environmental inspectors (in addition to safety inspectors) in the regional offices who monitor compliance with the 2002 Minerals and Petroleum Resources Development Act and enforce environmental requirements of mining permits.[15]

Where the mandates of various departments overlap on a horizontal level, the DEA may enter into a joint investigation or multi-media inspection with other competent authorities. Joint inspections would occur in cases with a mixed mandate such as a facility with nationally and provincially issued environmental authorisations. Joint inspections are also undertaken if a provincial or local authority requests help from the national department over a specific issue of non-compliance.

The DEA has tried to pool the efforts of different enforcement actors, notably by creating a multi-stakeholder National Wildlife Crime Reaction Unit, and by actively co-operating with the SAPS and Interpol (e.g. in Operation MOGATLE to combat illegal possession and trade of elephant ivory). However, such collaboration is exceptional rather than routine, and the fragmentation across environmental compliance assurance institutions undermines their performance.

4.4. *Environmental inspections*

Environmental inspection planning is not informed by any risk-based prioritisation procedure, mostly due to lack of proper information on the regulated community (as mentioned in Section 4.2). However, the Environmental Management Inspectorate uses sector-specific inspection campaigns ("strategic inspections"), which have so far focused on refineries, ferrous metallurgy, cement, pulp and paper, and power generation industries. The DEA has created a telephone hotline for the public to report environmental crimes and incidents, which trigger an inspection. Some reports are re-directed to other competent authorities, e.g. complaints about mining activities are forwarded to the inspection service of the DMR. In 2010/11, the number of incidents reported to the DEA through the Environmental Crime and Incidents Hotline increased by 50%, with the biggest increases concerning illegal waste dumping and water pollution (DEA, 2011a).[16]

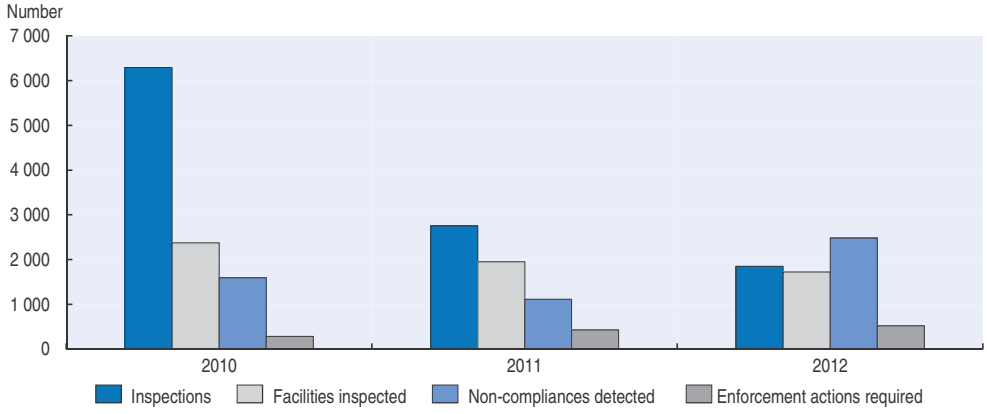
Since 2009, many compliance and enforcement activities have decreased dramatically. Between 2009/10 and 2011/12, inspections fell from 6 297 to 1 854. The DEA attributes this decrease to the transfer of the Marine and Coastal Management Branch to the DAFF in 2010. From 2010/11 to 2011/12, there was also a 45% decrease in proactive inspections,

i.e. those not triggered by accidents or complaints (DEA, 2012b); this was possibly due to the sharp increase in the number of incidents reported by the public.

At the same time, between 2009/10 to 2011/12, the number of inspections that required enforcement actions increased from 289 to 524. Together with the growing number of detected violations, this increased enforcement points to declining levels of compliance (Figure 2.2). Another concern is that serious pollution incidents more than tripled in 2011/12 over the previous year, with almost one-third occurring in the petroleum and transport sectors.

Figure 2.2. **Selected compliance monitoring indicators**

2010-12



Source: DEA (2011a).

StatLink http://dx.doi.org/10.1787/888932878876

Overall, there is a gap with respect to enforcement data recording and management (EWT, 2012). Failure to record case data correctly hinders the identification of problem areas in enforcement. This data quality problem is experienced across the board, in all enforcement agencies. It can be attributed to a range of factors, such as the use of different data collection methods and inconsistency in the reporting of cases by different enforcement agencies.

The DEA has recently commissioned a project to develop a Compliance and Enforcement Strategy for the Environmental Management Inspectorate. This would include a tool to identify priorities for both proactive and reactive compliance monitoring and enforcement at a national and provincial level, as well as respective capacity requirements. To date, reporting is based purely on output indicators, such as the number of inspections and enforcement actions taken. Consequently, the EMI should also systematically use outcome indicators to measure the effectiveness of its compliance monitoring.

4.5. *Compliance promotion*

Government engagement in compliance promotion can reduce compliance costs to businesses by allowing them to achieve and maintain compliance as efficiently as possible. It may also reduce regulatory costs by increasing the efficiency and effectiveness of compliance monitoring and enforcement. Compliance promotion is particularly effective when targeted at the SME community, where non-compliance is caused primarily by a lack of knowledge or capacity, and where cultural resistance to enforcement is the greatest.

To date, compliance promotion has not received the attention it deserves from South African environmental authorities. They are reluctant to give compliance advice to the regulated community for fear of being held liable for inappropriate advice or of compromising possible enforcement action. The DMR, on the other hand, engages in compliance promotion activities through the development of operational manuals and training, primarily focusing on small mining enterprises. The South African Mining and Biodiversity Forum (SAMBF) – facilitated by the Chamber of Mines with participation of mining companies, government departments and conservation organisations – is a case in point. It provided the catalyst and initial funding for the development of the Mining and Biodiversity Guideline, approved by MINMEC in October 2012. This guideline provides the mining sector with a practical, user-friendly manual for integrating biodiversity considerations into planning processes and managing biodiversity during the operational phases of a mine, from exploration to closure.

There has been a marked increase in the number of South African companies with environmental management systems (EMSs) certified through the South African Bureau of Standards. Between 1999 and 2011, the number of companies certified by the ISO 14001 certification scheme increased from 82 to 857, accounting for half of all certifications in Africa. However, the detection of serious non-compliance at several high-profile certified facilities has undermined the merits of the ISO 14001 certification scheme in the eyes of South Africa's environmental enforcement authorities. Unlike in some other countries, there are no regulatory incentives for EMS certification.

4.6. Administrative and criminal non-compliance responses

Administrative enforcement

Administrative non-compliance response tools have traditionally dominated enforcement practices in the industrial and energy sectors, while criminal enforcement was overwhelmingly relied upon in the nature protection and biodiversity conservation sector. Currently, the use of both sets of tools is more balanced in both sectors.

The EMI has developed robust procedures for responding to reported cases of non-compliance by both private and public (municipal) entities. The "Standard Operating Procedure" and "Enforcement Guideline" set out types of enforcement action for the EMI in specific circumstances. The most frequently used administrative enforcement tools are formal or informal warnings and compliance notices. In 2011/12, EMIs issued 194 warning letters and 521 compliance notices (DEA, 2012b). A compliance notice identifies the illegal or harmful activity; it requires the person to take corrective actions within a specified time to return to compliance and remedy the harm caused. The offender's failure to comply with the administrative notice may lead to prosecution and the suspension or withdrawal of the environmental authorisation.

Environmental inspectors can also impose "admission of guilt" (so-called J534) fines. In practice, these are criminal fines as a court can only impose the fine if the presumed violator contests the offence. According to the Criminal Procedures Act (51/1977), the court district sets maximum monetary values for admission-of-guilt fines, and revenues go to the general treasury. Generally, these fines are quite low (up to ZAR 5 000) and are only suitable for offences that do not cause significant environmental harm. The DEA is currently developing lists of offences with corresponding fine levels that would apply across the country under different legal acts.

While environmental inspectors have quite important enforcement powers, they apply them unevenly. For example, provincial environmental inspectors are often unwilling to enforce against unauthorised activities in rural communities; such activities support vital economic interests of the local population. This makes it important to complement formal enforcement with the education and empowerment of local communities, encouraging them to oppose illegal activities that are harmful for the environment.

Criminal enforcement

Environmental inspectors have wide criminal enforcement powers similar to police. These include seizure, forfeiture and disposal of property related to the criminal offence, as well as arrest powers. The involvement of organised crime in wildlife-related violations and the increasing sophistication of criminal methods have led to the creation of specialised units within provincial authorities (e.g. Gauteng Special Investigations Unit). All criminal cases must be handed over to the National Prosecuting Authority (NPA).

A number of statutes provide for severe sanctions for environmental crimes: terms of imprisonment of up to 10 years and criminal fines between ZAR 5 million and 10 million.[17] In addition, the court can withdraw any environmental permit or authorisation if the rights under that permit have been abused. It can also disqualify that person from obtaining a permit or other authorisation for up to five years (notifying all relevant permitting authorities of such disqualification). The NEMA makes top company officers personally liable for criminal offences committed by their company. The burden of proof is on officers to show the offence did not result from their failure to take reasonable steps to prevent it.

Several relevant South African laws aim to remove the violator's economic benefit from non-compliance. This approach, similar to those in the most advanced enforcement systems in OECD member countries, strengthens the deterrent impact of penalties. Under the Biodiversity Act, the fine should equal three times the value of the economic benefit from the poaching of wildlife. The forfeiture of the instruments and proceeds of environmental crime is mandated under the Prevention of Organised Crime Act (121/1998). The NEMA and the Air Quality Act also provide for the imposition of a criminal fine equivalent to the advantage gained by the offender through non-compliance. However, for offences related to industrial or energy sectors, including waste-related cases, no procedure is in place to assess benefits from non-compliance and incorporate them into the calculation of the fine. To increase the fines, environmental authorities try to couple prosecutions for environmental offences with commercial and common-law offences, such as money laundering, tax evasion and fraud, and damage to property.

Despite a wide range of options, only 82 convictions for environmental crimes were reported in 2011/12 (DEA, 2012), down from 673 in 2009/10. This is partly due to increased emphasis on administrative enforcement of wildlife-related crimes. However, the NPA is frequently unsuccessful in securing convictions for environmental crimes, especially for violators of biodiversity and conservation legislation. The contributing factors include the gaps in, and frequent changes to, the legislation, as well as the lack of skills and experience among NPA prosecutors, particularly at the local level. The DEA tries to work closely with the NPA to strengthen its environmental enforcement capacity: it has produced and distributed to all prosecutors a special manual ("The Prosecution of Environmental Crime: A Guide for Prosecutors", first issued in 2007); it has also conducted several trainings for prosecutors on the nature, scope, impacts and legislation related to environmental crimes. The DEA and the NPA are exploring the feasibility of a special NPA unit for the prosecution of environmental crimes.

South Africa's courts face similar capacity issues with respect to environmental cases. The DEA has produced the Magistrates' Benchbook, co-authored by several senior judges as a reference for court officials involved in adjudicating environmental crimes. To address the capacity challenge institutionally, two regional environmental courts were established in 2003 as joint initiatives between the provincial authorities and Department of Justice (DoJ): in the city of Hermanus (Western Cape province) and in Port Elizabeth (Eastern Cape province). However, both of them were later closed due to the unwillingness of the DoJ to fund specialised courts not mandated by specific legislation. An interdepartmental project in 2010/11 between the DEA, DWA and DoJ assessed the feasibility of re-establishing the environmental courts. The analysis showed the current load of environmental cases ready for prosecution did not justify the existence of dedicated courts. As one possible solution, more emphasis could be placed on training judges within the general court system to enhance their capacity to handle environmental cases.

5. Environmental liability

South Africa's legislation contains several provisions for administrative liability related to environmental damage. For example, according to the National Water Act, affected catchment management agencies must recover all costs for clean-up actions from the party responsible for serious water pollution incidents. Similar administrative liability rules are established by the NEMA. This liability is strict with respect to parties from whom costs may be recovered (Kotzé, 2009). For example, it can be applied to successor landowners of the site where pollution has originated. Currently, in cases where urgent remediation actions are needed, the DWA's regional office engages a contractor to do the clean-up and then aims to recover the respective costs from the responsible party in court.

With respect to land contamination, the Waste Act gives the Minister of Water and Environmental Affairs the power to direct the owner of identified contaminated land to submit a site assessment report; prevent the owner from transferring the land without complying with specific conditions; and order the land's remediation at the cost of the responsible party. Significantly, this provision applies retroactively to both the contamination occurring prior to the entry into force of the Waste Act, as well as to contamination caused by past activities. The law also provides for the creation of a register for contaminated land. However, these provisions (Chapter 4, Part 8 of the act) will only enter into force after the promulgation of regulations, on-site assessments and reports, as well as approval of recent DEA draft norms and standards for remediation of contaminated land and soil quality.

Currently, the DEA enforces the administrative liability through compliance notices, but it does not have resources to undertake clean-up operations. The decontamination of old mining sites is a particularly acute problem because of the danger of acid mine drainage. To address it, the DMR operates the national government's Derelict and Ownerless Mines Programme. However, the environmental rehabilitation of these sites represents a serious technical as well as financial challenge; the programme's funds are not commensurate to the magnitude of the task. To accumulate funds for remediation measures, a national fund for the remediation of abandoned industrial sites (following the example of the US Superfund) has been proposed. However, the mechanisms for generating revenue for such a fund (e.g. a tax on polluting industries) are in the early stages of discussion.

South Africa's environmental legislation enables environmental authorities to compel permit applicants to furnish financial security to cover any expenses incurred as a result of their potential non-compliance or post-closure site remediation (Craigie, 2009a). Such

practices already exist in the mining sector, but their practical implementation faces a number of challenges (Box 2.2). These concerns have been explicitly set as targets in the DMR's two most recent strategic plans. However, further efforts – including financial requirements for post-closure remediation of mines – are needed to ensure greater compliance of mining operators.

Box 2.2. **Financing of post-closure site remediation in the mining sector**

Mining companies are required under section 39 of the 2002 Minerals and Petroleum Resources Development Act (MPRDA) to draw up an environmental management plan (EMP) for approval by the Department of Mineral Resources (DMR). The EMP must include provisions for closure and rehabilitation through which the environmental impacts are mitigated. The plan has to calculate the cost of environmental remediation and how the operator will meet those costs.

According to the MPRDA, mining companies must set aside a certain amount of money to guarantee the post-closure site remediation. The DMR's Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provision Provided by a Mine (2005) provides a generic approach to determine potential liability for all essential closure components. These include removal of infrastructure, sealing of voids, rehabilitation and water management, as well as post-closure maintenance and aftercare. The calculations include 12.5% for preliminary and general management and administration and 10% contingency. A master unit rate is determined depending on risk class and area of sensitivity.

Operators can secure the funds in one of the following ways:

- direct deposit on the DMR account
- creation of the company's own trust fund
- provision of a bank guarantee
- signature of a legal agreement between the company and the DMR.

The different methods aim to spread the risk of default and diversify risk among more entities. However, the major mining companies generally use trust funds and centralise them at a corporate level.

The DME reassesses each mining company's liability annually as part of an inspection. Depending on results, additional payment may be required. The escrowed funds are returned to the company upon completion of the site's remediation according to the DMR-designed standards, failing which the DMR may retain a certain share of the deposit.

However, ongoing concerns regarding environmental degradation in mining areas and the high number of ownerless and abandoned mines have highlighted the need for improved environmental rehabilitation in the mining sector. A study by WWF South Africa indicated the following areas of concern:

- high variation in the quality of environmental management plans or programmes (EMPs) and inadequate consideration of longer-term impacts, in particular related to water quality, making it difficult to trace the links between the plans and calculations of financial provisions
- underestimation of financial provisions, including due to lack of inflationary adjustments of master rates contained in the 2005 DMR Guidelines
- lack of concurrent rehabilitation and clear incentives to rehabilitate, resulting in higher, longer-term and more significant risks, particularly with regard to water quality impacts
- lack of publicly available independent reviews of financial provision calculations.

Source: WWF (2012).

6. Environmental information, reporting and outlooks

6.1. Monitoring and reporting

South Africa has made progress in developing environmental monitoring and information systems, including at the provincial level. For example, there was a shift from individual source-based air pollution control to an ambient air-quality objectives approach. There was also more focus on impacts on ecosystems and on human health in priority industrial areas. This was supported in 2010 by launching the South African Air Quality Information System (SAAQIS), an electronic web-based tool, which will be updated and broadened in 2013. Information about the quality of freshwater resources has been enlarged under the National Water Quality Monitoring System, while the National Eutrophication Monitoring Programme run by the DWA monitors the trophic status of a number of large dams.

However, there are still areas where monitoring of environmental impacts is inadequate. As recognised in the second National Water Resource Strategy, there are gaps related to quality assessment in many river basins, the water-use register is incomplete and, in many cases, actual water use is not recorded. Groundwater monitoring is insufficient to define the status of, and trends in, groundwater quality and in determining its "fitness for use". Significant efforts are needed to strengthen information about generation and treatment of municipal and industrial waste, including hazardous waste; to expand air emission inventories, including an updated inventory of greenhouse gases; and to turn ambient air quality monitoring into a comprehensive national network.

State of Environment reporting has not been a legal obligation; the NEMA merely required all spheres of government to inform the Minister of Environmental Affairs on their performance. Nevertheless, a number of reports on environmental conditions and environmental management have been prepared, establishing important baselines for subsequent evaluations. The first State of the Environment Report was published in 1999 and the South Africa Environment Outlook (SAEO) in 2006. A new SAEO is expected in 2013. These comprehensive reports have been supplemented by assessments of individual environmental domains, such coastal areas (2006), forests (2007-09) and biodiversity (2011).

In 2010, the DEA introduced an innovative tool for analysing issues that have not attracted adequate policy attention. A series of "Emerging Issues" reports analysed problems such as air emissions of mercury and $PM_{2.5}$, uncontrolled discharge of contaminated water from abandoned mines, soil erosion and potential impacts of nanotechnology. These reports established an important knowledge base and a baseline for future actions and served to inform the general public about new policy priorities.

The 2006 SAEO reported that 19 sub-national State of the Environment Reports had been produced since 1999, and their number has been growing. Bigger and better resourced provinces and municipalities prepare their environment reports (e.g. North West and KwaZulu-Natal in 2008; Gauteng in 2012; Cape Town 2006, 2008 and 2009; Johannesburg 2008; Bojanala Platinum District Municipality 2012). There is also a growing trend to develop local-scale sectoral reports, such as State of the Bay or State of the River reports.

The publication of such reports is commendable, but many gaps exist in reporting and the information base. Fragmented monitoring, lack of trend analysis and major data discrepancies limit the possibility for regular updating of the reports. Recently proposed amendments to the NEMA (the 2012 National Environmental Laws Amendment Act, NEMLA) make the compilation of the State of the Environment Reports mandatory at

intervals of not more than four years for national and provincial tiers of government. The proposed regular reporting cycles are intended to correspond with the environmental implementation and management plans, thereby ensuring the integration between environmental reporting and management responses. The proposed amendments also establish reporting standards to allow better comparisons and to promote compliance with environmental requirements.

The promulgation of this bill could be supported by a review of existing environmental information systems at the national and local level with a view to designing a strategy for improving data collection and treatment and identifying remaining gaps. The strategy would also need to look at human and financial constraints. These include increasing costs related to maintenance and purchasing new equipment; shortage of skilled staff to carry out measurement and analysis; and competing priorities at the provincial and municipal level. Closer co-operation between the DEA and the country's statistical office (Statistics South Africa), already established through the Memorandum of Understanding, should be reinvigorated; this would create a more robust system to meet the statistical accreditation requirements and become a regular part of South Africa's statistics system.

6.2. Environmental economic accounts

South Africa has already made preliminary efforts to measure resource use via a number of Environmental Economic Accounts (EEAs). Statistics South Africa has issued discussion documents for energy, minerals and water, providing energy accounts for 2002-09, mineral accounts for 1980-2009 and water accounts for 2000-06. This initiative can benefit from, and contribute to, the international effort to develop a System of Environmental and Economic Accounts consistent with the System of National Accounts. However, data from other government ministries are provided irregularly, are not always in line with national accounts classifications (e.g. as regards the Standard Industrial Classification of economic activities) and in some cases are limited to physical volumes. Nonetheless, these discussion documents have added to the understanding of natural resource use and sustainability, and progress towards the issuance of regular and complete Environmental Economic Accounts should continue. In 2013, three environment-related indicators were developed based on current EEAs to serve as examples.[18] They will be refined before being published as part of the EEA compendium.

6.3. Integrated reporting on corporate governance and sustainability

Following the adoption of the King Report on Corporate Governance in 1994, South African companies have shown a growing willingness to disclose details of their corporate governance. The King II report, adopted in 2002, called for an inclusion of environmental sustainability issues in reporting on corporate governance; the King III report of 2010 called for an integrated reporting on governance and sustainability (Box 2.3).

In February 2010, the Johannesburg Stock Exchange (JSE), through its listings requirements, made it compulsory for all listed companies to comply with King III report requirements, including producing an integrated report for its financial year, or to explain why it was not doing so. The Integrated Reporting Committee (IRC) of South Africa was formed in May 2010 under the chairmanship of Mervyn King to develop and promote guidance on good practice in integrated reporting.[19]

An assessment of corporate reporting of the top 100 companies listed on the JSE showed progressive inclusion of sustainability issues (PWC, 2012). For example, 78 companies

Box 2.3. **The King reports on corporate governance**

The 1994 King Report on Corporate Governance was a groundbreaking code of corporate governance in South Africa. It was issued by the King Committee on Corporate Governance, named after its chairman Mervyn E. King, retired judge of the Supreme Court of South Africa. The report, known as King I, established recommended standards of conduct for company boards and directors. It was applicable to all companies listed on the Johannesburg Stock Exchange, large public entities, banks, financial and insurance companies, and large unlisted companies.

Following the Johannesburg Earth Summit in 2002, a revised report (King II) included a new section on environmental sustainability. King II defined "sustainability" as "conducting operations in a manner that meets existing needs without compromising the ability of future generations to meet their needs (…) having regard to the impact that the business operations have on the economic life of the community in which it operates". Sustainability included environmental, social and governance issues. In addition to the organisations listed in the King I report, King II applied to departments of state or national, provincial or local government administrations.

Issued in 2010, King III requires that statutory financial information and sustainability information be presented in an "integrated report", prepared annually. The integrated report should have sufficient information to record how the company's operations have positively and negatively affected the community in which it operated during the year under review. The report should also contain information on how the board believes it can enhance the positive aspects and negate the negative aspects in the future. Sustainability reporting should be integrated into other aspects of the business process and managed throughout the year. King III also requires establishing a formal process of assurance with regard to sustainability reporting. It calls for an external assurance provider to evaluate material aspects of the sustainability reporting in the integrated report. It also calls for audit committees, appointed by shareholders, to help boards review the sustainability reporting; the committees should ensure that information is reliable and that no conflicts or differences arise when compared to the financial results.

King III promotes transparent communication with stakeholders on all material issues affecting the company and includes all performance areas (including social and environmental performance). It emphasises that transparent and effective communication with stakeholders and proactive dealing with stakeholder relationships is essential for establishing and maintaining trust and confidence.

out of 100 disclose their carbon footprint, half of the respondents having clear carbon reduction targets and half having their emissions verified. Almost all companies had a senior-level climate change committee to steer progress, with energy efficiency being a major driver. There is also increasing water use disclosure; although fewer companies report their water use routinely, a majority of respondents identify water-related risks and opportunities. A number of South African banks have internal sustainable development teams, and are revising their lending and investment criteria to take the sustainability issues into account in funding in energy and infrastructure. However, responsibility for sustainability is not clearly defined in almost one-quarter of reports. Although all the companies surveyed had a sustainability report, only 43% obtained assurance over the key elements of sustainability reporting, with half of these being assured by the external auditor. In addition, less than 60% of entities disclosed their sustainability strategies over

the short, medium and long term. An emerging trend is for companies to produce a separate sustainability report that does not form part of the integrated annual report. While it is encouraging to note that entities value sustainability enough to devote an entire report to it, in some cases the integrated report does not contain enough detail about sustainability issues to satisfy the criteria of King III (PWC, 2012).

In 2004, the JSE launched the Socially Responsible Investment Index, which assesses a company's performance against four criteria: governance, society, environment and economy. Regarding the environmental criteria, companies are classified according to a scale of low, medium or high environmental impact. For example, it is considered that mining and utilities have a high impact whereas the banking sector has a low impact. High environmental impact companies need to score highly to meet the requirements of the Index methodology. Currently, environmental scores are established through an assessment of environmental policies, management and reporting/disclosure practices. Most recently, the JSE indicated its plans to develop additional indicators to assess companies' impacts related to climate change and to make public reporting more comprehensive and effective.

7. Promoting environmental democracy

7.1. Public access to environmental information

The establishment of a constitutional right to citizens' access to information was an important step to reverse the legacy of secretive and bureaucratic approaches developed by the apartheid state. This right is not limited to information held by government, but extends to information held by private actors.

The 2000 Promotion of Access to Information Act (PAIA) gave effect to this right and includes a wide range of enabling provisions for information requests, such as which records should be automatically available and how to access them. Section 9 of the PAIA recognised the right of access to information is subject to certain justifiable limitations aimed at, among others: the reasonable protection of privacy; commercial confidentiality; and effective, efficient and good governance. The PAIA assigned the Human Rights Commission to play a major role in assessing, monitoring and implementing various aspects of the access to information legislation.

Even before the promulgation of the PAIA, the NEMA (Section 31a) gave every citizen a right of access to information held on the "state of the environment and actual and future threats to the environment, including any emissions to water, air or soil and the production, handling, transportation, treatment, storage and disposal of hazardous waste and substances". Section 16(5) of the NEMA opened access of the public to all environmental management and implementation plans. Since then, environmental authorities at the national and sub-national level have appointed information officers, and developed manuals to inform the public about available records and how to access them. The manuals also identify reasonable fees for reproduction and for search and preparation of records for disclosure.

Although the regulatory framework for access to information, including on the environment, is among the most advanced in the world, performance falls short of the high standards. According to a survey carried out by the Centre for Environmental Rights (CER, 2012), a large majority of requests to public bodies are ignored or refused. The departments also tend to provide partial access to PAIA requests. Officials administering

requests for information are unfamiliar with the PAIA, and its provisions are poorly used. Internal appeals are not properly considered (and are often ignored) by public bodies, and there is no appeal mechanism for private bodies. As a result, even the most basic information is often only accessible through expensive court proceedings.

To foster the culture of openness and transparency needed for effective environmental compliance, the NEMA and the 2000 Protected Disclosures Act provided protection for "whistle-blowers" – those who may have insider information about environmentally damaging activities, but who may not disclose such information for fear of reprisal or victimisation. The NEMA protects any person who makes a disclosure in the reasonable belief that the information provides evidence relating to environmental risks. If whistle-blowers follow procedures in the NEMA, they may not be held liable under civil or criminal law, or be dismissed, disciplined, prejudiced or harassed.[20] Notwithstanding the formal protection, this activity remains risky; victimisation following disclosure is frequently disguised in different forms. Proper sanctions to penalise employers who seek to circumvent the law and improved public perception of whistle-blowers can make this a more useful tool for facilitating disclosure of evidence of environmental offences.

7.2. Public participation in environmental decision making and the role of NGOs

South Africa has made great strides in extending the participation of civil society in environmental policy making. The very first White Paper on Environmental Management adopted in 1997 was developed through an extensive, open and multi-stakeholder consultative process. Each environment-related strategy or law is open to public consultation and discussed in various bodies. This includes the National Environmental Advisory Forum, created in 2005 to advise the Minister of Environmental and Water Affairs on environmental management and governance issues. Environmental management co-operation agreements and EIAs provide other important mechanisms through which government can engage social groups or communities in promoting compliance with the provisions of the NEMA.

Although the size and scope of South African environmental non-profit organisations (NPOs) is difficult to measure, some estimate 100 000 groups, of which about half are less formalised, community-based organisations (CBOs) (SRK, 2005). The NPO movement can best be described as a web-like universe made up of highly interconnected networks clustered around a few key nodes or hubs, but with no horizontal forms of organising (Cock, 2004).

Historically, NPOs with a biodiversity focus have played a significant role in the establishment of protected areas, awareness-raising, environmental education, research, monitoring and mobilising the support of the private sector for conservation and development work. This traditional focus has broadened recently to include environmental mainstreaming, poverty alleviation and sustainable use of resources. NPOs have also proved invaluable as testing grounds for new ideas and for leveraging implementation capacity that would not otherwise have been possible. Many policy tools applied in the country had their origins in smaller, pilot projects initiated by NPOs; the ongoing development and implementation of these tools is often facilitated through partnerships with NPOs as key members.

Although the introduction of EIA requirements boosted the participation of major NPOs in decision making, the participation of poor, disadvantaged and rural communities,

including women, youth, indigenous peoples and farmers, remains insufficient, especially in the context of EIA procedures. Some of the challenges to creating meaningful participation include limited capacity both in government and civil society, limited access to information by marginalised groups and limited funds for participation, particularly at the local level.

7.3. Access to courts

South Africa's post-apartheid legal framework significantly extended access to courts in environmental matters. Persons or groups of persons may now seek relief not only in their own interest, but also on behalf of a person who is for practical reasons unable to institute such proceeding; on behalf of a group of persons whose interests are affected, in the public interest; and in the interest to protect the environment. Such a wide definition of legal standing, or access to justice, represents an advanced approach by international standards.

Litigation is expensive and very few individuals have the necessary financial resources required for extensive and complicated court proceedings. In the South African context, people most often affected by environmental degradation are poor, which prevents them from gaining access to courts. Consequently, public-interested organisations litigate on behalf of vulnerable groups (Feris, 2009). Evidence suggests that public interest actions in courts in the environmental field score a high success rate. This is due to the fact that many strategic and technical factors are carefully considered by the plaintiffs before taking the case to court (Algotsson, 2005).

Nevertheless, individuals and social groups face several obstacles regarding access to environmental justice. The Constitution provides for generous standing to approach the courts when rights are infringed, and the NEMA has widened this approach relating to statutes affecting the environment. There is, however, a need to develop provisions in common law where cases do not concern the infringement of a right provided in the Constitution, as well as provisions for improved understanding in the judiciary of the standing provisions in legislation. This will ensure broader access to courts where people are affected by environmental hazards (Feris, 2009).

Among the key obstacles are legal costs, which include court fees, expert fees and lawyer fees, and the risk of having to pay defence costs if the case is lost. The provisions of the NEMA are useful in this regard as judges can relieve a losing party from the legal costs "if the court is of the opinion the person or group of persons acted reasonably out of concern for the public interest or the interest of the protection of the environment and that no other means had been reasonably available for obtaining the relief sought". Although this provision has not often been applied, its very existence helps reduce financial obstacles in cases of high public interest.

Notes

1. Article 24 of the Constitution states:
   "everyone has the right a) to an environment that is not harmful to their health or well-being; and b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that *i*) prevent pollution and ecological degradation; *ii*) promote conservation; and *iii*) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

2. South Africa's policy-making procedure begins with the ministry concerned putting forward its proposals in a Green Paper, a discussion document on policy options. The Green Paper is usually a product of a think tank appointed by the minister. The Green Paper is open to public comments and presented to the Parliamentary Portfolio Committee. With the inclusion of input from civil society, the Green Paper forms the basis for a White Paper, which is a broad statement of intended government policy. Comments are again solicited from stakeholders. Once inputs have been taken into account, the department concerned may draft legislative proposals, which are reviewed by the cabinet. From this stage, public policies can follow either the parliamentary process (beginning with a draft bill) or go the route of an executive policy programme announced by the minister.
3. A statutory definition of sustainable development contained in the NEMA was: "Sustainable development means the integration of social, economic and environmental factors into planning, implementation and decision making so as to ensure that development serves present and future generations". This definition appears in over 40 statutes and many policy documents.
4. The allocation included ZAR 300 million for 2012/13 and ZAR 500 million for 2013/14. An additional allocation of ZAR 300 million was envisaged for 2015/16.
5. The system was implemented through the 2000 Municipal Systems Act. The regulation under this act provides for mandatory SEA of Spatial Development Frameworks (SDFs), the sole area where SEA is legally mandated.
6. The reform combined the environmental part of the former Department of Environmental Affairs and Tourism and the water management part of the Department of Water Affairs and Forestry. At the same time, the Department of Agriculture, Forestry and Fisheries and the Department of Tourism were created.
7. While building its high research and management standards, SANParks expanded the land under its protection.
8. There is a separate list of activities that only require a basic assessment if they are located in national or provincial protected areas.
9. One safeguard against this conflict of interest is that appeals against environmental authorisations granted by the DMR are to be decided by the Minister of Environmental Affairs. However, such appeals are quite rare.
10. Waste management licences with respect to hazardous waste are issued by the national DEA, and by the provinces for non-hazardous waste. Air emission licences (only for certain types of listed activities) are issued by local authorities. In practice, however, no rural municipalities and few district municipalities perform this function; power is delegated to the provincial government. Water-use licences (covering water abstraction, as well as wastewater discharges) are issued by the regional offices of the Department of Water Affairs (DWA). They apply to all water users, including mining enterprises, farms and municipal water utilities. Logging, hunting and other activities affecting biological resources require permits under provincial nature conservation ordinances.
11. Licence conditions should be based on the best practicable environment option (BPEO), defined in the NEMA as "the option that provides the most benefit or causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term".
12. Outside SANParks, about two-thirds of EMI inspectors work on green issues.
13. In addition to the inspectors enforcing national environmental laws (which requires official designation as an EMI), a few environmental enforcement officials are appointed through provincial legislation and local ordinances but they do not have EMI powers.
14. The DEA is responsible for ensuring compliance in the coastal zone.
15. With the expected incorporation of mining into the list of activities subject to environmental authorisation, the environmental inspection of mining installations will become the competence of the provincial environmental authorities; most DMR environmental inspectors are expected to be hired by the provincial governments and designated as EMIs.
16. The increase can be partly explained by the intensive awareness-raising campaign of promoting the hotline to the public. It does not account for complaints reported directly to provincial and local competent authorities.
17. A court that imposes a fine may order payment of up to one-quarter of the fine to the person whose evidence led to the conviction or who assisted in bringing the offender to justice. The court

may also have the fine recover the costs incurred in investigating and prosecuting the offence. However, there are no precise transparent criteria for determining the size of the penalty.

18. These are: *i)* energy intensity for manufacturing, *ii)* sustainability of hake – *Merluccius paradoxus* and *M. capensis* – stocks, *iii)* employment rate compared to production and *(iv)* total earnings in the gold production and extraction (Stats SA, 2013).

19. Mervyn King is also a chair of the International Integrated Reporting Council (IIRC), launched in 2010 by HRH The Prince of Wales with international partners, a body to oversee the creation of a globally accepted Integrated Reporting framework. The IIRC was formerly known as the International Integrated Reported Committee.

20. In order to secure protection, the information must be disclosed to a committee of parliament or a provincial legislature; an organ of state dealing with the protection of the environment or emergency services; the Public Prosecutor; or the Human Rights Commissioner. Information may also be provided to the news media if the person reasonably believes the release is necessary to avert an imminent and serious threat to the environment.

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PART I

Chapter 3

Towards green growth

This chapter presents efforts to mainstream environment into South Africa's economic policy and promote greening of the economy. It examines the use of tax policy to pursue environmental objectives and progress in removing fiscal incentives that can encourage environmentally harmful activities. Opportunities for "green" tax reform are also assessed. The chapter includes a discussion of public and private investment in environmental protection and resource use, as well as environment-related infrastructure. Investment in "clean energy" and sustainable transport modes are also discussed. In addition, the chapter examines promotion of environmental technologies and eco-innovation as a source of economic growth and jobs.

Assessment and recommendations

The global financial crisis prompted a reappraisal of South Africa's carbon- and resource-intensive growth model. Among other things, environment was a prominent feature in the fiscal stimulus package adopted in 2009. The national strategy for sustainable development, endorsed by cabinet in 2011, includes five strategic priorities that feature prominently in South Africa's National Development Plan through 2030. A Green Economy Accord was launched in 2011 to promote partnerships with the private sector and others to green the economy. Twelve commitments were identified, and financing mechanisms established, to support implementation of the accord. It is too soon to evaluate the impact of this initiative, but the recognition that economic and environmental policies could be better integrated was long overdue. A key challenge will be to fully engage the private sector and other stakeholders while restricting the government's role to catalysing action. Anticipated net employment impacts may prove overly optimistic. If this is the case, it should not detract from achieving the underlying goals of the Green Economy Accord.

In recent years, a growth-friendly taxation policy has reduced taxes on income and corporate profits and raised indirect taxes. Revenue from environmentally related taxes has increased as a result of new taxes (e.g. on electricity and cars) and increases in tax rates. In 2011, environmentally related taxes accounted for about 2.1% of gross domestic product (GDP), close to the OECD average. There is scope to further extend the use of environmentally related taxes, while giving special consideration to how additional revenue could mitigate potentially regressive impacts.

South Africa applies a range of taxes on fuels used for transport, but not on those for stationary purposes, including electricity generation and mining. Although fuel taxes increased substantially over the last decade, transport fuel taxes and prices are low compared to those in other emerging economies, and even in some relatively poorer African countries. They also imply much lower carbon prices than in most OECD member countries. As in many countries, taxes on diesel are lower than for petrol, although rates are gradually being equalised. There is scope to adjust tax rates to better reflect environmental externalities of fuel use and to increase fuel taxes so they are more in line with international standards. To some extent, this could also be achieved by introducing the carbon tax that has been discussed since 2010. However, the current proposal foresees a relatively low carbon tax and contains an array of relief measures for energy-intensive and trade-exposed sectors; these would weaken incentives to reduce greenhouse gas (GHG) emissions, while increasing administrative burdens on both the government and operators.

The high energy- and carbon-intensity of the South African economy is closely related to several key factors: pricing coal and electricity well below international levels; providing Eskom (the sole energy utility) with preferential access to domestically produced coal; and charging some energy-intensive industrial users for electricity prices much below the average price. In response to a series of power outages, electricity prices began to increase

sharply from 2008 and the government set out to cover generation and investment costs by 2018. This will reduce the implicit subsidies to energy consumption and stimulate improvement in energy efficiency. Subsidies for fossil fuel consumption have started to decrease and were 0.3% of GDP in 2011, compared to 1.4% of GDP in Mexico and 2.5% of GDP in India and Indonesia.

Substantial investments in infrastructure are needed to provide environmental services to the population, and to facilitate the transition to a low-carbon, resource-efficient economy. Consolidated government expenditure on environment and water was about 1% of GDP in 2012; these levels are comparable to current expenditure in many OECD member countries, but less than when these countries were at comparable stages of development. In 2012, a massive infrastructure programme was launched, focused largely on energy, transport and water. However, the investment plan does not take sufficient account of potential environmental and climate impacts. Weaknesses in planning, implementation and monitoring capacity have impeded the implementation of projects and discouraged investment by the private sector. This is especially true for environment-related infrastructure under the responsibility of local governments.

South Africa has made good progress in improving access to environmental services (water, sanitation, waste management). However, further investment is necessary to continue this progress and improve access to, and quality of, services. A key obstacle is the inadequate level and design of service charges, which do not cover operational and maintenance costs, let alone investment. There has been limited implementation of the increasing block tariffs required by legislation; municipalities tend to offer generous rebates, exemptions and discounts; and collection rates are low. The government provides free basic levels of electricity, water and waste services to poor households. However, there is evidence that this policy is not well-targeted and also benefits relatively better-off households in several municipalities. It may also create expectations about free entitlement to goods that ultimately should be paid for by users.

Investment in the energy generation sector is the largest part of the infrastructure plan. The Integrated Resource Plan sets a cap on GHG emissions from the electricity sector and envisages that nearly half of new power generation to 2030 will come from renewable energy; this would reduce the share of coal in electricity generation from 90% to 65%. An independent power producer programme involves reverse auctions to allocate new renewable generation capacity. Early evidence suggests this process is reducing the power generation price-guarantee in line with technology developments. In 2012, after some delays in implementing the programme, South Africa became the fastest growing renewable energy market in the G-20.

Several measures have improved energy efficiency, including new standards for buildings and electrical appliances, and a demand-side management programme by Eskom. Additional large gains, including job opportunities for low-skilled labour, could be achieved at relatively low cost by improving energy efficiency in the industrial, residential and commercial sectors.

South Africa should continue to improve transport infrastructure and to better integrate transport and urban planning policies. As well as reducing congestion, air pollution and GHG emissions, this would improve the mobility of African communities dispersed under apartheid. The Bus Rapid Transit system, currently in Johannesburg and Cape Town, along with the Johannesburg Gautrain light rail, could be extended and rolled

out in other major cities. Some 20% of national roads are subject to tolls to recover investment and operating costs. Tolls are partially linked to distance driven, but do not take the environmental performance of vehicles into account.

A number of incentive and funding mechanisms are in place to support private sector investment in environmental infrastructure and the green economy. These include the South African Green Fund, established in 2012 to provide catalytic finance for high-impact green economy projects. However, the uptake of these funds and their effectiveness in improving energy and resource use remain unclear. The multiplicity of funds managed at different government levels, which increases transaction costs and co-ordination difficulties, may also reduce transparency and efficiency.

South Africa has made good progress in improving governance of its national innovation system despite initially difficult conditions. A number of research institutions and the private sector, particularly large companies in the mining and energy sectors, have developed eco-innovation programmes and projects. However, due to the lack of a longer-term vision for eco-innovation, the approach to building the required human, institutional and infrastructural capacity has been ad hoc, with no effective mechanism to scale up activities and exploit possible synergies. Increased funding for environment-related research and development has not translated into technical innovation, especially in small and medium-sized enterprises. Eco-innovation indicators suggest that performance deteriorated during the 2000s. Addressing these challenges requires better supply-side measures, but also strengthened demand. Measures required include a clear environmental regulatory framework, particularly through better design of environmental policies (prices, technology-forcing standards); strengthened implementation; and green procurement. More emphasis should be placed on promoting partnerships between public and private stakeholders at every stage – from invention to diffusion.

Recommendations

- Assess how environmentally related taxes could contribute to a more pro-growth, pro-poor tax structure; adjust energy and vehicle taxes to better reflect environmental externalities; consider introducing new environmentally related taxes in other sectors (e.g. on fertilisers, pesticides, packaging materials, waste disposed in landfills); assess the distributional impacts of any new or revised environmentally related tax; and provide targeted support to offset any negative impact on the poorest segments of the population.
- Implement the proposed carbon tax at the earliest opportunity, as far as possible avoiding exemptions that decrease incentives to reduce GHG emissions, as well as minimising administrative burdens; and extend the CO_2-based vehicle tax to the vehicle registration fees applied at the local level and to heavy goods vehicles.
- Continue to reduce implicit and explicit subsidies for electricity and coal consumption, particularly in the electricity generation industry and energy-intensive sectors; and introduce a mechanism to systematically screen existing and proposed subsidies and tax benefits against their potential fiscal, environmental and distributional impacts, with a view to phasing out environmentally harmful and inefficient subsidies, and contributing to fiscal consolidation and social equity.

Recommendations *(cont.)*

- Streamline financing and incentive mechanisms to support investment in environment- and climate-related infrastructure, goods and services, particularly to better leverage private sector resources; and support capacity development in municipalities with a view to improving infrastructure delivery.
- Implement a programme to retrofit buildings with a view to enhancing energy efficiency and thereby reducing GHG emissions and creating job opportunities.
- Develop a strategy for gradually recovering costs of environment-related services; consider gradually phasing out the free provision of basic levels of energy, water and waste services, and introducing pricing (initially at low rates), while using social transfers to ensure that poor households have adequate access to these services.
- Continue to expand public transport systems in the context of integrated transport and urban planning policies; and gradually expand the system of road tolls and link them to vehicles' environmental performance.
- Develop and implement a comprehensive framework for promoting eco-innovation that includes a balanced mix of supply- and demand-side measures; and promote public-private partnerships for the development and diffusion of environment-related technologies.

1. Economic policy and the environment

Economic growth

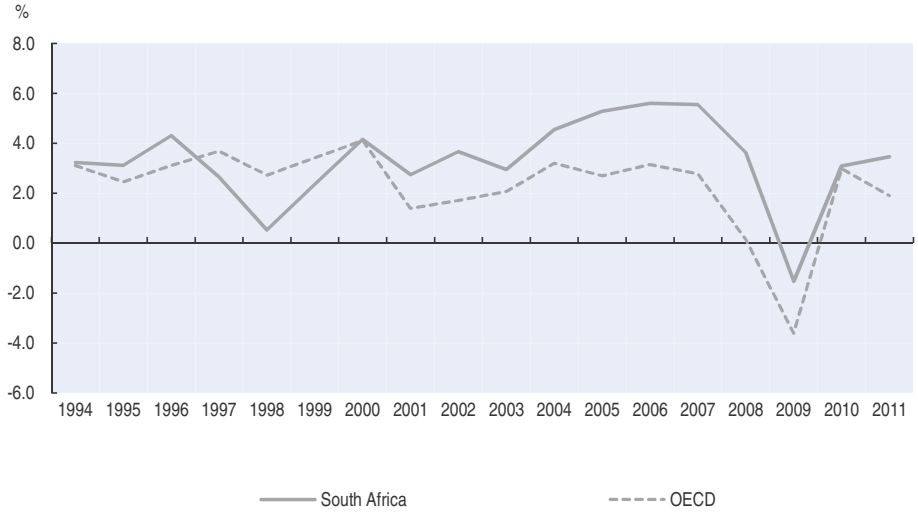
The democratically elected government that came to power in 1994 inherited an ailing economy weakened by years of internal conflict and external sanctions. Against that backdrop, South Africa's economic performance was impressive in the second half of the 1990s and for most of the 2000s. The country's GDP growth rate averaged 3.2%, reaching an all-time high of 5.6% in 2006 and 2007 (Figure 3.1). Successive government policies stabilised public finances, bringing down inflation and attracting growing foreign capital. The awarding of the 2010 FIFA World Cup to South Africa showed the country was a stable, modern state, in many ways a model for the rest of the continent (OECD, 2008, 2010a).

Like many other countries, South Africa was hit by the 2008/09 global economic crisis, mainly through trade and financial channels. As a result, real GDP began falling at the end of 2008; in 2009, South Africa suffered its first recession since the early 1990s (Figure 3.1). To cushion the economy, and especially the most vulnerable households and sectors, a special Presidential Economic Joint Working Group meeting, which included civil society representatives, endorsed the Framework for South Africa's Response to the International Economic Crisis in February 2009. The response comprised a USD 7.5 billion fiscal stimulus package, covering macroeconomic and industrial policies, but also supporting employment and social policies. Notably, it strengthened the Expanded Public Works Programme (EPWP), which aims to provide employment opportunities to 4.5 million individuals over a five-year period. About 11% of the fiscal stimulus package was allocated to environment-related themes, such as railways and energy-efficient buildings, as well as water and waste management (UNEP, 2012).

Although growth resumed by the end of 2009, South Africa's recovery remains relatively weak. Post-crisis growth performance is more similar to the OECD average than the more dynamic emerging economies. Actual growth has long lagged behind potential

Figure 3.1. **Real GDP growth in OECD and South Africa**

Annual growth rates, 1994-2011[a]



a) Based on data expressed in 2005 USD and purchasing power parities.
Source: OECD (2013), *OECD National Accounts Statistics Database.*

StatLink http://dx.doi.org/10.1787/888932878895

for several reasons: slow private consumption growth due to the heavy burden of household debt; overvaluation of the rand; slow growth of markets for South Africa's exports; weakening of key export prices; and depressed confidence due to the subdued global recovery. As a result, employment remains too low and unemployment excessively high, which exacerbate a range of social problems and tensions.

Green economy initiatives

For much of the last decade, environmental concerns have not been explicitly taken into account in economic development policies. As indicated in Chapter 2, little emphasis was placed on environmental sustainability as critical for growth in economic development plans, such as the 1994 Reconstruction and Development Programme (RDP), the 1996 Growth, Employment and Redistribution Strategy and the 2006 Accelerated and Shared Growth Initiative for South Africa (ASGI-SA). The major sectors identified to drive growth – mining, manufacturing and agriculture – depend heavily on low-priced water and coal-based electricity. To date, the resulting energy-intensive, high-carbon economy has produced impressive economic growth. However, this growth has also become structurally linked to an eroding natural resource base and many environmental problems. It has been increasingly understood that, to achieve an inclusive green economy, policies must recognise that changes in natural assets can affect growth.

The New Growth Path, the government's 2010-20 economic strategy, provided an updated vision for a more inclusive and greener economy. Within its five priority themes, the green economy produces environment-growth-employment synergies through expanding the production of technologies for solar, wind and biofuels. A "diagnostics" report issued in June 2011, which informed the 2012 National Development Plan (NDP), identified nine primary challenges facing the economy, including an overreliance on natural resources. The NDP itself stressed that, for more than a century, South Africa

exploited its natural resources, including water and land, with little regard for environmental consequences.

Through its "Global Green New Deal", the UN Environment Programme (UNEP) recommended countries view the financial crisis as an opportunity to shift their economies towards ecological sustainability. To that end, South Africa unveiled a Green Economy Accord (GEA) in November 2011, with 12 overarching multi-stakeholder commitments, which aims to green the economy and help achieve the objectives of the New Growth Path (Box 3.1).

Box 3.1. **Selected commitments under the 2011 Green Economy Accord**

1. *Rollout of solar water heating systems*, including a government commitment to ensure installation of 1 million heaters at household level by 2014. Business commits to working with government to develop, establish and then publicise a sustainable funding plan to support their installation.
2. *Increasing investments in the green economy*, including the Industrial Development Corporation's commitment to set aside ZAR 22 billion for green projects over the next five years and a further ZAR 3 billion to manufacture green products and components, as well as the government's commitment to compile a database of known projects in the green economy.
3. *Rollout of renewable energy*, including the government's commitment to expand renewable energy generation capacity and procure 3 725 MW of renewable energy by 2016 in keeping with goals for renewable energy under the Integrated Resource Plan 2010-2030.
4. *Promoting energy efficiency across the economy*, including industry commitment to work with the Department of Energy on benchmarks for energy efficiency in various sectors and company energy-management plans in support of the National Energy Efficiency Strategy.
5. *Waste recycling, re-use and recovery*, including the government's commitment to finalise the Waste Innovation Programme to promote reduced waste generation during production processes, and industry's commitment to work with government on recycling, re-use and recovery of industrial waste.
6. *Promotion of biofuels for vehicles,* including the government's commitment to finalise a supportive regulatory environment and an incentive system to kick-start the development of a local biofuels industry, and industry's commitment to support smallholdings, communal land and co-operatives in the supply of feedstock for private sector ventures to ensure extensive empowerment as a result of the biofuels strategy.
7. *Launching clean-coal initiatives to reduce emissions,* including the government's commitment to support specific projects, such as underground coal gasification and carbon capture and storage, under the South African National Energy Development Institute in partnership with business. Business committed to building in-country knowledge, capacity and expertise to enable the design, construction and operation of effective carbon capture and storage solutions where appropriate.
8. *Retrofitting of domestic, industrial and commercial buildings to promote energy efficiency*, including the government's commitment to regulations that will phase-out incandescent lighting for general, domestic and commercial use and Eskom's commitment to consider new technologies that can improve energy efficiency of its existing coal-fired power stations.

Box 3.1. **Selected commitments under 2011 Green Economy Accord** *(cont.)*

9. *Reducing carbon emissions on the roads*, including the government's commitment to invest in mass-transport systems and review investment in rail infrastructure and rolling stock, and industry's commitment to promote greater use of rail to transport freight.
10. *Electrification of poor communities and reduction of fossil-fuel open-fire cooking and heating*, including the government's commitment to increase access to modern energy carriers and to support the switch to appropriate modern thermal carriers like liquefied petroleum gas for cooking and heating.
11. *Economic development in the green economy through promotion of localisation, youth employment, co-operatives and skills development*, including trade unions' commitment to help form co-operatives and/or social enterprises and to train retrenched employees in the installation and maintenance of solar water heaters.
12. *Co-operation around the UN Framework Convention on Climate Change COP-17 and its follow-up*, including industry's commitment to demonstrate products and technologies that showcase South Africa's efforts on climate change, and the commitment of trade unions, business and community organisations to join government in communicating the messages of the Green Economy Accord.

Source: EDD (2011), *Green Economy Accord*.

Total funding required for the GEA is estimated at ZAR 220 billion over five years, or 1.6% of annual GDP. Rather than framed as a government-funded plan, the accord is positioned around partnerships for the 12 challenges; it emphasises a progressive shift from dependence on government grants to full reliance on private sources by 2025. The South African Green Fund, established in 2012 with an initial budget of ZAR 800 million for 2012-15, is expected to provide catalytic finance for high-impact green economy projects; for institutional and technical capacity to build an evidence base; and for attracting additional resources to support South Africa's green economy development. The Industrial Policy Action Plan (IPAP) supplements the implementation of the GEA by providing support to green industries and industrial energy efficiency, as well as by building a critical mass of renewable energy generation.

The GEA is an innovative approach to bring together economic actors to both affirm and explore how the economy can produce social and environmental benefits alongside economic activity. First, it adopts a partnership model that includes the government and its social partners (business, trade unions and community organisations) building on the multi-stakeholder spirit and consensus of the 2010 Green Economy Summit. Second, the GEA offers the potential to mobilise South African businesses, building their confidence in ways that will improve their domestic, and potentially international, competitiveness in green technology. Third, it taps into the public's concern for jobs, aiming to improve growth based in large part on the investment required to tackle climate change. Finally, a number of quantitative, ambitious and time-bound targets are given for the 12 shared commitments. They were tested through a modelling report that aimed to assess the impacts of green economy investments in the selected sectors.[1]

However, the GEA has been criticised for being too reliant on state structure and support. Critics argue it has so far failed to deliver on promises due to capacity constraints

and lack of policy co-ordination. Like many countries, South Africa does not yet have a unified view on whether a green economy is a "green" investment niche or an economy-wide transformation, and whether it will be controlled by elites or engage previously marginalised stakeholders.

Another weakness relates to the lack of adequate evidence in South Africa – or globally – in the job creation potential of green economic policies. In the informal sector, there is scattered evidence of livelihoods in waste management, recycling and diversification of natural resource use – all labour-intensive fields. Yet there are also indications that high-technology approaches to "green growth", particularly with respect to renewable energy, do not create many new jobs; indeed, they can lead to job cuts due to their capital-intensive nature. As a result, the overall employment impact of green economic policies could be negative, particularly if policies are not adequately inclusive.

Rather than focusing on green jobs, the Green Economy Accord should focus on policy interventions that promote welfare. The *OECD Green Growth Strategy* (OECD, 2011a) underlines that several constraints or distortions in an economy inhibit return on green investment and innovation, such as environmentally harmful subsidies and distorted pricing of natural resources. The following sections will show that South Africa has already made significant progress in these areas. Moving forward, South Africa needs to foster economic growth and development, while ensuring that natural assets provide the resources and ecosystems services on which well-being relies.

2. Greening the tax system

Over the past decade, South African authorities have increasingly emphasised the use of environmentally related taxes. The Department of Environmental Affairs (DEA) acknowledged the potential environmental and efficiency benefits of market-based instruments in both 2006 and 2013 environmental outlook reports. In 2003, the National Treasury launched a research project on the potential of environmental fiscal reform in South Africa, followed by several policy papers, including two discussion papers on a carbon tax in 2010 and 2013.

South Africa applies a wide range of taxes on energy products, vehicles, air travel and waste (Table 3.1), and such taxes have expanded in the last few years. Some levies are also in place at provincial levels. As elsewhere in the world, the use of environmentally related taxes has been mainly driven by revenue-raising purposes rather than environmental considerations. Revenue from those taxes grew in real terms by 67% between 2000 and 2011. As a result, these taxes accounted for 8.6% of total tax revenue (excluding social security contributions) in 2011, up from 7.7% in 2000. In all, revenue from environmentally related taxes represented about 2.1% of GDP, close to the OECD average (Figure 3.2).

Revenue has grown markedly since 2008 (Figure 3.2). This is mainly due to new taxes such as the electricity levy, the levy on incandescent light bulbs and the CO_2 tax on motor vehicle emissions, as well as to the rise of all tax rates. In 2010, the government also introduced royalties on the extraction of coal and minerals. Overall, taxes on vehicles and on other products or waste have accounted for an increasing share of environmentally related revenue, although their role remains modest. Taxes on energy products, discussed in more detail in the following section, continue to account for the lion's share of revenue (Figure 3.2).

Table 3.1. **Overview of environmentally related taxes**

Sector	Tax/levy	Tax base	Tax rate 2012/13	Tax rate 2013/14
Energy	Electricity levy	Electricity generated from non-renewable sources	ZAR 0.035/kWh	No change
Transport fuels	General fuel levy	Petrol	ZAR 1.975/litre	ZAR 2.125/litre
		Diesel	ZAR 1.825/litre	ZAR 1.975/litre
	Road accident fund levy[a]	Petrol, diesel	ZAR 0.88/litre	ZAR 0.96/litre
	Customs and excise levy	Petrol, diesel	ZAR 0.04/litre	No change
Air transport	Air passenger departure tax	International air travel from South Africa	ZAR 190 per passenger; ZAR 100 per passenger to Southern African Customs Union member states	
Vehicle taxation	*Ad valorem* excise and customs duty (one-off vehicle taxes)	All passenger and light commercial vehicles[b], motorcycles	Graduated rate based on the vehicle price with an upper ceiling of 25%	
	CO_2 tax on vehicles	Passenger cars	ZAR 75 per g CO_2/km in excess of 120 g CO_2/km	ZAR 90 per g CO_2 in excess of 120 g CO_2/km
		Light commercial vehicles and pickup trucks[b]	ZAR 100 per g CO_2/km in excess of 175 g CO_2/km	ZAR 125 per gram/km in excess of 175 g CO_2/km
	Provincial motor vehicle licensing fees (recurrent vehicle taxes)	All registered vehicles	Rates usually based on weight, varying across provinces	
Waste	Plastic shopping bags levy	Plastic shopping bags	ZAR 0.04 per bag	ZAR 0.06 per bag
	Levy on incandescent light bulbs	Incandescent light bulbs	ZAR 3 per bulb (equivalent to ZAR 0.01-0.03/watts	ZAR 4 per bulb

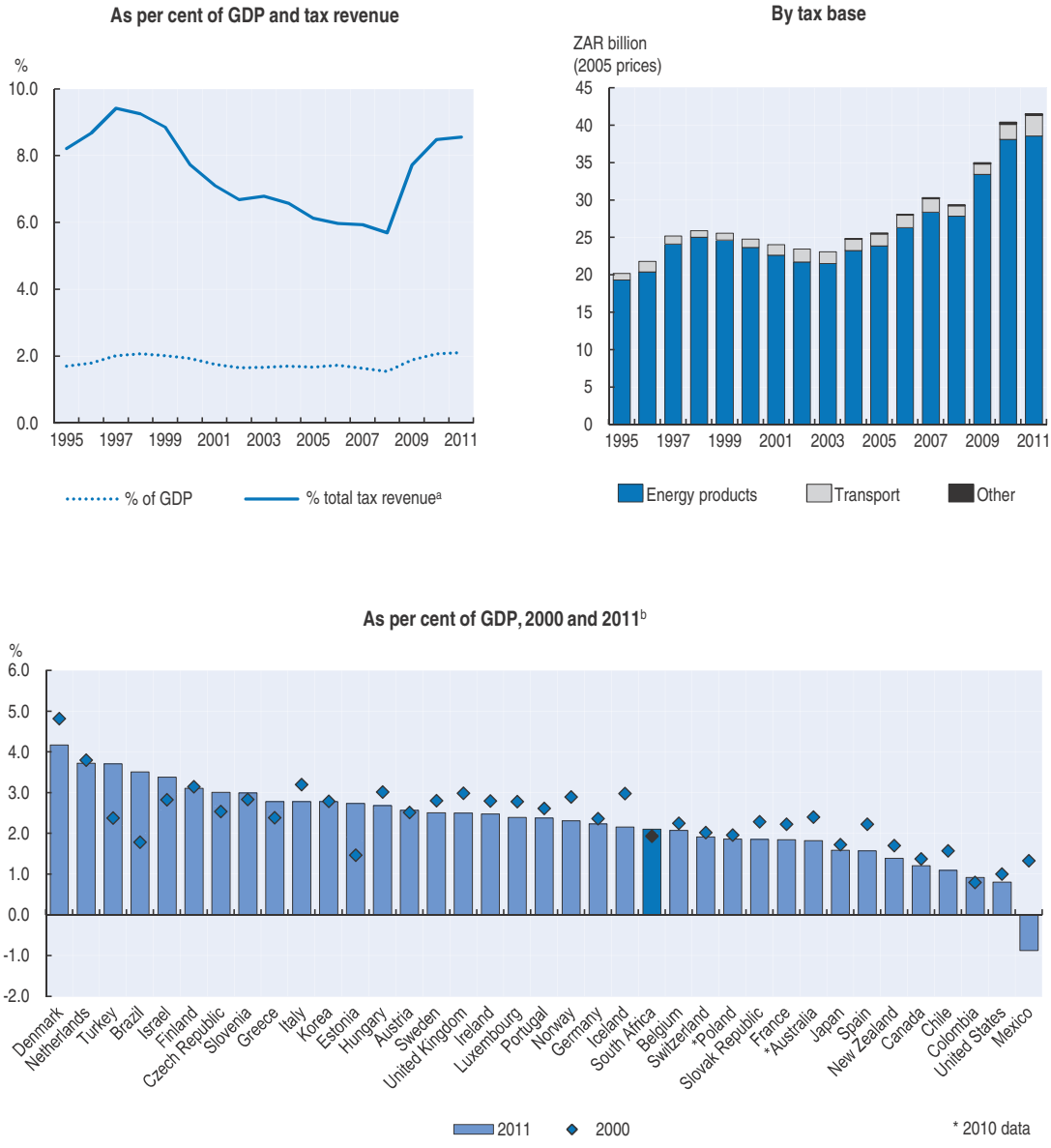
a) Revenues are earmarked to the Road Accident Fund and are not part of the national budget. The Fund is a state insurance covering road accidents.
b) Medium and heavy commercial vehicles are exempt.
Source: Speck (2010); National Treasury (2013); National Treasury and South Africa Revenue Service (2013).

South Africa has been implementing the principles of green tax reform, albeit still to a limited extent. In recent years, authorities have been gradually reorienting the tax mix towards more growth-friendly taxation. To that end, they have reduced tax on income and corporate profits, while raising indirect taxes on environmentally harmful activities. There is scope to further extend the use of environmentally related taxes in this context, as well as in sectors other than energy and transport. For example, there may be a case for taxes on fertilisers and pesticides to limit water pollution; on waste disposed in landfills; on packaging materials; and on water abstraction. Such measures should be introduced in clearly defined stages to minimise uncertainty about future tax rates, help the economy adapt to changes in relative prices, facilitate long-term investment and encourage eco-innovation.

Extending the use of "green taxes", together with removing environmentally harmful subsidies (Section 3), would encourage a more economically efficient use of resources and generate revenue that could fund infrastructure and other high-priority areas. This could also help the government gradually reduce the deficit and debt in keeping with its current medium-term budget plan, avoiding the accumulation of large deficits in an era of weak growth (OECD, 2013a).[2] In general, earmarking of revenue should be avoided, and general considerations about efficiency and equity should govern use of revenue.

Addressing the potential impact of taxes on the large number of low-income and poor households is a pressing need in South Africa. Special consideration, for example, should be given to using additional revenue from environmentally related taxes to provide social benefits. Given that many low-income people are unemployed, or work in the informal

Figure 3.2. **Environmentally related tax revenue**



a) Excludes social security contributions.
b) Mexico: the system used to stabilise end-use prices of motor fuels causes tax revenue to turn negative (i.e. become a subsidy) in years when the international price of oil is high.
Source: OECD calculations; OECD/EEA (2013), *OECD/EEA Database on Instruments Used for Environmental Policy and Natural Resources Management.*

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economy, direct social transfers may be preferable to income tax rebates. OECD (2005) stated that environmental fiscal reforms could help reduce poverty by addressing environmental problems that threaten the health and livelihoods of the poor (e.g. water and air pollution) and by generating resources to achieve the Millennium Development Goals and other pro-poor programmes. In the same vein, a number of studies indicate that environmental fiscal reform (e.g. taxes on CO_2 emissions and water use) in South Africa could generate environmental, economic growth and poverty alleviation benefits,

especially if revenue reduces indirect taxes on food and finances energy efficiency in social housing (Speck, 2010).

2.1. Energy taxation

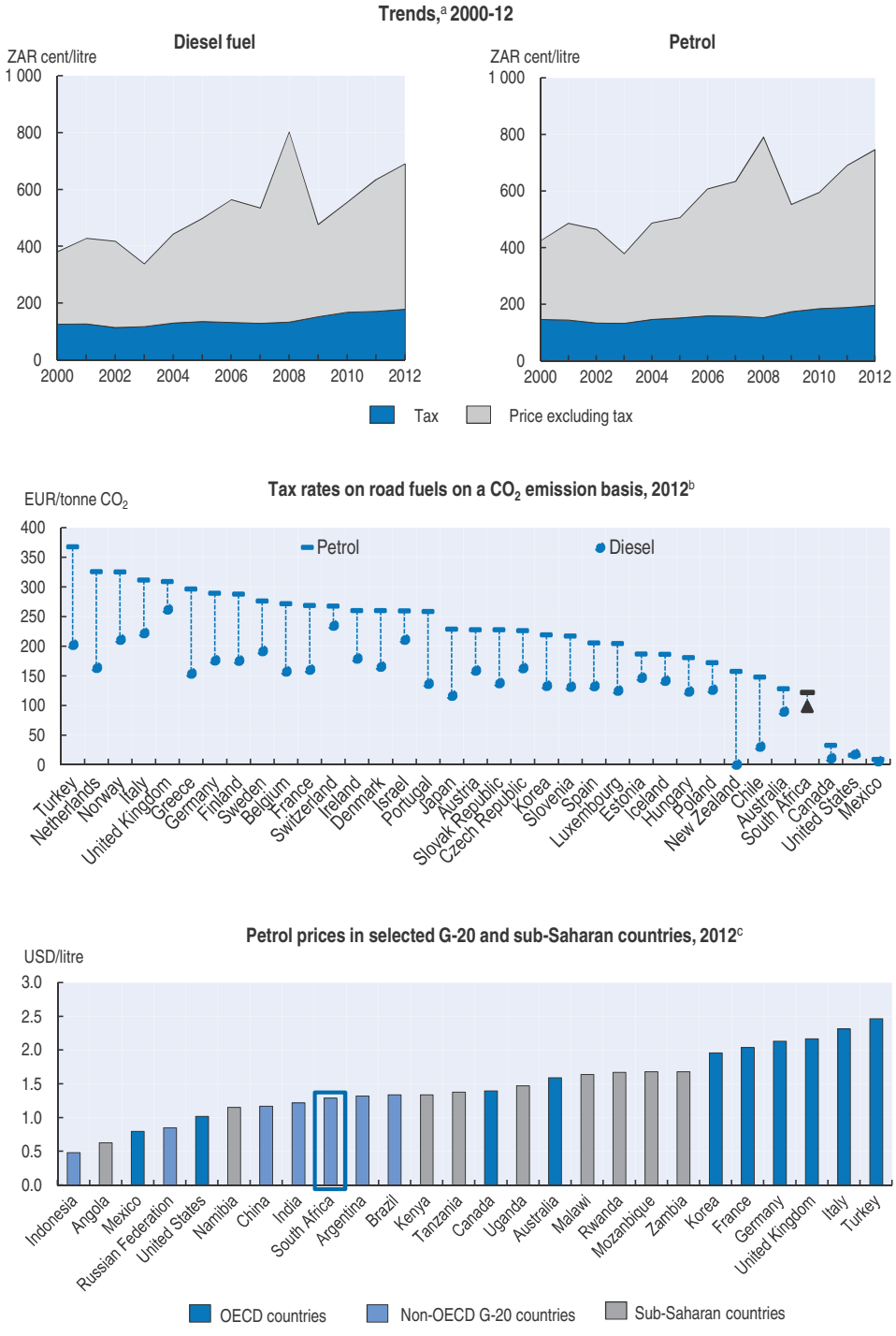
South Africa imposes a variety of taxes on energy products. There are duties on transport fuels and electricity, but not on coal for electricity generation or fuel for household heating. With the exception of the electricity levy (see below), energy taxes do not have any explicit environmental purpose, as in most countries. Nonetheless, regardless of their formal purpose, energy taxes send important price signals that influence energy-use patterns (OECD, 2013b). Energy taxes in South Africa accounted for 93% of environmentally related tax revenue in 2011, more than in all OECD member countries; between 2000 and 2011, revenue grew in real terms by 63% due to increased energy consumption, new taxes and increased tax rates.

Prices of road transport fuels are regulated, but automatically respond to world oil prices (IMF, 2013).[3] The general fuel levy is the main tax on petrol and diesel (Table 3.1). Bioethanol is fully exempt from the fuel levy, while biodiesel benefits from a 50% exemption. While nominal fuel tax rates have been steadily increased over time, including in periods of rising international oil prices, they have not kept pace with inflation. Together with the rise of oil prices in world markets, the lower-than-inflation tax rate adjustments have led to a decline in the share of taxes in fuel prices and in the contribution of the fuel levy to tax revenue (Figure 3.3). In 2012, taxes accounted for about 25% to 28% of petrol and diesel prices, down from about 33% in 2000. Excise duties account for a lower share of fuel prices than in most other countries (Annex I.A). They also imply much lower carbon prices than in most OECD member countries (Figure 3.3; Section 2.2). In addition, other exemptions apply to fuel consumption (Section 3.1); South Africa is one of the few countries that do not apply value added tax on fuels. Overall, transport fuel prices in South Africa are at the lower end compared to other emerging economies and sub-Saharan countries, including those with a lower GDP per capita such as Tanzania and Uganda (Figure 3.3).

As in most countries, diesel benefits from lower taxation: in 2012/13, the nominal tax rate on diesel was about 5% below that on petrol, but the tax differential becomes 20% if tax rates are expressed in terms of CO_2 emissions (Figure 3.3). As a result, consumption of diesel has increased faster than that of petrol, although petrol is still used more. Since 2009, tax rates on diesel and petrol have been adjusted with a view to gradually equalising them. This is a welcome move, as the diesel-petrol tax differential is not environmentally justified: a litre of diesel produces about 18% more CO_2 emissions than a litre of petrol, as well as higher emissions of local pollutants. Internalising these environmental costs would require an even higher tax per litre on diesel than on petrol (OECD, 2013b).

Therefore, tax rates could better reflect environmental externalities of fuel use and further be brought in line with international standards, thereby strengthening the price signal. In particular, duties on transport fuels could be adjusted to include a component for carbon in anticipation of the proposed carbon tax (Section 2.2). Once the carbon tax is in place, the government should ensure it is correctly reflected in end-use fuel prices and passed on to consumers. This would help mitigate CO_2 emissions from transport; although these account for a relatively modest share of total emissions, they have been rising with economic growth and are projected to further increase (Chapter 1; Winkler et al., 2011). Increased fuel taxation would certainly have a direct negative impact on low-income households, as well as an indirect impact via higher prices of other goods and other

Figure 3.3. **Road fuel prices and taxes**



a) Prices for the Gauteng province, 30 June each year, constant 2005 values. Diesel: wholesale prices. Leaded petrol: (RON 93) retail prices.
b) Tax rates as of 1 April 2012 (except 1 July 2012 for Australia); federal taxes only for Canada and United States. Tax rates converted using standard carbon emission factors from the Intergovernmental Panel on Climate Change and conversion factors from the IEA.
c) OECD countries: second quarter 2012; non-OECD countries: July 2012.
Source: OECD calculations; Kojima (2013); SAPIA (2013); OECD (2013b).

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transport services. However, it would probably hit middle- and high-income households harder because transport fuels account for a larger share of their expenditures.[4] More than 70% of South African households do not own a vehicle, and this share climbs to about 95% for households in the poorest three-income deciles.

In 2009, South Africa introduced a levy on all electricity generation from non-renewable sources, collected at source by producers. The levy rate has been gradually increased to ZAR 0.035 per kWh, with the aim of discouraging power generation based on fossil fuels and encouraging electricity savings. Given that South Africa's electricity mix produces about 1 kg CO_2/kWh, the levy is equivalent to a relatively low carbon price of about ZAR 35/tCO_2 (Table 3.2). There is no evidence this levy has had any impact on electricity consumption; it has been overshadowed by increasing electricity prices (Rennkamp et al., 2012; Section 3.1). The Western Cape has considered imposing its own energy levy as an implicit incentive to develop renewables.

2.2. Towards a carbon tax

While there is no explicit economy-wide carbon price, the electricity levy and other fiscal instruments on fuels and vehicles implicitly impose a price on carbon (Table 3.2). As in all other countries, these implicit carbon prices widely vary across fuels and sectors (OECD, 2013b). In addition, other regulatory and incentive measures in the energy sector generate implicit carbon prices. These include the demand-side management programme for energy efficiency, whose costs are recovered via the electricity tariff; and the cap on greenhouse gas (GHG) emissions of the electricity generation sector included in the 2011 Integrated Resource Plan (Section 4.2) (Rennkamp et al., 2012).

Table 3.2. **Estimated implicit carbon prices**

	Implicit carbon price EUR t CO_2 eq
Taxes on petrol[a, c, d]	121.95
Taxes on diesel[b, c, d]	98.12
Electricity levy	3
CO_2 vehicle tax	30
Biodiesel subsidy	–
Bioethanol	84.77
Biodiesel	33.8

a) Assuming CO_2 emissions of kg 2.26/litre of petrol.
b) Assuming CO_2 emissions of kg 2.67/litre of diesel.
c) CO_2 emission factors calculated on the basis of standard carbon emission factors from the Intergovernmental Panel on Climate Change and conversion factors from the IEA.
d) Include fuel levy, road accident fund levy, and customs and excise levy (rates as of April 2012).
Source: Rennkamp et al. (2012); OECD calculations.

The 2011 National Climate Change Response White Paper envisages a carbon tax as a short-term step, while exploring the potential of an emission trading system in the longer term. The National Treasury first circulated a carbon tax proposal in 2010, but putting it in place has been taking longer than expected. The proposal initially envisaged a simple tax on the carbon content of fuels applied to all sectors, with no special relief measures. Subsequent revisions resulted in a more complex tax, featuring an array of relief measures for energy-intensive and trade-exposed sectors (Box 3.2). This is the common method in many other countries, which has proven to weaken the price signal while placing a greater

Box 3.2. **Carbon tax proposal**

In 2010, the National Treasury proposed a simple tax on the carbon content of fuels. It was to be imposed upstream to limit the number of affected taxpayers (coal mines, natural gas processing plants, refineries) and cover all sectors. To avoid administrative difficulties and inefficiency, no special relief measures were planned.

The proposal was revised several times. According to the 2013 budget, the tax would be introduced in two phases starting from 2015. During the first phase (2015-20), the tax rate would be ZAR 120/tCO_2-eq, increasing by 10% per year. Assuming a 5% inflation rate, the 10% tax rate increase would result in a real tax level of ZAR 55/tCO_2 in 2020 (Rennkamp et al., 2012). The tax would not apply to emissions from agriculture, land-use change and waste. In this phase, a basic tax-free threshold of 60% would apply, with further exemptions for emissions from process industries and trade-exposed sectors. In addition, by investing in emission-abatement projects outside their normal activity, emission-intensive sectors (cement, iron and steel, aluminum and glass) and trade-exposed industries could offset their carbon tax liabilities up to a maximum 5-10%. All this implies an average tax level on total CO_2 emissions between ZAR 24/tCO_2 and ZAR 48/tCO_2 (EUR 2.5-4.5) (Rennkamp et al., 2012).

Additional relief measures would be considered for firms that reduce their carbon intensity. An energy-efficiency savings tax incentive is also foreseen to help companies reduce their energy intensity. While the carbon tax revenue would not be earmarked, some revenue would be recycled to fund the energy-efficiency savings tax incentive.

Tax-free thresholds would be reduced during the second phase (2020-25) and might be replaced with absolute emission thresholds thereafter. The government is also considering a gradual reduction of the electricity levy as the carbon tax is implemented. An updated policy paper was released in May 2013 for public consultation.

burden on lower emitting sectors (OECD, 2013b). The initial rate is also to be set at a very low level; it will likely take several years before the effect on economic decisions is significant. The revised proposal would also require substantially more information to administer.

Efficiency and effectiveness considerations argue in favour of a return to the simpler, initial vision of the carbon tax. A uniform tax on the carbon content of fuels, applied to all sectors, is likely to be the most efficient instrument to achieve the government's targeted emissions abatement. While there may be a case for introducing exemptions at an initial stage to protect competitiveness and prevent carbon leakage, the exemptions introduced in South Africa seem too wide: some sectors could end up paying the tax on some 15-20% of their actual emissions. Moreover, while relief measures should ideally be applied for a limited period, the current proposal opens the possibility of exemptions in the second phase of implementation as well, subject to a review of the carbon tax policy (Box 3.2). The effectiveness of the carbon tax would also be enhanced if competition in the electricity market were improved. Eskom, the state-owned power company, is a regulated monopoly that produces almost all of South Africa's electricity. It would recover its costs, including the carbon tax, through the electricity tariff, which may hinder the incentive to switch fuel for power generation (World Bank, 2011).

It is not clear how the proposed carbon tax would interact with the "carbon budget approach" put forward by the National Climate Change Response White Paper. This

approach specifies desired emission reduction outcomes for relevant economic sectors, and possibly individual companies, consistent with the target national GHG emission trajectory. It is not clear whether the carbon budgets would be voluntary or mandatory. Nor is it understood if carbon budgets would be set as caps or targets on absolute emission levels or on relative indicators such as emission intensity (DNA Economics, 2012). Having indicative emission targets per sector may help clarify institutional and implementation responsibilities, as well as improve progress monitoring and evaluation. However, if an economy-wide carbon tax is in place, emission constraints on sectors would theoretically not be needed. A simple carbon tax appears to be preferable, as it is effective and easier to administer than sectoral carbon budgets associated to incentive measures or cap-and-trade (OECD, 2013a). In addition, since a few monopolistic companies, namely Eskom, generate a large part of GHG emissions, the market for emission permits would likely be too small for trading to be effective.

Modelling studies generally agree that a carbon tax in South Africa would be the most efficient option to reduce GHG emissions. Even a relatively low tax, broadly applied, would substantially contribute to moving away from coal-based power production and reducing GHG emissions. Using revenue for tax shifting, pro-poor transfers and investment to extend provision of basic services could minimise the impact on GDP growth and welfare. In addition, ensuring a more flexible labour market would facilitate the adjustment of workers to a lower-carbon economy and reduce welfare losses (National Treasury, 2010).

2.3. Other environmentally related taxes

South Africa pioneered the introduction of a plastic bag levy in 2004, which has helped reduce waste and encourage plastic bag reuse (National Treasury, 2009). A levy on incandescent light bulbs was introduced in 2009 to promote energy efficiency and reduce electricity demand.

A CO_2 tax on motor vehicle emissions was first introduced in 2010 on purchases of passenger vehicles. In 2011, the tax was extended to purchases of pickup trucks and other light commercial vehicles; the main objective was to promote renewal of the fleet with more fuel-efficient vehicles. Heavy goods vehicles and minibus taxis, a popular form of public transport in South Africa, are exempt. This tax adds to the *ad valorem* excise duty on the retail price. The increase in the purchase price associated with the CO_2 tax is relatively small, around 2-3% for most vehicles (Rennkamp et al., 2012). Nonetheless, according to the government, average CO_2 emission levels for passenger vehicles have declined since the introduction of the tax (National Treasury, 2013).

South Africa could consider extending CO_2-based taxation to two other cases: vehicle registration fees applied at the local level; and heavy goods vehicles, which are currently excluded from both the *ad valorem* excise tax and the CO_2 tax. While taxes on vehicle ownership are theoretically less economically efficient than fuel taxes and road charges in reducing emissions (OECD, 2009), the experience of many countries shows that such taxes help renew the vehicle fleet in favour of cleaner vehicles.

3. Removing environmentally harmful subsidies

3.1. Energy subsidies

South Africa implements a number of fiscal and energy policy measures that generate subsidies with potentially negative impacts on the environment. A fuel-levy refund system

is in place for diesel used in agriculture, forestry, mining, offshore and harbour vessels, rail freight transport and large electricity generation plants. Coal used for electricity generation is tax free. Transport fuels and kerosene for heating are exempt from the value added tax (VAT).

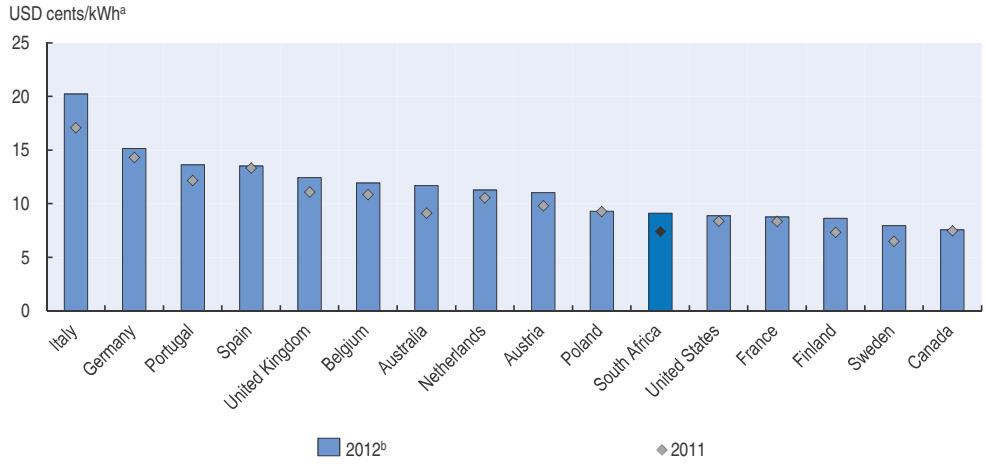
These exemptions lower end-use prices and can reduce incentives to use energy efficiently. According to government estimates, the zero VAT rate on fuels and the diesel refund system cost the public budget about ZAR 13.6 billion in lost revenue in 2010-11, equivalent to 2% of total tax receipts. While this is a minor share of revenue, the cost associated with these tax relief measures has increased over time. The National Treasury started measuring and publishing tax expenditure in 2011, with a view to increasing transparency of the tax system. South Africa could build on these records to establish a systematic review of existing and proposed tax expenditure and subsidies. Such a review, which would include environmental and social implications, could be the basis for reforming special tax treatments that are not justified on economic, equity or environmental grounds.

The largest source of environmentally harmful subsidies in the energy sector relate to coal and electricity. Coal for electricity generation has long been priced well below international levels, which explains the very high share of coal-fired plants in total electricity production (above 90%). Eskom has preferential access to domestically produced coal and, thanks to medium-term contracts, pays prices that are well below the export price of coal. The implied subsidy to Eskom is some two-thirds of its total revenue, which is equivalent to more than 2.5% of GDP (OECD, 2013a). Low coal prices have helped keep electricity prices down. This, in turn, has attracted investment in energy-intensive industries such as aluminium smelting, which add to the energy-intensive domestic mining sector. A long period of low electricity prices has therefore helped make the South African economy one of the most energy- and carbon-intensive in the world. Emissions of other pollutants such as SO_2 and particulate matter are also high by international comparison (Chapter 1).

The generation capacity accumulated in the 1970s kept pace with increasing power demand until the second half of the 2000s, when South Africa started to experience power outages. In response to these outages, and the need to rapidly expand generation capacity, prices started rising sharply in 2008; they have since more than doubled in real terms. While South Africa still had among the lowest prices internationally in 2011, the subsequent annual increase (by 23% in 2011-12) brought its electricity prices above those of countries such as France and the US (Figure 3.4). Beginning in 2013, prices will further increase by an average 8% per year, with a view to fully covering generation and investment costs by 2018. In 2010, in combination with increasing prices, the South African energy regulator introduced increasing block tariffs for residential customers to promote electricity savings in households, while assuring affordability.[5] Municipalities have also been providing free electricity for basic needs since 2003 (Box 3.3).

This progressive price increase is a very welcome move that will remove implicit subsidies to electricity consumption, thereby providing domestic consumers with the right incentives to use energy efficiently. A 2011 survey found that most large companies are implementing measures to increase the energy efficiency of production processes in response to electricity price hikes (DNA Economics, 2011). However, Eskom should pay the market price for coal and the electricity regulator should allow that to be reflected in electricity prices. This would require further large increases in electricity prices in the

Figure 3.4. **Electricity prices in selected countries**



a) Prices for the supply of 1 000 kWh with 450 hours use; excluding VAT.
b) As of June 2012.
Source: NUS Consulting (2012), *International Electricity and Natural Gas Reporting.*

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Box 3.3. **Free basic services**

The South African government has made great strides in extending access to electricity, water and sanitation (Chapter 1). The government also provides free basic services to poor households, financed mainly through transfers from the national budget to local governments (the "equitable share"). This transfer is expected to grow from about ZAR 20 billion in 2009 to ZAR 35 billion in 2013 (National Treasury, 2013). Cross-subsidisation between service users also contributes to the funding, especially in large municipalities as they serve a variety of consumers, including businesses.

Estimates indicate that about 35% of households connected to the grid (4.3 million) receive free basic electricity (FBE), while just over 100 000 households receive an allowance for alternative energy in areas off the grid. The FBE allowance corresponds to 50 kWh per household and per month; it relates to a small proportion of total consumption, as it covers only minimal needs of poor households. Many poor households cannot afford to use electricity as their primary source of energy. The FBE allowance covers their lighting needs, while more dangerous and environmentally harmful fuels (e.g. wood, coal or paraffin) are still used for more energy-intensive activities such as cooking and heating (National Treasury, 2011).

While the population with access to basic water services has increased, those benefiting from free basic water (6 000 litres per person per month) and sanitation has decreased. In 2009, 58% of households with basic water services and 33% with basic sanitation services were granted free water services, down from 73% and 38%, respectively, in 2007. Most municipalities have introduced free basic waste collection services. Some use a self-selection system for targeting waste service subsidies, which typically involves either a tariff-based subsidy or a means-tested subsidy. The number of consumers receiving subsidies for basic waste services declined by 37% between 2005 and 2009 (National Treasury, 2011).

Box 3.3. **Free basic services** *(cont.)*

There is some evidence that the free basic service system can be inefficiently targeted, depending on how municipalities manage the subsidies. Some municipalities have difficulties identifying eligible consumers and do not systematically monitor service provision; some extend the allowance beyond the basic service (e.g. 100 kWh of electricity); others provide allowances to all households, to all households in certain areas (typically townships) or only to households that fall below a poverty line and apply for it. There is evidence that some better-off households receive the subsidies, while some of the very poor do not; these comprise, for example, households not connected to the electricity grid and that do not have access to metered water (households in rural areas and in urban informal settlements). Over the last few years, several municipalities have changed from providing free basic services to all households to using application-based methods that aim to target poor households more effectively. This is probably driving the decline in the proportion of beneficiaries indicated above.

There are no sufficient data to analyse how benefits of the free basic service policy are distributed among the poor and the non-poor. Some case-study results for water services indicate the subsidy, together with increasing block tariffs (Box 3.4), have positive redistributive effects within municipal boundaries, with considerable cross-subsidisation from higher-income households. However, the redistributive impact is relatively small compared to that of direct social grants (Van der Berg, 2009).

There are inevitable trade-offs between free delivery of environment-related services and potential overuse. A policy of free basic services seeks to redress inequalities in accessing environmental services, while taking environmental concerns into account insofar as the free allowances cover strictly basic needs. However, the government should consider the signal provided to millions of households that such services and resources are free. In the longer term, it would probably be more efficient and equitable to gradually introduce pricing at low rates, while using cash transfers or vouchers to support poor families.

future. A renegotiation of below-cost long-term contracts with industrial users would also enhance efficiency. Some energy-intensive industrial users benefit from electricity prices of around one-sixth of the average Eskom price, which implies a very large subsidy (OECD, 2013a).

Overall, the International Energy Agency (IEA) estimates that subsidies for fossil fuel consumption in South Africa have substantially decreased with the rise in electricity prices (Table 3.3). They are now relatively modest compared to those in other emerging economies, amounting to USD 27.6 per capita in 2011. The subsidies represented 0.3% of South Africa's GDP in 2011 compared to 1.4% in Mexico and about 2.5% in India and Indonesia. The average subsidy rate (as measured by the share of the subsidy in full cost of supply) is 4.6%, which, along with China, is the lowest among emerging economies.

Table 3.3. **Estimates of fossil fuel consumption subsidies**

	2007	2008	2009	2010	2011
	billion USD				
Oil	0.18	0.21	0.12	–	–
Electricity	4.98	5.53	2.84	2.12	1.38

Source: IEA, Fossil fuel subsidy database (accessed April 2013).

Simulations by the *OECD Environmental Outlook to 2050* indicate that phasing out fossil fuel consumption subsidies could reduce South Africa's GHG emissions (excluding land use, land-use change and forestry) by 3% by 2050 compared with a business-as-usual scenario. It would also help encourage energy efficiency; promote the development of low-carbon technology and renewable energies; and generally support the transition to a lower-carbon economy. This could ultimately increase real aggregate income in the BRICS group (Brazil, Russia, India, China and South Africa) by 1.1% by 2050 (OECD, 2012a).

3.2. Agricultural support

While agriculture contributes a relatively low share of GDP (3%) in South Africa, it accounts for some 9% of employment. Agriculture consumes around 62% of water resources (Chapter 1). As in many countries, agricultural producers receive various forms of support, but in South Africa the level is very low. In addition, total agricultural support dropped from an average 1% of GDP in the late 1990s to 0.3% of GDP in 2008-10 (Figure 3.5). This compares with an average 0.9% of GDP in OECD member countries. Support for farmers as measured by the share of producer support estimate (PSE)[6] declined from 11% to 3% between 1995-97 and 2008-10, well below the 20% OECD average (OECD, 2011b).

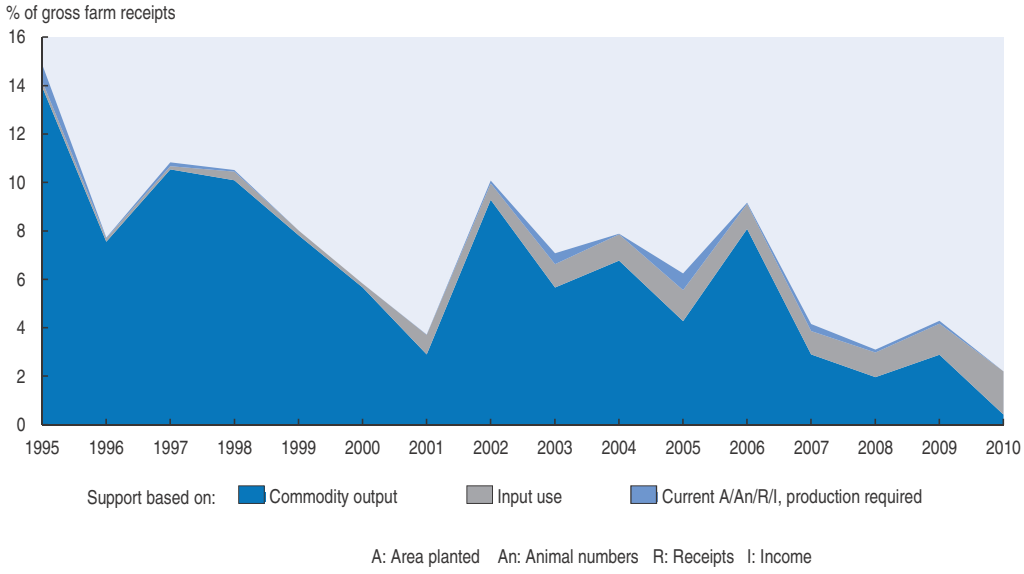
Between 1995-97 and 2008-10, the share of PSE from subsidies linked to output level and input use also declined from 97% of PSE to 74%. This remains very high and above the share observed in many OECD member countries (Figure 3.5). These are the most distorting subsidies: they can stimulate production and input use, thereby encouraging intensification and expansion of agriculture with a potentially negative impact on the use of water, land, fertilisers and pesticides. However, the high share of subsidies linked to production has to be seen in the context of the low level of total PSE (OECD, 2011b). Input subsidies include a diesel tax refund system (Section 3.1) and a limited range of subsidies for water transport to areas suffering from drought.

Water, a key factor in agricultural production, is implicitly subsidised. Much agricultural water use remains unmeasured and uncharged, and little progress has been made in licensing users (OECD, 2013a). In addition, while large-scale farmers have often continued using water without restriction, smaller and poorer farmers have been forced to pay for licences without having the infrastructure to extract and distribute the water (Chapter 6).

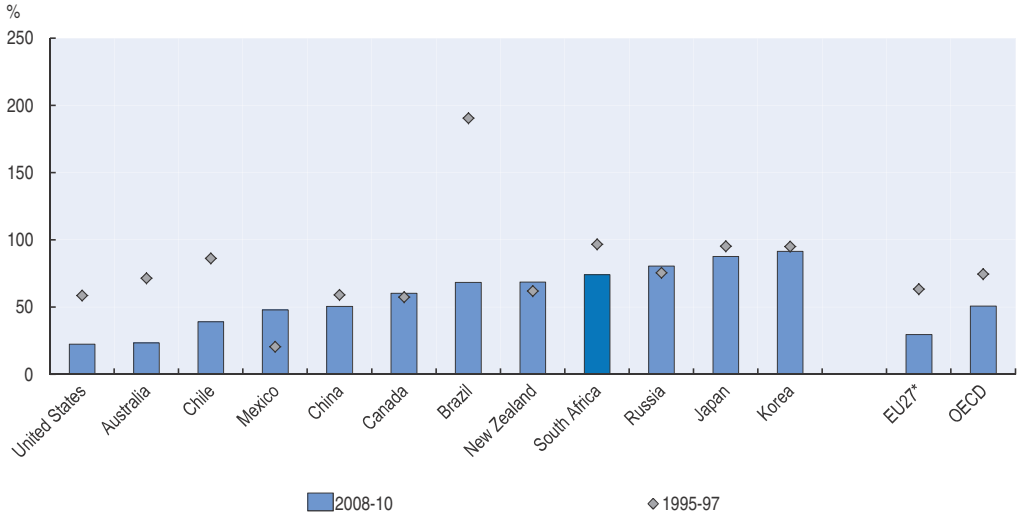
Water charges in agriculture are too low. Much of irrigation water remains unmetered and, therefore, unpaid for. Agricultural water users, in general, do not pay a return on assets and the depreciation charge is capped. This largely contributes to keeping revenue from the service well below actual costs, resulting in underinvestment (OECD, 2013a). There is still a heavy reliance on public funding for investment in water infrastructure (Section 4.2). As recommended by the *2013 OECD Economic Survey of South Africa*, the government should speed up allocation of licences for water use and ensure that agriculture water charges reflect supply cost and scarcity of water resources.

Figure 3.5. **Agriculture support**

PSE level and composition by support categories, 1995-2010



Potentially distorting subsidies as per cent of PSE, 1995-97 and 2008-10[a, b]



* EU27 for 2008-10 and EU15 for 1995-97.
a) Unweighted averages.
b) Payments based on commodity output and variable input use.
Source: OECD (2013), *Producer and Consumer Support Estimates Database.*

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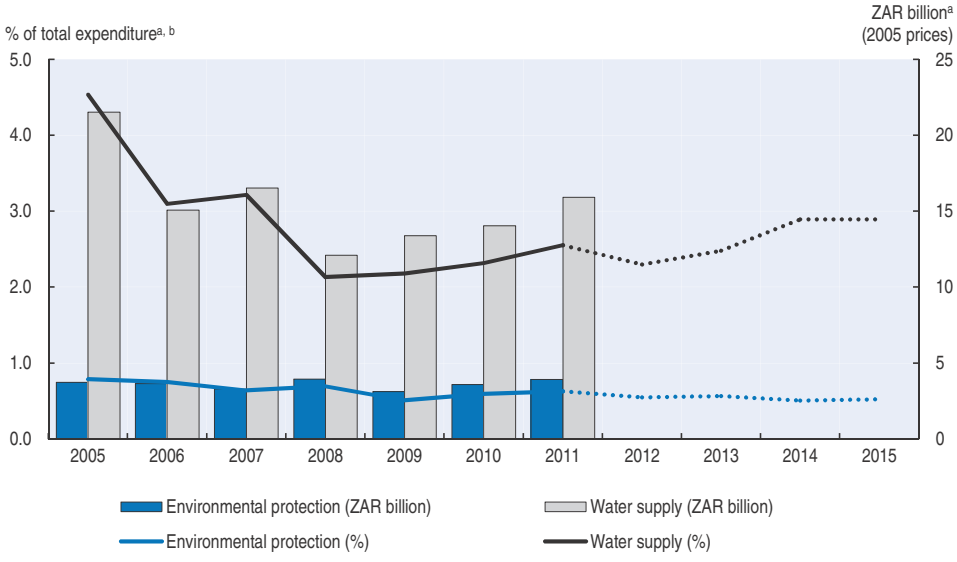
4. Environmental and low-carbon investment to promote green growth

4.1. *Public environmental expenditure: An overview*

Estimates by the National Treasury indicate that consolidated government expenditure for environmental protection grew by 5% (in real terms) between 2005 and 2011.[7] However, it has declined from 0.8% of total expenditure to 0.6%, and will continue to

account for a minor share of consolidated government spending in future years (Figure 3.6). Real expenditure for water supply grew by more than 30% between 2008 and 2011, but remains below the pre-recession level. Expenditure in this sector is planned to reach nearly 3% of total public spending by 2015 (Figure 3.6). Overall, consolidated government expenditure on environment and water accounted for some 1% of GDP in 2012. This, however, excludes expenditure on environmental services financed directly by municipalities. This share of GDP is comparable to that of many OECD member countries. However, it is probably still insufficient to cope with pressing environmental needs and backlogs in environment-related infrastructure and services of an emerging economy like South Africa (Section 4.2). South Africa has also benefited from substantial international funding for environmental projects. However, it is likely that grants from donors will decline over time.

Figure 3.6. **Expenditure for environmental protection and water supply**



a) Includes current and capital expenditure financed by national and provincial governments, social security funds and public entities, excluding expenditure financed by municipalities and state-owned enterprises. Environmental protection relates to the conservation of biodiversity and landscape, including the management of natural parks and reserves, waste and wastewater management, pollution abatement and related R&D. Estimates for different years may not be strictly comparable.
b) Dotted lines are planned expenditure.
Source: South Africa National Treasury, *Budget Reviews 2009, 2010, 2011, 2012, 2013.*

StatLink http://dx.doi.org/10.1787/888932878990

The DEA spends about half of its budget on the Expanded Public Works Programme, which seeks to create temporary employment opportunities in environmental protection (Box 6.5). According to Statistics South Africa's financial census of municipalities, local authorities allocate about 8.5% of their operating and maintenance (O&M) expenditure to environmental protection, waste collection and wastewater (sewerage and sanitation); waste and wastewater services account for more than 90% of this, as they are the responsibility of local governments. On the other hand, nature park authorities carry out most of the nature conservation and management expenditures. Water supply accounts for about 12% of total O&M expenditure of municipalities. This composition of expenditure remained virtually unchanged between 2007 and 2011.

4.2. Investing in environment- and climate-related infrastructure and services

South Africa needs to extend and upgrade its energy, transport and environment-related infrastructure to support economic growth and deliver better services to its population. In response to the 2008 global economic crisis, South Africa launched a fiscal stimulus package worth USD 7.5 billion for 2009-11. About 11% of this package, or nearly 0.3% of GDP, was allocated to environment-related investment. This compares with less than 0.1% and 5.2% of GDP allocated to environment-related investment in Mexico and China respectively. Investment in railways attracted most of the "green" stimulus spending (74%); energy-efficient buildings, and water and waste management accounted for 13% each (UNEP, 2009). The spending allocation reflects government priorities of building infrastructure, while creating employment in the sector. However, both public and private investments have slowed down since the 2008 recession and have not yet fully recovered. Public-sector investment stood at 7% of GDP in 2011 (National Treasury, 2013). Shortfalls have been particularly marked in the energy and water sectors (World Bank, 2011).

The government reiterated its commitment to invest in infrastructure – also with a view to greening the economy – in the 2010 New Growth Path (NGP), the 2011 Green Economy Accord and in the 2012 National Development Plan to 2030 (NDP). The NDP set the targets of 30% of GDP for gross fixed capital formation and 10% of GDP for public-sector investment by 2030. The NGP sees a potential 250 000 additional jobs per year through 2015 arising from public investment in infrastructure in energy, transport, water, communications and housing; it also envisions 300 000 jobs over the decade by establishing a green industrial base in South Africa.

In 2012, in line with these goals, South Africa launched a massive infrastructure programme to be funded through the national budget, state-owned enterprises such as Eskom, development financial institutions such as the Development Bank of Southern Africa (DBSA) and the private sector. National budget allocation for investment in infrastructure is nearly ZAR 830 billion in 2013-15. The value of ongoing major infrastructure projects to be completed by 2023 amounts to nearly ZAR 3.6 trillion; over half of the projects are in the electricity generation sector. Transport accounts for about 23% of total project value, while the water sector represents less than 4% (National Treasury, 2013). About 40% of these projects are relatively advanced. However, the infrastructure plan does not fully consider environmental and climate objectives, including the risk of carbon lock-in (Misuka, 2012).

Despite this massive infusion of funds, problems persist in project delivery. South African authorities acknowledge that weaknesses in planning, implementation and monitoring delay implementation and discourage private-sector investment (National Treasury, 2013). This is especially true for environment-related infrastructure, which is the responsibility of local governments. Often unable to spend the funds allocated for infrastructure development and maintenance, municipalities are forced to return a large share of funds to the National Treasury. Many factors contribute to this scenario, including weak administrative capacity and insufficient finance at the local level (Chapter 6).

The government launched a number of technical assistance and training programmes to improve local capacity to deliver infrastructure investment and provide services to the community (Chapter 6). These include the Municipal Infrastructure Support Agency, established in 2012, which has been helping water service providers plan and implement their investment in infrastructure and services. The Presidential Infrastructure Co-ordinating

Commission aims to ensure greater inter-institutional co-operation and consistency of spending with policy priorities.

Steps have also been taken to leverage private finance for infrastructure investment, as well as for developing industry sectors linked to the green economy. The South African Green Fund, managed by the DBSA, was established in 2012 to provide catalytic finance for high-impact green economy projects. With an initial budget of ZAR 800 million (USD 1.2 million) for 2012-15, the first call for proposals elicited over 500 applications, mainly from municipalities. A progressive shift from government grants to full reliance on private sources by 2025 is envisaged. The DBSA and the Industrial Development Corporation have allocated additional funds to be spent on renewables, energy efficiency, recycling projects and green manufacturing. Similar initiatives have also been launched at the provincial level. South African banks have been revising their lending and investment criteria to support green economy sectors, with an energy and infrastructure focus. In particular, more than ZAR 70 billion in debt and equity funding have been provided to fund the renewable energy independent power producer programme (see below). However, there is a need to scale-up private involvement in financing environment-related investment.

Water and waste

Large investment in water supply and wastewater infrastructure has extended access to water and sanitation throughout the country (Chapter 1), but gaps remain. Ageing water infrastructure requires maintenance and upgrades. In addition, extending infrastructure to provide water and sanitation service to remote communities would likely not be cost-effective. Consequently, alternatives need to be explored.

Expenditure for water services remains low, with many municipalities struggling to operate and maintain their water infrastructure at an adequate level. This is linked to limited administrative capacity, as well as to significant problems in cost recovery, especially in smaller municipalities (Box 3.4; Figure 3.4). Water losses, water theft and inaccurate and incomplete billing account for about 35% of South Africa's water abstraction (National Treasury, 2011, 2013). Underpricing of water for agriculture use is another major contributing factor (Section 3.2).

Access to waste services has also improved: in 2007, 65% of all households had access to some form of municipal waste service, although service levels varied widely across municipalities. In rural municipalities, many households do not have access to basic waste collection services, and dispose of their waste illegally.

Most municipalities provide waste collection services in-house. For instance, only three out of six metropolitan cities outsource waste collection service on a commercial basis. Both revenue and expenditure related to waste services have increased, although this may result from better reporting. Capital and operating expenditures are both lower than levels estimated to ensure high levels of access. Currently, waste is predominantly disposed of in landfills (Chapter 1). Only 18 recycling facilities have been licensed, and just a few municipalities have started to invest in waste-to-energy facilities. Additional investment will likely be needed to shift waste disposal from landfill to other treatment methods. This will require increasing the cost recovery rate (Box 3.4). In addition, municipalities could consider alternative revenue sources, such as landfill levies, hazardous-waste disposal fees and fines for littering and illegal dumping.

Box 3.4. **Pricing of water and waste services**

South Africa has put in place a sophisticated system of water pricing. There are charges at all stages of the water cycle: raw water tariff, bulk water tariff, retail water tariff, sanitation charge, bulk wastewater tariff and wastewater discharge. Bulk water tariffs are partially differentiated depending on availability of water resources, which is ultimately reflected in the retail tariffs. For urban water, users pay according to increasing block tariffs. The price structure rightly charges more for additional use at the margin, thereby providing an incentive to save water, while taking equity considerations into account. In addition, poor households benefit from free basic water and sanitation (Box 3.3). However, municipalities, which are self-regulating, lack guidance on setting prices that meet the efficiency, equity and transparency criteria established by the Water Services Act. As a result, there may be a case for creating an independent regulator to ensure better and more consistent regulation of retail water tariffs across the country.

Most waste user charges do not incorporate environmental considerations since they are fixed monthly and are based on the nature of the service, as well as the value or size of the household property. While fixed charges are easier to administer, they do not provide any incentive to generate less waste. Pretoria/Tshwane introduced a volumetric charge, although its effects on household behaviour have still to be assessed.

While the charging policy designed in legislation meets efficiency and transparency standards, practical implementation is lagging behind. The National Treasury (2011) notes there is still limited uptake of the increasing block tariff methods and municipalities tend to offer generous rebates, exemptions and discounts. Overall, widespread underpricing of services results in large losses of potential revenue for the local authorities, which then rely on transfers from the national and provincial budgets. Charges for waste collection, water supply and sanitation make up 15% of municipalities' income. However, as Table 3.4 shows, these charges are largely insufficient to cover operating and maintenance costs, let alone investment. Recovering at least O&M costs would require increasing the collection rate and user charges, as well as better targeting subsidies to low-income households (Box 3.3).

Table 3.4. **Cost recovery of waste and water services**

	2007	2008	2009	2010	2011
Waste collection	59%	53%	52%	54%	57%
Sewerage and sanitation	71%	69%	63%	65%	71%
Water supply	72%	61%	57%	60%	60%

Source: Statistics South Africa, Financial census of municipalities, 2008, 2009, 2010, 2011.

Renewable energy and energy efficiency

Investment in the energy sector accounts for the largest share of public infrastructure investment. Extension of the transmission and distribution networks has provided an increasing proportion of households with access to electricity (from less than 70% of households in 2001 to about 85% in 2011) (Chapter 1).

Eskom has been investing in extending electricity generation capacity on the basis of the 2011 Integrated Resource Plan (IRP). The IRP outlines a development path for electricity production by different sources to 2030 and, for the first time, caps annual CO_2 emissions from the electricity sector (275 Mt CO_2 eq from 2025). This implicitly imposes a carbon

price on the sector, due to the higher costs of electricity production incurred to meet the emission limit compared to the least cost option (i.e. more coal-fired power plants) (Rennkamp et al., 2012). Accordingly, the IRP envisages that 48% of new power generation capacity will come from renewables, followed by nuclear (23%), gas (15%) and coal (15%). This implies renewables would account for 14% of electricity generation by 2030 (from 5% in 2010), and that the share of coal would decline from more than 90% to 65%. As indicated in Section 3.1, this scenario requires progressive increases in electricity prices to cover the costs of the new investment. As suggested by OECD (2013a) and World Bank (2011), it will be important to regularly revise the IRP to take into account new information about technologies, costs and demand.

In March 2009, South Africa's energy regulator approved the first renewable energy feed-in tariff programme. However, the programme was largely unsuccessful, and it was changed into the renewable energy independent power producer (IPP) programme. This consists of a series of auctions, with separate allocations for different renewable sources. The bidding criteria include procurement of renewable energy equipment produced locally to encourage the development of manufacturing of renewable energy technologies. The Green Economy Accord specifies a 35% local procurement target by 2016. The first two bid windows auctioned some 2 500 MW of electricity capacity. Early evidence suggests this process tracks technology developments well: the price per kilowatt hour for solar photovoltaics (PV) in the second bid window was about 40% lower than in the first, just a year earlier. After delays in signing contracts with independent power producers, in 2012 South Africa attracted USD 5.5 billion of investment in renewables, mostly solar. It has become the fastest-growing market in the G-20 and the ninth-leading destination of clean energy investment behind Italy, the United Kingdom and India (PEW, 2013). Full implementation of the IPP programme will further extend the participation of private investors in the electricity generation sector. Reducing barriers to entry and unbundling the functions of the state-owned energy utility Eskom to increase competition in the electricity sector would facilitate this process (OECD, 2013a).

In 2008, the government launched a programme to install 1 million solar water heaters by 2014. Depending on the model, installation would be subsidised by around 40%. This initiative has several benefits: it allows reductions in CO_2 emissions (displacing more carbon-intense water heating systems) at the relatively low cost of USD 30 per tonne of CO_2; it contributes to reducing energy poverty; and solar water heaters constitute a plausible export industry, especially for export to other African countries (OECD, 2013a). However, the target appears likely to be missed, as fewer than 300 000 heaters had been installed by 2013. The government has also implemented a programme to replace inefficient light bulbs in the residential sector.

Eskom launched a demand-side management programme in 2003, which allowed electricity capacity of nearly 2.8 GW to be saved by 2010. By comparison, this represents nearly half of the new coal-fired power capacity to be installed by 2030 according to the IRP. The Eskom programme consists of a range of measures such as energy efficient lighting, heat pumps, solar water heating and energy efficiency measures for industrial customers. Costs of these measures are recovered through the electricity tariff. Eskom estimates that demand-side management could reduce the need for additional electricity generation capacity by 8-15% between 2003-20.

A number of incentive and funding mechanisms exist to support the business sector's investment in renewables and energy efficiency, as well as to improve resource efficiency and environmental performance more generally. These include tax allowances and deductions for such investments, soft loans and grants provided by the national and provincial governments and their subsidiaries (such as the Green Energy Efficiency Fund provided by the state-owned Industrial Development Corporation – IDC). However, the uptake of these funds and their effectiveness in reducing energy use remain unclear. There may also be less transparency and efficiency due to multiple funds at different government levels, which also increases transaction costs and co-ordination difficulties.

Increased electricity prices and the expected introduction of a carbon price should encourage future energy savings. However, it may still make sense to complement higher energy prices with well-targeted standards and financial assistance programmes to overcome barriers to energy efficiency investment, including limited awareness of energy costs, high up-front investment costs and difficult access to credit. Recently adopted energy efficiency standards for building and electrical appliances can help address these issues. In addition, the effectiveness of higher energy prices and subsidy programmes would benefit from more efforts to raise consumer awareness and involve the financial sector.

South Africa could do more to increase energy efficiency, which would also help achieve climate change goals more cost effectively. The industrial structure is highly energy-intensive and many residential buildings, especially the large stock of public housing,[8] are of poor quality and highly inefficient, indicating that large efficiency gains are available at relatively low costs. In addition, investment in energy efficiency (e.g. building retrofit) can generate significant employment opportunities in the construction sector; this can absorb some of South Africa's oversupply of low-skilled labour (World Bank, 2011; OECD, 2013b).

Transport

Shifting to a greener growth path will require South Africa to improve transport infrastructure and to better integrate transport and urban planning policies. Public investment in transport infrastructure has increased significantly, reaching some 7% of total consolidated public expenditure in 2010. Sustainable rail freight transport and urban public transport are among NDP priorities. Accordingly, budget allocations for integrated public transport networks in urban areas and for railways are planned to grow by 7% and 20.5% per year, respectively, between 2013 and 2015 (National Treasury, 2013).

The Bus Rapid Transit system began operating in Johannesburg and Cape Town in 2009 and 2010 respectively. Construction of similar systems is expected to begin in other major cities in 2013. The Gautrain light rail, completed in 2012, has already helped reduce traffic congestion in and around Johannesburg. Further expansion of public transport networks would help reduce the spatial inequality of the population inherited from the apartheid era, as well as congestion, air pollution and GHG emissions.

Massive investment has also been directed to road infrastructure such as the Gauteng Freeway Improvement Project. South Africa's road infrastructure is relatively well developed compared to most sub-Saharan African countries and even by international standards, particularly in urbanised areas. However, there is evidence the road network is poorly maintained. Many rural areas lack access to main roads, which undermines prospects for their economic and social development. Some 20% of national roads are

tolled to recover investment and operating costs. Tolls are based on distance driven (lengths of road stretches) and vehicle category (size, weight), but do not take any environmental parameter into account.

5. Promoting environmental technologies and eco-innovation

5.1. *General innovation capacity*

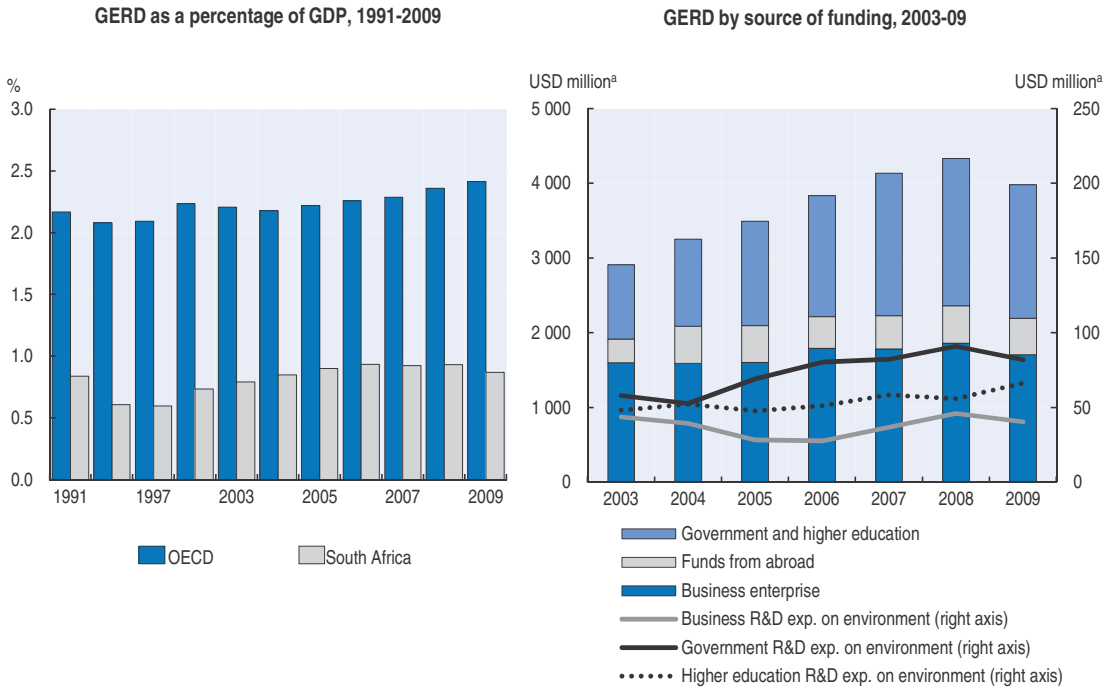
Since 1994, South Africa has made good progress in improving the governance of its national innovation system despite the extremely poor initial conditions for innovation (OECD, 2007). The organisational structure responsible for research and development (R&D) has been transformed by the creation of the Department of Science and Technology (DST). The new department has become well integrated across the government at the ministerial and senior civil servant levels. Creation of the Technology Innovation Agency in 2010 strengthened links between innovation policies and funding for R&D.

While a large share of resource-based sectors limit the level and leverage of business R&D investments, the science and technology base supports pockets of global excellence (OECD, 2012b). South Africa has developed a core of technologically strong, innovative business enterprises. This base appears to be broadening. Important segments of the services sector, which has recently been the main engine of growth, have recorded success in innovation, especially in areas of information technology applications. Some enterprises are emerging as particularly strong R&D performers, such as in the area of biotechnology. Another valuable national asset is a good, though still narrow, collection of established universities and a research institute (science council) system with core areas of considerable strength and experience.

The reform of the innovation system accelerated after the adoption of the White Paper on Science & Technology in 1996 and the National R&D Strategy in 2002. These actions increased gross domestic expenditure on R&D (GERD) from 0.6% of GDP in 1997 to 0.93% in 2008 (OECD, 2012b). Although GERD increased at a strong annual compound rate of 8% in real terms, its share as a percentage of GDP is less than half of the OECD average (Figure 3.7). In 2008, business expenditure on R&D was 0.54% of GDP, but 59% of GERD. Companies spend about 1.8% of their sales revenue on innovation activities, moderate by OECD standards but still significant, especially given the importance of resource-based industry in South Africa's economy. Nevertheless, business funding of R&D increased only slightly between 2003 and 2008, while government funding doubled. Public funding is expected to keep increasing due to the government's competitiveness and growth packages. South Africa attracts R&D funding from multinational companies and through its active participation in global R&D initiatives (EU Framework Programmes), as well as through joint R&D programmes with multinationals. International collaboration plays a role in 46% of scientific articles and 14% of patents (OECD, 2012b).

A major bottleneck for South Africa's innovation is the lack of a broad skills foundation. Only 4% of the adult population has tertiary level education and South Africa has only 1.5 researchers per thousand employed compared to the OECD average of 7.5; science and engineering graduates make up only 16% of all new degrees. In 2008, the country had a relatively low 110 scientific articles per million people; at the same time, scientific publications have grown by an average annual 4.5% since 1998, placing South Africa among the 20 fastest-growing countries in this respect. The country had less than one triadic patent per million people, well below average; its share in triadic patent

Figure 3.7. **Gross domestic expenditure on R&D**



a) At 2005 prices and purchasing power parities.
Source: OECD (2013), *OECD Science, Technology and R&D Statistics Database.*

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families in 2007 was also small. Lack of design, engineering, entrepreneurial and management capacity is also a major constraint (OECD, 2010b).

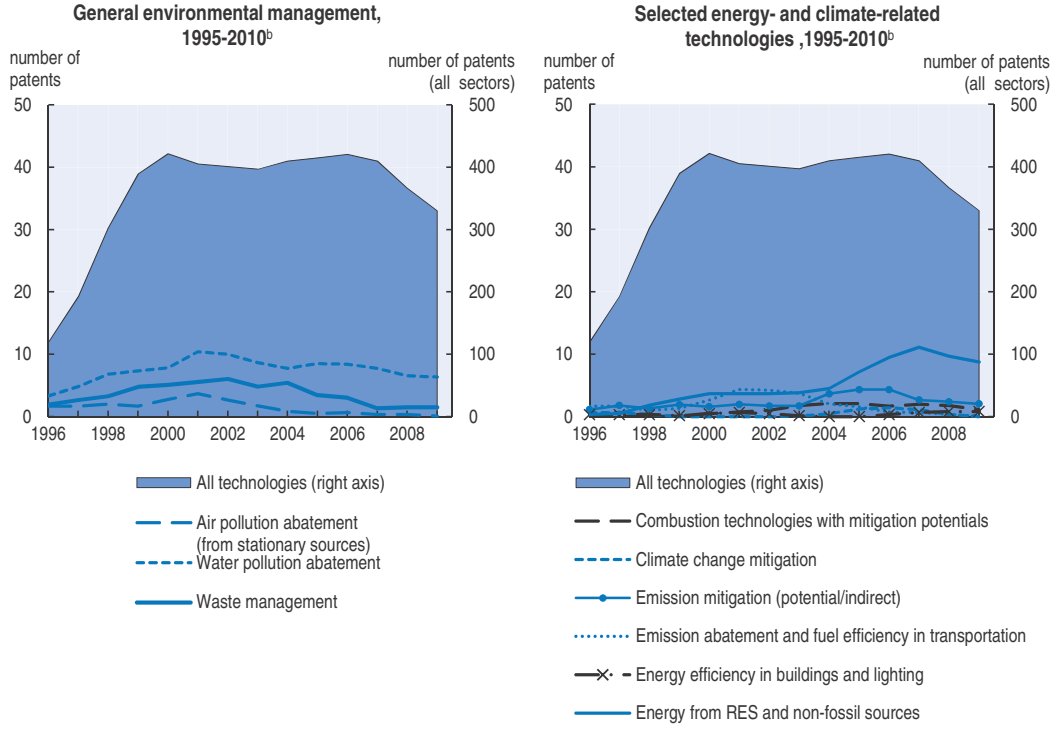
Capacity to generate innovation in the production of goods and services is still very limited across large areas of the economy, not only in small and micro-enterprises but also in many medium-sized and larger ones. This is the case in both private- and public-sector services, where innovation capacity has actually fallen in many areas (OECD, 2012b). This lack of capacity is partly due to human resource constraints, as well as other deficiencies in the innovation system.

5.2. *Building eco-innovation capacity*

A number of strategic policy documents adopted after 1994 contained a concept of environment- related innovation and entrepreneurship under different terms, such as environmentally sound/green/cleaner technologies, or environmentally friendly products and services. Demand-side instruments (e.g. standards and economic instruments for cleaner products and processes) have played an increasing role in promoting technological and non-technological changes with a favourable impact on the environment. A number of research institutions and the private sector, particularly large companies in mining and energy sectors, have developed eco-innovation programmes and projects. Most focused on energy efficiency, renewable energy, water and waste management. A number of donor programmes and projects supported environmental research and eco-innovation; this percentage has steadily grown over the years as 11% of South Africa's R&D is now financed from abroad.

However, due to the lack of longer-term vision for eco-innovation, human, institutional and infrastructural capacity building has been ad hoc with no effective mechanism to scale-up activities and exploit possible synergies. None of the established centres of excellence identified in the National R&D Strategy cover the area of environmental pollution prevention and control. Government funding for environment-related R&D increased by 40% between 2003 and 2009 (Figure 3.7); however, eco-innovation output indicators weakened throughout the 2000s. For example, South Africa's Revealed Technological Advantage[9] index in environmental technologies fell from 1.1 in 1997-99 to 0.9 in 2007-09; except for renewable energy, the number of patents in environment and climate-change technologies also fell (Figure 3.8). One reason for the decline is the reliance of R&D on freely funded government support (supply driven) rather than the targeted support (demand driven) that industry needs for innovation.

Figure 3.8. **Patents in environment and climate-related technologies[a]**



a) Patent applications are based on the priority date and the inventor's country of residence, and use fractional counts on filings under the Patent Co-operation Treaty at international phase (European Patent Office designations).
b) Three-year moving average data.
Source: OECD (2013), *OECD Patent Statistics Database.*

StatLink http://dx.doi.org/10.1787/888932879028

Rising material and energy prices, growing public awareness and the introduction of more stringent environmental standards have led to increased global demand for environmental technologies and services. Consequently, government and industry leaders started to consider the "green tech" sector to be an important growth engine. The Ten-Year Innovation Plan (2008-18) identified climate change as one of the five "grand challenges"; the 2009 National Growth Path and the 2011 Green Economy Accord reinforced the emphasis on green technologies to address unemployment and pressures on natural resources. Various governmental departments are beginning to articulate their explicit

commitment to eco-innovation, including the Department of Science and Technology (DST), which is establishing an eco-innovation directorate.

Development of the renewables market is seen as key to energy sufficiency and the transition to a green economy. As part of the South African Renewables Initiative, which foresees an ambitious 25% reduction in CO_2 emissions, the Renewable Energy Finance and Subsidy Office was set up to manage renewable energy subsidies and advise developers. In addition, the Green Efficiency Fund, administered by the IDC and the Green Fund (which supports the implementation of the Green Economy Accord), help South African companies invest in energy efficiency and renewable energy projects. The DST is currently developing a Waste Innovation Plan to address the increasing waste problem in South Africa, and a 10-year roadmap for innovative technologies to improve water security.

South Africa is streamlining its approach to eco-innovation, integrating it into the activities of some government departments and the research community. However, closer interaction between public and private partners at every stage – from invention to diffusion – is needed. A clear environmental regulatory framework (increasingly based on adequate price signals) and strengthened implementation of environmental policies would help increase demand for environmental technologies, goods and services and related market opportunities. Green procurement, still in its infancy in South Africa, can also help build demand for green goods and services. Further efforts to stimulate dialogue and co-operation among the main players in the innovation system, including the financial sector and international partners, should be encouraged. The recent OECD report *Fostering Innovation for Green Growth* discussed some of the best practices and challenges in this regard.

6. Environmental policy and employment

South Africa is facing a significant challenge to reduce an excessively high rate of unemployment of 25% (or 4.4 million people without work). Unemployment is extremely high among youth (51% in the fourth quarter of 2012), compared to 22% for prime-age adults (aged 25-54) and less than 8% for senior workers (55-64). Raising employment rates is central to both the New Growth Path (NGP) and the National Development Plan (NDP). Indeed, the NGP classifies the green economy as one of the 10 "jobs drivers"; it targets creating 5 million jobs by 2020, 300 000 of them "green". The Industrial Policy Action Plan (IPAP) also identifies the green economy as one of three priority areas for scaling up.

South Africa's environmental sector has already been at the forefront of creating green jobs. The DEA's "Working for…" series, part of the Expanded Public Works Programme (EPWP) launched in 2004 to promote economic growth (Box 6.5), has met a wide range of environmental rehabilitation needs through labour-intensive methods. It began with the success of Working for Water (WfW) (Box 3.5), much copied in other developing countries, and expanded into other environment-related areas. WfW has created the equivalent of 14 000 full-time jobs and aims to create another 10 000 by 2017, directly benefiting as many as 30 000 people. "Working on Fire", which helps to mitigate the consequences of wild fires, provided an additional 5 500 jobs and hopes to reach 7 000 by 2017. The "Working for…" programmes enabled authorities to promote environmental management on the basis of its contribution to job creation, a politically attractive objective. Initially, the programmes were criticised as inefficient because they tended to favour the better connected rather than the poorest. In addition, they created mostly shorter-term "work opportunities" (often of a few weeks only) rather than permanent jobs. The programme has recently addressed some of these criticisms and is now seen as broadly successful.

Box 3.5. **Working for Water programme**

This public programme, founded in 1995, has the dual function of removing invasive vegetation and providing employment and training opportunities to members of marginal communities. The invasive species are usually high water-consumers. Their removal frees water resources for both human needs and the environment. Training for workers includes not only technical skills such as herbicide application, but also small business development and health education.

WfW is administered by the Department of Water Affairs, which works in partnership with local communities; federal departments, including Environmental Affairs, Agriculture and Forestry, and Trade and Industry; provincial departments related to agriculture, conservation and environment; research foundations; and private companies.

Since its inception in 1995, the programme has cleared more than 1 million ha of invasive alien plants. It has provided jobs and training to approximately 20 000 people per year from among the most marginalised sectors of society. Of these, 52% are women. WfW currently runs over 300 projects in all nine of South Africa's provinces. Scientists and field workers use a range of methods to control invasive alien plants, including applying herbicides, as well as felling, removing or burning invading alien plants. WfW is a pioneer in biological control (bio-control) of invasive species, which involves identifying natural enemies of alien invasive plants, careful testing and controlled release. Compared to physical and chemical control, effective bio-control is less costly in the long term.

While the high biomass of invasive species is an ecological problem, the wood removed has value as raw material. The total available biomass of invasive plants has been estimated to equal the annual requirements for all of South Africa's pulp, paper and board mills. WfW's Value-Added Industries Programme makes this wood available to firms for processing, which creates jobs in rural areas; the programme was first introduced in 1998, and then expanded substantially in 2002.

Under the umbrella of a poverty reduction programme, WfW helped address the urgent need to reduce poverty and unemployment, and to transform South Africa. WfW took several steps to promote economic empowerment and social equity, including developing entrepreneurial skills, training, addressing gender imbalances and re-integrating ex-offenders. The focus on entrepreneurial skills includes the contractor scheme, which enables people living within an area identified for clearance of invasive alien plants to apply for contract work and develop business skills. It targeted three main areas: training in work-related activities (the development of skills in machine and herbicide use, and worker safety issues), training in health (with a focus on HIV/AIDS) and contractor development. The programme ensured that women would earn at least 60% of wages.

A number of analyses have estimated the potential of net direct job creation from greening the economy. For example, a recent report shows the formal economy could create about 98 000 new jobs in the short term (2011/12), 255 000 in the medium term (2013-17) and 462 000 in the long term (2018-25) (Maia et al., 2011). Due to the rich endowment of natural capital in South Africa and the need for strong intervention to restore and/or safeguard ecosystems, natural resource management is pegged as the largest potential contributor to job creation. Other sectors include energy generation; energy and resource efficiency; and emissions and pollution mitigation. An early example is the 1 Million Solar Water Heaters campaign. Between its inception in July 2010 and May 2012, the campaign rolled-out over 80 000 units (on average close to 4 000 per month) and created employment opportunities for approximately 800 people (Misuka, 2012).

A successful transition towards a greener economy will create new opportunities for workers, but also the loss of jobs in some sectors. The net effect could be positive or negative, but is unlikely to be large. Labour market and skill policies should play an active role in helping workers and employers to make the transition to green growth. To that end, they should support a smooth reallocation of workers from declining to growing firms. At the same time, they must reduce adjustment costs borne by displaced workers, as well as reform tax and benefit systems. In this way, cost pressures generated by environmental policies would not become a barrier to employment. The government will also need to strengthen initial education and vocational training, as well as work with industry and trade unions to create dedicated green education and training programmes. These efforts would help workers participate fully in the emerging green economy. Through partnerships with local stakeholders, the government should also design programmes for sectoral adjustments, as well as local development strategies (OECD, 2012c).

Notes

1. The report identified four scenarios: Business-as-Usual (BAU) 2%, representing a 2% investment of gross domestic product in the BAU activities; Green Economy (GE) 2%, representing an allocation of 2% of gross domestic product in green economy sectors (natural resources management, agriculture, transport and energy); and the Green Economy Target Specific (GETS) scenario, which aims to identify whether policy makers can achieve the medium to long-term targets following green economy interventions in the prioritised sectors.
2. According to the *2013 OECD Economic Survey of South Africa*, fiscal sustainability is not under immediate threat. However, given the fragility of growth, consolidation of the cyclically adjusted deficit should be speeded up.
3. Prices are determined on a monthly basis (the first Wednesday of each month) and include margins, taxes and levies.
4. According to the income and expenditure survey 2010/11, transport fuels account for 2% of expenditures of the poorest 10% of the South African population, and for 5% of the richest 10% of the population.
5. The tariff was initially structured in four blocks. The number of blocks was reduced to two in 2013. The first block, which pays the lower tariff, was widened with a view to compensating for the impact of higher average electricity prices.
6. The PSE percentage expresses the monetary value of public transfers to producers as a percentage of gross farm receipts.
7. National Treasury estimates for consolidated government expenditures include current and capital expenditure by national and provincial governments, social security funds and public entities, excluding expenditure financed by municipalities. They exclude state-owned enterprises such as Eskom and local authority entities that provide goods and services against payment of a price. Expenditure is consolidated to eliminate transactions between these levels of the general government. Environmental protection relates to the conservation of biodiversity and landscape, including the management of natural parks and reserves, waste management, wastewater management, pollution abatement and related R&D. Estimates for different years are not strictly comparable.
8. Since 1994, the government has subsidised construction of nearly 3 million houses for low-income households, contributing to an estimated 40% of registered housing units. However, the building specifications remain very basic, including in terms of energy efficiency. Most houses are located on peripheral urban land, which exacerbates social inequalities, economic inefficiencies and environmental problems (Misuka, 2012).
9. The index of revealed technological advantage is based on patent applications filed under the Patent Co-operation Treaty. It is defined as a country's share of patents in a particular technology field divided by the country's share in all patent fields. The index is equal to zero when the country holds no patents in a given sector; is equal to one when the country's share in the sector equals its share in all fields (no specialisation); and above one when a positive specialisation is observed.

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PART I

Chapter 4

International co-operation

This chapter reviews South Africa's environmental engagement with the rest of Africa and like-minded countries of the South. It also reviews the country's participation in international forums, notably on climate change and sustainable development, as well as on chemical, biodiversity and marine issues. This chapter also addresses South Africa's performance in implementing trade and environment-related agreements, as well as its position as both a recipient and donor of official development assistance.

Assessment and recommendations

Since 1994, after years of isolation under apartheid, South Africa has shown its resolve to be a "responsible global citizen". In environmental matters, this determination has been demonstrated by its hosting of the Rio+10 Conference in 2002, the International Union for Conservation of Nature (IUCN) World Parks Congress in 2003 and the UN Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP) 17 in 2011. Fostering sustainable development at home and abroad is a cornerstone of South Africa's environmental diplomacy, and an integral part of the country's wider foreign policy objective of promoting better alignment between the development agenda of Africa and the South and that of global organisations.

Africa is a primary focus of South Africa's international environmental activities. It works with the African Union (AU) and the Southern African Development Community (SADC) to articulate common African positions in global negotiations concerning, for example, climate change and biodiversity. The AU and SADC are also platforms for South Africa to share its experience as a large country that is already implementing progressive environmental policies. South Africa has signed up to most pan-African environmental agreements dealing with regional problems. However, in areas such as those involving its large industrial and mining sectors, it does not have the same interests as other African countries.

South Africa has recognised the global "duty of care" in hosting the third-highest biodiversity in the world. Although it is faced with pressing problems of poverty, unemployment and poor education, South Africa has assigned a high priority to the protection and sustainable use of the biodiversity within its borders and beyond. South Africa's six Transfrontier Conservation Areas (TFCAs) are examples of bilateral, and sometimes trilateral, co-operation based on the notion that nature knows no boundaries. Since most of South Africa's territory is taken up by international river basins, it has a long history of co-operation with its neighbours on the shared use of water resources. International water commissions or technical committees – set up under the aegis of 2000 SADC Revised Protocol on Shared Watercourse Systems – now exist for the four international basins.

As both an importer and exporter of living genetically modified organisms (GMOs), such as grains, South Africa enacted legislation ahead of the Cartagena Protocol on biosafety under the Convention on Biological Diversity (CBD). It contributes to training and development activities with other African countries to help them build their institutional capabilities, in the absence of which South Africa cannot fulfil its own obligations under the Protocol. In 2013, South Africa ratified the CBD Nagoya Protocol, which provides the global context for its already established domestic access and benefit-sharing (ABS) management regime. The Biodiversity Act and the 2008 Bioprospecting, Access and Benefit-Sharing Regulations are but two of several laws dealing with aspects such as intellectual property rights, patents, plant breeding and customs.

South Africa has many single-issue laws relating to maritime activities or the protection of the marine environment, but legislation from the perspective of the sustainable use and protection of the ocean is still lacking. The recent release of a Green Paper on this topic affords the opportunity for a debate about the need for an overarching Oceans Act. South Africa's effort to establish a sustainable ecosystem approach to fisheries management is seriously undermined by the scourge of large and small-scale illegal, unregulated and unreported (IUU) fishing. IUU fishing not only plunders target fish stocks, it also compromises other species and their habitats and affects the livelihoods of legal fishers and their communities through loss of income and food insecurity. As IUU fishing often is an international enterprise, South Africa collaborates with SADC and AU countries on strengthening Port State Control measures and joint surveillance patrols at sea.

Although South Africa is a major emitter of greenhouse gases, it is committed to the global effort to mitigate climate change. In 2009, in line with its obligations under the UNFCCC, South Africa made a GHG emissions mitigation commitment to substantially reduce emissions by 2020-25 compared to a business-as-usual scenario. Achieving this commitment would imply that emissions level off and be thereafter reduced by 2050. It also adopted a comprehensive and detailed climate change response policy in 2011. A variety of other policies also relate to climate change, requiring good co-ordination to ensure consistency. Progress in implementing some measures and achieving targets is slow, despite reduced energy demand following the 2008 economic slump. South Africa has not participated much in the Clean Development Mechanism as it considers the low price of carbon involved does not provide sufficient finance for its climate mitigation projects. In view of its high vulnerability to the effects of climate change, South Africa has begun working on a comprehensive set of adaptation measures across a range of sectors (e.g. land use, water resources, human health).

If South Africa can be considered a leader on several multilateral environmental agreements (MEAs), it is more of a slow follower with regard to the cluster of "chemical" MEAs (i.e. Basel, Stockholm, Rotterdam, Montreal). While there are some bright spots, the overall picture is one of national implementation plans lingering in the drafting stages, of incomplete regulatory frameworks and of lack of monitoring and enforcement. Acting to implement the provisions of the Minamata Convention, even in advance of its entry into force, could help address the serious health and environmental issues associated with releases of mercury to the environment, particularly from mining and energy production operations.

Although South Africa unquestionably has the world's most successful conservation record for the rhinoceros, wildlife poaching is an increasingly serious problem. Species of key concern are abalone, rhino (horn), elephant (tusks) and plant species such as rare succulents and cycads. In addition to strengthened national efforts, South Africa takes part in Interpol actions. Moreover, it concluded a Memorandum of Understanding with Vietnam (probably the world's largest destination and consumer of rhino horn) in 2012, and with China in 2013, to help tackle the problem at the other end of the supply chain.

South Africa has been a recipient of Official Development Assistance (ODA) since 1995. Total ODA was about USD 20 per capita in recent years, of which the environmental component accounts for around 10%. A large proportion of donor ODA to South Africa takes the form of technical co-operation. Many projects focus on climate change, which has resulted in difficulties in matching supply and demand for development assistance.

Some donors have re-programmed their aid for this reason, but also because of absorption capacity limitations, particularly at the local level. South Africa also is a donor country of ODA. Since the end of apartheid, it has furnished emergency aid, training and technical assistance to other African countries. The 2000 African Renaissance and International Co-operation Fund Act gave the country a funding vehicle for channelling aid and assistance to the region. Although the Fund to date has not financed environmental projects, South Africa is one of 39 countries contributing finance to the Global Environment Facility (GEF) Trust Fund and also is a donor to the Quick Start Programme under the Strategic Approach to International Chemicals Management (SAICM). It also contributes environmental technical assistance to other African countries in various contexts. Given the country's strength in this regard, as well as its own experience as a developing nation and its local knowledge of Africa, South Africa is well placed to further boost its role as a transmitter and translator of environmental know-how, particularly in Africa.

Recommendations

- Continue to play a leading role in international environmental forums and to promote common environmental policy positions among like-minded, mega-biodiverse countries, the African Union, the Southern African Development Community and, where appropriate, the BRICS.
- Rectify shortfalls in the implementation of MEAs by *i)* enacting and enforcing requirements (e.g. Stockholm, Rotterdam, Basel); *ii)* developing required national implementation plans where they are lacking (e.g. Ramsar, Stockholm, Rotterdam, hydrochlorofluorocarbon [HCFC)] phase-out, ballast water); *iii)* completing outstanding reviews of such plans (e.g. combating desertification, oil pollution contingency plan); and *iv)* in all cases, use MEA national reporting systems to assess progress domestically and adjust implementation plans or policies where needed.
- Strongly pursue actions to reduce IUU fishing and poaching, particularly of rhino horn and ivory, at all points of the supply chain (i.e. poaching, transit and end-use market) in co-operation with international organisations, governments, private game parks and NGOs.
- Implement the National Climate Change Response Policy; in line with international best practice and national circumstances, consider mandating an independent body to regularly prepare progress reports for parliament that propose policy adjustments to achieve targets; and adopt a dedicated climate change law to stimulate the transition to a low-carbon economy and a climate change-resilient society.
- Finalise the proposed Policy on the National Environmental Management of the Ocean; consider enacting specific legislation to promote the sustainable development of the ocean, ensuring that commitments under marine MEAs (e.g. Abidjan, Nairobi, Conservation of Antarctic Marine Living Resources, International Maritime Organization) are fully taken into account.
- Integrate environmental priorities into the aid programme; further build on South Africa's strong position in science, research and policy formulation to support AU and SADC countries on environmental matters; gradually include environmental projects in the funding portfolio; ensure that aid projects are subject to appropriate environmental assessment; and provide environmental training to staff working in aid programmes and projects.

1. Foreign policy and environmental diplomacy

The 2011 Government White Paper on Foreign Policy singles out climate change, desertification, green technology and green jobs, as well as the heightened demand for scarce natural resources, particularly energy and water, as important elements. The White Paper also states that the power of its example is South Africa's greatest asset, saying that "in a world characterised by a competition of values, the diplomacy of Ubuntu[1] focusing on our common humanity offers an inclusive and constructive worldview to shape the evolving global order." (GoSA, 2011a).

Fostering sustainable development at home and abroad is one of the main goals of South Africa's environmental diplomacy. It is also an integral part of the country's wider foreign policy objective of promoting a better alignment between the development agendas of Africa, developing countries (the South) and global organisations. This determination is demonstrated by its hosting of the World Summit on Sustainable Development in Johannesburg in 2002, the International Union for Conservation of Nature (IUCN) World Parks Congress in Durban in 2003 and the United Nations Framework Convention on Climate Change (UNFCCC) COP-17 in 2011, also in Durban.

To make its voice heard more clearly in global decision- and policy-making processes, South Africa has formed alliances with like-minded countries in different configurations depending on the issue at hand. Formations of the South, such as the African Union (AU), the India-Brazil-South Africa Dialogue Forum (IBSA) and the BRICS (Brazil, Russia, India, China and South Africa) have become strategic relationships in terms of working with countries of the North to establish an equitable political and economic global system. Other formations are more narrowly focused on specific environmental issues. For example, in the BASIC (Brazil, South Africa, India and China)[2] group, South Africa co-operates with its peers on climate change issues; in the Group of Like-Minded Megadiverse Countries (LMMC), it co-operates with 16 other countries on biodiversity issues in the context of the Convention on Biological Diversity (CBD).[3]

South Africa also actively participates in global efforts to build a rules-based system governed by international law that is more responsive to the needs of the developing world. The country's record of participation in multilateral environmental agreements (MEAs) testifies to its commitment to such approaches. This includes areas such as biodiversity, desertification, climate change and pollution, marine and maritime protection, and deep seabed exploration.

2. Regional and bilateral co-operation

2.1. Regional co-operation in Africa

Since its creation in 1985, the African Ministerial Conference on the Environment[4] (AMCEN) has been important to South Africa and other African countries to frame[5] common African positions in wider international forums, such as at recent UNFCCC negotiations (COPs 15 to 17), and on access and benefit-sharing under the CBD.[6] Africa was the only region with such a common position at the Rio+20 meeting in 2012. In recent years, AMCEN positions have been instrumental in shaping the Environmental Action Plan of the African Union under the New Partnership for Africa's Development (NEPAD).[7]

More generally, AMCEN countries are interested in learning from South Africa's experience in areas like the CBD Cartagena and Nagoya protocols; South Africa's legislation (e.g. GMO Act, Regulations on Bioprospecting, Access and Benefit-Sharing) is ahead of that

of many other African countries. South Africa does respond to such requests where it can, such as the support given by Statistics South Africa to help other countries report on progress in achieving the Millennium Development Goals (MDGs).

South Africa, through its Department of Water Affairs, views the African Ministers' Council on Water[8] (AMCOW) as a forum for, among other things, promoting joint management of watercourses, notably those shared with its six neighbours. One avenue for influencing AMCOW positions is to agree first among the smaller group of countries belonging to the Southern African Development Community[9] (SADC), which brings together 15 countries with a population of more than 250 million inhabitants and a gross domestic product (GDP) of almost USD 500 billion. South Africa hosted AMCOW's Second African Water Week in Johannesburg in 2009, while its Minister for Water Affairs held the post of AMCOW President in 2010-12.

The SADC region suffers from high levels of environmental degradation through deforestation, loss of biodiversity, soil erosion, decreasing quality and quantity of water, poor sanitation services and poor urban conditions. Consequently, the SADC Treaty designates natural resources and environment as an area of co-operation for member states. Also, the SADC Regional Indicative Strategic Development Plan (RISDP) identifies environment and sustainable development as a key intervention area in alleviating and eradicating poverty and food insecurity. South Africa is a signatory to the two SADC protocols with direct environmental relevance, as well as to the Statement of Commitment to combat illegal, unreported and unregulated (IUU) fishing.

2.2. African multilateral environmental agreements

South Africa has joined two regional multilateral environmental agreements (MEAs) administered by the UN Environment Programme (UNEP) and two MEAs of the SADC. However, it has not signed the two MEAs administered by the AU (Table 4.1).

Table 4.1. **African multilateral environmental agreements**

Title	Date	SA joined in:	In force since:
Abidjan: Convention for Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region	1981	2002	1984
Protocol concerning co-operation in combating pollution in cases of emergency		2002	1984
Nairobi: Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region	1985	2003	1996
Text as amended in 2010		Not yet	
Protocol for the Protection of the Marine and Coastal Environment of the Western Indian Ocean from Land-Based Sources and Activities, 2010		Not yet	Not yet in force
Protocol Concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region, 1985		2003	1996 1996
Protocol Concerning Co-operation in Combating Marine Pollution in Cases of Emergency in the Eastern African Region, 1985		2003	
Bamako: AU Convention on the Ban on the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Waste within Africa	1991	Not signed	1998
Southern African Development Community	1999	2003	
Protocol on Wildlife Conservation and Law Enforcement	2000	2002	
Revised Protocol on Shared Watercourses			
Maputo: AU Convention on the Conservation of Nature and Natural Resources	2003	Not signed	Not yet in force
Benguela Current Convention	2013 (expected)	2013 (expected)	

Due to its location at the junction of two oceans, South Africa takes part in 2 of 17 regional seas programmes of UNEP. In 2002, it acceded to the 1981 Abidjan Convention for Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region.[10] The ambit of the Convention includes, but is not limited to, topics also covered by global MEAs such as the various conventions of the International Maritime Organization (IMO) about pollution from ships, dumping and land-based sources of pollution.

The Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region covers much of the same ground as the Abidjan Convention, but has, next to a protocol on oil spill emergencies, two additional protocols (Table 4.1). The Nairobi, like the Abidjan Convention, also covers the establishment of Specially Protected Areas, environmental impact assessments, environmental damage from engineering activities, scientific and technical co-operation, liability and compensation. At home, South Africa has given effect to several obligations contained in both the Abidjan and Nairobi Conventions and their protocols. This includes adopting legislation (e.g. the 2008 Integrated Coastal Management Act) or putting in place a specific capability (e.g. an oil spill emergency-response regime of equipment, personnel and training). It can use this experience to help other Parties to the conventions implement their part.

The 2000 SADC Revised Protocol on Shared Watercourse Systems[11] lays down principles with respect to the sharing of water resources, a whole-catchment approach and the establishment of river basin management institutions. The Protocol is directly relevant to South Africa since most of its territory is taken up by international river basins.[12] In fact, South Africa's engagement with its neighbours on international rivers pre-dates the Protocol by a long time and continued even during political tensions and conflict. The country has concluded about 60 water-sharing agreements over the past 60 years.[13] Many of these have remained "paper agreements", mostly due to resource constraints (Bernauer, 2002). Nevertheless, international water commissions or technical committees, called for in the Protocol, now exist for the four international basins (Limpopo Watercourse Commission, Orange-Senqu River Commission and the Inco-Maputo Tripartite Permanent Technical Committee).

South Africa has also signed up to the 1999 SADC Protocol on Wildlife Conservation and Law Enforcement. This Protocol aims to establish common approaches to the conservation and sustainable use of wildlife resources and to assist with the effective enforcement of associated laws. One specific objective of the Protocol is to establish transfrontier conservation areas (TFCAs) to promote the conservation of shared wildlife resources. South Africa, in co-operation with its neighbours, has created six transfrontier conservation parks and areas (Table 4.2). Based on the notion that nature knows no boundaries, TFCAs are managed as one integrated unit; a streamlined management plan undertakes to remove all human barriers within the transfrontier park so that animals can roam freely. Apart from promoting conservation and sustainable use of biological and cultural resources, TFCAs aim to foster regional peace, co-operation and socio-economic development.

South Africa is not a Party to the 2003 AU Maputo Convention (Revised African Convention on the Conservation of Nature and Natural Resources),[14] which addresses a spectrum of issues such as sustainable management of land and soil, water, air and

Table 4.2. **Transfrontier conservation parks and areas**

Name	Created in	Total area km^2	Share of area in SA %	Share of area in neighbouring country %	Memorandum of Understanding signed
!Ai-!Ais/Richtersveld TCP[a]	2003	6 222	31	Namibia 69	Yes
Kgalagadi Transfrontier Park	1948	37 991	27	Botswana 73	Yes
Limpopo-Shashe TCA[b]		4 872	53	Botswana 28 Zimbabwe 19	In preparation
Great Limpopo Transfrontier Park	2002	35 000	57	Mozambique 29 Zimbabwe 14	Yes
Lubombo TCA	2000	4 195	26	Mozambique 66 Swaziland 8	Yes
Maloti-Drakensberg TCA	2002	8 113	36	Lesotho 64	Yes

a) Transfrontier Conservation Park.
b) Transfrontier Conservation Area.
Source: www.environment.gov.za/?q=content/projects-programmes/transfrontier-conservation-areas.

biological resources. In spite of the encouragement of bodies such as the AU, UNEP and the IUCN, the Convention has yet to enter into force (only 8 of the required 15 countries had ratified the Convention as of 2012). Part of the reason for the slow progress is that the Maputo Convention covers similar ground as several well-established global conventions in the natural resource/sustainable development/nature field (Anywar, 2011). For South Africa, the added value of Maputo is not obvious since it is already deeply engaged in implementing a host of international and sub-regional processes. These include the CBD, UNCCD, the Commission on Sustainable Development (CSD), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Convention on the Conservation of Migratory Species of Wild Animals (CMS), Ramsar, Abidjan, Nairobi and Benguela.

Neither is South Africa a party to the 1991 Bamako Convention on the Ban on the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa. Inspired by the wish to halt the much publicised importation of toxic waste into Africa from Europe in the late 1980s, the Bamako Convention is more stringent than the Basel Convention: not only does it include the so-called Basel Ban, it does not make exceptions for certain hazardous wastes (e.g. radioactive materials). However, the Convention is not yet in force and South Africa, finding it too strict, does not wish to sign it. The country still has to set up a comprehensive waste management regime; it should address hazardous waste issues, including reported illegal transport across its borders, as part of the planned arrangements.

2.3. South-South co-operation

South Africa actively pursues South-South co-operation to address the challenges of underdevelopment and give a greater voice to the developing world, particularly Africa, in international affairs. Hence, South Africa actively co-operates with like-minded countries in regional and sub-regional groups, such as the Non-Aligned Movement (NAM), G77+China, BASIC, IBSA and, more recently, the BRICS. An example of South-South co-operation in the environmental domain is South Africa's participation in the work of the Steering Committee for South-South Co-operation on Biodiversity under the aegis of UNEP and the CBD Secretariat. There have been two Expert Meetings on South-South Co-operation on Biodiversity for Development. These have led the Group of 77+China to adopt the

Multi-Year Plan of Action for South-South Co-operation on Biodiversity for Development at the South-South Co-operation Forum in 2010. The Plan is a contribution to the implementation of the CBD's 2011-20 Strategic Plan.

2.4. Bilateral and trilateral co-operation

South Africa has established environmental co-operation programmes with selected countries. In 2010, for example, China and South Africa signed an Environmental Memorandum of Understanding (MoU) that covered issues of mutual importance, including climate change, cleaner technology, water resource conservation, the green economy and sustainable development. As of 2012, talks were underway to draft an implementation plan for the MoU. Another example is the South African pavilion – under the theme of environment and climate change – at the 2010 "Better City, Better Life" Expo in Shanghai.

South Africa also has bilateral co-operation arrangements on biosafety. In 2008-10, South Africa and Norway jointly ran the Environmental Biosafety Co-operation Project to develop a framework for environmental monitoring of insect-resistant maize (MON810). This project included a regional workshop on sharing experiences in risk assessment and risk management. The project was part of the wider Environmental Programme Norway-South Africa (2005-10). In 2005, South Africa and Argentina set up a bilateral commission and agreed to collaborate on a wide range of topics, including agriculture. As part of the latter work, a workshop on the biosafety of genetically modified (GM) crops was held in Pretoria in 2011 in collaboration with the International Centre for Genetic Engineering and Biotechnology (ICGEB).

The Benguela Current Commission (BCC), created in 2007, is a joint South Africa–Angola–Namibia initiative to sustainably manage and protect the Benguela Current Large Marine Ecosystem (BCLME). The BCLME is one of the richest marine ecosystems in the world that spans some 30 degrees of latitude, extending from Angola's Cabinda province in the north to just east of Port Elizabeth in South Africa. The three countries work together on ecosystem-wide issues such as shared fish stocks, environmental monitoring, biodiversity, ecosystem health and mitigating pollution. The BCC is supported by the GEF and the United Nations Development Programme (UNDP); Norway provides funding for the BCC Science Programme; and Iceland supports a comprehensive training and capacity building initiative. In 2012, the three BCC countries agreed on the text of a Benguela Current Convention, which South Africa is expected to sign in 2013.

2.5. Co-operation with the OECD

South Africa is one of five non-member economies with which the OECD has established a "Key Partner" co-operation programme (the others are Brazil, China, India and Indonesia). Reflecting strong interest from member countries to involve Africa's largest economy in OECD work, South Africa has participated actively in a variety of OECD activities, and has been the subject of specific projects (Box 4.1). This has offered the opportunity to work more closely with the OECD in a more focused, comprehensive, coherent and mutually beneficial manner. This closer working relationship should enable South Africa to make a greater contribution to the debates taking place within the OECD. While the engagement is distinct from accession to the OECD, it has the potential to lead to membership.

Box 4.1. **South Africa, the OECD and the environment**

South Africa is a full adherent to the OECD Council Acts on Mutual Acceptance of Data (MAD), a multilateral approach that saves governments and chemical producers around EUR 150 million every year by allowing the results of a variety of safety tests on chemicals and chemical products to be shared across OECD member countries. Members – plus full adherents Argentina, Brazil, India, South Africa and Singapore – have implemented this system via appropriate legislative and administrative procedures. By participating in the MAD system, South Africa has created economic opportunities for laboratories that test chemical substances. In addition, it has removed potential trade barriers for exporting chemicals to OECD members and non-member countries that adhere to MAD.

In 2003, South Africa became the first non-member to be a full adherent to the MAD system. South Africa is an active member of the Working Group on Good Laboratory Practice (GLP), which oversees implementation of the MAD system. It has also participated in on-site evaluations of other member and non-member countries' GLP compliance monitoring systems. In recognition of its positive contribution to this work, South Africa was elected chair of the Working Group in May 2012, the first non-member to serve in this capacity.

South Africa's export credit agency, the Export Credit and Insurance Corporation (ECIC), regularly observes meetings of the OECD Export Credits Group. In this way, it stays up-to-date with international best practice, notably in applying anti-bribery measures and environmental standards. The ECIC also attends the meetings of the Participants to the Arrangement on Officially Supported Export Credits ("the Arrangement").

South Africa ratified the OECD Convention on Combating Bribery of Foreign Public Officials in International Business Transactions in 2007. In addition, it participates in implementation and enforcement activities to improve compliance with the Convention. The Convention also has environmental relevance such as when public officials are bribed in the context of wildlife poaching of CITES species.

3. Marine Issues

3.1. Conventions under the International Maritime Organization (IMO)

South Africa experiences a large volume of sea traffic, notably of cargo and fuel. However, since its own fleet is quite small, it benefits from being a Party to many of the IMO environment-related conventions and protocols (Table 4.3).[15] The growing worldwide emphasis placed on Port State Control[16] is one factor that has increasingly drawn South Africa into IMO affairs.

Under the 1972 London Convention (and 1996 Protocol) on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, South Africa annually provides information about dumping and incineration at sea to the IMO Compliance Group, one of a relatively small minority of countries to do so. The country does not dump industrial wastes or sewage sludge from ships. Routine harbour-dredging spoil and unserviceable equipment are dumped, but dredge spoils containing heavy metals (e.g. lead, copper, zinc, mercury and cadmium) are dumped at designated sites.

Six of the country's eight major sea ports provide reception facilities for the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex I waste (e.g. oily bilge water, dirty ballast water). The IMO database does not record reception facilities for Annex II and V substances (i.e. tank washings and cargo residues containing

Table 4.3. **Environment-related IMO conventions and protocols**

Title	√ (acceded or ratified, etc.) by South Africa
1969 International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties	√ 1986
and the 1973 Protocol	√ 1986
1972 London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter	√ 1978
and the associated 1996 London Protocol	√
1973 International Convention for the Prevention of Pollution from Ships (MARPOL)	√ 1984
Annex I: Regulations for the Prevention of Pollution by Oil	√
Annex II Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk	√
Annex III Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form	√
Annex IV Prevention of Pollution by Sewage from Ships	no
Annex V Prevention of Pollution by Garbage from Ships	√
Annex VI Prevention of Air Pollution from Ships	no
1990 International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC)	√ 2008
2000 Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances (OPRC-HNS)	no
1992 Protocol of the International Convention on Civil Liability for Oil Pollution Damage (CLC)	√
1992 Protocol on the Establishment of an International Fund for Compensation for Oil Pollution Damage (FUND)	√
2003 Protocol on a Supplementary Fund (optional)	no
1996 International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea (HNS) and its	√
2010 Protocol	no
2001 International Convention on the Control of Harmful Anti-fouling Systems on Ships (AFS)	√ 2008
2001 International Convention on Civil Liability for Bunker Oil Pollution Damage	no
2004 International Convention for the Control and Management of Ships' Ballast Water and Sediments (BW)	√ 2008
2009 Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships	Not yet

Source: International Maritime Organization.

noxious liquid substances, garbage). As the country has not committed to Annexes IV and VI, it is not obliged to furnish reception facilities for sewage, ozone-depleting substances and exhaust gas-cleaning residues. Also, the waters off southern South Africa were declared a Special Area[17] under MARPOL Annex I in 2008. The Special Area includes the 50 nautical miles exclusion zone over the Agulhas Bank; this creates a larger buffer zone where the operational pumping of oil is sufficiently far offshore to protect the coast in this high-risk area. Tankers engaged in coastal trade with South Africa must retain slops on board for discharge ashore at established port waste reception facilities.

South Africa has experienced a series of marine pollution incidents over the years. In 2000, the sinking of the bulk carrier "Treasure" in heavy seas off Cape Town severely affected two large breeding colonies of African penguin on Robben and Dassen islands. In recent years, aerial sightings of oil slicks from patrol aircraft have diminished significantly and South Africa has built up a response capacity that has coped with the latest emergencies. The South African Maritime Safety Authority (SAMSA) also has the responsibility of preventing and combating pollution from ships in the marine environment under the International Convention on Oil Spill Preparedness, Response and Co-operation (OPRC). It owns three dispersant-spraying vessels and has access to an emergency response tug on standby in Cape Town to respond to vessels in difficulty. The National Contingency Plan (being revised as of the end of 2012) allows equipment and human resources to be mobilised at short notice. Under the Abidjan and Nairobi Conventions, South Africa can share these services with its neighbours. No special provision appears to have been made for emergencies involving hazardous and noxious substances; South Africa has not signed up to the Protocol on Preparedness, Response and

Co-operation to pollution Incidents by Hazardous and Noxious Substances (OPRC-HNS Protocol).

A draft ballast water management (BWM) policy was prepared in 2002 under the South African component of the GEF/UNDP/IMO Global Ballast Water Management Programme (GloBallast) – an international effort to help countries comply with the BWM Protocol. However, the draft policy does not appear to have been formally adopted or implemented at any of the country's ports. In 2003, the Port of Saldanha was one of six pilot sites worldwide to test a ballast-water risk assessment tool developed by the GloBallast Partnerships. It is not clear, however, what further use has been made of the methodology. The International Ocean Institute Southern Africa, part of an international non-governmental organisation (NGO), hosted a meeting of the GloBallast task force in Cape Town in 2012 in association with the South African National Biodiversity Institute (SANBI).

SAMSA participates in two regional MoUs on Port State Control for, respectively, the Indian Ocean and West and Central Africa (Abuja). It carried out almost 250 inspections in the country's ports in 2011, during which eight ships were detained. Inspections cover a score of issues contained in a variety of IMO conventions on, for example, structural safety, navigation and fire protection. The 2011 annual report of the Indian Ocean Port State Control Committee gives an idea of the weight put on environmental issues in these inspections: almost 10% of all deficiencies reported in the Indian Ocean region involved the MARPOL Convention (annexes I, IV and V).

3.2. International fisheries management

South Africa counts 18 recognised commercial fisheries that contribute about 0.5% to GDP and employ more than 43 000 people on a seasonal and permanent basis.[18] However, the industry suffers from the poor state of a large part of commercial fisheries. Total catch production, which had peaked at almost 900 000 tonnes in 2004, fell to 583 000 tonnes in 2009 (Figure 1.10).

South Africa has equipped itself with a modern set of legal and policy instruments to manage its fisheries in a sustainable manner. The 1998 Marine Living Resources Act (MLRA) is based on an ecosystem approach and sets out policy relating to all living marine resources, including non-consumptive activities such as boat-based whale watching (BBWW) and shark-cage diving. The core of commercial fisheries management consists of an adaptive regime of *i)* restricting the total allowable catch (TAC) allocated to permit holders; *ii)* restricting the amount of effort (vessels, fishers or hours) applied to a particular fishery (total allowable effort or TAE), or *iii)* a combination of the two. The Department of Agriculture, Forestry and Fisheries (DAFF) fisheries branch annually collects catch and stock data as a basis for decision making. It also operates a fleet of vessels for research and compliance monitoring.

South Africa participates in four international fisheries agreements: Indian Ocean Tuna Commission (IOTC), Southwest Indian Ocean Fisheries Commission (SWIOFC), South Indian Ocean Fisheries Agreement (SIOFA) and the International Commission for the Conservation of Atlantic Tunas (ICCAT). It is not part of the Southeast Atlantic Fisheries Organization (SEAFO). The country also is a Party to the 1980 Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR Convention), which regulates fisheries such as toothfish and krill.

3.3. Illegal, unreported and unregulated (IUU) fishing

South Africa's approach to fisheries management is seriously undermined by the scourge of illegal fishing, both large scale (i.e. by foreign ocean-going vessels) and small scale (i.e. poaching by poor people from coastal communities). IUU fishing plunders target fish stocks: in the early 2010s, 68% of commonly caught line-fish fisheries are categorised as "collapsed", and 11% as "over exploited". IUU also compromises other species and their habitats,[19] and affects the livelihoods of legal fishers and their communities through loss of income and food insecurity (Box 4.2).

Box 4.2. **The case of endemic South African abalone**

The case of the endemic South African abalone (*Haliotis midae*) fishery in Eastern Cape province shows how a full-scale illegal fishery can emerge in a short time. In a situation where few, if any, local people were holding fishing rights and fisheries authorities exercised only weak enforcement, the temptation of high-value abalone that was easy to access at low cost proved difficult to resist. Between 1997 and 2005, a fleet of 30 purpose-built vessels[20] was built up, taking 1–2 000 tonnes of abalone with an export value of USD 35-70 million per year (Raemaekers and Britz, 2009). On a national scale, estimates of the amount of abalone taken illegally run from four to six times the amount taken by the legal fishery (Bürgener, 2008). Little of the illegally caught abalone is consumed domestically. About 95% of the take is exported to eastern Asia, often via ports in neighbouring countries.

The fleet of small vessels and jet skis used in several areas by the DAFF fisheries branch for enforcement is no match for well-organised poachers. As of the end of 2012, the government was reconsidering its approach to compliance with fishery regulations, including the possible use of the Navy. This would help enforcement on the high seas, but at the other end of the scale, perhaps the government could consider borrowing some features of its access and benefit-sharing (ABS) regulatory framework under the Nagoya Protocol (Section 4.3). This could include, for example, more engagement and benefit-sharing with local communities or community-based management of local resources (Chapter 5), including enforcement by locally appointed coast guards/fishery inspectors (Chapter 2).

Since IUU fishing often is a border-crossing operation serving distant markets, international co-operation to combat it is vital. South Africa participates in the implementation of the 2008 SADC Statement of Commitment to combat IUU fishing and the associated 2010 Action Plan. The South African contribution includes activities like participation in joint surveillance patrols with partner states (e.g. Mozambique, Tanzania, Kenya), and making a vessel available for such exercises. The South African cabinet in 2003 approved the SADC Protocol on Fisheries, which aims at the conservation and sustainable use of living aquatic resources and aquatic ecosystems under the jurisdiction of SADC countries. Even though the Protocol had not yet entered into force as of November 2012, a SADC Monitoring, Control and Surveillance (MCS) Centre was being established to co-ordinate joint actions to combat IUU fishing.

The "Stop Illegal Fishing" Working Group of the NEPAD is working in partnership with governments, the fishing industry, NGOs and other international organisations. Together,

they promote policy reform across Africa with regards to IUU fishing, both in inland and marine waters and at small-scale and industrial levels. In 2012, South Africa hosted a NEPAD/CCAMLR workshop on the role of Port State controls to fight IUU fishing. South Africa should also consider signing the 2009 Food and Agriculture Organization (FAO) Agreement on Port State Measures to Prevent, Deter and Eliminate IUU Fishing.

3.4. The proposed South African policy on the national environmental management of the ocean

South Africa has been actively participating in designing and implementing several MEAs aimed at protecting the ocean, covering issues like marine pollution from ships and land-based sources, the protection and sustainable use of marine living resources, integrated coastal zone management and Port State control. In addition, a raft of other oceanic issues and interests needs to be accommodated and reconciled, e.g. maritime traffic, fisheries, seabed exploration and mining, and national defence. Each of these topics has its own constituency of private players and government departments governed mostly by single-issue laws; an integrated approach towards the sustainable development of the ocean is thus far lacking.

Human pressures on the oceanic environment are expected to increase. Also, awareness is growing of the ecosystem services (e.g. heat distribution, oxygen production, carbon dioxide absorption, fish production, mining of oil and minerals) furnished by the ocean and the need to maintain the integrity of marine ecosystems. The Green Paper on South African Policy on the National Environmental Management of the Ocean, released in October 2012, is a timely response to this challenge. The stakeholder consultation process for the Green Paper should be followed up by the adoption and implementation of an Oceans Policy.

4. Global environmental co-operation: Sustainable development and the three Rio Conventions

4.1. Sustainable development: CSD, Millennium Development Goals

South Africa has an exemplary record of pursuing sustainable development, in line with the conclusions of the 1992 Rio Conference. The 2008 National Framework for Sustainable Development and the 2011 National Strategy for Sustainable Development and Action Plan 2011-14 provide the over arching agenda for further progress in this area (Chapter 2). Public consultation has become an integral part of the policy development process; the country should consider becoming a Party to the Aarhus Convention (on access to information, public participation in decision making and access to justice in environmental matters) to calibrate its procedures with international best practice in this regard.

The most important outcomes of the 2012 UN Conference on Sustainable Development (UNCSD) Rio+20 conference, from South Africa's point of view, include *i)* the global pronouncement on green economy policies in the context of sustainable development and poverty eradication; *ii)* the comprehensive agreement to strengthen the participation of women and youth; *iii)* the establishment of a process to formulate global sustainable development goals beyond 2015 that build on the MDGs; and *iv)* the process to establish a global sustainable development finance strategy. Also, South Africa teamed up with Brazil, Denmark and France to insert a clause promoting sustainability reporting by private companies in Rio+20's final document.

In 2010, South Africa's progress towards achieving the UN MDGs was assessed. Of the 15 targets included under Goal 7 Ensure Environmental Sustainability, one had already been achieved (proportion of the population using an improved drinking water source), four were likely to be achieved (share of the population using an improved sanitation facility; three ozone-depleting substances targets), six could possibly be achieved (three CO_2 targets, two protected area targets and the proportion of households with access to electricity) and two were unlikely to be achieved (threatened species and share of population living in slums), while two are unknown (Republic of South Africa, UNDP, 2010).

4.2. The UN Framework Convention on Climate Change (UNFCCC)

South Africa is one of the top 20 GHG-emitting countries in the world. This is mostly due to the fact that coal is the largest source of the country's GHG emissions, at almost 83% of the total in 2010. GHG emissions grew by 1.1% per year in the 1990s, and by 3% per year between 2000 and 2008, in line with rising energy consumption. However, emissions fell in 2009-11 as a result of the economic downturn (Chapter 1, Figure 1.2).

South Africa ratified the UNFCCC in 1997 and the Kyoto Protocol in 2002. It submitted an initial National Communication to the UNFCCC in 2004, a second in 2011 and actively participates in international climate change discussions. It has established alliances with other countries, notably the Africa Group, the G77+China and the BASIC partnership which, in November 2012, had its 13th ministerial meeting since being formed in 2008. South Africa and its partners aim to make sure that the burden of mitigation is shared equitably among developed and developing countries, and that international climate change agreements take account of developing countries' priorities of eradicating poverty and promoting sustainable development. Demonstrating that its mitigation policy produces the desired results will strengthen South Africa's voice in this regard.

South Africa began addressing climate change issues in earnest in the early 2000s. Through the second half of the decade, a series of milestones (technical studies, policy papers and consultations involving a wide spectrum of stakeholders) permitted stepwise progress, culminating in the announcement of a GHG emission mitigation trajectory at Copenhagen in 2009 (see below) and the adoption of a comprehensive and detailed policy (set out in the National Climate Change Response White Paper in late 2011). The White Paper deals with mitigation and adaptation, sectoral action programmes (e.g. water resources, transport), job creation, mainstreaming climate change into climate-resilient development and resource mobilisation. Short, medium and long-term timelines have been set for the White Paper implementation.

The Department of Environmental Affairs (DEA) established a dedicated climate change and air quality branch in 2010. The country also adopted a few climate-relevant policy instruments (an electricity levy, an electricity feed-in tariff, a vehicle tax based on CO_2 emissions per kilometre); a carbon tax has been under consideration since 2010 and is set to be introduced in 2015 (Chapter 3). So far, no dedicated climate change legislation has been adopted. Doing so would more securely anchor greenhouse gas (GHG) reduction targets and climate governance mechanisms in the overall policy framework. At the same time, several other sectoral policies under various headings but directly relevant to climate change were adopted; these include the 2003 White Paper on Renewable Energy, 2005 National Energy Efficiency Strategy and 2007 National Industrial Biofuels Strategy. This multiplicity of plans and initiatives suggests a need for a single body to monitor progress vis-à-vis the various targets and to ensure coherence between the different initiatives. One

model for such a body is the independent Committee on Climate Change created under the 2008 Climate Change Act in the United Kingdom. Making such a body accountable to parliament rather than government would ensure that its findings are publicly debated.

In 2009, the government announced that South Africa will implement mitigation actions that will collectively result in a 34% deviation below a business-as-usual emission growth trajectory by 2020 and in a 42% deviation by 2025. In absolute terms, the National Climate Change Response White Paper anticipates emissions to peak in the period 2020 to 2025 in a range with a lower limit of 398 Mt CO_2e and upper limits of 583 Mt and 614 Mt for 2020 and 2025 respectively. After the peak, emissions should plateau for up to 10 years within the range with a lower limit of 398 Mt CO_2e and upper limit of 614 Mt. From 2036 onwards, emissions would decline to a range with a lower limit of 212 Mt CO_2e and an upper limit of 428 Mt by 2050 (GoSA, 2011b). As part of the implementation of the National Climate Change Policy, further work is underway on a more detailed analysis of the mitigation potential for key economic sectors. This work is expected to form the basis for developing desired emissions reductions outcomes per sector.

The climate change policy itself is too recent to be able to assess results, but it is possible to consider aspects of other policies already mentioned:

- Outcome 10 of the Presidential Delivery Agreement, as well as the White Paper on Renewable Energy, set a target of generating 10 000 GWh of electricity (representing about 4% of electricity consumption in 2010) from renewable sources by 2013. While this target is unlikely to be met, the construction of a considerable amount of new capacity has been approved; the target will likely be reached with a delay of a few years. A review of the strategy was underway as of the end of 2012.
- The 2005 National Energy Efficiency Strategy (NEES) promised a 12% reduction in final energy demand (the target is also disaggregated by sector) by 2015, compared with a business-as-usual projection for the same year. Total final energy demand grew from 63 to 72 Mtoe over 2006-08, and then fell again to 61 Mtoe in 2010. The initial 14% rise in demand cannot fairly be ascribed to a failure of the NEES so soon after its adoption, but it is clear that the subsequent decrease is mostly due to the strong impact of the 2008 economic downturn. The NEES also set a target of installing 1 million solar water heaters on private dwellings over the period 2008-14. After a slow start, the programme appears to have hit its stride (about 275 000 heaters had been installed by 2012), although the 1 million target may be reached later than the 2014 target date. Another NEES measure – the retrofitting of buildings with efficient light bulbs – has had a good uptake. The NEES was being reviewed as of the end of 2012 so additional measures might be taken.
- The National Industrial Biofuels Strategy proposed that 2% of the national liquid fuels supply would be from non-fossil fuels by 2013. The main motivation behind the target was to create employment for poor farmers on un- or under-utilised land, but farmers' uptake of the policy so far has not been sufficient (partly due to lack of technical support and financial incentives) to significantly increase production (Janssen and Rutz, 2011).

South African projects under the Clean Development Mechanism (CDM) of the Kyoto Protocol have to date not made a significant contribution to reducing global GHG emissions. In 2004, South Africa established a CDM Designated National Authority in the Department of Energy. While more than 300 proposals have since been submitted to the Authority, as of mid-2012, only 21 projects with a combined potential annual emission reduction of 4.8 million tonnes per year, had been registered by the CDM Executive Board

as CDM projects. Only nine have been issued with certified emissions reductions (CERs). Another 77 projects were at various stages of the project cycle. According to authorities, low carbon prices have meant that the CDM has not provided sufficient finance for South African climate mitigation projects. There is some support for creating a domestic CDM market with its own rules. However, it is also recognised that, since 65% of the country's emissions originate in just two companies, the market would not be very liquid.

Many of South Africa's existing problems (e.g. rural poverty, water shortages, desertification) are likely to be exacerbated by the effects of climate change. Evaluations project decreasing winter rainfall in the west of the country and increasing summer rainfall in the east. All regions are expected to be warmer in the future. The government is formulating adaptation measures for various sectors (e.g. human health and communities, water resources, agriculture, invasive alien species, biodiversity). Once these measures have been defined, they will need to be integrated into sectoral programmes and at different levels of government, which will require sustained effort and financial resources to overcome a variety of obstacles. For example, adaptation measures often must be carried out at the local level – precisely where implementation capacity is weakest. Effective implementation will also require an appropriate monitoring and evaluation system that can ensure policy measures stay aligned with objectives.

In setting its GHG mitigation trajectory, the government also drew attention to Article 4.7 of the UNFCCC: the extent to which it can achieve its targets depends on the degree to which developed countries meet their commitment to provide financial support, capacity building, technology development and technology transfer to developing countries. The government considers the new financial architecture now being put in place (i.e.UNFCCC Adaptation Fund and Green Climate Fund) as a significant step forward. South Africa has a member on the board of the Green Climate Fund, who is also an alternate member of the board of the Adaptation Fund. The country has received GEF funding for several climate change projects over the years, but has not used the Adaptation Fund so far. This is likely to change now that the National Biodiversity Institute (SANBI) is accredited as a National Implementing Entity under the Fund.

South Africa is working to set up a comprehensive set of domestic financing instruments by 2014. Some of this is already in place. The Development Bank of Southern Africa (DBSA) administers the Green Fund – with initial funding of ZAR 800 million from the government – to support the transition to a low carbon, resource-efficient and climate-resilient development path delivering high-impact economic, environmental and social benefits (Chapter 3). The DBSA, on behalf of the Department of Energy, also administers the Renewable Energy Independent Power Producer Procurement Programme. In November 2012, it approved ZAR 9.6 billion in loans earmarked for renewable energy projects to support the establishment of the renewable energy sector (representing 896.5 MW of the 3 725 MW national target).

South Africa's climate change policy rests on the sophisticated analysis that informs the 2007 Long-Term Mitigation Scenarios (LTMS), which assessed different policy options against a business-as-usual scenario. The LTMS, which has been recognised as a world-class analytical tool, now enables South Africa to help other developing countries devise response policies. The South African team responsible for the LTMS has received funding to roll out the analysis globally through a project known as MAPS (Mitigation Action Plans and Scenarios). This project has been launched in four countries in South America.

4.3. The UN Convention on Biological Diversity (CBD) and its protocols

South Africa has recognised the global "duty of care" in hosting the third-highest biodiversity in the world (after Brazil and Indonesia). While it must deal with pressing problems in many areas (poverty, jobs, housing, health and education), it is nevertheless giving high priority to the protection and sustainable use of the biodiversity within its borders and on the African continent. South Africa ratified the Convention on Biological Diversity (CBD) in 1995, became a Party to the Cartagena Protocol on Biosafety in 2003 and signed the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits (ABS) Arising from their Utilization to the Convention of CBD in 2011. The CBD has become the main driver for the country's comprehensive legal and policy framework related to biodiversity (Chapter 5).

South Africa is one of two African countries that both import and export living modified organisms (LMOs). It was also the first African country to commercialise GM crops. It has fully aligned its legislation with the requirements of the CBD Cartagena Protocol on Biosafety, and has a working regime for decision making with regard to the management of, and trade in, LMOs. The principal law, the 1997 GMO Act, preceded the Protocol by two years. The National Environmental Management Act (NEMA) requires environmental impact assessment of selected categories of LMOs, and the Biodiversity Act requires long-term monitoring of the potential impact of LMOs. A statutory body – the advisory committee – contributes the scientific advice that informs decisions by an executive council consisting of relevant government departments. As of the end 2012, South Africa had yet to define a position on the 2010 Nagoya-Kuala Lumpur Supplementary Protocol on Liability and Redress to the Cartagena Protocol on Biosafety; a decision will depend on conclusions from domestic consultations.

Exports of LMOs under the Cartagena Protocol, notably of grains to other African countries, are hampered by institutional and regulatory shortfalls in importing countries, as well as by the burden of providing required documentation. South Africa would like to see importing countries improve their capacity to implement the Protocol, which explains its emphasis on biosafety in international co-operation efforts (e.g. staging and participating in workshops, as already discussed above). South Africa also sees trade arrangements with Argentina, which include co-operation on regulatory biosafety issues, as a model for its trade relations with other countries.

South Africa's genetic resources, and the traditional knowledge of South Africans, attract the interest of a range of industry sectors (e.g. pharmaceutical, biotechnology, horticulture, food and beverage, cosmetics). In 2013, it ratified the CBD Nagoya Protocol, which provides the global context for its domestic ABS management regime; the Biodiversity Act and the 2008 Bioprospecting, Access and Benefit-Sharing Regulations are but two of an array of laws that deal with ABS matters such as intellectual property rights, patents, plant breeding and customs.

The concept of access and benefit-sharing (ABS) defined in the 2010 Nagoya Protocol is predicated on a single notion: whereas new genetic resources are mostly found in the developing world, and the enterprises able to commercialise these resources through research are usually in developed countries, a fair system of benefit-sharing between the South and North is a prerequisite for sustainable development on a global scale. The South African ABS regime aims to ensure such a fair benefit-sharing system. The Biodiversity Act stipulates that a permit is required for i) bioprospecting involving

indigenous biological resources, including the associated traditional use or knowledge; and *ii)* exporting indigenous biological resources for the purposes of bioprospecting or other research. The Act also states such permits can only be issued after prior informed consent from those who allow access to the indigenous biological resources (e.g. a landowner) or from indigenous communities whose knowledge of traditional use of these resources has contributed to, or may contribute to, the bioprospecting (Box 5.8).

4.4. *The UN Convention to Combat Desertification*

Severe droughts with the potential to cause food shortages are a real risk in South Africa. In 2004, six provinces were declared a drought disaster zone and as many as 4 million people were affected. The UN Convention to Combat Desertification (UNCCD) is highly pertinent for South Africa. With its bottom-up approach to sustainable land management, it aims to reverse and prevent land degradation and to mitigate the effects of drought in order to support poverty reduction and environmental sustainability. The country became a Party to the UNCCD in 1997 and formulated a very comprehensive National Action Plan (NAP) in 2004. Progress was made in some areas, notably in improving institutional arrangements, (e.g. formulation of drought disaster-management plans). Even so, implementation of the NAP has proven difficult owing to the cross-sectoral nature of land degradation problems (involving land, agriculture, water, forestry, mining and disaster management) and the need for grass-roots buy-in of proposed actions. Insufficient resources, poor integration between government agencies, lack of local capacity to implement approved programmes and plans, and a paucity of data by which to judge progress have contributed to a loss of direction and momentum. An external review of the NAP planned for early 2013 offers an opportunity to put the plan back on track and align it with both the 10-Year UNCCD Strategy and Framework and climate change adaptation policies being formulated at present.

5. Global environmental co-operation: The biodiversity and chemical clusters of MEAs

5.1. *MEAs concerning biodiversity: CMS, Ramsar, Biosphere reserves, World Heritage*

South Africa is a Party to the Bonn Convention on Migratory Species of Wild Animals (CMS) and two of its spin-off accords: the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) and the Agreement on the Conservation of Albatrosses and Petrels (ACAP). It has also signed four of the non-binding Memorandums of Understanding (MoUs) under the CMS, namely those on Marine Turtles-Africa, Marine Turtles-Indian Ocean and South East Asia, Birds of Prey and Sharks. In the context of the transfrontier conservation areas, South Africa and its neighbours formally and informally co-operate on implementing the CMS (e.g. identification of habitats and species, tracking of animal movements across borders, harmonisation of conservation measures). In 2012, the Department of Agriculture, Fisheries and Forestry released a National Plan of Action for the Conservation and Management of Sharks as part of the FAO international plan of action. The plan is largely consistent with the MoU on sharks even though it does not refer to it at all. However, the plan is non-binding and receives limited funding, which makes it more of an information resource than a model for action.

South Africa has been a party to the Ramsar Convention on Wetlands since 1975. It presently has 20 sites – of which 8 were added since 1997 – designated as Wetlands of International Importance, with a total surface area of 553 178 ha. Many Ramsar sites are

also part of national parks or provincial nature reserves. However, two sites – *Blesbokpunt* and the Orange River mouth – have featured on the Montreux Record[21] since 1996 and 1995, respectively, partly because they are detrimentally impacted by upstream mining activities. In 2009, a National Ramsar Committee was established and a national wetland inventory was developed.[22] The country has so far not adopted a planned national wetlands policy, but wetland issues are addressed in a range of water, biodiversity and environmental policy instruments. The management plans for about half the Ramsar sites have been recently updated. Ramsar sites, among other wetlands, benefit from rehabilitation work carried out under the "Working for Wetlands" programme (Chapter 5).

South Africa ratified the 1972 UNESCO World Cultural and Natural Heritage Convention in 1997 and adopted the World Heritage Convention Act two years later. Since then, UNESCO placed eight South African sites on the World Heritage list, with four considered to have outstanding natural heritage value. The country also counts six biosphere reserves[23] (all declared during 1998-2009) under UNESCO's Man and the Biosphere (MAB) Programme; it is planning to create another three reserves.

5.2. CITES: Trade in endangered species

South Africa is a significant exporter and importer (and an inter-country conduit) of endangered species. Poaching is a pressing problem and often involves members of local communities who, driven by financial hardship, are co-opted into illegal activities by foreign smugglers. Species of key concern are abalone (meat and shell), rhino (horn), elephant (tusks) and plant species such as rare succulents and cycads.

South Africa ratified the Washington Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1975 and set up a working CITES implementation regime. The legal framework consists primarily of the 2004 NEMA: Biodiversity Act. The DEA co-ordinates a working group on which a range of government and non-governmental organisations (NGOs) are represented to help implement the South African CITES Implementation Project.[24] New technologies such as genetic identification of animals help authorities to identify their origin, as in cases of confiscated rhino horns. The DEA also organises training courses for personnel from agencies with a responsibility for CITES implementation.[25]

An important part of CITES implementation is to define the limits of legal trade in species of wild flora and fauna. Exports are only permitted if they do not cause detriment to the species involved. The Scientific Authority of South Africa, together with various stakeholders, formulated so-called non-detriment findings (NDFs) on 16 species. These included 12 critically endangered cycad species, cheetah, leopard, white rhinoceros and hippopotamus. Lack of knowledge on species, however, often makes it difficult to prepare NDFs. NGOs have expressed concern about South Africa's live exports of white rhinos to countries (e.g. to China, Vietnam) they suspect of planning to set up rhino farms for harvesting horn.

Concerning illegal trade in CITES species, the South African police and provinces in recent years participated in one regional and two global Interpol operations on the illegal possession of, and trade in elephant ivory, traditional medicines containing wildlife products, and reptiles and amphibians. South African courts also play their part; witness that about 30 people of different nationalities are currently serving sentences.

However, it has been the surge in illegal trade in rhino horn and elephant ivory that has attracted the world's attention over recent years. South Africa unquestionably has the world's most successful conservation record for the rhinoceros (Milliken and Shaw, 2012), but is now confronted with a dramatic increase in poaching. It has implemented a comprehensive set of measures (e.g. the use of DNA forensics, improving intelligence gathering, more stringent legislation, stricter regulation of trophy hunting to avoid pseudo-hunting, higher penalties) and will be taking others to remedy the situation. So far, however, the increase in rhino killing has not been stopped (Box 5.1). The debate among CITES countries over the past two decades continues about whether to allow limited trade in rhino (including trophy hunting) and horn; the latest stage took place at the COP-16 in March 2013, when the CITES secretariat recommended, among other things, that focus be placed on reducing demand for trade and increasing public awareness.

South Africa has played a key role, together with Germany and the Netherlands (as donor states) and the CITES secretariat, in setting up the African Elephant Fund. The Fund was established under UNEP as a Multi-Donor Technical Cooperation Trust Fund for the Implementation of the African Elephant Action Plan, adopted by African elephant-range states in 2010. Further measures with regard to the illegal trade in elephant ivory would partly depend on the outcome of the CITES COP-16 in March 2013.

5.3. MEAs concerning chemicals: The Stockholm and Rotterdam Conventions, the Montreal Protocol, the Minamata Convention

South Africa's chemical industry is the largest in Africa, directly employing more than 150 000 people. Large companies account for 60-70% of turnover with small, medium-sized and micro-enterprises (SMMEs) being responsible for the remainder. The Department of Health (DoH) imports dichloro-diphenyl-trichloroethane (DDT) from China for malaria vector control and exports this pesticide to some other African countries for permitted uses. South Africa became a Party to the Stockholm Convention on Persistent Organic Pollutants (POPs) in 2004. South African research institutions working on POPs contribute to the work of the Convention's Review Committee; they also have taken part in a review for the continued use of DDT in the SADC region, and the development of a toolkit for the quantification of dioxins and furans by UNEP.

Although a draft National Implementation Plan (NIP) under the Stockholm Convention was published in 2005, human and financial resource capacity constraints, as well as industry objections during the consultation phase, delayed the completion of the NIP; it was finally submitted to the secretariat of the Stockholm Convention in 2012. While Aldrin has been banned and other POPs containing pesticides were withdrawn from the market well before the Convention came into force, a lack of technical and financial resources slowed down the drafting and implementation of the regulations for Stockholm chemicals (including the POPs added in 2009). The DoH, the custodian of the Hazardous Substance Act, already lists some POPs; it committed to include all the POPs when reviewing relevant legislation as a means of regulating the management of the POP-containing chemicals in the country. Except for an assessment of releases of polychlorinated dibenzo-p-dioxins (PCDD) and dibenzofurans (PCDF) in 2006, an evaluation of the unintentional production of POPs – also required under the Convention – has not been carried out yet.

Currently, the main guidance for dealing with polychlorinated biphenyls (PCBs) is a National Standard on Mineral Oil Management, but regulations for phasing out PCBs and PCB-containing equipment are being drafted. No timetable has been set but, once in place,

the regulations will compel businesses to register their PCB-containing and PCB-contaminated equipment with the DEA, to indicate plans for safe disposal of hazardous waste and to phase out PCB-containing equipment. It will thus be possible to establish a national PCB inventory. Data are currently being collected from municipalities. Eskom, the energy utility in South Africa, holds a large part of the country's PCB stocks in electrical equipment. In addition to compiling an inventory of PCBs at its own facilities, it has been running a programme for the removal of PCB-containing capacitor cans from decommissioned sites.[26] In 2005-10, more than 1 000 tonnes of PCBs were destroyed. However, there has been no clean-up of POPs-contaminated sites to date.

South Africa acceded to the 1998 Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade in 2002. The country actively participates in the Conference of the Parties (COP) – it chaired the COP-5 in 2011 – and has contributed to a range of regional training and awareness-raising activities. The Multi-stakeholder Committee on Chemicals Management (MCCM) – comprising government, NGOs, industry and academia – provides a platform for improving chemicals management, including the information exchange obligations under the Rotterdam, Stockholm and Basel Conventions. The country reaps the benefits of the PIC process/notification/circular since they keep the country up to date about the position of other Parties on Annex III chemicals.[27]

A partial implementation of the Rotterdam Convention regarding import and export of chemicals that are not in Annex III of the Convention takes place through the 2003 International Trade Administration Act. This stipulates that Annex III substances require a permit from the International Trade Administration Commission (ITAC), given upon the decision of the DEA, before they can be imported or exported. Out of 39 requests to import chemicals, ITAC approved 18 under certain conditions and refused 21 as they were no longer allowed to be imported into the country in line with import responses submitted to the secretariat of the Rotterdam Convention. Although an agreement among key departments, (i.e. the DEA, the DAFF and the DoH) has been reached, the regulatory framework remains insufficient to implement key Convention rules with respect to, among other things, Final Regulatory Actions (FRAs) and PIC applications. Stakeholder consultations have taken place in preparation for a National Action Plan to implement the Convention, but no such plan had been adopted as of the end of 2012.

South Africa appears to be on track to implement its obligations under the Montreal Protocol on Substances that Deplete the Ozone Layer. It became a developed-country Party to the Protocol in 1990 and also acceded to its four amendments. In 1997, South Africa was granted its request to be downgraded to "Article 5" developing country status. As a result, it was not required to comply with early phase-out dates imposed on developed countries, and avoided the annual payments to the Protocol's Multilateral Fund for poorer countries.

South Africa is presently a consumer of two Montreal-controlled substances: methyl bromides and hydrochlorofluorocarbons (HCFCs). Consumption of methyl bromides fell from 330.0 ozone depletion potential (ODP) tonnes in 2006 to zero in 2010, well ahead of the final Article 5 phase-out date of 2015. During the same period, consumption of HCFCs[28] rose from 222.6 to 400.1 ODP tonnes, above the baseline of 369.7 ODP tonnes for compliance.[29] Nevertheless, South Africa expects to reach the baseline level by the 2013 target and is confident it will complete phase-out by the target date of 2040. South Africa is looking into how to recover or destroy ozone-depleting substances (ODSs), which are currently vented into the air.

The National Ozone Unit within the DEA is tasked with implementing the Protocol and works closely with industry. The ITAC import/export system used for Rotterdam Annex III substances (mentioned above) is also applied to ODSs. Since 2008, the DEA has been working with industry and other stakeholders on an HCFC Phase-Out Management Plan (including proper disposal, recovery and destruction of ODSs in an environmentally sound manner). The Multilateral Fund for the Implementation of the Montreal Protocol, through the United Nations Industrial Development Organisation (UNIDO), granted substantial funding in 2012 for the completion of the plan and implementation of the phase-out.

Mercury is a transboundary pollutant with both natural and anthropogenic origins. Important human activities that result in mercury release include coal combustion, waste incineration, cement production and ferrous metals production. Despite identification of the important sources of mercury in South Africa, information on specific sources and concentrations in the region is yet to be collected. South Africa has been an active participant in the development of the Minamata Convention – a global, legally binding instrument on mercury – and has already identified mercury as a national pollutant of concern. The DEA has been working with UNEP to quantify the country's mercury emissions. For example, the South African Mercury Assessment Programme (SAMA) has undertaken a limited Hg inventory, as well as development and monitoring. UNEP has also provided funding to measure mercury emissions at two Eskom power stations; it is also discussing a possible demonstration project to reduce mercury emissions from coal-fired power generation.

5.4. *Basel Convention*

South Africa acceded to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal in 1994 but the requirements of the Basel Convention have yet to be transposed into national legislation. An amendment to the 1995 "Basel Ban"[30] that prohibited all forms of hazardous waste exports from the OECD to all non-OECD member countries, as of 1 January 1998, is currently before parliament. The country has not signed the 1999 Basel Protocol (not yet in force) on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and their Disposal. Following the COP decision of the Basel Convention to establish centres to help developing countries implement the provisions of the Convention, the Pretoria-based Basel Convention Regional Centre for English-speaking African Countries[31] offers training, capacity building, awareness-raising and information exchange.

The current regulatory framework includes the 2008 National Environmental Management Act (NEMA): Waste Act and the 2003 International Trade Administration Act, which stipulates that imports and exports of Rotterdam Annex III waste require a prior permit from ITAC. South Africa restricts the export of hazardous wastes and other wastes to all non-Parties to the Basel Convention and any country that cannot demonstrate it has the necessary technology to dispose of the waste in an environmentally sound manner.[32] The DEA and Department of Trade and Industry (DTI), together with DAFF and DoH, have been working for some time on a single-window permitting regime, administered by ITAC, for all substances controlled under chemical MEAs, but the process has not yet been finalised. The DEA has developed draft Regulations for Exports and Imports of Wastes; this is in line with the 2008 National Environmental Management: Waste Act and provisions of

the Basel Convention to ensure environmentally sound management of waste, including its transboundary movement.

Information about waste transport permits (i.e. type, weight, origin/destination) is not collated and analysed; hence, the nature and size of legal transboundary waste flows are not known. Anecdotal evidence exists of illegal waste movements in both directions across borders, but there is no indication of any enforcement action associated with such transports. In the light of this paucity of information, the degree to which South Africa implements the Basel Convention is not known.

6. Trade, investment and environment

6.1. Trade and environment

About 40% of GHG emissions can be attributed to exports (Vickers, 2012). South Africa has signed several trade agreements (all concerning goods only) in the past few years. These include accords with the European Union, SADC and Zimbabwe. As of late 2012, several other trade agreements were in the pipeline, e.g. between the Southern African Customs Union[33] (SACU) and Mercosur,[34] and between SACU and India.

So far, these agreements have included only few, generic references to sustainable development and environmental matters. For example, the SACU-European Free Trade Association (EFTA) Free Trade Agreement states that the Parties "recognise that it is inappropriate to encourage investment by relaxing health, safety or environmental standards" (Art. 28), and that the "EFTA States shall provide technical assistance to the SACU States in order to support the SACU States' own efforts to achieve sustainable economic and social development" (Art. 30). There is still limited harmonisation of environmental laws and regulations among SACU states. However, the recent SADC template for bilateral investment treaties (see below) suggests it should be possible to include more ambitious environmental clauses in trade agreements, as is becoming increasingly common around the world.

South Africa is sensitive to the potential impact on its exports of environmental measures taken by developed countries. It invokes provisions in the climate convention and the Kyoto Protocol, which enjoin developed countries to "strive to implement policies...in such a way as to minimise adverse effects…on international trade, and social, environmental and economic impacts on other Parties, especially developing country Parties" (UNFCCC, 1997). In 2012, for example, a British supermarket chain decided to import South African wine in bulk rather than bottles to reduce additional impact of transport; this caused the loss of jobs in the Cape province packaging industry. Also of concern is the threat of green protectionism under the guise of ecolabelling with its plethora of official and informal labels. Whatever the outcome of the current international debate on trade rules around ecolabels, market expectations with regard to environmental sustainability are, in the end, best met by South Africa being able to show its exports are "clean and green" (Chapter 3).

As for the environmental aspects of export credits, South Africa's government-owned Export Credit and Insurance Corporation (ECIC) makes use of the OECD Common Approaches on Environment and Officially Supported Export Credits in its underwriting activities. The ECIC's 2011 annual report states the corporation screens all requests for export credit on their environmental merits, but does not provide statistics about the results of this scrutiny, e.g. how many proposals were sent back for further consideration of environmental aspects, or how many were rejected outright.

6.2. Investment and environment

In the early period of the transition to democracy, South Africa concluded a series of bilateral investment treaties (BITs) to reassure investors their investments were safe in the new South Africa. In 2010, however, the government took a new approach, signalling a move from the narrow commercial focus of previous BITs in favour of preserving its sovereign right to pursue development-oriented public policy objectives. The government was concerned about what it saw as the unintended expansive interpretation of the investment rules contained in existing BITs, especially relating to the mining sector. As a result, it sought to establish more equitable relationships with investors based on respect for human rights, the rule of law and due process, sustainable development and security of tenure and property rights within the framework created by the South African Constitution.

The new investment regime will include a yet to be drafted National Investment Act. The proposed law, which aims to facilitate investment into South Africa by strengthening the domestic legal framework for investors, will: *i)* codify and clarify core international law concepts that have been subject to conjecture and dispute in international investment arbitrations; and *ii)* provide for domestic adjudication of investment disputes.

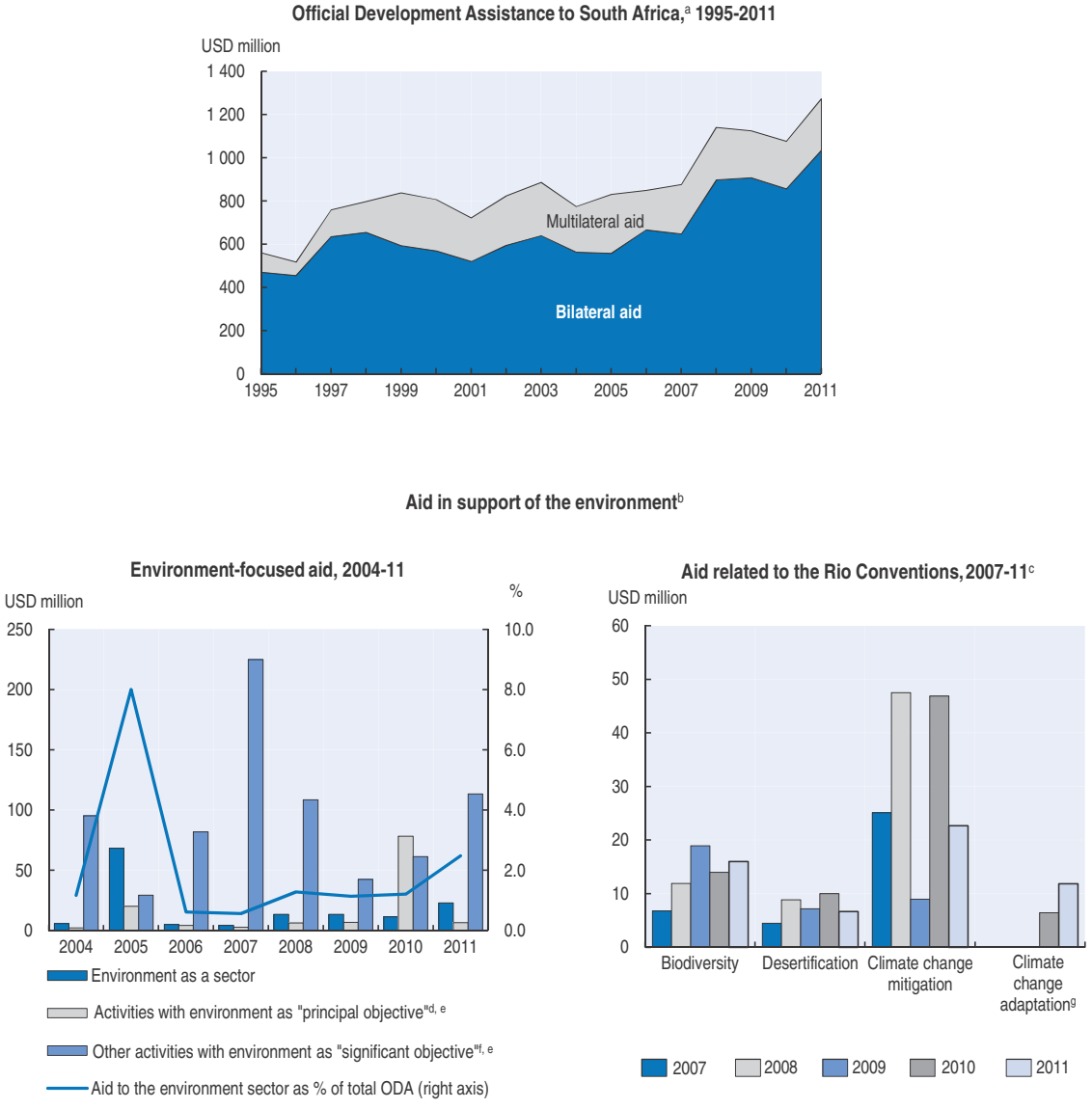
Currently, South Africa has 21 BITs based on the old model. Before negotiating new BITs that will be based on a new model, the government decided not to prolong the existing BITs, which had almost reached their validity date. Instead, government will seek to codify BIT-type protection into domestic law, ensuring that such protection is consistent with the South African Constitution. An inter-ministerial committee on investment will oversee the implementation of these measures. Also, in future, South Africa will enter into BITs only for compelling economic or political reasons; it will also use a new BIT negotiating template with standard provisions to reduce the scope for unpredictable, inconsistent and arbitrary interpretations. In fact, the SADC in July 2012 published a Model Bilateral Investment Treaty Template that contains several clauses demanding attention to environmental standards and aspects of sustainable development. This template represents an important step towards accommodating sustainable development dimensions of future international investment agreements by including provisions related to environmental and social impact assessments; measures against corruption; standards for human rights, environment, labour and corporate governance; and the right of states to regulate and pursue their development goals.

7. Official development assistance

7.1. South Africa as a recipient of ODA

South Africa has been a recipient of Official Development Assistance (ODA) since 1995. As a middle-income country, it depends little on foreign aid in both absolute and relative terms: World Bank figures suggest that net ODA received in the four years between 2007-10 averaged about USD 20 per capita (in current USD) per year. Total ODA since 2000 has fluctuated between 0.47% and 0.28% of gross national income (GNI) and between 1.15% and 1.67% of central government expenditure. A large proportion of donor ODA to South Africa is in the form of technical co-operation, with smaller shares being made available as grants, loans or credit guarantees. In the environmental area, a total amount of ZAR 440 million (USD 51 million) was provided to South Africa in grants and ZAR 700 million (USD 81 million) in concessional loans during 2010/11. The environmental component of ODA represents roughly 10% of the total (Figure 4.1).

Figure 4.1. **Aid to South Africa**



a) Net ODA disbursement expressed at 2011 prices and exchange rates.
b) Commitments of bilateral ODA expressed at 2011 prices and exchange rates. Excludes activities on water supply and sanitation not targeting the environment as a principal or significant objective.
c) Most activities targeting the objectives of the Rio Conventions fall under the definition of "environment-focused aid" but there is no exact match of the respective coverages. An activity can target the objectives of more than one of the conventions, thus respective ODA flows should not be added.
d) The marker data do not allow exact quantification of amounts allocated or spent in support of the environment. They give an indication of such aid flows and describe the extent to which donors address these objectives in their aid programmes.
e) Activities where environment is an explicit objective of the activity and fundamental in its design.
f) Activities where environment is an important, but secondary, objective of the activity.
g) Climate change adaptation markers exist only since 2010.
Source: OECD (2013), *International Development Statistics Databases.*

StatLink http://dx.doi.org/10.1787/888932879047

The DEA has concluded donor partnerships with Germany (focal area climate change), Norway (waste, biodiversity, governance) and Denmark (urban environment). The DEA also participates in a trilateral conservation and tourism project funded by USAID. Notwithstanding the relatively small sums involved, the DEA values these partnerships

because they act as a catalyst of strategic importance to help projects get off the ground. Also, some foreign embassies in Pretoria work directly with NGOs without involving the DEA, but it is not known what sums are involved.

South Africa adheres to the 2005 Paris Declaration on Aid Effectiveness and the 2008 Accra Agenda for Action. It also endorses the 2011 Busan Partnership for Effective Development Co-operation. These agreements already form the basis of South Africa's partnership with some donor countries, but overall it still experiences some difficulties in matching supply and demand for development assistance, at least in the environmental area.

During the first four funding cycles (i.e. 16 years) of the Global Environment Facility (GEF), South Africa received total grants of USD 108 million, leveraging co-financing of a further USD 726 million. For the fifth cycle (2010-14), South Africa has been allocated a total of about USD 52 million, of which 41% is for biodiversity projects, 49% for climate change and 10% for land degradation remediation. Through UNDP, the country also receives some part of regional-scale GEF funding; this amounted to about USD 290 million of grants with co-financing of an additional USD 595 million over the first four funding cycles. The government-owned Development Bank of Southern Africa, which mainly funds municipal infrastructure projects, is a candidate for accreditation as a GEF Project Agency, with a decision likely to be made in 2013.

7.2. South Africa as a donor of ODA

South Africa is also a donor country. Since the end of apartheid, it has furnished emergency aid, training and technical assistance to African countries. The 2000 African Renaissance and International Co-operation Fund Act gave the country a funding vehicle for channelling aid and assistance to the region. The African Renaissance Fund provided funding for supporting democratic processes in Africa (e.g. AU observer missions) or medical services in Sierra Leone. In the 2011/12 funding round, ZAR 288 million (USD 33 million) was allocated for a variety of purposes that, to date, have not included the environment. However, South Africa does contribute environmental technical assistance to other African countries in various contexts. Given the country's strength in this regard, as well as its own experience as a developing nation and its local knowledge of Africa, South Africa should further boost its role as a transmitter and translator of appropriate environmental know-how. Furthermore, South Africa is one of 39 countries contributing finance to the GEF Trust Fund.

South Africa is planning to set up the South African Development Partnership Agency (SADPA) within the Department of International Relations and Co-operation. SADPA's mission will be twofold: to manage development assistance in support of South Africa's foreign policy objectives and to ensure policy cohesion and synergies in South Africa's bilateral and multilateral interactions. The agency will have a staff of diplomats and technical specialists in the areas of development, project management and evaluation. It will presumably align its mandate with the Paris/Accra/Busan agreements already underwritten by South Africa. Given the central place of environmental concerns in the country's foreign policy, the agency should gradually include some environmental projects in its funding portfolio. It should also mainstream environmental considerations into its operations by implementing good international practices regarding environmental assessment procedures for major projects and by providing appropriate environmental training for staff.

Notes

1. Ubuntu is a southern African ethic focusing on people's allegiances and relations with each other. Nelson Mandela explained Ubuntu as follows: A traveller through a country would stop at a village and he did not have to ask for food or for water. Once he stops, the people give him food, entertain him. That is one aspect of Ubuntu, but it will have various aspects. Ubuntu does not mean that people should not enrich themselves. The question therefore is: Are you going to do so in order to enable the community around you to be able to improve?
2. Acronym stands for Brazil, Afrique do Sul, India and China.
3. South Africa chairs the LMMC until the CBD COP in 2014.
4. The mandate of the African Ministerial Conference on the Environment (AMCEN), which has been meeting biennially since 1985, is to provide advocacy for environmental protection in Africa, and to ensure that basic human needs (including human rights and food security) are met adequately and in a sustainable manner. UNEP acts as the AMCEN secretariat.
5. For subsequent endorsement by the Assembly of Heads of State and Government of the African Union.
6. At the 14th Session of AMCEN in 2012, where Africa's post-Rio+20 Strategy for Sustainable Development was the main topic, South Africa advocated for African governments to implement the CBD Strategic Plan for Biodiversity 2011-20 as a matter of urgency, with the participation and involvement of all sectors of government at all levels, business/private sector, and indigenous and local communities.
7. The New Partnership for Africa's Development (NEPAD) is a programme of the African Union (AU) that was created in 2001 with the objective of enhancing Africa's growth, development and participation in the global economy. A dedicated technical body, the NEPAD Planning and Co-ordinating Agency, was set up in 2010 to help implement the programme. "Climate change and natural resource management" is one of NEPAD's six thematic areas, under which an Environmental Action Plan is being implemented. South Africa is the lead country for the plan's focus on alien invasive species.
8. Ministers responsible for water in 41 African countries met at Abuja, Nigeria in 2002 to establish AMCOW. The mission of AMCOW is to provide political leadership, policy direction and advocacy in the provision, use and management of water resources for sustainable social and economic development and maintenance of African ecosystems. AMCOW has the status of a Specialized Committee for Water and Sanitation in the African Union.
9. The SADC was formed in 1992 and currently has a membership of 15 Member States, namely; Angola, Botswana, Democratic Republic of Congo (DRC), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, United Republic of Tanzania, Zambia and Zimbabwe.
10. The Convention covers the marine environment, coastal zones and related inland waters falling within the jurisdiction of the States of the Western African Region, from Mauritania to South Africa.
11. The revised Protocol supersedes the 1995 Protocol on Shared Watercourse Systems.
12. Foremost the Orange River, but also the Limpopo, Inkomati and Maputo Rivers. The country must share water resources with Namibia, Botswana, Zimbabwe, Mozambique, Swaziland and Lesotho. Owing to earlier economic growth, South Africa's use is high compared to that of its neighbours. This is now changing and the pressure on these shared resources is expected to increase.
13. The protracted negotiations, dating back to 1948, between South Africa, Swaziland and, later, Mozambique over water sharing in the Inkomati basin show how difficult water security issues can be. Another lesson from the Inkomati case is the need for all parties to agree on the size and characteristics of the resource (including on the effects of climate change on water resources) before entering into serious negotiations.
14. It is the updated version of the 1968 Algiers Convention of the same name.
15. South Africa became a full member of the IMO in 1995 after having had observer status from 1948. The country was elected a member of the IMO Council for 2012/13.
16. Port State Control (PSC) is the inspection of foreign ships in other national ports by PSC inspectors for the purpose of verifying that the competency of the master and officers on board, and the condition of the ship and its equipment, comply with the requirements of international conventions (including MARPOL).

17. MARPOL defines certain sea areas as "special areas" in which, for technical reasons relating to their oceanographic and ecological condition and to their sea traffic, a higher level of protection than other areas of the sea is required. In an Annex I Special Area, any discharge into the sea of oil or oily mixtures from ships of 400 gross tonnage and above is prohibited except when certain conditions apply.

18. In the same year, the country exported some ZAR 560 million of fish and fishery products worldwide, of which the squid fishery alone accounted for about ZAR 500 million.

19. Including the impact on by-catch species (unintended catches of marine species such as sharks and turtles caught in fishing nets), ghost fishing (continued entanglement of marine species in discarded nets), habitat destruction (bottom trawling, poison and dynamite fishing).

20. For example semi-rigid, inflatable, "superduck" vessels that can carry up to 14 people, are powered by twin 250 HP outboard engines and are capable of speeds of up to 50 knots (Raemaekers and Britz, 2009).

21. The Montreux Record is a register of wetland sites on the List of Wetlands of International Importance where changes in ecological character have occurred, are occurring or are likely to occur as a result of technological developments, pollution or other human interference.

22. In 2010, South Africa hosted a meeting of the Africa region Ramsar Scientific and Technical Review Panel National Focal Points for the first time.

23. Biosphere reserves are sites established by countries and recognised to promote sustainable development based on local community efforts and sound science.

24. This includes: Department of Foreign Affairs, International Trade Administration Commission, Customs and Excise Service, DAFF, South African Police Service: Endangered Species Unit, Traffic East/Southern Africa, SANBI, Traffic East/Southern Africa, SPCA, SANPARKS, Sea Fisheries.

25. Another example is the training tool for law enforcement officers, developed by the Scientific Authority of South Africa and TRAFFIC East and Southern Africa, to enable the correct identification of species. The tool, which will be available on a CD and also through the Internet, focuses on priority South African taxa listed in the CITES appendices.

26. Disposal certificates under the Basel Convention were obtained and the PCBs were transported to a European incineration facility for disposal.

27. The chemicals listed in Annex III include 32 pesticides and 11 industrial chemicals that have been banned or severely restricted for health or environmental reasons.

28. Mostly, this comprises HCFC-22 and HCFC-141b used in refrigeration and air-conditioning and for foam making.

29. Of this amount, the servicing sector consumed 167.0 ODP tonnes, representing 80% consumed in the refrigeration/air-conditioning sector in 2010. The sector is devoted mostly to servicing equipment used in commercial refrigeration (convenience stores, supermarkets and small cold rooms), followed by central air-conditioners and unitary air-conditioners. The high demand for HCFC-22 in servicing is due, among other things, to the high refrigerant leakage from systems and the low level of refrigerant recovery and recycling during maintenance.

30. The Basel Ban decision prohibited all forms of hazardous waste exports from the OECD to all non-OECD countries, as of 1 January 1998.

31. The BCRC is part of the Africa Institute for the Environmentally Sound Management of Hazardous and Other Wastes, which is an intergovernmental organisation that also serves as a Stockholm Convention Regional Centre. As of mid-2012, eight countries were part of the Institute, with additional countries in the process of joining.

32. South Africa accepts waste for disposal from SADC countries where the exporting country can demonstrate lack of facilities to allow for the environmentally sound disposal of waste in their countries. Currently, about 40 transboundary movement applications/notifications are processed every month concerning imports of waste from neighbouring countries and exports of waste to developed countries for environmentally sound management. South Africa has also made use of the opportunity offered by the EU to be informed of shipments of non-hazardous waste for recovery in non-OECD countries, regulation (EC) No. 1013/2006.

33. Botswana, Lesotho, Namibia, South Africa and Swaziland.

34. Brazil, Argentina, Paraguay, Uruguay and Venezuela.

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PART II

Progress towards selected environmental objectives

PART II

Chapter 5

Biodiversity and economics of ecosystem services

This chapter reviews current status and trends of South Africa's biodiversity and natural heritage along with pressures stemming from the legacy of apartheid and more recent economic development. It examines policy initiatives implemented since 1994 to better manage South Africa's biodiversity. It also presents the strategic and institutional frameworks and the mechanisms in place to manage interactions between different policy instruments and monitor their implementation. The chapter assesses progress in using various instruments, such as biodiversity stewardship programmes and payments for ecosystem services, and analyses the effectiveness of measures that promote sustainable markets in biodiversity and reduce harmful subsidies. This chapter also examines measures to integrate biodiversity conservation into operations of the tourism and financial sectors.

Assessment and recommendations

South Africa is one of the world's 17 megabiodiverse nations, hosting 10% of the world's total known bird, fish and plant species, and over 6% of the world's mammal and reptile species; many are endemic. South Africa is also host to some exceptional ecosystems and habitats. This rich biodiversity and related habitats now face increasing pressures from a range of economic activities, particularly agriculture, manufacturing, mining and mineral processing, urban development, forestry and fisheries. The impacts from external factors are also growing, especially invasive alien species, illegal international trade of endangered species and climate change. One study has suggested that ecosystem services were equivalent to about 3% of GDP, and that small reductions in these services could have large impacts on welfare, particularly within poorer, rural communities.

The status of South Africa's biodiversity has been extensively mapped in the 2011 National Biodiversity Assessment (NBA). The methodology developed, the quality of the data assembled and the level of analysis are at the forefront of international practice. The NBA charts the extent of biodiversity loss, which is about 20% of natural habitats in total. In large parts of the country, more than half of the original area covered by wetlands has been lost. Nearly 40% of estuaries, and half of the main river ecosystems, are critically endangered. Twenty-five of 41 marine fish stocks studied are over-exploited, collapsed or threatened. Despite the high quality of the NBA, important data gaps remain that should be filled to further support policy development and implementation. The scientific mapping of biodiversity should be complemented by a better understanding of the economic importance of biodiversity and ecosystems: this would help strengthen policy formulation and target-setting.

South Africa's high quality scientific information has underpinned the development of a pioneering set of biodiversity laws and policies that are more advanced than those in many OECD member countries. Its approach is grounded in the sustainable use of biodiversity and ecosystems, but also seeks to integrate biodiversity into economic development and to promote social justice.

South Africa's approach to biodiversity ultimately aims to identify priority biodiversity areas and actions at various spatial scales. It is supported by a state-of-the-art, online mapping system that makes information available to policy makers, end-users and stakeholders. Key elements of the South African approach include rigorous and systematic planning as mandated by the 2004 National Environmental Management: Biodiversity Act; mainstreaming of biodiversity into all forms of economic activity; and a system of targets to conserve a representative sample of ecosystems and species, as well as the ecological processes that will allow them to persist over time. Specific targets form part of the government's 2010-14 Delivery Agreement document, providing a good basis for monitoring and evaluation. Coastal and marine ecosystems are the most important gaps in the current system and should be addressed as a priority.

South Africa has also strengthened its institutional framework for biodiversity management. The budgets of the Department of Environmental Affairs increased, mostly due to additional funding to the South African National Biodiversity Institute and the South African National Parks. The situation at the provincial level is much less favourable. Although a number of arrangements are in place to facilitate co-operation between the national, provincial and municipal levels of government, estimates of resource shortfalls at sub-national levels range between 10-50%. As a result, a number of policy, implementation and capacity gaps at provincial and municipal levels limit the effectiveness of South Africa's spatially-based approach to biodiversity management. Another consequence is that the rights and interests of local communities are often not adequately taken into account.

Protected areas have grown by 10% since 2004, largely by including under-represented ecosystems. In 2011, protected areas accounted for 6.5% of the total territory, using a stricter definition than the International Union for Conservation of Nature (IUCN) based on their legally protected status. In 2008, a 20-year National Protected Areas Expansion Strategy was adopted, with priority given to connecting landscapes to enhance ecological sustainability and resilience to climate change.

The 2003 National Environmental Management: Protected Areas Act has fostered the development of various biodiversity stewardship programmes within protected areas. Essentially, these are payment-for-ecosystem services (PES) schemes that involve a contract between landowners and national or provincial authorities. Stewardship programmes, whose costs are estimated at one-tenth of those for purchasing land, are supported by a range of fiscal, financial and other incentives. They also provide a mechanism for expanding protected areas in a way that respects the rights and interests of landowners, an important consideration in post-apartheid South Africa. If all contracts under negotiation are successfully concluded, stewardship programmes would cover 430 000 ha, equivalent to 15% of the 2013 protected area expansion target.

With modest additional resources, biodiversity stewardship programmes could play a greater role, and expand to cover river, wetland and estuarine ecosystems. In parallel, further consideration should be given to the long-term viability of these programmes, including the post-contract behaviour of landowners. Further efforts also should be made to seize the opportunities that protected area expansion can provide for supporting the land reform agenda and the diversification of rural livelihood options, especially in agriculturally marginal areas. The Somkhanda Game Reserve project in northern KwaZulu-Natal provides a positive example in this regard.

Although the development of PES schemes is mandated in key policy documents, progress remains at a very preliminary stage. Pilot sites are currently being selected, and institutional arrangements established, that could be rolled out more widely. PES schemes involving carbon sequestration, surface water supply, water flow regulation and soil retention could provide significant livelihood improvement opportunities to local communities. Building on initiatives by some international mining companies, a more coherent and systematic approach to biodiversity offsets should be developed covering both ongoing and post-mining activities. Opportunities of benefiting from PES schemes with an international dimension are largely unexplored.

A number of certification schemes are in place to incentivise biodiversity-friendly production and trade, largely in export-oriented sectors like forestry, food and tourism.

However, one concern is that the benefits do not accrue to local communities, particularly in areas like medicinal plants, bioprospecting and flowers. The court cases involving Rooibos and Pelargonium plants illustrate the need to accompany the creation of markets for products based on biodiversity with regulations governing benefit-sharing in bioprospecting. More generally, these cases underscore the importance of cost-benefit analysis before establishing certification or biodiversity market creation schemes.

South Africa has the world's most successful conservation record for the rhinoceros. However, enforcement efforts – increased arrests, more stringent sanctions – have not kept pace with dramatically increased levels of poaching involving highly organised international crime syndicates in partnership with poor local counterparts. In 2010, South Africa adopted a National Strategy for the Safety and Security of Rhinoceros Populations. Other species subject to illegal activities include abalone, elephant (tusks) and plant species such as rare succulents and cycads.

Although some inter-ministerial arrangements are in place, further efforts are needed to integrate biodiversity considerations into other sectoral policies, notably mining, energy, transport and coastal zone management. Despite the opportunities presented by nature-based tourism, very few of the benefits are filtering through to communities. There is a huge need to upgrade the skills of community-based tourism operators to realise these opportunities. While the level of agricultural subsidies is much lower than in many OECD member countries, a number of other perverse fiscal incentives threaten biodiversity. For example, current municipal property rates discourage game farming activities in favour of intensive agricultural policies. Similarly, tax breaks for the eradication of noxious plants and the prevention of soil erosion create perverse incentives to bring land into cultivation that could be of high conservation value.

Non-governmental organisations (NGOs) have played a significant role in the development and implementation of biodiversity policies, particularly integrating biodiversity into land-use planning and the development of biodiversity stewardship programmes. They have also played important roles in awareness-raising, environmental education, research, monitoring and mobilising the private sector. Many of the policy tools applied in South Africa had their origins in pilot projects initiated by NGOs. The private sector is also becoming more engaged: the Biodiversity and Wine Initiative and the development of biodiversity offsets in the mining sector provide a good basis for strengthening this engagement. There are also opportunities to engage the financial sector in biodiversity initiatives.

Recommendations

- Building on the National Biodiversity Assessment, identify the priority research and data gaps that need to be filled to better support policy development and implementation.
- Undertake a comprehensive national assessment of the economic benefits of the conservation and sustainable use of biodiversity and ecosystems; and integrate economic analysis into the formulation and evaluation of biodiversity policies.
- Ensure that sufficient resources are allocated to implement the National Protected Areas Expansion Strategy cost-effectively, using a combination of land purchase and stewardship agreements; ensure the rights and interests of local communities are fully taken into account; and provide additional support to local communities to enable them to develop competitive biodiversity-related services and products.

Recommendations *(cont.)*

- Assess how biodiversity stewardship programmes could be extended to support a broader range of ecosystems; and support the land reform agenda and the diversification of rural livelihood options, especially in agriculturally marginal areas.
- In keeping with the Nagoya Protocol, strengthen regulatory frameworks for bioprospecting to ensure fair and equitable benefit-sharing.
- Building on the experience gained in pilot projects, expand the use of PES schemes, focusing in areas where the benefits for ecosystems and the livelihoods of local communities are greatest; and assess the potential benefits of participating in international PES schemes.
- Strengthen the co-ordination of activities, and sharing of information, among key stakeholders involved in the fight against poaching of endangered species (e.g. central and provincial authorities, public and private parks managers, police); and strengthen the capacities and tools available to enforcement agencies and the judiciary in responding to biodiversity-related criminal activities.
- Reinforce mechanisms for integrating biodiversity considerations into sectoral policies by strengthening the analysis of the impacts of sectoral policies on biodiversity; identifying and considering how to reform fiscal incentives with a perverse impact on biodiversity (e.g. municipal property taxes, tax breaks for agricultural activities); and expanding the use of biodiversity offsets and integrating them into the permitting and licensing systems, particularly for major infrastructure and extractive industry projects, among other activities.
- Further extend and strengthen partnerships with NGOs and the private sector; and work with the financial sector to support biodiversity through well-based eco-tourism initiatives and by strengthening access to capital, including micro-finance, for the provision of biodiversity services and products, among other activities.

1. Current status and trends of South Africa's biodiversity

South Africa is recognised as one of the world's 17 megabiodiverse nations. It hosts 10% of the world's total known plant species, and about 7% of the world's vertebrate species. Many mammals, birds, reptiles and amphibians are endemic, placing South Africa as the fifth-richest country in Africa and the 24th-richest in the world in this regard. South Africa is also the only country in the world with its own plant kingdom and three internationally recognised "biodiversity hotspots" of high concentrations of biodiversity under serious threat: the Cape Floral Kingdom, the Maputaland-Pondoland-Albany Region (shared with Mozambique and Swaziland) and the Succulent Karoo (shared with Namibia). The Succulent Karoo biome, which stretches along the coastal strip of South Africa's Northern Cape province and south-western Namibia, is one of only two arid biodiversity hotspots in the world (the other being the Horn of Africa). South Africa's territorial waters include an exceptional range of habitats, from cool-water kelp forests to subtropical coral communities.[1] The southern African coast is home to almost 15% of the world's known coastal marine species, including 270 of 325 marine fish families.

The status of South Africa's biodiversity has been recently extensively mapped and evaluated in the National Biodiversity Assessment 2011 (NBA). The methodology developed, the quality of the data assembled and the level of analysis is at the forefront of international practice. The NBA assesses the status of its main ecosystems with respect to

two headline indicators: ecosystem threat status and ecosystem protection level (Figure 1.8).[2] The NBA also provides a summary assessment of the current state of species of special concern or importance.

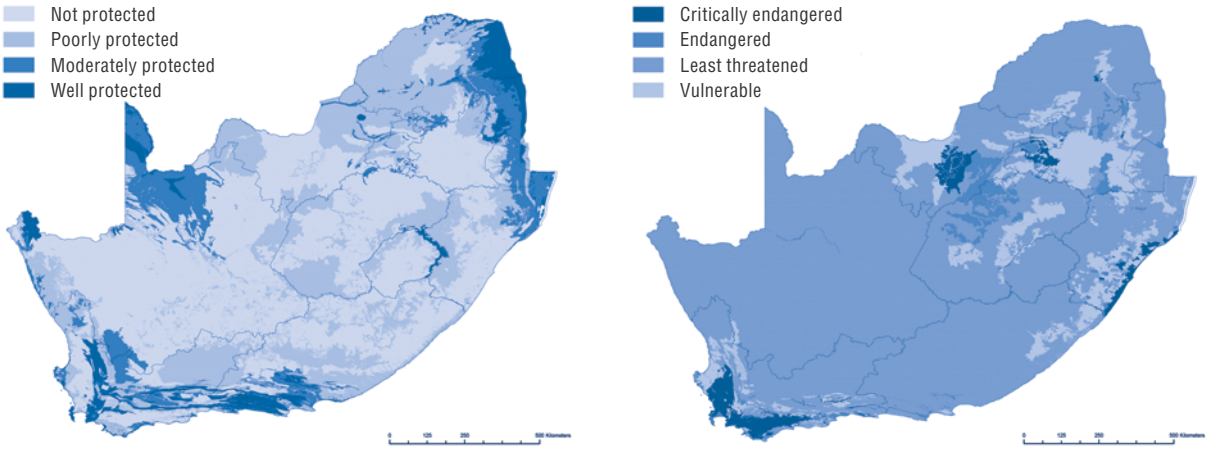
1.1. Status of South Africa's ecosystem types

Terrestrial ecosystems

According to the NBA, about 40% of terrestrial ecosystem types are threatened, which include those critically endangered, endangered or vulnerable (Figure 5.1).[3] The highest proportions of threatened ecosystem types tend to be concentrated in hubs of economic production and production landscapes, in particular in the Indian Ocean Coastal Belt, Grassland, Fynbos and Forest biomes.

Recognising the importance of terrestrial ecosystems in terms of food security, protection from natural hazards and development of the economy, the size of protected areas has increased by 10% since 2004, reaching the current level of 6.5% of the total territory (Figure 5.1). These areas enable the appropriate protection of 23% of terrestrial ecosystem types. Much of this expansion focused on under-protected ecosystems, with the Succulent Karoo biome in particular benefiting from inclusion of previously unprotected vegetation types (Driver et al., 2012). Despite the increase, about 35% of terrestrial ecosystems remain completely unprotected, leaving many representative samples of all ecosystems outside the protected area network (Figure 5.1) (Driver et al., 2012).[4]

Figure 5.1. **Terrestrial ecosystem protection and threat levels**



Source: South African National Biodiversity Institute (2012), Ecosystem Protection Level NBA 2011, Biodiversity GIS website *http://bgis.sanbi.org/nsba/terrestrialStatus.asp*.

River and wetland ecosystems

Nearly 60% of river ecosystem types are threatened. As mountain and upper foothills tributaries tend to be in better ecological condition, the proportion of threatened main-river ecosystem types is even higher, with 46% being critically endangered.

Despite increasing pressures on freshwater ecosystems, nearly half are not protected at all. This is mostly due to the fact that land-based protected areas are not designed to protect rivers (Driver et al., 2012). High-water yield areas make up less than 4% of the country's area, but only 18% have any form of formal protection. These "water factories" of

strategic importance for water security include sub-quaternary catchments in Centre-East and North-West in which mean annual runoff is at least three times more than the average.

The NBA provided the first-ever national assessment of approximately 300 000 wetlands, which make up 2.4% of South Africa's land area. In large parts of the country, the outright loss of wetlands is estimated to be more than half of the original wetland area. Wetlands represent high-value ecological infrastructure that provides critical ecosystem services, such as water purification, flood regulation, shoreline stability and homes for plant and animal life; however, around 70% of wetlands are not protected at all (Driver et al., 2012).

Estuaries

The NBA also included the first-ever assessment of South Africa's 291 estuaries that cover an area of 90 000 ha. The assessment concluded that about 43% of estuary ecosystem types are threatened (with 39% critically endangered). Most are located in the cool temperate region of the west coast, which has relatively few estuaries; the fewest number appear in the warm temperate region of the south and southeast coast, including the many small estuaries along the Wild Coast, most of which are in good ecological condition.

About 33% of estuary ecosystem types are well protected and 7% partially protected through zonation, closed seasons and bag limits that together allow for some direct use of the estuary. However, nearly 60% of estuaries have no protection.[5] This includes St. Lucia in northern KwaZulu-Natal, which is currently in poor ecological condition although it forms part of the World Heritage Site of the iSimangaliso Wetland Park (Driver et al., 2012).

Coastal and marine habitats

Marine and coastal habitat types were also mapped and classified for the first time by the NBA.[6] For coastal and inshore ecosystem types, 58% are threatened, compared with 41% of offshore ecosystems types. Coastal and inshore ecosystems are heavily impacted by human activities as nearly one-quarter of South Africa's population lives within 30 km of the coast; already, nearly one-fifth of the coast has some form of development within 100 m of the shoreline (Driver et al., 2012).

Currently, the marine protected area network focuses almost entirely on the coast and inshore, providing almost no protection to offshore ecosystems. Only 9% of coastal and inshore ecosystem types are well protected, but 75% have at least some form of protection. In the offshore environment, only 4% of ecosystem types are well protected and 69% are not protected at all (Driver et al., 2012).

1.2. Status on species of special concern

South Africa has over 95 000 known species of flora and fauna. Species of special concern are those that have particular ecological, economic or cultural significance and include threatened flora and fauna species, medicinal plants and harvested marine species. Invasive alien species also fall into this category as they have a major negative impact on biodiversity and ecosystems.

Red List assessments in South Africa show that one in five inland-mammal species and freshwater fish species, as well as one in seven frog and bird species, are threatened (Table 5.1). Species of special concern include white rhinoceros (Box 5.1) and abalone,

Table 5.1. **Summary of species status in South Africa**[a]

Taxonomic group	Number of described *taxa*	Number of threatened	% of threatened	Number of extinct	Number of endemic to South Africa	% of endemic to South Africa	% of Earth's *taxa*	Most recent Red List
Plant	20 692	2 505	12	40	13 203	64%	6%	2011
Inland mammals	307	60	20	3	57	19%	6%	2004
Birds	841	122	14.5	2	68	8%	8%	2000
Amphibians	118	17	14	0	51	43%	2%	2010
Reptiles	421	36	9	2	196	47%	5%	2011
Freshwater fish	114	24	21	0	58	51%	1%	2007
Butterflies	793	59	7	3	415	52%	n.a.	2011

a) For those groups that have been comprehensively assessed.
Source: Driver et al. (2012).

Box 5.1. **The spate in rhino poaching**

South Africa hosts about 35% of Africa's black rhino in the wild and 93% of its white rhino. The total population of South African rhinos (consisting predominantly of white rhinos) increased from about 12 000 to over 20 000 in 2004-09. However, rhino poaching in South African range-states has increased since around 2008, driven by illegal international trade. The tables below show that poaching continues to increase dramatically, reaching levels that significantly reduce, or even reverse, rhino population growth. Over the period 2000-07, 15 animals were killed on average per year compared with 668 in 2012.

The number of arrests is also growing, but not as much as the number of animals killed. Of the 246 arrested individuals up to November 2012, 217 were poachers, 18 were couriers and 11 were receivers. To date, the longest sentence handed out by the courts is a 40-year prison term given in 2012 to a Thai national. However, charges against five South African and Asian co-accused were withdrawn without explanation.

The perpetrators' operating methods in the recent illegal killing of rhino and the smuggling of their horns suggests they are highly organised and well-structured crime syndicates. In addition to the loss of horns through increased poaching, concerns have also been raised regarding "leakage" of South African horns onto the illegal international markets from stocks in the public and private sector. These syndicates are also involved in the "legal/unethical" hunting of rhino in which poached horns are exported as legal hunting trophies.

In 2010, the worsening situation prompted South Africa to initiate a National Strategy for the Safety and Security of Rhinoceros Populations. The Strategy, in the short term, proposes a better coordination of activities by stakeholders (e.g. central and provincial authorities, public and private parks managers, the police). In the long term, it proposes measures such as better information management and dedicated environment courts.

Measures have also been taken to address demand. In 2012, South Africa concluded a Memorandum of Understanding with Vietnam (probably the world's largest destination and consumer of rhino horn) to, among other things, share intelligence and technology and improve enforcement to curb wildlife poaching. Moreover, the Veterinary Genetics Laboratory of the University of Pretoria, with support from the World Wide Fund for Nature (WWF), is helping build Kenya's capacity in rhino forensic work by developing a forensic database on the rhino population in Kenya. It also trains Kenyans to undertake DNA fingerprinting and profiling to build a Kenyan national rhino database.

Box 5.1. **The spate in rhino poaching** *(cont.)*

Rhino poaching statistics					Rhino poaching arrests statistics				
National Park/Province	2010	2011	2012	Until March 2013	National Park/Province	2010	2011	2012	Until March 2013
Kruger National Park	146	252	425	116	Kruger National Park	67	82	73	28
Marakele National Park	0	6	3	0	Marakele National Park	0	0	0	0
Gauteng	15	9	1	0	Gauteng	10	16	26	3
Limpopo	52	74	59	8	Limpopo	36	34	43	20
Mpumalanga	17	31	28	9	Mpumalanga	16	73	66	1
North West	57	21	77	13	North West	2	21	32	8
Eastern Cape	4	11	7	0	Eastern Cape	7	2	0	0
Free State	3	4	0	0	Free State	0	0	6	0
KwaZulu-Natal	38	34	66	12	KwaZulu-Natal	25	4	20	1
Western Cape	0	6	2	0	Western Cape	2	0	0	0
Northern Cape	1	0	0	0	Northern Cape	0	0	1	0
South Africa	333	448	668	158	South Africa	165	232	267	61

Source: www.environment.gov.za/?q=content/updaterhino_poachingstatistics.

which has been subject to an unprecedented level of poaching (Box 4.2); cycads, the most threatened plant group in South Africa and globally; and threatened freshwater fish, one of the country's most threatened animal groups. Poaching is a pressing problem to sustainable management of biodiversity and often involves members of local communities who, driven by financial hardship, are co-opted into illegal activities by local or foreign smugglers.

Out of 20 000 plant species, South Africa uses 2 000 for medicinal purposes. The highest numbers occur in the Grassland, Forest and Savanna biomes. About one-third of medicinal plant species (656) are traded in medicinal markets of KwaZulu-Natal, Gauteng, Eastern Cape, Mpumalanga and Limpopo with an estimated annual value of ZAR 2.9 billion and the employment of at least 133 000 people, many of whom are rural women (Driver et al., 2012).

According to the Red List of South African Plants, the current extraction levels for most medicinal plant species are sustainable. Policy attention focuses on the 56 threatened species (9% of the total), 7 of which are critically endangered and extremely scarce.[7]

More than 630 marine species, most of them fish, are caught by commercial, subsistence and recreational fisheries, contributing significantly to the South African economy.[8] However, high extraction rates of harvested marine species have had serious implications on the sector. In its evaluation of stock status, the NBA considers 25 of 41 marine species overexploited, collapsed or threatened (Driver et al., 2012).

Invasive alien species present a large and growing challenge to South Africa's biodiversity. Not only do invasive species threaten indigenous biodiversity, they also have serious socio-economic impacts such as threats to water security, reduced productivity of rangelands, increased fire risk and impacts on agriculture. A conservatively estimated ZAR 6.5 billion value of ecosystem services is lost each year as a result of invasive alien plants, a loss that would be more than six times higher had no management of these plants been carried out.

Known invasive species include 660 plant species, 6 mammal species, 10 bird species, at least 6 reptile species, at least 22 freshwater fish species, at least 26 mollusc species, at least 7 crustacean species and more than 70 invertebrate species.[9] Widespread species or groups include wattle (*Acacia spp.*), gum (*Eucalyptus spp.)*, prickly pear (*Opuntia spp.*), pine (*Pinus spp.*), poplar (*Populus spp.)*, weeping willow (*Salix babylonica*) and mesquite (*Prosopis spp.*). The first National Invasive Alien Plant Survey completed in 2010 showed that land area invaded by invasive woody plants has doubled since 2000, reaching 20 million ha, or 16% of South Africa's land area.

Assessment and critical data gaps

South Africa has made significant progress in mapping and classifying ecosystems, laying the foundation for meaningful monitoring of pressures, assessment of the state and planning of necessary interventions. For example, marine and coastal habitat types and wetland ecosystem types have been evaluated for the first time, and the estuarine functional zone has been mapped for the first time for all estuaries (Driver et al., 2012). South Africa has also made considerable progress in listing threatened flora and fauna species following the IUCN classification under the Red List of Threatened Species. It has assessed a wider range of taxonomic groups than most countries and is the only megabiodiverse country to have assessed its entire flora.

Yet many important data gaps remain, partly because various datasets generated over the years used different methodologies and covered different scales of biodiversity. The NBA formally recognises this knowledge gap, but further efforts are needed to apply more robust ecological assessment of the terrestrial and marine environments, possibly based on a comprehensive Present Ecological State system for rivers, wetlands and estuaries developed by the Department of Water Affairs. The key challenge is the establishment of trends for headline indicators with respect to changes in different ecosystems and species. Programmes for long-term monitoring of ecosystems in their original situation based on quantitative indices, such as the River Health Programme, need to be strengthened or established in all environments. Other priorities for assessing ecological conditions include regularly updated maps of land cover in the terrestrial environment, and quantification of the modification in freshwater flow to the coast on a watershed scale (Driver et al., 2012). This priority research and data gathering should inform the National Biodiversity Research Strategy, currently being developed. They should also guide further development and implementation of the national biodiversity monitoring framework, as well as the updating of the 2005 National Biodiversity Strategy and Action Plan (NBSAP) and the NBA itself.

2. Pressures on South Africa's biodiversity

Analyses of projections of drivers of biodiversity loss can inform policy making and help set priorities. South Africa's biodiversity faces a number of direct and indirect pressures related to habitat conversion and economic activities, particularly agriculture, manufacturing, mining and mineral processing, urban settlement development and over-exploitation by forestry and fisheries. External factors, such as invasive alien species and climate change, have been increasingly important (Box 5.2). Although not all losses of natural habitat pose a threat to the continued provision of ecosystem services, the degradation of habitats in "critical biodiversity areas" is of particular concern. Such areas include critically endangered and endangered ecosystems; ecological and river corridors; and critical wetlands, estuaries and special habitats (DEAT, 2008; Driver et al., 2012).

Box 5.2. **Key factors impacting biodiversity and habitats in South Africa**

The *mining industry's* operations lead to a diverse and complex set of direct and indirect impacts on biodiversity. Key impacts include alterations to the water table due to mine de-watering and a decline in the functioning and quality of above-ground natural ecosystems at the mine and its surrounding areas due to water contamination. Visible changes to the scenery by mine dumps, slime dams and open pits are also of concern. For example, mine dumps are often susceptible to alien plant infestations due to decline in ecosystem resilience, and thus serve as source centres for dispersal to surrounding areas. The impacts of the mining sector have worsened significantly over the past few years as acid water drainage from abandoned mines contaminates groundwater used for irrigation; this, in turn, leads to heavy metal and other pollutant accumulation in organisms of all trophic levels as they pass through the food chain. The available evidence suggests that mining will continue, perhaps with higher intensity due to an increased demand for coal and other minerals; as a result, it constitutes a significant threat to biodiversity.

Timber plantations degrade biodiversity, but their impacts on landscape fragmentation are even more severe. Commercial afforestation is one of the most important threats to the Grasslands biome. This is especially true of the high rainfall sour grasslands, which have been almost completely transformed in terms of both species composition and vegetation structure. Afforestation also impacts heavily on hydrology, drying up rivers and streams. Commercial plantations, which usually use alien species, also impact on indigenous forests, particularly where they have been planted close to natural forest. Moreover, the timber industry tends to reduce the frequency of fires, which may have dire ecological consequences as grassland species require fire for regeneration.

The *agricultural sector* (both commercial and subsistence) occupies approximately 80% of South Africa's land and has had profound impact on natural habitat across the country. The clearing of natural vegetation for crop cultivation has impacted all biomes. For example, commercial agricultural farms constitute 3.2 million ha (65%) of the Grassland biome. There is also a steady increase in game-ranching and subsistence farming in rural and communal areas. Beyond land conversion, agriculture has impacted biodiversity through an extensive introduction of genetically modified crops; the main environmental risks are displacement of indigenous species (emulating the effects of alien invasive species), effects on soil organisms (including microbes) and impacts on other species along the food chain. South Africa is currently the ninth GM crop producer in the world, but the extent of GMO impacts on biodiversity is still unclear.

Uncontrolled *urban development* results in the destruction of key habitats and biodiversity, directly (through land conversion) or indirectly (through polluted water and air). Urban settlements and associated developments are concentrated in the eastern and north-eastern parts of the country, along both primary road networks and the coastal belt. The most evident impacts of urban development can be observed in Gauteng, which is the smallest, yet most urbanised province.

The main pressure to aquatic freshwater ecosystems (rivers and wetlands) comes from *flow modification,* which occurs as a result of building dams and weirs; *extracting water for agricultural, industrial and human use;* and *pollution*. Moreover, the loss of natural habitat and invasive alien species in the riparian zone and farther away in the catchment, pose serious threats. All of these pressures in freshwater ecosystems apply equally to estuaries, and can also affect near-shore marine habitats.

Box 5.2. **Key factors impacting biodiversity and habitats in South Africa** *(cont.)*

Invasive alien species, both plants and animals, are a major problem in terrestrial, freshwater and marine environments. They consume more surface water than the natural vegetation they displace. For example, invasive woody aliens are thought to utilise 3.3 billion m^3 of surface water per year (about 7% of the country's runoff), which exceeds water used by indigenous vegetation. The second largest impact concerns losses in agricultural yields from crop pests. The main pathways for introducing alien species include freight transport, the commercial forest sector and the aquaculture industry.

High and/or unsustainable levels of *species harvesting,* e.g. for medicinal purposes, poses another serious threat to South Africa's biodiversity. However, unlike in other countries with similar features, over-harvesting in terrestrial ecosystems does not generally pose a major pressure compared to habitat conversion and invasive alien species. Still, 192 plant *taxa* are threatened by direct use or are subjected to potentially unsustainable harvest levels. These figures do not capture the less well-documented illegal trade in animal parts, such as rhino horns.

Climate change modelling suggests the area covered by South Africa's nine biomes could be reduced by up to 55% in the next 50 years. This will significantly increase fragmentation of habitats, species extinction and disruption of ecosystem services. The poor and marginalised are most likely to be exposed to these impacts, and least able to cope due to lack of access to both resources and social services.

Source: NBF (2008); Cadman et al. (2010); DEAT (2010); GoSA (2011); Driver et al. (2012); DEA (2013).

Direct and indirect pressures have resulted in the loss of around 20% of natural habitat in South Africa, most of it in the last century. Rates for certain high pressure areas are even higher and continue to grow. For example, the NBA estimates that if current rates of loss were to continue, there would be almost no natural habitat left outside protected areas by 2050 in Gauteng, KwaZulu-Natal and North West provinces.

3. The policy and institutional frameworks

3.1. Legal and policy framework

Under apartheid, conservation frequently entailed dispossessing people from their land for the creation of game parks and nature reserves. As a result, entire communities lost their livelihoods and were forcibly relocated. Further, past conservation efforts often focused on specific "charismatic" species as opposed to habitat types. Policies were characterised as "fence and protect", and generally did not seek any accommodation with economic development.

Under the new political system, South Africa underwent a significant shift in policy development and target setting within the biodiversity conservation sector. Ecosystem services (as opposed to species), social justice and socio-economic development became the key considerations of biodiversity policies. These policies embraced approaches that involved stakeholders in decision making and aimed to re-integrate communities within the production landscapes (DEAT, 2005; DEAT, 2008; Cadman et al., 2010).[10]

In keeping with the provisions of the 1998 National Environmental Management Act (NEMA), two key pieces of legislation set out the principles and procedures governing biodiversity management: the 2003 National Environmental Management: Protected Areas Act, which is the central piece of legislation for the establishment and management of South Africa's protected area network; and the 2004 National Environmental Management:

Biodiversity Act (NEMBA), which provides for the management and conservation of biodiversity. The NEMBA, in particular, was a milestone as it laid the legal basis for policy directed specifically towards biodiversity conservation and not "nature" in general. It addresses the protection of the diversity of species and ecosystems, sustainable use of indigenous biological resources, and the fair and equitable sharing of benefits arising from bioprospecting that involves indigenous biological resources. South Africa's biodiversity legislation is pioneering, and in advance of that in many OECD member countries.

Other legal acts, such as the World Heritage Convention Act (Act No. 49 of 1999) for globally recognised heritage sites, the Marine Living Resources Act for marine protected areas, the National Forests Act (Act No. 84 of 1998) for forest protected areas and the Mountain Catchment Areas Act (Act No. 63 of 1970), create specific regulatory and management frameworks. Several other acts concerning management of forests, as well as of water, marine and coastal resources – enacted within the first decade of the post-apartheid period – contained provisions relevant to biodiversity conservation.

Having established one of the world's most detailed, progressive, scientifically sound and comprehensive bodies of biodiversity legislation between 1994-2005, South Africa has since introduced legislation and strategies that set biodiversity objectives and targets, and facilitate their implementation. The key national policies that guide biodiversity planning and management are the 2005 National Biodiversity Strategy and Action Plan (NBSAP), the 2008 National Biodiversity Framework (NBF) and the 2009 National Protected Areas Expansion Strategy (NPAES) (Box 5.3). The setting of the objectives and targets of these policy documents was guided by the 2004 National Spatial Biodiversity Assessment (NSBA).

Box 5.3. **South Africa's main national biodiversity policy and target-setting documents**

The National Biodiversity Strategy and Action Plan (NBSAP), published in 2005, sets out a comprehensive framework and plan of action until 2020 for the conservation and sustainable use of South Africa's biodiversity and the equitable sharing of benefits derived from such use. The NBSAP influenced the development of the National Biodiversity Framework (NBF) that provides the blueprint for implementing South Africa's biodiversity policy and objectives, as required by the Biodiversity Act. This effectively gave the NBSAP legal standing, another feature that makes South Africa's NBSAP more advanced than those in other countries. The NBSAP developed five strategic objectives accompanied with outcomes, five-year targets, indicators and activities with clearly indicated lead agencies and partners.

The NBF of 2008 focused on immediate priorities for action, both spatial and thematic. It identified 33 priority actions for 2008-13, organised according to the five strategic objectives of the NBSAP. The NBF is expected to be reviewed at least every five years, providing an opportunity to take stock of progress, review priorities and realign efforts.

The 2009 National Protected Area Expansion Strategy (NPAES) and the accompanying National Freshwater Ecosystems Priority Areas Report provide the policy vehicles for implementing South Africa's protected areas expansion objectives as laid out by national legislation. The NPAES seeks to achieve cost-effective expansion of protected area for ecological sustainability and increased resilience to climate change, whereas the goal of the freshwater counterpart document is to conserve a sample of the full diversity of species and the inland water ecosystems in which they occur, as well as the processes that generate and maintain diversity.

Source: NBF (2008); Cadman et al. (2012); DEA (2013).

However, progress at the national level has not been matched at the sub-national level. The enactment of provincial biodiversity legislation to help implement key national policies, such as the NBF, is still pending. Another challenge is that the rights and interests of local communities are often not adequately taken into account. For example, legislation to protect traditional biodiversity knowledge and intellectual property is still inadequate (African Centre for Biosafety, 2011 in DEA, 2013). Also, prior consultations with local communities over protected-area expansion have not always taken place, which negatively affects community participation in the management of protected areas.

The social dimension of biodiversity policy, most notably job creation, poverty alleviation and the amelioration of past injustices through local community access and benefit-sharing, are well-pronounced compared to many OECD member countries. Key biodiversity legislation is aligned in this regard with the country's important national policies, namely: the National Strategy for Sustainable Development (NSSD–1); the National Action Programme: Combating Land Degradation to Alleviate Rural Poverty (NAP); and the National Spatial Development Perspective (NSDP) (Chapter 2).

3.2. Overarching themes of South Africa's biodiversity policy

South Africa's biodiversity laws and policies follow the rigorous and systematic *planning approach* mandated by the NEMBA (Box 5.4). This approach ultimately aims to identify spatial biodiversity priority areas and actions.[11] These include protected area expansion plans, provincial biodiversity plans, bioregional plans and biodiversity sector plans for freshwater ecosystem priority areas or threatened ecosystems on land and at sea. The identification of spatial priorities based on the best available scientific data and methodologies provides a systematic and strategic guide for action. It also allows South Africa to identify cost-effective areas of conservation priority, as well as to investigate constraints and opportunities for ensuring their security over the long-term (Cadman et al., 2010; Driver et al., 2012; DEA, 2013).

The planning approach is supplemented by a *landscape approach*. While planning focuses on conservation beyond the boundaries of protected areas or specific species, it promotes the conservation of well-functioning production landscapes. This requires mainstreaming biodiversity considerations into all forms of economic activity, such as agriculture or mining, within a particular landscape. The landscape approach also directly acknowledges the close inter-linkages between biodiversity conservation and economic development. As such, the landscape approach actively enables implementation of the ecosystem approach to biodiversity conservation, as laid out in the UN Convention on Biological Diversity (CBD).

3.3. Biodiversity target setting in South Africa

Target setting for biodiversity policy emphasises the need to conserve a representative sample of ecosystems and species (the principle of representation), as well as the ecological processes that allow them to persist over time (the principle of persistence). Quantitative biodiversity targets are also set for how much of each biodiversity feature should be maintained in a natural or near-natural state (Box 5.5). These principles are reflected in the NSBA and NBA headline indicators, ecosystem threat status and ecosystem protection level through biodiversity targets and thresholds. They also underpin spatial biodiversity planning at the national and sub-national level (Driver et al., 2004, 2012).

Box 5.4. **Systematic biodiversity planning: The basis for South Africa's national biodiversity policy**

Systematic biodiversity planning involves mapping a wide range of biodiversity features and patterns of land and resource use, and setting biodiversity targets on the basis of specialised software programmes linked to Geographical Information Systems (GIS). Outputs are then interpreted and presented as maps and land-use guidelines.

Maps can be generated at various spatial scales to indicate where to focus conservation action. They also help to assess the implications of different land-use options for biodiversity. As one key feature, this approach focuses on ecosystems, represented by vegetation types. This makes it well-suited to inform a landscape approach to biodiversity conservation and ecosystem resilience. The listing of ecosystems and their threat and protected status (and not only species) makes it possible to focus interventions at the landscape scale. Threatened ecosystems can be used to identify sites for biodiversity stewardship or for targeting other forms of conservation action. The maps also add contextual information for environmental assessment, indicating geographic areas that require special attention in environmental impact assessments or other environmental management frameworks.

Biodiversity targets, based on thresholds determined by science, may be revised as knowledge and information improve. The biodiversity targets established by this approach should not be confused with other targets such as those for protected areas, which refer to the area of land that should be included in the protected area network by a certain date. Protected area targets, focused on action or political targets, should be updated every few years. In South Africa, the ecosystem-specific, 20-year protected area targets that are set in the National Protected Areas Expansion Strategy are a subset of national biodiversity targets established in the NSBA and NBA.

In another key feature of South Africa's biodiversity planning, the generated spatial-information is made available to policy makers, end users and stakeholders through web-based technology. A Biodiversity-GIS (BGIS) website (*http://bgis.sanbi.org*) provides spatial biodiversity information in the form of interactive maps, GIS data layers and a wide range of supporting databases, reports and other literature. An additional online service, the Land-Use Decision Support (LUDS) tool, gives quick access to all the spatial biodiversity information available for a particular site through short summary reports highlighting key biodiversity features. The success of BGIS led to the Biodiversity Advisor portal (*http://biodiversityadvisor.sanbi.org*), which provides access to additional datasets such as species and specimen data. Other notable data gathering and dissemination platforms include the South African Environmental Observation Network (SAEON) and the Southern African Plant Invaders Atlas (SAPIA) Project. The investment in such data collection and dissemination mechanisms is a central component of South Africa's world-class and pioneering systematic biodiversity planning approach.

Source: Cadman et al. (2010); Driver et al. (2011); DEA (2013).

Biodiversity target setting goes beyond a technocratic systematic planning approach. It is a much more complex and multi-layered process that accommodates budgetary constraints and cost effectiveness considerations (Chapter 3), as well as external obligations and commitments towards international treaties (Chapter 4). It also reflects relations across government departments and between government and industry. Finally, distributional concerns and issues related to poverty and unemployment are important considerations in target setting.

Box 5.5. **South Africa's biodiversity objectives and targets**

The main objectives set in the NBSAP, the NBF and the NPAES include:

- Reduction of the loss and degradation of natural habitat in priority areas that are still in good ecological condition.
- Protection of critical ecosystems through consolidating and expanding the protected area network, as well as strengthening the effectiveness of existing protected areas recognised under the Protected Areas Act, including contracting protected areas on private or communal land.
- Restoration and enhancement of ecological infrastructure in those biodiversity priority areas that are currently not in good ecological condition in order to strengthen ecological infrastructure and support delivery of ecosystem services.
- Promotion of sustainable utilisation of biodiversity resources within production landscapes that enhances livelihoods.

The main priority targets for biodiversity under Outcome 10 "Environmental Assets and Natural Resources", of the Government Medium-Term Strategic Framework 2009-2014, include:

- Expansion of land under conservation status from 6% to 9% and the increase of coastline with partial protection from 12% to 14%.
- Reduced climate change impacts on biodiversity via climate change adaptation frameworks for major biomes (Desert, Succulent Karoo, Fynbos, Nama Karoo, Grassland, Savanna, Forest and Albany thicket) and aquatic ecosystems (freshwater, estuaries, marine and coastal ecosystems).
- Better protected ecosystems and species through setting specific harvesting restrictions and the number of species under formal protection, which entails:
  - maintaining the current 9% of the coastline area where harvesting is prohibited and increasing the exclusive economic zones from 1% to 3% of offshore territories where harvesting is prohibited
  - reducing below the current 6.5% the proportion of species threatened with extinction
  - ncreasing fish stocks by 10% from 2010 levels
  - increasing the number of Ramsar wetlands with management plans in place by five sites per year
  - increasing the number of estuaries under formal protection from the current zero to 20% by 2015.
- Enhanced understanding of the values of ecosystem and biodiversity services (through National Ecosystem Assessment), incorporating these values into the decision-making process.
- Expansion of protection of high-potential agricultural land from 3% to 81%.

The establishment of biodiversity targets allows the development of spatial biodiversity plans. These identify biodiversity priority areas important for conserving a representative sample of ecosystems and species, for maintaining ecological processes or for providing ecosystem services. Coastal ecosystem priority areas and marine ecosystem priority areas have yet to be identified across the country, and are the missing elements in this set of biodiversity priority areas. Therefore, the development of a national coastal biodiversity plan is an urgent priority (Driver et al., 2012).

3.4. Institutional set-up for biodiversity management

State and local administration

The Department of Environmental Affairs (DEA) has been the lead agent in driving the implementation of the NBF by co-ordinating and catalysing the actions of other agencies and institutions, including the South African National Biodiversity Institute (SANBI),[12] South African National Parks (SANParks)[13] and iSimangaliso Wetland Park. Provincial parastatal agencies such as the Ezemvelo KZN Wildlife, which carries out biodiversity conservation and associated activities in the province of KwaZulu-Natal,[14] also play important roles.

A number of inter-governmental structures facilitate co-operation between South Africa's three spheres of government with respect to biodiversity management. Notable among these are the Ministerial Forum (MINMEC) and the Ministerial Technical Committee (MINTEC) (Chapter 2). They provide critical inputs to policy reform and legal amendments. One of the MINTEC's Working Groups focuses specifically on biodiversity and management of protected areas.

Despite progress in strengthening co-ordination in policy development, institutional gaps remain with respect to the integration of biodiversity policies into other key sectors. Most notable issues include mining, energy generation, transport and coastal management. To date, for example, the DEA only has a verbal agreement to deal with environmental impacts of mining activities (Chapter 2). Although progress is being made on interagency binding and institutionalised agreement, there is a need to accelerate such co-operation.

The other institutional constraint in the biodiversity sector is lack of sufficiently skilled and experienced managers, in particular in provincial and local governments (DEA, 2013). All agencies and institutions surveyed during the stocktaking phase of the NBSAP noted lack of funding as a limiting factor. The considered shortfall varied in extent from 10% to more than 50%. Funding shortages result in identified projects not being implemented, infrastructure not being maintained, staff shortages and excessive workloads for remaining staff. The latter often leads to further reducing capacity to absorb the allocated funds. To address the skill limitations, a Human Capital Development Strategy was developed and is coordinated by SANBI (*www.greenmatter.co.za*). The strategy provides a mechanism for agencies to contribute in a coherent and synergistic way to skill development and retention, and further demonstrate the potential of ecosystems to contribute to economic and social development. To address staff funding constraints, many sub-national governments have established independent institutions, governed by boards, which rely heavily on tourism revenues to offset funding shortfalls (DEAT, 2005; DEA, 2013).

Public expenditure on biodiversity

Government expenditure on biodiversity conservation-related matters in 2012/13 was around ZAR 1.9 billion, an increase from ZAR 1.3 billion in 2009/10[15]. At the national level, the DEA spent ZAR 576 million in 2011/12, which constituted around 13% of its budget. This amount includes activities directly related to conserving and managing terrestrial and marine biodiversity, such as the expansion of protected areas or livelihood support programmes that promote sustainable use of biodiversity, as well as biodiversity landscape planning and research. The expenditure increase between 2009/10 and 2012/13 was mostly

due to additional funding to SANBI and SANParks to ensure that both institutions deliver on their mandates. This trend is set to continue until 2016. The increase in budget allocations are also driven by the creation of new Biodiversity Monitoring and Evaluation and Biodiversity Economy and Sustainable Use sub-programmes (National Treasury, 2013).

At the provincial level, biodiversity-related expenditure reached around ZAR 1.3 billion in 2012/13, nearly doubling since 2007/08. Biodiversity management activities account for half of provincial environment expenditures, except in Gauteng and Northern Cape; these two provinces allocate less than 25% of their budget to biodiversity conservation programmes. In Eastern Cape, KwaZulu-Natal and Western Cape, large proportions of biodiversity budgets are transferred to conservation agencies that manage provincial nature reserves and carry out monitoring and enforcement. The transfers are also used for research, education and visitor services. The DEA's operations at the sub-national level are supported by substantial allocations (ZAR 1.5 billion in 2009/10 and ZAR 3 billion in 2012/13) under the Social Responsibility Programme (SRP), which is part of the government's Expanded Public Works Programme. Under this programme, the DEA supports the "Working for…" series that targets a wide range of environmental rehabilitation needs through labour-intensive methods. It began with the success of Working for Water, an early "payment for ecosystem services" (PES) programme that has been much copied in other developing countries. The series was expanded into a wider range of programmes such as Working on Fire, Working for Wetlands and Working for Land (Chapter 6).

Despite these increases, provinces report shortfalls in funding to implement biodiversity targets. For example, only Free State and Gauteng approved budgets with valid management plans of provincial protected areas at the end of 2010/11, an indicator of the extent of a province's oversight of its biodiversity (National Treasury, 2011). The shortfalls are attributed to the vertical budget allocation in South Africa; it does not explicitly take biodiversity issues into account and does not transfer more funds to provinces with nationally and globally significant or threatened biodiversity. Provinces have only limited powers to raise their own finances for the implementation of biodiversity policies. Debates continue on how revenues from environment-related taxes, fines, fees and licences (e.g. ecotourism) and permits are distributed among the different levels of government. The result is an inadequate balance between spatial scale, biodiversity importance and threats to conservation in the province on the one hand, and the allocation of national funding to the province on the other.

During the last decade, much of these shortfalls have been alleviated by international funding. For example, the Global Environment Facility (GEF) has contributed over USD 80 million in support of projects such as the Richtersveld Community Biodiversity Conservation Project, Cape Action for People and the Environment, Agulhas Biodiversity Initiative, Maloti Drakensberg Transfrontier Conservation and Development Project, Greater Addo Elephant National Park, Benguela Current Large Marine Ecosystem and numerous other smaller biodiversity projects, mainly in internationally recognised biodiversity hotspots. However, grants from external donors are likely to decrease over time.

Non-governmental organisations

Non-governmental organisations (NGOs) with a biodiversity focus have played a significant role in the establishment of protected areas, awareness-raising, environmental education, research, monitoring and mobilising the support of the private sector for

conservation and development work.[16] An informal DEA-NGO collaborative forum, and its Biodiversity Working Group, is an important place for government and large NGOs to co-ordinate biodiversity policy development and implementation. Increasingly, smaller community-based organisations operating at local site-level are joining larger NGOs in implementation partnerships (DEAT, 2005; Cadman et al., 2010).

A traditional focus of NGOs on advocacy and the conservation and sustainable use of biodiversity has broadened recently to include biodiversity mainstreaming, poverty alleviation, sustainable use and benefit-sharing. They have played particularly important roles in identifying and initiating projects on integrating biodiversity into land-use planning, as well as biodiversity stewardship and engagement with production sectors. The updating of Red Data Lists in South Africa is largely due to the commitment of NGOs, such as the Endangered Wildlife Trust, Conservation Breeding Specialist Group, BirdLife South Africa, university research units such as the Avian Demography Unit at the University of Cape Town and volunteer public interest groups. NGOs have initiated ideas, secured funding to support pilot studies and then successfully embedded the fully fledged project in institutions with a mandate for biodiversity conservation. (DEAT, 2005; Cadman et al., 2010). Examples of such pilot projects are the Putting Biodiversity Plans to Work and the Baviaanskloof Mega-reserve Project.

4. Economic and financial aspects of ecosystem services

South Africa's biodiversity policy framework endorses and promotes market solutions for biodiversity conservation, including a number of economic, fiscal and financial instruments. This is motivated by efficiency and cost effectiveness, as well as social and development considerations. The application of economic instruments is in line with the landscape planning approach discussed in Section 3.2.

4.1. *Estimate of economic values*

Some indicative analyses found the aggregate economic value of South Africa's ecosystem services to be approximately ZAR 73 billion per year, or around 3% of GDP in 2008 figures (Table 5.2). Although a lower bound, conservative and coarse estimate, it nevertheless indicates the significant value of South Africa's biodiversity. These figures exclude marine services and existence values and do not fully capture the consumptive benefits from biodiversity (such as food, clean water, fuel wood and building material), subsistence income-generation benefits (such as the sale of medicinal plants and reed mats) and crucial safety net and insurance benefits. Hence, small reductions in ecosystem services derived from biodiversity can have large welfare impacts, particularly for the poor segments of society (Driver et al., 2012).

The NBF and NBSAP do acknowledge that more rigorous economic valuation analyses could help biodiversity policy on many fronts. The benefits could help demonstrate the adverse side-effects of certain economic activities and hence strengthen the economic case for biodiversity conservation rather than relying on ethical or ecological criteria. The economic analysis can help develop markets for biodiversity conservation or help design and implement PES-type policies such as stewardship programmes. Despite the acknowledgement of their usefulness, estimates of the economic value of environmental externalities for biodiversity goods and services do not seem to have influenced the setting of policy objectives and targets or allocation of resources for their conservation and development. Social concerns – when considered – are brought into the biodiversity

Table 5.2. **Valuation of ecosystem services**

Ecosystem service	ZAR million per year	USD million per year
Grazing	18 094	2 349
Natural resources	4 895	635
Bioprospecting	178	23
Carbon sequestration	8 649	1 123
Pollination	5 684	738
Erosion control	8 319	1 080
Flow regulation	440	57
Water treatment	202	26
Blackfly control	77	10
Crop pest control	4 380	568
Nursery value	976	127
Tourism	21 000	2 727
Scientific	15	2
Total value of selected ecosystem services	73 000	9 465

Source: Turpie et al. (2008).

decision-making process through more deliberative processes, such as stakeholder participation or multi-criteria analysis. Even though cost effectiveness is sometimes considered, biodiversity target setting is not subjected to formal cost-benefit analysis as in many OECD member countries.

4.2. The ecosystem services in protected areas

The use of protected areas (PA) as a conservation tool in South Africa has a long history. Many protected areas became national icons and a source of pride, including Cape Floral Region Protected Areas, Kruger National Park, iSimangaliso Wetland Park or uKhahlamba/Drakensberg Park. The PAs provide crucial ecosystem services, are sources of livelihood for rural communities and contribute to local and regional economies (Box 5.6). The management of PAs is associated with certain institutional and legal advantages, such as property rights and user rights, but also the standing and practice with respect to benefit-sharing. The latter can provide incentives for the development of sustainable markets, e.g. through micro-enterprises, and for community self-enforcement of conservation practices. PA statutes also help landowners extract benefits (or "rents") from their land. They also provide alternatives in the face of tempting economic decisions. Contracting land for mining operations, for example, may have short-term benefits, but can be detrimental to the land and resource base in the long term.

Economic activities within protected areas provide important livelihood opportunities to South Africa's population. Especially in marginal agricultural areas, evidence to date suggests that conservation-related industries have higher economic potential than regular agricultural activities, such as stock farming. A study in the Eastern Cape showed that a change from livestock farming to ecotourism resulted in a four-fold increase in income per hectare and a two-fold increase in the number of jobs per hectare. In Namaqualand, anecdotal evidence suggests that Namaqua National Park creates twice as many jobs as commercial farming on an equivalent area of land. The most valuable rural land in the country outside peri-urban development nodes, based on 2005-07 land prices, is found on the boundaries of Kruger National Park, suggesting that game farming and ecotourism provide the most lucrative land-use option, in at least some parts of the country (Driver et al., 2012).

Box 5.6. **Protected areas in South Africa**

A protected area is defined as an area of land or sea that is formally protected by law and managed mainly for biodiversity conservation. This definition is narrower than that adopted by the IUCN, which recognises many "protected area" categories, distinguished largely by land management objectives, with no requirement for formal legal status.

The Protected Areas Act established a streamlined set of four categories for protected areas: *i)* Special Nature Reserves, *ii)* National Parks, *iii)* Nature Reserves and *iv)* Protected Environments. Further conservation categories are provided for by the Biodiversity Act, by contract law and through informal arrangements (NPAES, 2008). The Act also recognises World Heritage Sites, Marine Protected Areas, Specially Protected Forest Areas and Mountain Catchment Areas, all of which are declared in supporting legislation. A protected area can be declared on private or communal land, with the landowner recognised as the management authority.

In 2008, the National Protected Areas Expansion Strategy (NPAES) was adopted to increase the extent of land under formal protection for the following 20 years. Priority was placed on the protection of connected landscapes that enhance ecological sustainability and resilience to climate change. The NPAES included quantitative, ecosystem-specific protected area targets that were a subset of the national biodiversity targets determined by the 2004 National Spatial Biodiversity Assessment. The NPAES provided provincial breakdowns of national protected area targets and prioritised areas to be assigned a protected status based on both biodiversity importance and the urgency of conservation. Targets (in hectares) were then determined to provide a roadmap for increasing the conservation estate: only biodiversity-significant land that is threatened should be considered for inclusion in protected area expansion.

The main mechanisms for expanding the land-based protected area network are acquisition of land and contract agreements with private and communal landowners, including biodiversity stewardships. The main institution implementing the expansion is SANParks, which manages approximately 4 million ha of protected land constituting 55% of all protected areas and 3% of the total area of South Africa.

South Africa has adapted the global Management Effectiveness Tracking Tool (METT) for protected areas, and in 2010 conducted the first national assessment of management effectiveness of state-owned protected areas. The assessment highlighted significant management challenges and pointed to the importance of adequate infrastructure, equipment and facilities as determinants of management effectiveness. Invasive alien plants and poaching emerged as the top two threats faced by land-based protected areas. In general, National Parks and World Heritage Sites appeared to be on a more sound management footing than state-owned provincial Nature Reserves (Cowan et al., 2010). The intention is to repeat the assessment every five years. Only land-based protected areas were assessed in 2010, with a recommendation that marine protected areas be included in the next assessment.

Source: Driver et al. (2012).

Marine protected areas play a particularly important role in helping sustain fish stocks for commercial, subsistence and recreational fishing. For example, these areas, especially those with "no-take" status, can protect spawning and breeding grounds for stocks of fish species, allowing for recovery of over-exploited fish species and improving fishing yields outside marine protected areas through a spillover effect (Driver et al., 2012).

4.3. Biodiversity stewardship programmes

It is neither socially desirable nor financially feasible for government to purchase all sites of high biodiversity importance for inclusion in an expanded, state-owned protected area network. South Africa's model for biodiversity stewardship programmes has provided a cost-effective way for government, sometimes in partnership with NGOs, to carry out its conservation mandate by entering into contractual agreements with landowners. Whether private individuals/entities, local communities or public institutions, these landowners commit to conserving and managing the biodiversity on their land. It is estimated that stewardship agreements entail only one-tenth of the cost of purchasing land out-right. Beyond cost saving, such approaches provide a policy mechanism for expanding PAs in a way that considers the rights and interests of landowners. This is particularly important in South Africa: in the past, the establishment of protected areas was received with resentment as communities were often dispossessed of their land (Cadman et al., 2010).

Depending on the agreement, stewardship programmes can have different scope and duration (Figure 5.2). The degree of biodiversity importance of the site, the degree of site security associated with the contract and the benefits to landowners all increase as the area moves through the hierarchy of conservation categories from "conservation areas" to "nature reserves". Several factors determine the biodiversity stewardship category most appropriate for a particular site, including biodiversity considerations, land tenure arrangements and willingness of landowners to participate.

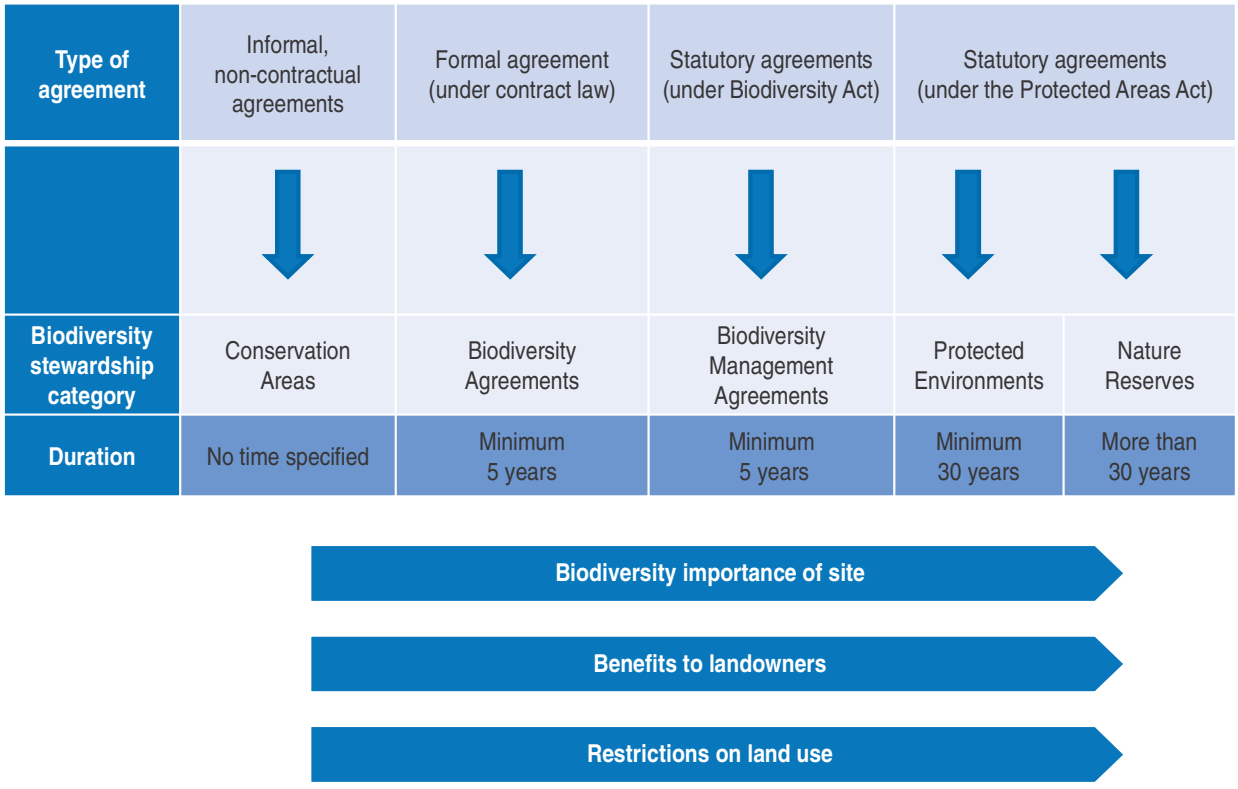
A range of incentives matches various biodiversity stewardship categories and meets the needs of the wide range of potential stakeholders – from financial and tangible incentives to non-financial and less tangible benefits relating to social, cultural or moral factors (DEAT, 2008).

Fiscal incentives are mainly income tax deductions for private landowners who have entered into statutory biodiversity stewardship agreements. These tax-based incentives are only relevant for landowners with important biodiversity on their land and who are generating significant taxable income from this land. A further incentive, provided by the 2004 Municipal Property Rates Act, excluded nature reserves from paying property taxes. These exclusions apply only to land declared under the "nature reserve" stewardship category, and only to parts of the property not used for commercial, business, agricultural or residential purposes (DEAT, 2008; Cadman et al., 2010; DEA, 2013).

Other incentives for signing such agreements that are not strictly fiscal but which have an income-generating or livelihood improvement dimension include the following: land tenure security benefits that come from such agreements; technical and professional advice (such as assistance with development of management plans); support and access to public works funding (such as clearing of invasive alien plants, fire management, law enforcement, habitat rehabilitation); partnerships and co-operation among landowners, between landowners and the authorities and with nature-based commercial ventures; access to marketing resources; public recognition and product branding (certification). To facilitate the development of stewardship programmes, a national Biodiversity Stewardship Policy and a Biodiversity Stewardship Guideline Document were developed by the DEA in partnership with SANBI (Cadman et al., 2010).

In just a decade since the first pilot stewardship programme in South Africa, the country now has programmes operating in six provinces with 24 provincial contracts under which protected areas have been declared on more than 75 000 ha. Another 35 contracts

Figure 5.2. **Biodiversity stewardship programme models**



Source: Cadman et al. (2010).

have been signed and are awaiting proclamation, and over 70 more are in negotiation. If all of these are successfully proclaimed, around 430 000 ha will have been added to the protected area network through biodiversity stewardship programmes. This will have achieved over 15% of the 2013 national protected area expansion target of 2.7 million ha, at a fraction of the cost of traditional approaches for acquiring land. With modest additional resources, biodiversity stewardship programmes could play an even greater role, and expand their scope to river, wetland and estuarine ecosystems (Driver et al., 2012).

Despite these notable advancements, progress is hindered by a lack of staff and operating budget capacity. South Africa's biodiversity stewardship model is still quite resource-intensive, as all agreements must be serviced by the provincial conservation authority, which requires ongoing support to landowners. The challenge is not only to increase human capacity and financial resources for rolling out biodiversity stewardship countrywide, but also to ensure adequate time to build and maintain the positive relationships upon which biodiversity stewardship depends. Long-term viability, or post-contract behaviour of landowners, remains a challenge (Cadman, 2010; Cowan et al., 2010; DEA, 2013).

The relationship between efforts to enlarge protected areas and land reform has also tended to be controversial, as it often focuses on land claims within existing protected areas. It is unfortunate that not enough attention is paid to the opportunities that protected area expansion can provide for supporting the land reform agenda and diversifying rural livelihood options, especially in agriculturally marginal areas. As

potentially major landholders through the land reform process, local communities could enjoy full access to the economic opportunities associated with ecotourism (Driver et al., 2012). Protected area expansion can work in partnership with land reform for mutual benefit; this is exemplified by contract agreements that establish nature reserves or other forms of biodiversity stewardship agreement on land that remains in the hands of its owners. The Somkhanda Game Reserve project in northern KwaZulu-Natal demonstrates how biodiversity stewardship in the context of land reform can successfully deliver both conservation and socio-economic benefits to communities. The Biodiversity and Wine Initiative (BWI) is an example of a successful partnership between business and the biodiversity sector (Box 5.7).

Despite facing some challenges, biodiversity stewardship programmes have significant potential in South Africa for several reasons:

- The stewardship model is firmly based on national biodiversity and planning legislation rather than applied in an ad hoc fashion as is the case in many countries.
- Stewardship programmes retain the pursuit of biodiversity conservation as their central and primary aim. International experience with such contract schemes has shown that economic development can over-ride biodiversity objectives, e.g. when such schemes have been used as a cloak for social or agricultural subsidy programmes and have generated few ecological benefits and no lasting effects.
- Incentive schemes do not follow a "one size fits all" approach. Rather, they are flexible and adapted for different types of landowners and stewardship agreements.
- Effective partnerships between NGOs, the international community and government departments have facilitated effective implementation, where action by any side alone would not have succeeded. (Cadman et al., 2010; DEA, 2013).

Whether financial incentives are high enough depends on whether programmes attract sufficient interest from landowners, as well as attracting the appropriate type of land (i.e. achieving additionality).[17] An increased focus on non-fiscal incentives is also a promising strategy. International evidence, especially from developing countries, suggests that non-fiscal payments or rewards associated with these type of contractual agreements are often more effective in attracting participants.

4.4. Payment for ecosystem services

South Africa has promoted the use of "payment for ecosystem services" (PES) schemes. Where environmental resources and ecosystem services are used as inputs to produce marketable goods and services, these approaches are in line with South Africa's landscape approach (where biodiversity conservation is mainstreamed into economic activities and linked with economic growth and job creation). These schemes are based on a formal contract between a beneficiary of these services and the entity (individual landowner or community) that bears the opportunity cost of providing them. The stewardship programme discussed above is essentially a PES scheme, but one that applies only in protected areas and involves contracts between landowners and (national or provincial) state authorities.

Although the development of PES schemes is mandated under NBSAP and NBF, progress remains at a very preliminary stage in South Africa. Feasibility studies for the implementation of PES have been carried out in two major water-production areas in South Africa: the Maloti-Drakensberg Mountains and the Tsitsikamma-Baviaanskloof

Box 5.7. **Biodiversity stewardship programmes in South Africa**

The Somkhanda Game Reserve project: Land restitution with conservation benefits

The Gumbi people in northern KwaZulu-Natal province established Somkhanda Game Reserve as part of a land restitution project in which the community successfully reclaimed 21 500 ha of land in the mid-1990s. The tribal authorities formed a legal entity, the Emvokweni Community Trust, which allowed them to negotiate the ownership of the land with the provincial conservation authority. In 2009, the Community Trust negotiated a biodiversity stewardship agreement that has provided the following benefits:

- **Strategic business partnerships**: A private property development company became a partner in developing a residential estate linked to the game reserve. Resulting monetary benefits provide the necessary resources for management of the game reserve, development of tourism opportunities and provision of housing and accommodation for the community.
- **Planning and management support**: Both the provincial conservation authority and a well-resourced conservation NGO, the Wildlands Conservation Trust, are helping the community develop a management plan, map invasive alien plants, develop an invasive alien species strategy and procure donations of game to stock the reserve.
- **Training and capacity building**: The community is being empowered to manage the game reserve through a range of training programmes, including accredited law enforcement training and use of a GIS-based patrolling system.

Biodiversity and Wine Initiative: A partnership between the wine industry and the conservation sector

Nearly 95% of the country's wine-growing takes place in the Cape Floral Kingdom (CFK), the richest – and also the smallest – plant kingdom on the planet. Recognised both as a global biodiversity hotspot and a World Heritage site, the CFK has come under increasing pressure from agriculture, urban development and invasive alien species.

In 2004, faced with just 4% of the CFK's unique renosterveld plant community and vegetation type remaining, and much of its lowland fynbos ecosystems under threat, the wine industry developed a conservation partnership with the Botanical Society of South Africa, Conservation International and The Green Trust. This led to the Biodiversity and Wine Initiative (BWI).

BWI members set aside at least 10% of their farmland for long-term conservation to minimise the loss of threatened biodiversity and encourage sustainable land management practices on wine farms. For every hectare under cultivation, an additional hectare of natural vegetation is committed to conservation. The success of the BWI has thus far resulted in securing more hectares for conservation than is currently under grape production in the Cape's winelands. Other provinces are applying valuable lessons learned from the BWI.

Source: Cadman et al. (2010); DEA (2013).

region in the Eastern Cape. The latter scheme is based on a major opportunity for the Nelson Mandela Bay Municipality and Gamtoos Irrigation Board, situated within a region characterised by chronic water shortages, to become willing and able buyers of ecosystem services; by paying for improved watershed management, they could increase their water allocations.

Building on lessons learned from environmental public works programmes, pilot sites for PES implementation are being selected, focusing on the establishment of institutional arrangements that can be rolled out more widely (DEAT, 2005; Cadman et al., 2010). PES schemes that concern carbon sequestration, surface water supply, water flow regulation and soil retention could provide significant livelihood improvement opportunities to local communities.

There are also unexplored opportunities to engage the mining industry in PES schemes. The impacts of mining can be significant on biodiversity. In several cases, prospecting rights are sought in areas of high biodiversity importance, some of which are not subject to any formal protection. Some of the larger mining companies that operate globally are including biodiversity issues in their environmental management systems, in light of operational and reputational risks, and the accompanying need to access capital. For example, the National Grasslands Programme has been working with key stakeholders to mainstream biodiversity in the coal mining sector. This included the use of biodiversity offset schemes such as wetland mitigation banking, and the use of biodiversity planning tools to minimise loss of critical biodiversity areas to mining operations. In another example, Anglo Coal has agreed to rehabilitate two offsite wetlands (Dunns farm and Thubalihle wetlands) that cover an area of 46 ha. This is the first wetland offsite mitigation scheme in South Africa and was a pre-condition for granting mining authorisation.

However, there are very few other examples of offsets applied in the mining sector in South Africa. The country is drafting a national biodiversity offsets policy framework; two provinces (Western Cape, KwaZulu-Natal) have developed guidelines for using biodiversity offsets; and a third is following suit (Gauteng). Wetland offset guidelines are also being developed. However, more coherent and systematic application of off-site mitigation and biodiversity offsets are needed. Ensuring no-net-loss of biodiversity by prioritising conservation of sites in their original state enables these schemes to offer considerable opportunities for mainstreaming biodiversity considerations in the mining sector.

Another area receiving attention is the development of PES for use in post-mining rehabilitation. Generally, rehabilitation schemes focus on stabilisation of mined areas, but not on restoration of agricultural potential or biodiversity. Namaqualand is developing "restoration packs" containing seeds, soil ameliorants and equipment for planting to stabilise the tailings of diamond mines. The restoration packs can be tailored to each site so they correctly balance species suited to the conditions of each area (Cadman et al., 2010).

4.5. *Green markets in biodiversity and information disclosure scheme*

Green markets in biodiversity-friendly products in South Africa have been developed through various policies related to procurement advice, consumer awareness campaigns, ecolabelling and certification systems. These can also fall under the heading of "information disclosure policy tools" as they incentivise biodiversity-friendly production and facilitate market transactions. They have proven more effective in industries that trade in final consumer goods and services with a strong export orientation, such as forestry, tourism and food products. These policies include certification to the commercial forestry sector by the Forestry Stewardship Council; certification of South Africa's hake trawl fishery by the Marine Stewardship Council; and the Fair Trade in Tourism South Africa label, a locally-developed certification and trademark scheme supported by IUCN.

Meaningful certification systems take a long time to develop and can be costly to audit. Large commercial sectors in South Africa such as plantation forestry have been able to adopt internationally recognised certification systems; at present, South Africa has the world's highest percentage of certified plantations in the world. However, such systems are more difficult for local-scale South African producers who may not benefit from such markets (the "benefit drain"). This is especially worrying for extractive-based commercial enterprises, such as medicinal plant, bioprospecting and flower enterprises. These dangers highlight the need for accompanying regulations, such as those regulating benefit-sharing in bioprospecting operations, when developing these markets. The cases of Rooibos or Pelargonium plants in traditional medicine (Box 5.8) underscore the importance of analysing the potential costs and benefits of a particular market for existing certification and biodiversity markets before embracing a market creation scheme. As many such schemes are not viable, economic evaluation tools enable the assessment of potential benefits from a biodiversity conservation perspective.

Box 5.8. **Rooibos, Pelargonium, and access and benefit-sharing**

Rooibos

Rooibos (*Aspalathus linearis*) is an endemic, broom-like member of the legume family of plants growing in South Africa's fynbos, the natural shrubland vegetation occurring in a small belt of the Western Cape province. Traditional medicinal uses of rooibos in South Africa include alleviating infantile colic, allergies, asthma and dermatological problems. Outside South Africa, rooibos tea has become popular among health-conscious consumers for its high level of antioxidants. It is also used for its anti-inflammatory and anti-allergenic properties in cosmetic products and for research. Thanks to profitable European markets, an historically marginalised community of the Suid Bokkeveld district at the far north-western end of the Cape Floristic Region benefited economically from the sale of a certified organic rooibos tea. Since its formation in 2001, the Heiveld Co-operative and its members have been certified organic; since 2003, they have also been certified "fair trade" by the Fairtrade Labelling Organization.

The plant has been the focus of two attempts by international businesses to claim rooibos-related benefits without reference to either CBD Article 19 or the more specific 2002 Bonn voluntary guidelines on access and benefit-sharing. In the mid-1990s, a US firm selling rooibos tea and cosmetics registered the name "Rooibos" and thus obtained a monopoly on the use of the name in the United States. When the plant later became more widely used, the firm demanded that companies either pay fees or stop using the name. Subsequent protests, petitions and lawsuits led the firm to surrender the name to the public domain.

More recently, a large Swiss cosmetics firm filed for three patents (with the UN World Intellectual Property Organisation) for the use of compositions containing rooibos for treating conditions like skin inflammation, reactive or dry skin, psoriasis, acne, ageing, wrinkles, and hair and coat loss. Two NGOs, one South African and one Swiss, drew public attention to the fact that neither the Swiss firm nor the South African company that supplied the raw material had obtained bioprospecting permits under the Biodiversity Act. None of the patents were granted. Wild-harvested rooibos tea is sold by communal farmers in the Bokkeveld district.

Box 5.8. **Rooibos, Pelargonium, and access and benefit-sharing** *(cont.)*

Pelargonium

Pelargonium sidoides and *Pelargonium refinforme,* endemic to South Africa, are found in the Eastern Cape and Lesotho. For centuries, local communities used these plants for medicinal purposes, including for the treatment of common coughs and colds, as well as viral and parasitic infections. Recent studies suggested that extracts from the plant could be used in treating acute bronchitis. For more than 50 years, extracts of both Pelargonium species have been internationally marketed as a unique African remedy under its traditional name, *Umckaloaba*, with the active agent, *cumerin*, a key additive in cold and flu remedies.

In 2001, a European phyto-medical company obtained patenting rights from the European Patent Office for the extraction method of the root tincture, and for the exclusive use of the species for the treatment of AIDS and related diseases. Concerns were raised that these patents were an illegal monopolisation of a genetic resource and traditional knowledge; there was no evidence of any benefit-sharing agreements, as required by the 2010 Nagoya Protocol to the UN Convention on Biological Diversity (CBD) to which South Africa is signatory. The patent applications were successfully contested by the Centre for African Biosafety.

Source: CBD; DEA (2013).

4.6. Reducing harmful subsidies and introducing positive fiscal measures

The important role of fiscal and financial instruments in furthering biodiversity objectives has been explicitly acknowledged in South Africa's NBSAP. Achieving the objectives entails the reform of existing harmful fiscal measures, as well as the development of novel fiscal and financial instruments that involve both government and the private sector.

Removal of harmful agricultural subsidies to protect biodiversity is less of concern for South Africa as it has considerably fewer of these subsidies than most OECD member countries. Still, government reports have identified several perverse fiscal incentives that are of concern for biodiversity. For example, current municipal property rates discourage game farming activities in favour of more biodiversity-destructive, intensive agricultural policies. Municipal property rates could be extended to properties under more biodiversity-friendly uses such as game farming. Similarly, certain tax breaks create perverse incentives for landowners to bring land into cultivation that could be of high conservation value. For example, expenditure incurred in pastoral, agricultural or other farming operations to eradicate noxious plants and prevent soil erosion can be deducted from taxable income. This provision affords substantial benefits and incentives to farmers to undertake such activities. Yet the incentive is only available to landowners that farm their land. This limitation thus creates perverse incentives for landowners to cultivate land that could be of high conservation value in order to secure the tax benefit. All landowners could be offered such incentives to undertake these measures irrespective of whether their land is under cultivation.

A diesel fuel tax refund is mainly available to primary producers and non-road freight transport operators that are responsible for a significant proportion of national biodiversity losses. Such concessions may enable marginal primary activities to become viable, but also help expand the primary sector to the detriment of wider environmental and conservation

objectives. By contrast, diesel for conservation activities by private landowners, such as alien invasive clearing and ecosystem rehabilitation, is not eligible for this concession (National Treasury, 2006).

Beyond reviewing existing tax and subsidy provisions, the South African government is considering the introduction of additional fiscal instruments. These would promote biodiversity conservation, sustainable use and, to differing extents, embrace the polluter-pays principle. The fiscal instruments, encouraged by the NBSAP and NBF to complement existing stewardship incentives, include income tax deductions and property rates exclusions, exemptions, rebates and property revaluations. Yet, unlike the stewardship programme, these broader instruments apply to territory beyond protected areas.

5. Integrating biodiversity into other sectors

5.1. *Nature-based tourism*

Nature-based tourism is one of the most significant and dynamic industries in South Africa. The 2011/12 Annual Tourism Report states that total foreign direct spending[18] in South Africa was ZAR 56 billion, or ZAR 28 billion more than gold exports. Game ranching, including hunting, is estimated to generate ZAR 7.7 billion a year and provides 100 000 jobs. Substantially more labour-intensive than livestock farming, game ranching has grown at an average rate of 20% a year over the last 15 years, making it the fastest growing tourism sector in the world. A study in the Eastern Cape found that, for private game reserves, the switch from farming to ecotourism resulted in 4.5 times as many full-time employees and a five-fold increase in the average annual salary for full-time employees, as well as large increases in revenues (Blignaut et al., 2008; Maia et al., 2011).

Tourism contributes significantly to provincial and local economies, and there is growing awareness of this economic potential. Game farming is often undertaken on a private, commercial basis. However, unique opportunities also exist in community-based game farming and safari operations. To that end, communities are creating ecotourism associations and community-based tourism structures to collectively plan, manage and market specific tourism routes. Still, some indications show these community programmes are not yielding the anticipated results. Very few of the benefits, including financial, employment and business opportunities, are filtering through to the community at large (DEAT, 2005). Many community-based tourism efforts are poorly capitalised, widely dispersed, poorly marketed and not sufficiently unique to attract interest. Generally, there is a huge need to upgrade the skills of community-based tourism operators so they can compete effectively with better-known brands, such as the Namibia community-based tourism projects. There is a further need for supportive activities such as finance, training, extension and joint marketing to be drawn into a stronger relationship with community-based operations.

5.2. *The engagement of the financial sector*

Some mainstreaming of biodiversity in the financial sector in South Africa is observed with the financing of sustainable tourism operations, both by private banks and the Development Bank of Southern Africa (DBSA). Yet there is scope for using the leverage of the financial sector to promote pro-biodiversity practices in key areas such as mining, commercial fishing and forestry. This can be done through more stringent environmental impact assessment procedure and better enforcement. In addition, the financial sector can play a larger role in aiding micro-finance schemes to develop small-scale markets for

biodiversity conservation. Further, there is considerable scope for the financial industry to be engaged with developing biodiversity offsetting schemes.

The relatively new "Sustainable Finance Forum" provides a promising development in this direction. The Forum consists of members from the financial and industrial sectors with a shared belief in sustainable development. It has developed a "Code of Conduct" for its financing activities in line with the "Equator Principles". Further, the New Banking Initiative (NBI) has been established as an umbrella process for green finance in South Africa. Lastly, the financial sector, primarily through the DBSA, has become heavily involved in shaping and financing biodiversity conservation/sustainable use and employment-generating programmes such as the Dry Lands Fund and the Green Fund. For example, the Dry Lands Fund finances primarily pro-poor rural development projects in arid, semi-arid and dry sub-humid areas. Biodiversity conservation and natural resource management is of strategic importance to this initiative as they promote healthy and resilient livelihoods and landscapes.

Notes

1. South Africa's territorial waters include three bands: 12 nautical miles (nm) of the territorial sea, 24 nm of the contiguous zone and 200 nm of the exclusive economic zone.
2. Ecosystem threat status shows the degree to which ecosystems are still intact or are alternatively losing vital aspects of their structure, function and composition, on which their ability to provide ecosystem services ultimately depends. Ecosystem protection level shows whether ecosystems are adequately protected based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act.
3. The NBA categorises ecosystem types as critically endangered, endangered, vulnerable or least threatened, based on the proportion of each ecosystem type that remains in good ecological condition relative to a series of thresholds.
4. The Grassland biome is of particular concern as it is the economic heartland of South Africa. Densely populated, it is under immense development pressure, most notably from coal mining, agricultural activities and timber plantations. Major rivers such as the Orange, Tugela, Caledon and Kei have their headwaters in this biome.
5. To be fully protected, an estuary should be surrounded by a land-based protected area and a no-take marine or estuarine protected area. Its freshwater flow requirements should be met using legal mechanisms in the National Water Act.
6. The assessment covered South Africa's Exclusive Economic Zone, which extends 200 nautical miles offshore.
7. These include, for example, wild ginger (*Siphonochilus aethiopicus*), used to treat asthma, colds, coughs and flu; and pepper-bark tree (*Warburgia salutaris*), an expectorant for treating chest infections, as well as a range of yeast, fungal and bacterial infections.
8. With total annual production of 600 000 tonnes of fish valued at approximately ZAR 6 billion, the commercial fisheries sector employs about 27 000 people; an estimated 28 000 households are engaged in subsistence fishing.
9. These figures are almost certainly underestimated, as thorough surveys have not yet taken place in most environments.
10. Production landscapes refer to landscapes that support both agricultural production and biodiversity conservation. They keep ecosystems intact (and not fragmented) and aim to improve the livelihoods of rural communities, mostly through sustainable agriculture, while conserving biodiversity.
11. Biodiversity priority areas include the following categories, which are not mutually exclusive: protected areas; critically endangered and endangered ecosystems; critical biodiversity areas and ecological support areas; freshwater ecosystem priority areas (including rivers and wetlands); high water yield areas; flagship free-flowing rivers; priority estuaries; focus areas for land-based protected area expansion; and focus areas for offshore protection.

12. The South African National Biodiversity Institute (SANBI) is mandated through NEMBA to function as the lead national research, consultative and advisory organisation on South Africa's biodiversity.
13. South African National Parks (SANParks), established through the Protected Areas Act (No 57 of 2003), is the lead statutory conservation authority.
14. This includes nearly 100 protected areas, as well as the uKhahlamba-Drakensberg Park World Heritage Site and the Isimangaliso Wetland Park World Heritage Site.
15. Due to changes in budgetary headings, comparable and meaningful expenditure trends can be only shown for the period since 2008/09.
16. Some of the large or long-established environmental NGOs in South Africa include the Botanical Society of South Africa, the World-Wide Fund for Nature (South Africa), the Endangered Wildlife Trust, the Wilderness Foundation, the Wildlife and Environment Society of South Africa, the Wildlands Conservation Trust, Conservation International-South Africa, BirdLife South Africa, EcoAfrica and Fauna and Flora International. Some of these are local branches of international NGOs that provide valuable links to international networks, programmes, technical expertise and funding.
17. Only biodiversity-significant land that is threatened should be considered for inclusion.
18. Direct expenditures by foreigners, including costs of transport to South Africa's airlines.

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PART II

Chapter 6

Multi-level environmental governance

This chapter examines South Africa's management of the environment from a multi-level governance perspective. It presents the key reform of local governance and decentralisation of environmental management since 1994. It provides insights into institutional and management challenges in selected environmental sectors, including land use and water resources. Finally, this chapter presents efforts and challenges to making South Africa's multi-level environmental governance more effective and efficient, including strengthening interagency collaboration, accountability and performance management, financing and capacity building.

Assessment and recommendations

South Africa has undertaken an ambitious decentralisation programme. The functional expansion of municipalities (including responsibility for the provision of environmental services such as water supply, sanitation and waste management) has been a major element of this reform; it is one of the country's most significant changes in governance since the end of apartheid. At the same time, provinces continue to play a crucial role in environmental governance, including oversight of local environmental programmes.

Decentralisation is far from complete. Policy gaps impede the realisation of the ambitious role foreseen for municipalities in the environmental domain. There is fragmentation and unclear division of responsibilities between different administrative levels of government, as well as an institutional capacity gap, particularly at the provincial and local levels. The capacity constraints, closely linked to a funding gap, create significant discrepancies between the provinces, and even more across municipalities, in implementing environmental requirements and delivering environmental services. There is also an accountability gap related to weak assessment of environmental policy implementation by the provinces and municipalities. The existence of concurrent national, provincial and local competences for some environmental management issues has created multiple co-ordination, co-operation and capacity problems, particularly in policy implementation.

South Africa is using different policy mechanisms to address implementation gaps in environmental governance. Following the constitutional principle of "co-operative governance", it has established structures (e.g. committees and issue-specific working groups between environmental authorities at different administrative levels) and procedures to promote vertical co-operation and facilitate the settlement of intergovernmental disputes. They seem to be effective in areas like compliance assurance and biodiversity protection, but need to be strengthened in other areas of environmental policy.

South Africa has recently introduced an outcome-oriented performance measurement framework, with 1 of the 12 policy outcomes focusing on the environment. This is an important tool to ensure all levels of government are accountable for executing their environmental management responsibilities. Reporting is irregular, and the quality of data questionable. However, it is in the early stage of implementation.

Further efforts are needed to address the funding gap. Targeted grants from the national government, mostly under the Expanded Public Works Programme (EPWP), cover only project-related costs but not routine operations of provincial and municipal environmental departments. Environmental budgets have grown slowly and unevenly across the provinces and municipalities. In light of their growing environmental responsibilities, provincial and especially local governments need to secure sufficient funding to pursue their mandates.

Two issues need to be addressed to strengthen institutional capacity at the provincial and local levels: the shortage of qualified staff; and the lack of training for current staff, especially those in smaller municipalities, on implementing new environment-related

regulations. Positive examples of capacity building by the national and provincial environmental authorities need to be scaled-up and more systematic.

Multi-level environmental governance challenges are particularly acute in the domains of land use and water resources management.

There is persistent uncertainty between provinces and municipalities about the legislative and executive powers for land use and spatial planning, which is mostly a legacy of the apartheid era. As a result, different requirements are applied within and among provinces. Most local authorities do not have the capacity to exercise their post-apartheid constitutional powers in land-use management and to integrate environmental aspects into spatial planning; thus, provinces continue to play a significant role. In many areas, traditional (tribal) authorities are insufficiently engaged in spatial planning and land-use management, partly because they consider that the state does not heed the communities' historic land rights.

South Africa has adopted a modern, integrated approach to water resources management. However, the institutional barriers to its implementation have seriously limited policy effectiveness. Water resources management – a national responsibility implemented through regional offices – is not adequately integrated with the provision of water services, which is a municipal responsibility. Various obstacles have impeded efforts to establish water catchment management agencies; the current arrangements are partial, overly complex and inefficient. The forthcoming second National Water Resource Strategy provides an opportunity to address some key institutional challenges in the water sector.

Recommendations

- Undertake a comprehensive review of environmental sector financing as a whole; link transfers from national to provincial and local authorities more closely to defined environmental outcomes; allow transfers from national authorities to cover the core operations of the provincial and municipal environmental authorities with a view to attracting and retaining suitably qualified staff; and consider ways to strengthen own revenue sources at the provincial and local levels such as through permitting and other environmentally related fees.
- Provide appropriate guidance and training to environmental staff at the provincial, and especially local, level as well as to judges, prosecutors, police, border officials and town planners; and reinforce the Environmental Sector Skills Plan by establishing clear and realistic targets and ensuring adequate resources are available for implementation.
- Strengthen the framework for assessing the performance of governmental bodies at all administrative levels in implementing national environmental policies; refine the system of input, output and outcome indicators and data collection and reporting procedures; fully integrate environmental performance indicators into the budget planning process.
- Adopt the national Spatial Planning and Land-Use Management Bill; ensure its implementation integrates development and physical planning; establishes uniform procedures and co-ordination mechanisms for spatial planning and land-use management at the provincial and local levels; and takes adequate account of the interests of traditional rural communities.
- Establish water catchment management agencies in line with the second National Water Resource Strategy; and ensure they better integrate water resources management, the provision of water services and land use through enhanced engagement of all governmental and non-governmental stakeholders, including traditional authorities.

1. Reform of local governance and decentralisation of environmental management

The degree to which environmental policy objectives are achieved depends to a great extent on governance, in particular the allocation of responsibilities, powers and resources across different levels of government. Essentially, the Constitution prevents higher levels of government from intervening in areas where lower levels of government have competence without the agreement of the latter. Decentralised systems like this enable lower levels of government to tailor their interventions to balance benefits and costs in the local context. However, this potential advantage can be undermined if local economic interests overly influence decision making, or if decentralisation results in fragmentation and insufficient resources to carry out tasks. Thus, finding ways to co-ordinate different levels of government is a key challenge for environmental and other areas of public policy.

1.1. Reform of local governance

The local administration has been subject to significant reform since the end of apartheid. On the eve of the 1994 elections, South Africa's former homelands – Bantustans – which served as semi-independent territories of the black population during the apartheid era, were re-integrated into the provinces. At the same time, the existing four provinces were divided into nine.[1] At the local level, the reform integrated racially-distinct municipal administrations and created entirely new municipalities in the former homeland areas.

The functional expansion of local government authority and autonomy has been one of the most significant institutional changes in South Africa since the end of apartheid and a key feature of the 1996 Constitution. There are currently 8 metropolitan (Category A) municipalities,[2] 44 district (Category C) municipalities and 226 rural (Category B) municipalities. Metropolitan municipalities are responsible for all local government functions within their jurisdiction. Each district municipality includes several local municipalities, and the powers and functions assigned to local government in that area are shared between Category B and C municipalities (based on a decision by the provincial minister for local government). While national and provincial governments continue to supervise local authorities, they must not encroach on their autonomy.

The redrawing of administrative boundaries was accompanied by a systematic overhaul of legislation, and an improved operational and financial management framework in municipalities. The transformation aimed to make municipalities more accountable, financially sustainable and able to deliver critical services. However, local governments faced enormous pressure to deliver on their new mandate, as well as immense challenges in providing functional, sustainable services in a context of chronic poverty and under-development. New boundaries led to major staff movements as personnel were transferred between newly-defined municipalities, often for political reasons. Many posts were consolidated as existing municipalities amalgamated, and a moratorium was placed on the recruitment of new staff to key positions. The impacts of rationalising technical and engineering positions, as well as uncertainty over jurisdiction, budgets and basic planning data, were particularly severe. The scale of these changes put great strain on structures that were already under-resourced.

1.2. Vertical division of environmental competencies

South Africa's Constitution designates the environment as an area of concurrent national and provincial responsibility. This means that both the national and provincial governments have the power to make and implement environmental legislation. In case of conflict, national environmental legislation prevails over provincial norms and standards. Provincial authorities administer new provincial environmental laws (where they exist, e.g. Limpopo Environmental Management Act, 7/2003); old provincial conservation and land-use planning ordinances; and environmental functions delegated to them. The management of surface water, groundwater and marine resources, as well as national parks, are the competence of the national government.

While the stringency of environmental requirements, which are based on national laws, does not vary dramatically across the provinces, the requirements can be applied quite differently. Operational guidelines and actual practices often show the different levels of stringency in enforcing the laws, e.g. with respect to environmental impact assessment (EIA) and environmental authorisations, depending on implementation capacity in individual provinces. At the same time, provinces sometimes initiate policy without the legal competence where national-level programmes are lacking (e.g. in water resources management).

The grouping of environmental functions between departments varies among the provinces (e.g. Gauteng province has a Department of Agriculture and Rural Development in charge of natural resource management, environmental planning and impact assessment, while the Eastern Cape has a Department of Economic Development, Environmental Affairs and Tourism). While institutional arrangements usually reflect the principal interactions between different sectors in each province, the environmental staff are often over-committed and have little capacity for interagency co-operation. Similar institutional fragmentation exists at the local level. At the same time, national implementation of environmental policy is becoming more consistent: while national, provincial and local environmental inspectors remain under the direction of their respective government departments, the creation of the Environmental Management Inspectorate and the adoption of a standard operating procedure for all inspectors across the country was a significant step forward.

The regulatory competence of local governments (municipalities) has also been defined in the Constitution. Their responsibilities include providing basic public services – water and electricity distribution, sanitation, storm water management, municipal road maintenance, municipal waste collection removal and non-toxic solid waste management; they finance these services mainly through user fees and taxation. Local authorities play an important role in regulating land use and development through monitoring and enforcing compliance with relevant zoning regulations.

The exercise of municipal government powers is subject to national and provincial oversight. In many cases, the oversight aims principally to address capacity gaps and prevent potential mismanagement. While the legislation does not differentiate environmental responsibilities among all 278 municipalities, in practice they exercise functions based on size and capacity. The eight large metropolitan municipalities are usually well equipped to execute their environmental mandate and generally have fairly stringent by-laws on air pollution and waste management. Category B municipalities often lack capacity to execute certain regulatory responsibilities, which are then assumed by

either the district (Category C) municipality or the province (in which case the district municipality's role is limited to co-ordination). For example, three provinces currently deal with air quality issues, which are normally part of the municipalities' remit.

2. Institutional issues of multi-level governance in selected environmental sectors

The regulatory dimension of decentralisation implies that multiple levels of government agencies produce and/or enforce regulation that affects citizens and businesses in different ways. The crucial issues in establishing a level playing field and achieving desired policy outcomes in the context of multi-level governance are a) the division of responsibilities between competent authorities at the national, provincial and local levels; and b) whether these authorities are willing and able to carry out their functions.

Land use and water resources management are among the environmental policy domains where the challenges of multi-level governance are most pronounced in South Africa. In both sectors, the relationship between different levels of government appears particularly problematic, creating substantial policy implementation gaps.

2.1. Land-use management

Land-use management can have an important impact on vulnerable water resources and biodiversity, as well as on the development of urban and industrial areas; this makes it a key issue of environmental governance in South Africa. Despite the abundance of land-use policies and regulations at all levels of government, there is still no adequate framework for managing land development in an efficient, equitable and sustainable way.

Provinces and municipalities remain uncertain about legislative and executive powers related to land use and spatial planning. Many relevant laws date from the apartheid era, when provinces were responsible for land-use planning. However, the 1996 Constitution assigned those powers to municipalities, thereby raising questions about responsibilities and competencies. The existing spatial planning regulations are also fragmented territorially: under apartheid, the laws applicable in white areas were fairly complex and relatively well implemented, while the rest of the country was practically abandoned from a planning perspective. As a result, a single province, or even one municipality, has a plethora of laws related to land use.

In 2010, South Africa's constitutional court decided that while both the national and provincial governments could make legislation affecting municipal planning, the laws must not remove municipal power to control and regulate land use. For example, a provincial law may limit a municipality's land use and spatial planning authority (with respect to housing, agriculture and environmental matters). However, it must respect the institutional integrity of municipalities by not taking a decision on behalf, or instead, of a municipality. In practice, some provincial governments do all the spatial planning, despite the constitutional role of local authorities. In other provinces, district municipalities perform municipal planning because of capacity problems in local municipalities.

To address this situation, provinces have taken one of two approaches: proceed with efforts to write their own legislation or wait for national direction either in the form of a policy framework or national legislation. Those that have adopted their own legislation (e.g. Northern Cape, KwaZulu-Natal) have achieved limited success in streamlining land-use management despite spending considerable resources on the reform (SACN, 2012a).

At the national level, both the Department of Rural Development and Land Reform and the Department of Co-operative Governance and Traditional Affairs (which oversees local authorities) have a stake in land-use planning. The national government has been working since 2001 on the national Spatial Planning and Land-Use Management Bill (SPLUMB), which has not yet been adopted by parliament. The bill seeks to establish a uniform procedure for spatial planning at the municipal, provincial and national levels by bringing together development and physical planning. One critical issue is whether certain land-use (e.g. infrastructure) projects require provincial approval (in addition to, or instead of, municipal approval), and if so, which procedure should be followed.

One of the key barriers to the adoption of the SPLUMB is its apparent disregard for the role of traditional authorities, including tribal kings, chiefs and headmen. Traditional authorities actively oppose the bill because provincial and local development plans often pay no attention to the interests of traditional rural communities. They do not involve local tribal leaders in development projects, economic activities and even environmental conservation efforts in their area. Traditional leaders are also opposed to land-use reform because they advocate community ownership of land, which is currently state-owned.

Apart from the division of responsibilities, there are also challenges with the design and implementation of spatial planning instruments. A five-year Integrated Development Plan (IDP) is the main planning tool in South Africa. An IDP has legal status at the municipal level, but not at the provincial level (there is no national-level spatial planning), and is associated with a spatial development framework (SDF). A provincial authority cannot impose its spatial plan on the province's municipalities; it can only comment on municipal IDPs and try to achieve a consensual alignment of provincial and local SDFs.

The IDPs, developed by every municipality, are commonly of poor quality and do not fulfil their role of integrating and harmonising water management, land use and environmental considerations (SACN, 2012a). In the positive example of Johannesburg, a special municipal tribunal considers any proposed development that does not conform to the IDP, soliciting views from the public. If the project is approved, the IDP is amended accordingly. However, most local authorities do not abide by their own IDPs and can be easily persuaded to undertake an unplanned development project without assessing its potential impact (particularly since their environmental management capacity is very low).

Planning practices are aggravated by poor municipal record-keeping on land-use applications and their outcomes. The absence of reliable records makes it almost impossible for the provinces to fulfil their constitutional role of oversight of local government on these matters.

SDFs are informed and supported by environmental management frameworks (EMFs). An EMF is a spatial planning tool that defines the conservation status of the area or its specific parts; environmental management priorities within the area; and the types of developments or land uses that may have a significant impact on the area or may be undesirable. EMFs require a transparent participation process, with the draft EMF made available for public scrutiny. In theory, the EMFs ensure the integration of environmental aspects into spatial planning; in practice, most local governments lack the capacity to make these tools truly meaningful.

There is also insufficient co-ordination between requirements for planning approval (such as the need for an activity to be consistent with land-use zoning) and for an environmental authorisation. An EMF should provide a strategic context for zoning and for

assessing indirect and cumulative impacts of specific proposed projects; in this way, it informs and enhances such processes as the EIAs. However, EMFs are currently not reconciling biodiversity conservation planning with development priorities in different programmes.

To respond to these challenges, the national and provincial governments are trying to improve co-ordination between spatial planning and environmental regulation. At the national level, the Department of Rural Development and Land Reform and the Department of Environmental Affairs (DEA) are working jointly on guidelines for integrating the country's planning and permitting systems, which will enhance the credibility of municipal SDFs and EMFs.

Several initiatives are also undertaken at the provincial level. For example, the KwaZulu-Natal Planning and Development Act requires local authorities to consider a proposed activity's environmental impact and makes it part of one, integrated permitting process supported by public consultation. The provincial government of Eastern Cape has combined the environmental and planning functions within the Department of Economic Development and Environmental Affairs; it actively involves other stakeholders in the development of integrated spatial and environmental management plans and guidelines (Box 6.1). Finally, metropolitan municipalities (e.g. Durban, KwaZulu-Natal) have tried to integrate the environment even further at the local level by using town-planning schemes to formalise environmental requirements. However, such initiatives have come up against the Constitution, which does not allow local authorities to legislate on environmental matters.

Although such initiatives are commendable, the national and many provincial planning departments that should support and build capacity in local planning departments lack capacity themselves. The National Environmental Management Act (NEMA) requires provincial authorities to help municipalities incorporate environmental considerations into planning. However, all the provinces have capacity constraints and need guidance on fundamental aspects, such as land-use management in rural areas. Apart from lacking sufficient staff, planning departments are not equipped and trained to confront their significant challenges (SACN, 2012b). Massive, co-ordinated capacity building is needed to address such limitations, which should be initiated and supported by the DEA and the Department of Rural Development and Land Reform. The South African Local Government Association (SALGA) – an autonomous association of the country's municipalities – should also play an important role.

A substantial, mostly project-based, effort goes into building environmental conservation capacity at the grass-roots level in rural communities. The objective is to achieve community ownership of protected areas through "settlement agreements" between the state and the local community (Chapter 5). This is challenging because all environmental considerations must be closely intertwined with social and economic objectives, which are the communities' top priorities. Traditional communities also need to increase their ability to access and absorb funding (ability to set priorities and establish management structures) that is already available from national and provincial governments.

3.2. Water resources management

South Africa is not well endowed with fresh water resources (Figure 1.5). Even though South Africa's water abstraction per capita (300 m^3/capita) is only one-third of the OECD

Box 6.1. **Integration of spatial and environmental planning for the Wild Coast, Eastern Cape province**

The Wild Coast of the Eastern Cape province is a scenic coastal region with unique biodiversity (a high proportion of indigenous species), but also high levels of poverty, unemployment and underdevelopment. In view of the Wild Coast's significant environmental and developmental challenges, it has recently received a great deal of attention from national, provincial and local government institutions, national development agencies and international donors.

The key environmental and land-use challenges facing the Wild Coast include:

- unlawful development in the coastal zone, particularly the illegal construction of holiday homes, despite long-standing enforcement efforts
- rapid destruction of coastal indigenous forests
- unplanned spread of settlements into highly environmentally-sensitive areas
- housing development outpacing the provision of infrastructure, leading to sewerage pollution and waste dumping
- illegal mining of sand for construction, scarring extended sections of the coast with little or no benefit to local communities
- construction of badly planned new roads into the coastal zone, with extensive damage to the environment.

To balance the development of this underdeveloped, high-poverty region with the protection of its environment, the Eastern Cape Department of Economic Development and Environmental Affairs (DEDEA) has developed Spatial and Environmental Management Guidelines for the Wild Coast. The guidelines are an instrument to help develop the area and a framework to involve the widest possible range of stakeholders, including coastal communities.

The guidelines lay down, among others, the following principles for the sustainable development of the Wild Coast:

- To protect the environment in the long term, it is crucial to eradicate endemic poverty in the area.
- It is necessary to concentrate the expansion of human settlements around "development nodes" to facilitate the provision of infrastructure and protect the natural environment in other areas.
- The rights of communities that have historically occupied and used the coastal area must be respected.
- Spatial planning must seek to redress the imbalances of the past and promote equity.
- Existing formal protected areas must be expanded and new protected areas established, particularly to preserve the remaining indigenous forests.

DEDEA has developed an extensive Wild Coast stakeholder database (including traditional and other community leaders). It has also put in place a public participation system that aims to align the local authorities' planning processes with the provincial spatial and environmental management framework.

Source: DEDEAT (2012).

average, the use of available water resources has risen to over 30%; major water stress is projected within 15 years, particularly in some inland catchment areas where a large proportion of economic activity takes place. Continued population growth and expansion of the economy, combined with the resulting growth of income levels, will put increasing pressure on scarce water resources.

South Africa's basic approach to water management is modern and sophisticated. Based on the concept of integrated water resource management, the approach aims to take due account of equity, efficiency and ecology. The 1998 National Water Act reversed the historical approach, in which landholders were deemed to own the water resources on their land. Instead, it made the Minister of Water and Environmental Affairs the trustee, on behalf of the national government, of the nation's water resources.

The first National Water Resource Strategy (NWRS-1) adopted in 2004 laid out a blueprint for water resources management by following two distinct streams: water resources, and water supply and sanitation services. Water resources management, including water quality, is an exclusive national competency. As the custodian of the country's water resources, the Department of Water Affairs (DWA) remains accountable for their sustainable, equitable and efficient use. The DWA's nine regional offices – one in each province – provide policy implementation, control and monitoring services at the operational level.

The devolution of water supply and sanitation services has provided municipalities with the management and regulatory powers that, in principle, should increase the efficiency and effectiveness of water service delivery. However, the reform greatly enhanced the institutional complexity of water governance (Figure 6.1). While larger municipalities operate their water supply and sanitation infrastructure themselves, smaller ones employ Water Boards – state agencies reporting to the DWA.[3]

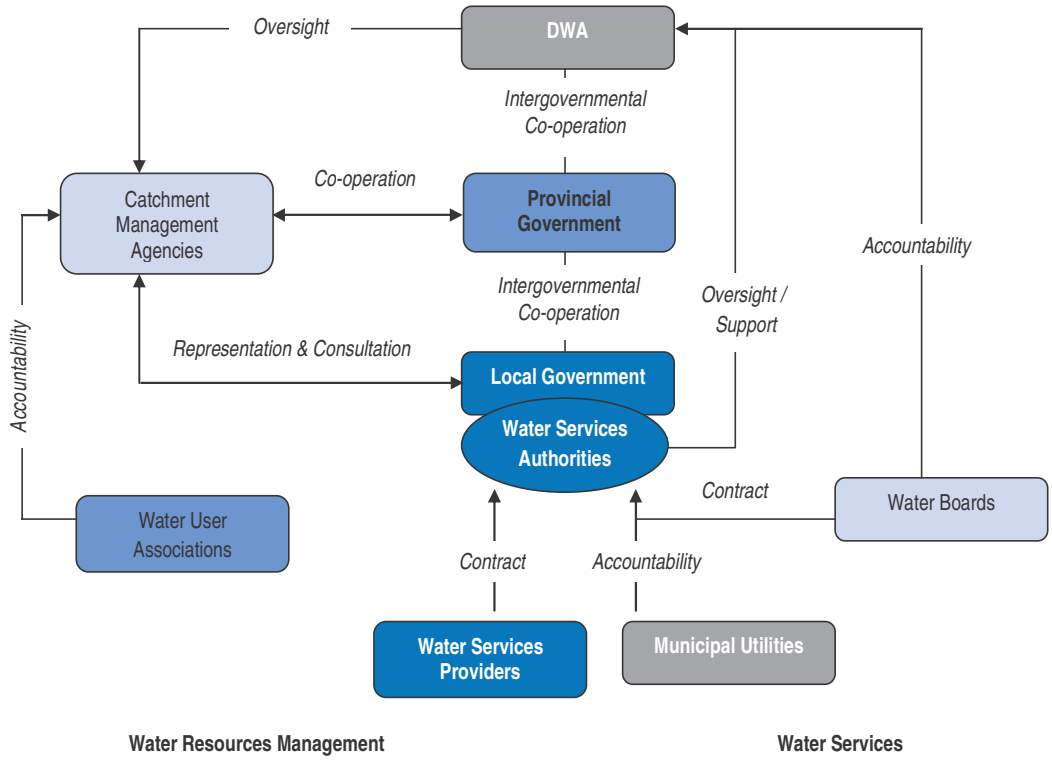
DWA regional offices collaborate with provincial authorities, albeit on a limited number of issues and unsystematically, but not at all with municipalities. The lack of interaction between the DWA and local governments creates an important policy gap between water resource management and water services. Local land-use planning tools do not integrate water service delivery and water resource management considerations. Moreover, there is no comprehensive management of municipal water and wastewater utilities from both a water resources and water services perspective.

The 1998 National Water Act (NWA) provided for catchment management agencies (CMAs) to assume water resources management functions carried out by the DWA's regional offices, especially water-use licensing (Box 6.2).

Through establishment of CMAs, stakeholders – especially those previously excluded from access to water and related benefits – were intended to participate in water resource management decision making. A CMA should be governed by a board bringing together representatives of different stakeholders from all administrative levels. However, by 2011, only two CMAs were operational: Inkomati in the Mpumalanga province and Breede-Overberg in Western Cape. The following are the main reasons for this institutional failure:

- Shortage of human resources (particularly pertinent for CMAs in poor areas): the absence of clear direction on the future transfer of staff from the DWA's regional offices to the CMAs has been a key impediment to progress (Karar et al., 2011).

Figure 6.1. **Institutional framework for water management in South Africa**



Source: Adapted from Karar et al. (2011).

- Lack of financial resources: while the CMAs are expected to rely on water-use charges, the continued capping of such charges for irrigated agriculture has undermined the financial viability of several prospective CMAs.
- Protracted transformation of apartheid-era Irrigation Boards into water user associations (WUAs) and delays with the establishment of new WUAs; these new co-operative associations of water users would be accountable to CMAs, manage local water infrastructure and collect water-use charges (which are supposed to constitute the main source of revenue for CMAs).
- Resistance against CMAs' broad powers, mostly by influential agricultural interests (Box 6.2).

The establishment of CMAs has also faced a number of problems with the delimitation of water management areas. The 19 water management areas (WMAs) were supposed to follow hydrological boundaries in accordance with the internationally accepted principle of water basin management. However, due to economic, social and geophysical constraints, there have been multiple digressions from this principle. The mismatch between hydrological and administrative boundaries has created a number of problems in co-operating with local governments. For example, Cape Town, Johannesburg and several district municipalities were divided between two WMAs (Herrfahrdt-Pähle, 2010). In such cases, two CMAs are supposed to issue water licences, but ensuring compliance can be quite challenging. Local authorities are becoming increasingly frustrated with protracted attempts to establish CMAs and doubt their future effectiveness.

Box 6.2. **Water use reallocation and licensing challenge**

The National Water Act (NWA) established a compulsory water-use licensing system to replace all apartheid-era water-use authorisations. This was intended to achieve a fairer allocation of water, promote its more beneficial use and facilitate the management and conservation of water resources. The NWA assigned authority to allocate water to the state and called for allocation procedures to follow the principles of equity, efficiency and sustainability, taking into consideration the quantity of water abstracted, as well as the scale and impact of use.

While efforts have been made to introduce the new licensing system, progress has been very slow. Because of concern that revoking all existing use-rights would cause a barrage of court cases against the state, "old" rights were allowed to carry over into the new system. However, existing users are not regulated in the same way as licence holders: they are not subject to a review of their licence every five years and may not need to comply with specified conditions and terms of use set out in the application guidelines.

The other key obstacles are the delay in establishing CMAs and the low capacity of the DWA's regional offices. While the DWA was supposed to delegate responsibility of issuing licences to the CMA, this has not happened. Apart from capacity constraints limiting the establishment and running of CMAs, some stakeholders argue the DWA is reluctant to devolve too much power to the CMAs due to potential problems in dealing with local vested interests. In fact, historic agricultural water-users have been impeding the creation of CMAs for fear of a likely water rights re-allocation.

Finally, ensuring compliance with water-use licences remains challenging. In principle, municipal water utilities are treated like any other user. In practice, however, it is difficult to enforce compliance with the requirements of their licence conditions: utilities often lack both capacity and resources to carry out necessary compliance, and the co-operative governance approach prevents one state body from taking coercive action against another.

Source: Quibell et al. (2011).

The second National Water Resource Strategy (NWRS-2) is intended, among other goals, to overcome the financial and human resource constraints in establishing CMAs. NWRS-2, submitted for public consultation at the end of 2012, seeks to consolidate the 19 WMAs proposed under NWRS-1 into 9, with 9 corresponding CMAs associated with the existing DWA's regional offices. The transition of water resources management responsibilities is expected to happen in a gradual and progressive manner (Box 6.3).

It is important the DWA try consistently to engage all stakeholders to implement this institutional reform. The establishment of CMAs in line with the new National Water Resource Strategy should ensure better integration between water resources management, water service provision and land-use management. It would achieve this through enhanced engagement of stakeholder authorities (including those responsible for the environment, agriculture and rural development) at the provincial level, as well as of municipal governments and traditional authorities.

Box 6.3. **Draft second national water resource strategy: Institutional aspects**

The second National Water Resource Strategy (NWRS-2) makes distinctions in the water sector between the centralised system of co-ordination and enforcement (ensured by the DWA) and the decentralised mechanism of participatory management (provided by the CMAs).

NWRS-2 justifies the plan to consolidate the 19 water management areas (WMAs) into 9 on an assessment of available funding, capacity, skills and expertise in regulation and oversight. The proposed WMA boundaries take into account catchment and aquifer areas, as well as financial viability and equity considerations; they are not aligned with provincial or local government boundaries. According to the Strategy, the proposed institutional structure:

- enables the distribution of scarce technical skills over a smaller number of institutions
- improves balance in revenue streams, supporting more financially sustainable CMAs
- speeds up establishment of CMAs
- improves co-ordination at the regional, provincial and international levels.

The strategy's institutional development priorities include, among others:

- accelerate establishment of CMAs in priority WMAs, and delegate water-resource management functions to two CMAs by 2014 and to another two CMAs by 2015
- build the CMAs' capacity and develop decision-support tools so they can play their role in regional development planning
- develop a policy framework to provide financial and technical support to CMAs
- develop a water governance framework for effective oversight and support of CMAs.

Source: DWA (2012).

3. Mechanisms to promote effective multi-level environmental governance

The OECD multi-level governance framework defines several gaps that may impede the implementation of public policies in decentralised governance systems. These include, among others:

- fragmentation of policy tasks and insufficient co-ordination across government agencies (policy gap)
- no or weak assessment of the performance of competent authorities (accountability gap)
- unstable or insufficient revenues, undermining effective implementation of responsibilities (funding gap)
- insufficient human and technical resources for effective policy implementation (capacity gap).

This section analyses the policy instruments – interagency collaboration, accountability and performance measurement, financing mechanisms and capacity building – used in South Africa to address each of the listed gaps.

3.1. *Interagency collaboration*

Most OECD member countries with decentralised systems of environmental governance have set up co-operation and co-ordination mechanisms to streamline the relationship between levels of government. Those mechanisms can be formal or informal, depending on the political and legal tradition. Despite the constraints in human and technical resources, financial costs associated with the co-operation process and vested interests at various levels, different means of vertical interagency collaboration are rapidly developing.

The constitutional principle of "co-operative governance" in South Africa means the three levels of government should support each other, share information and co-ordinate their efforts. The Intergovernmental Framework Relations Act (No. 13 of 2005) establishes mechanisms and procedures to promote intergovernmental co-operation and help settle disputes through mediation. The NEMA also prescribes statutory mechanisms for achieving co-operative *environmental* governance, such as a set of national environmental management principles, planning frameworks and procedures for conflict resolution.

The most important structures to ensure vertical intergovernmental collaboration include the minister and members of executive council (MINMEC), a committee chaired by the national environment minister and comprising relevant provincial environment ministers[4]; and MINTEC, a committee chaired by the director-general of the Department of Environmental Affairs (DEA) that includes heads of provincial environmental departments. In addition, 11 working groups made up of officials from the DEA and provincial environmental departments meet quarterly to engage in joint priority-setting, annual work planning and reporting; they are considered the most effective mechanism to co-ordinate operations between different levels of government on environmental issues.

These national structures are complemented at the provincial and local levels by Technical Working Groups, which comprise relevant provincial "environmental" members of the provincial executive council (MECs) and representatives of mayoral committees of the province's key municipalities. Two provinces have led the way in setting up provincial working groups on enforcement against wildlife-related crime: Mpumalanga Environmental Law Enforcement Forum and KwaZulu-Natal Wildlife Crime Working Group.

Government departments frequently use Memorandums of Agreement (MoAs) as a co-ordination tool. MoAs can address the division of responsibilities and procedural issues, such as timeframes for decision making, but often have little effect because of capacity constraints. In addition, MoAs are not flexible enough: establishing and amending them is a time-consuming, bureaucratic process.

Despite these co-ordination mechanisms, vertical institutional co-operation remains a challenge in South Africa. Some of the important reasons for lack of co-operative governance at different administrative levels include the lack of a comprehensive policy and legislative agenda (new initiatives are taken independently by different stakeholders); overlaps and contradictions between the mandates of different government departments and between the national, provincial and municipal levels of government; and lack of capacity within many government authorities to implement the legislation and government policies (Du Plessis, 2008).

3.2. Accountability and performance measurement

According to the principle of co-operative governance, higher levels of government should conduct general oversight of the lower level's activities, even though they cannot intervene in particular cases, as all the issues have to be resolved in a non-confrontational manner. In line with this principle, the national Department of Co-operative Governance and Traditional Affairs builds the capability and accountability of provinces and municipalities to implement their constitutional mandates. It also monitors and evaluates the impact of national government programmes at the provincial and local levels.

In 2010, the Government of South Africa introduced the "outcomes approach" to enhance accountability of public agencies at all administrative levels for results. The

national government's policy priorities were translated into a set of 12 outcomes, including Outcome 10, "Environmental assets and natural resources that are well protected and continually enhanced". The president of South Africa and each of his ministers have signed performance agreements that describe how respective ministries would help deliver the 12 outcomes.

More detailed delivery agreements laid out targets and implementation plans for each outcome and involve all spheres of government. A delivery agreement for the environment-related Outcome 10 was signed in September 2010 between the minister of Water and Environmental Affairs and the provincial MECs with environmental competencies (who thereby assumed responsibility for the deliverables of all municipalities within their provinces). A number of qualitative and quantitative output and outcome targets (for 2014 and beyond) with respective indicators have been set under five major output areas (Box 6.4). Some indicators are national in scope, while others (according to the constitutional mandates) require monitoring and reporting at the provincial level. An executive implementation forum, comprising representatives of national, provincial and municipal stakeholders, monitors and evaluates progress.

Box 6.4. **Selected environment-related government-wide performance indicators**

Output 1. Quality and quantity of water resources enhanced

- number of water licences issued
- number of wetlands under rehabilitation per year
- percentage of water treatment works complying with drinking water quality standards
- percentage of wastewater treatment works complying with effluent standards
- percentage of mines complying with water licence conditions

Output 2. Reduced greenhouse gas emissions, climate change and improved air quality

- percentage of total emissions of CO_2 reduced
- percentage of power generation from renewable energy sources

Output 3. Sustainable environmental management

- percentage of net deforestation
- percentage of households with basic waste collection
- percentage of permitted landfill sites
- percentage of waste diverted from landfills for reuse, recycling and recovery
- number of derelict and ownerless mines rehabilitated and closed in line with environmental best practice
- number of municipalities with credible spatial development frameworks

Output 4. Biodiversity protected

- percentage of land mass under formal protection
- number of municipalities with bioregional plans or biodiversity sector plans

Output 5. Environmental legislation compliance and enforcement

- number of compliance inspections conducted
- number of enforcement actions undertaken for non-compliance.

Source: DEA (2012a).

The performance measurement framework under Outcome 10 covers most priority environmental issues. However, in practice, reporting on indicators is irregular rather than quarterly. Moreover, it tends to focus on activities/outputs rather than results/outcomes, as in the case of the Environmental Management Inspectorate (Chapter 2). The quality and reliability of reported data also appear to be a problem.

It is important to integrate environmental performance indicators into various other existing government policy frameworks, including the government-wide monitoring and evaluation system, the framework for managing programme performance evaluation and especially the budget planning process, as discussed in the following section.

3.3. Financing mechanisms

Sub-national governments account for about half of total government spending, which is relatively high in comparison with OECD member countries. However, the share of revenue generated by sub-national governments is approximately 20%, around the average for OECD member countries. The large difference between sub-national expenditure and revenue-shares indicates a vertical funding gap. This gap is filled by central government grants, mostly to the provinces. Municipalities, especially those in Category A, have relatively more resources. For example, the City of Johannesburg receives 40% of its revenues from service charges (mainly electricity) and 14% from property taxes (the main tax base for local governments in South Africa). Only 8% of its revenues come from grants. The picture for the Gauteng province where Johannesburg is located is radically different: the largest share of revenues (70%) comes from the general grant (called equitable share), 24% from conditional grants and only 5% from provincial revenue sources.

General budget funding is the dominant source of environmental expenditure at each administrative level. However, since the provinces cannot raise taxes, their budgets consist mostly of annual allocations from the National Treasury. At the municipal level, the share of targeted grants from the national and provincial government is about 20-25%; the rest is mostly revenues from local taxes and service charges.

There is no earmarked environmental funding as part of the general budget support from the national to the provincial and local governments. Targeted, "conditional" project-related grants constitute almost half of financial support from the national budget, but there appears to be great volatility and uncertainty in their size. To date, most such grants have been channelled towards energy, transport and water infrastructure investment (Box 6.5). The national government also funds a number of environmental clean-up projects.

Whereas the national DEA's budget almost doubled from ZAR 2.4 billion in 2008/09 to ZAR 5.2 billion in 2012/13, environmental budgets at the provincial level grew more slowly. The rate of increase varies greatly among the provinces: some of them (such as Gauteng, Western Cape and KwaZulu-Natal) are financially better off, while others (such as Limpopo and the Northern Cape) started at a very low base. Overall, environmental expenditures account for less than 1% of provincial budgets.

Funding at the local level is even more severe. The gap between available resources and the funds needed to meet programme objectives is more acute in smaller, rural, less economically developed jurisdictions, contributing to inequities of policy implementation.[5] Targeted grants from the national government cover project-related costs but not routine operations; most smaller municipalities do not assign high priority to

Box 6.5. **Expanded public works programme**

The Expanded Public Works Programme (EPWP) was launched in 2004 to promote economic growth with strong elements of environmental sustainability. Phase 1 was to help alleviate unemployment by creating at least 1 million jobs, a target attained in 2008 – one year earlier than envisaged. This both captured public imagination and created considerable political momentum to massively expand the programme and improve its reach. It also enabled environmental authorities to promote environmental management on the basis of its contribution to job creation, a politically-attractive objective. The DEA spends about half of its budget on the EPWP.

The DEA's "Working for…" series of programmes has met a wide range of environmental rehabilitation needs through labour-intensive methods. It began with the success of Working for Water, an early payment for ecosystem services (PES) programme, much copied in other developing countries and expanded into other environment-related areas. The other programmes included Working on Fire (preventing and suppressing fires), Working on Waste (clean disposal, recycling business and livelihoods), Working for the Coast (cleaning, rehabilitation, improving facilities), Working for Wetlands (rehabilitation, conservation, groundwater purification), Working for Land (soil conservation and re-vegetation), Greening & Open Space Management (rehabilitation of urban areas), People & Parks (conservation, community benefit-sharing), Eco-Furniture Factories and Youth Environmental Service (environmental services for marginalised communities).

Some earlier programmes with an environment focus, notably Working for Water, Working for Wetlands and Working on Fire, were evaluated as broadly successful. However, there is now criticism that such state-run job creation programmes are inefficient because they tend to favour the better connected rather than the poorest segments of the population. Moreover, these types of programmes are not sustainable in the absence of government funding.

Source: National Treasury (2012).

environmental tasks. At the same time, due to capacity constraints, some local authorities cannot absorb funds allocated for specific projects, and return them to the upper level at the end of the budgetary year. Such a situation leads to serious deterioration of environmental performance even in cases where some funds are available.

In light of their growing environmental responsibilities, provincial and especially local governments need to ensure they can secure sufficient funding to pursue their mandates. One option is through linking "conditional grants" (from national to provincial and local authorities) to defined environmental outcomes; these transfers could cover the core operations of the provincial and municipal environmental authorities. The National Treasury already uses performance indicators as part of its medium-term expenditure management at the national level. This good practice should be extended to targeted transfers to the provinces and municipalities. The delivery agreement under Outcome 10 could serve as a basis for result-oriented budgeting of financial transfers to provincial and local authorities.

Another option for closing the funding gap is to develop own revenue sources at the provincial and local levels. Currently, funds produced from environmental regulation (licence fees, administrative and criminal fines, etc.) are not earmarked for environmental purposes. Gauteng province is planning to introduce administrative fees for EIA/

environmental authorisations, revenues from which would be earmarked. However, these revenues are not expected to be a major source of environmental expenditures. Permitting fees could be increased in the future, using the experience of several OECD member countries (e.g. the UK, Ireland and the US).

3.4. Capacity building

Lack of capacity at the provincial and local levels of government is proving to be a major constraint, hampering effective implementation of environmental policies and laws. Capacity varies widely across the provinces and municipalities; capacity in some metropolitan municipalities, such as Johannesburg, exceeds that of provincial authorities.

The lack of capacity occurs in two main forms: the shortage of people with appropriate qualifications in environmental management to meet current demand; and the difficulty for environmental professionals, especially in smaller municipalities, to access training on the implementation of new environment-related regulations.

The vacancy rate for public sector environmental jobs was 29% in 2009, with a need to fill 800 environmental technical and 600 scientific positions at the national and provincial levels (DEA, 2009). There is a 56% shortage of environmental impact management officers at the provincial level (DEA, 2010). Many municipalities have no staff positions dedicated to environmental management. The number of vacancies is high because of a combination of factors, including high staff turnover and low wages due to the lack of funding. This affects the ability of environmental departments to attract and retain staff. The professionally qualified are often shifted to other positions, leading to the loss of institutional memory and leaving the least qualified to deal with complex policy and technical requirements for which they do not have sufficient skills.

While there is an urgent need to improve skills within the environmental sector, training does not receive sufficient attention in many provinces. The expenditure on training per staff member per year ranged in 2005 from ZAR 161 in North West province to more than ZAR 5 000 in Gauteng and KwaZulu-Natal (DEAT, 2006). These imbalances persist to date.

To ensure that lower-level environmental authorities accumulate sufficient knowledge and practical experience, the national DEA provides programmatic support (including training, information resources, etc.) to the provinces free of charge.[6] One of the most successful environmental capacity building efforts in South Africa has resulted from the establishment of the Environmental Management Inspectorate. The collaboration between the national and provincial levels on environmental compliance and enforcement is viewed quite positively by both sides (Box 6.6).

The DEA has developed a number of strategic and programmatic documents outlining capacity building needs and priorities. The Human Capital Development Strategy for the Environmental Sector (2009-14) lays down a strategic objective to "address the scarce and critical skills that currently exist in the environmental sector to enhance vertical and horizontal governance" (DEA, 2009). In particular, it calls for an urgent national initiative to strengthen environmental skills in the local government sector. To improve the supply and retention of internal environmental skills in the public sector, the strategy provides for targeted bursary and internship schemes linked to, and funded by, workplace skills plans and annual training budgets at the national and provincial levels. It also supports the development of training programmes in air quality and waste management, pollution

Box 6.6. **Capacity building on environmental compliance and enforcement at the provincial level**

Through the institutionalisation of training programmes and collaboration with international environmental organisations, the DEA's compliance and enforcement units have managed to build capacity within many provincial institutions in a relatively short time.

The national government's support programme on environmental compliance and enforcement consists of the following main elements:

- operational compliance and enforcement support in the form of joint investigations and inspections if requested by the provincial or local government
- basic and specialised training courses
- development of information and communication resources, including a website, a quarterly newsletter, an electronic notice board, an Environmental Management Inspectorate's operating manual, legislative handbooks, manuals for magistrates and prosecutors on environmental crimes, Green Dockets and Pocketbooks
- referral of complaints from the national Environmental Crimes and Incidents Hotline.

The Environmental Management Inspectorate is just starting to build capacity at the local authority level in areas such as air quality. It is envisaged that support mechanisms between the national and provincial levels will be replicated by the provincial governments to develop capacity at the municipal level. There are already positive examples (e.g. in Gauteng) of provincial authorities building capacity by training local environmental inspectors after a new Compliance and Enforcement Branch was created in the province.

Source: DEA, (2012b).

incident management, EIA, biodiversity conservation, and compliance and enforcement. The strategy aims to address the perceived lack of relevance associated with many training programmes by aligning them with real workplace needs.

The Human Capital Development Strategy is implemented through an associated environment sector skills plan (ESSP), a comprehensive study of environmental skills development in South Africa and the Guidelines for Skills Development Planning in the Environmental Sector (DEA, 2010). The ESSP implementation is part of the delivery agreement under the national government's Outcome 10 (Section 3.2). However, apart from a very ambitious goal of creating hundreds of thousands of environmental sector jobs, mostly through EPWP (Section 3.3), no quantitative targets or indicators have been established. It is, therefore, difficult to assess progress.

To make the investment of additional resources in training and other forms of capacity building worthwhile, it is essential to address the challenge of staff retention, especially those with demonstrated skills, experience and commitment. This, in turn, requires additional core funding from the national government to the provinces and municipalities, as discussed in Section 3.3.

Notes

1. Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West and Western Cape.
2. Bloemfontein, Cape Town, Durban, East London, East Rand, Johannesburg, Port Elizabeth and Pretoria.

3. The Water Boards also operate dams and provide bulk water supply services, thereby playing an important role in water resources management. Some Water Boards provide technical assistance to municipalities.
4. Similar MINMEC committees have been established in other sectoral ministries.
5. At the same time, South Africa's Constitution provides that local government is "entitled to an equitable share of revenue raised nationally" and may also receive additional conditional transfers from the national and provincial governments.
6. The national government also provides "capacity building grants" to municipalities, but those are used primarily for programmes to develop in-house systems and skills for planning, project management and financial management in local authorities.

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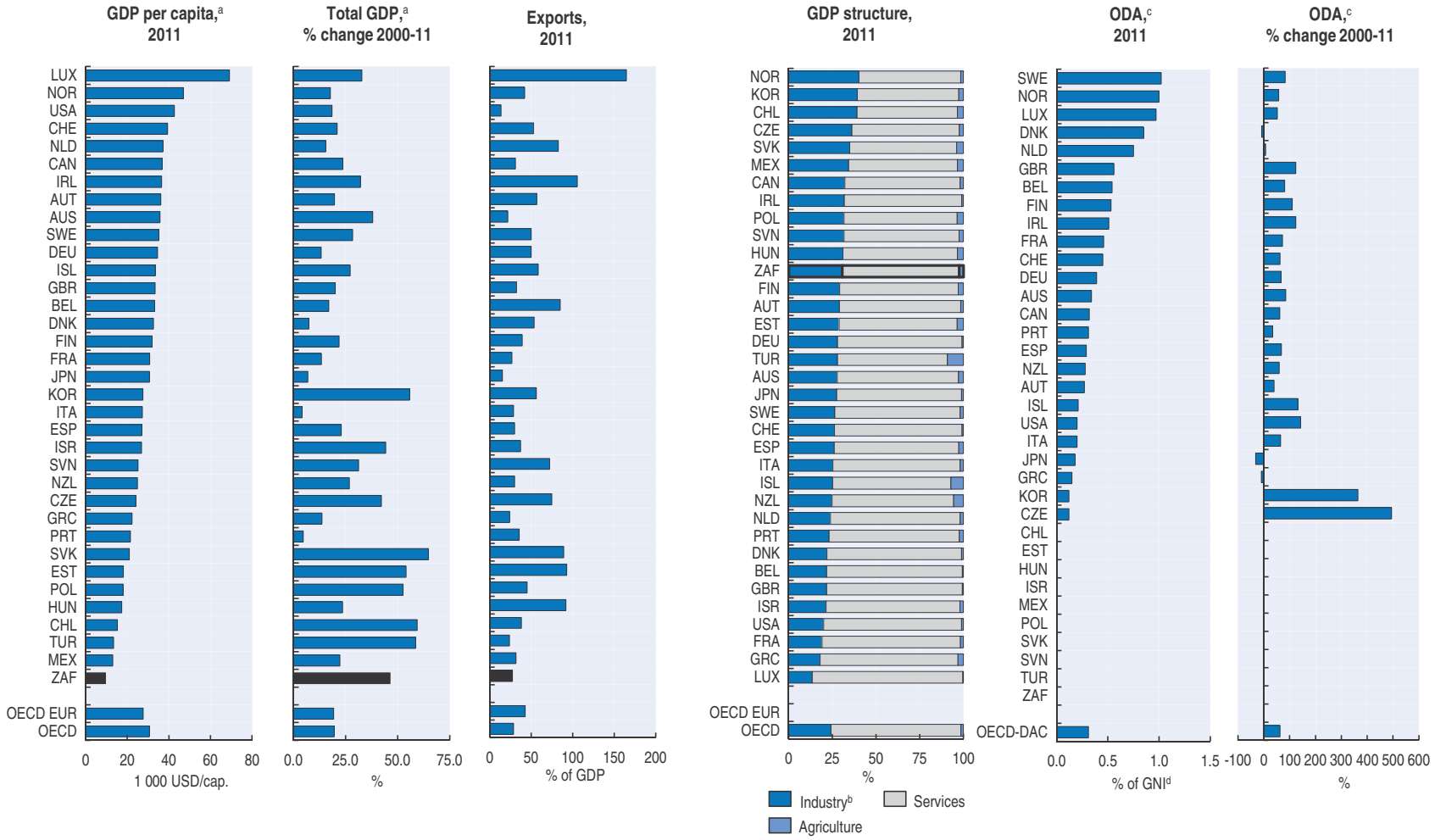
ANNEX I

*Selected data**

* The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Annex I.A. **Selected economic data* – Economic context**



*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Partial totals are indicated by dotted borders.

a) GDP at 2005 prices and purchasing power parities.

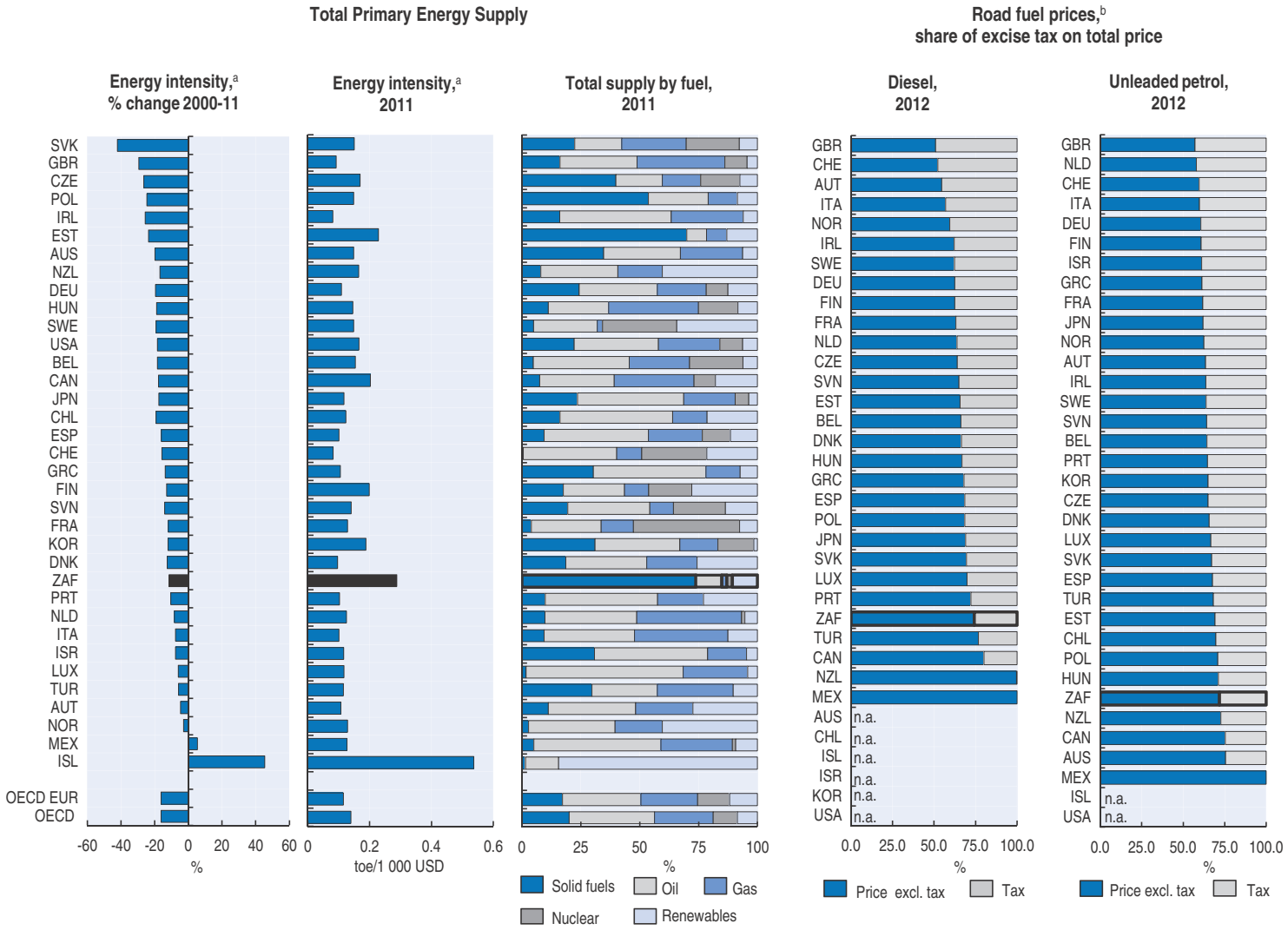
b) Includes mining and quarrying, manufacturing, gas, electricity and water, and construction.

c) Official development assistance by member countries of the OECD Development Assistance Committee (DAC). Total net disbursements; % change based on data expressed at constant 2010 USD; (CZE, ISL, KOR became DAC members after 2000).

d) Gross national income.

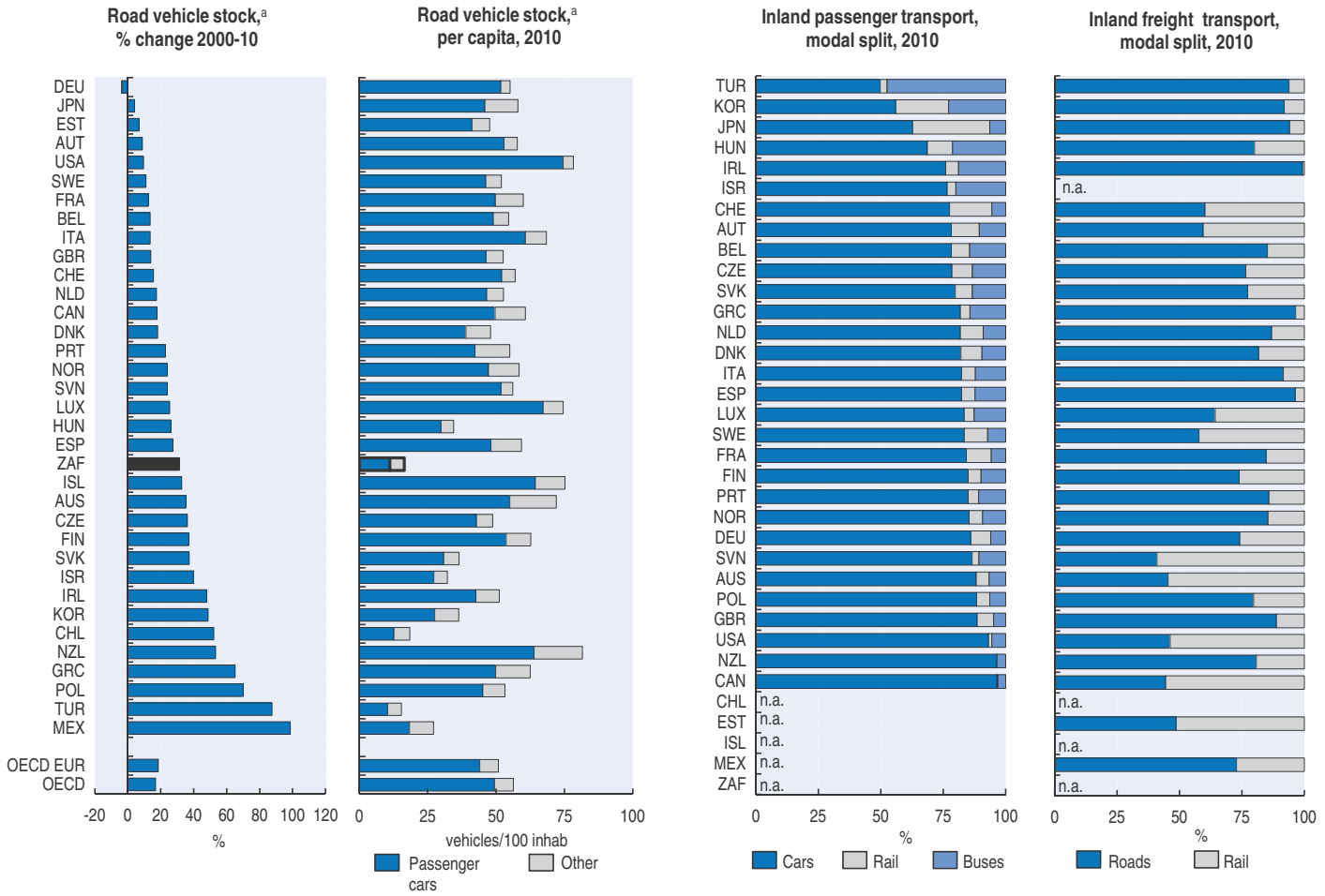
Source: OECD Environmental Data.

Annex I.A. **Selected economic data* – Energy**



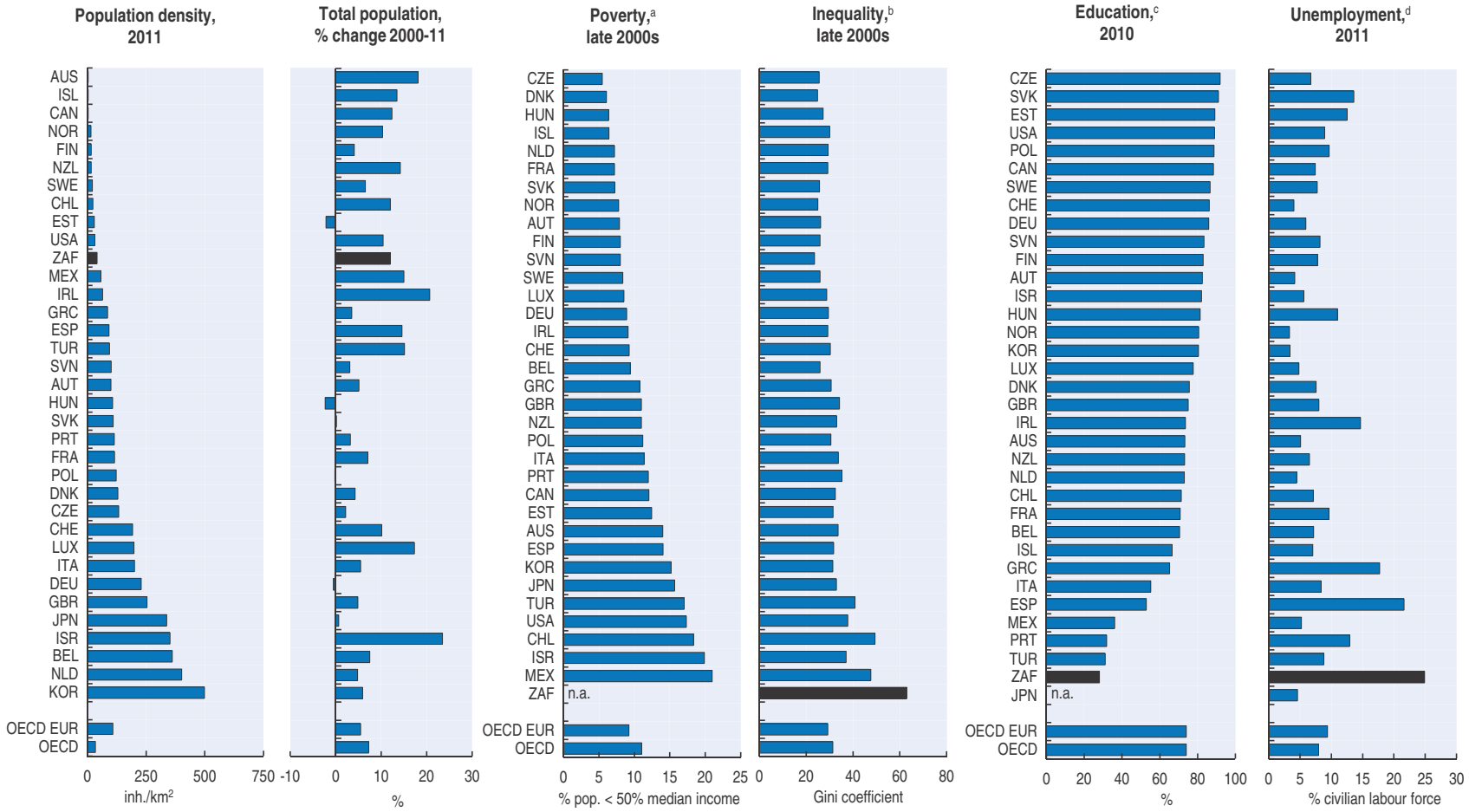
*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Partial totals are indicated by dotted borders.
a) Total primary energy supply per unit of GDP expressed at 2005 prices and purchasing power parities.
b) Diesel fuel: automotive diesel for non-commercial use; unleaded petrol: unleaded premium (RON 95), except JPN (regular unleaded) and ZAF (RON 93).
Source: OECD Environmental Data.

Annex I.A. **Selected economic data* – Transport**



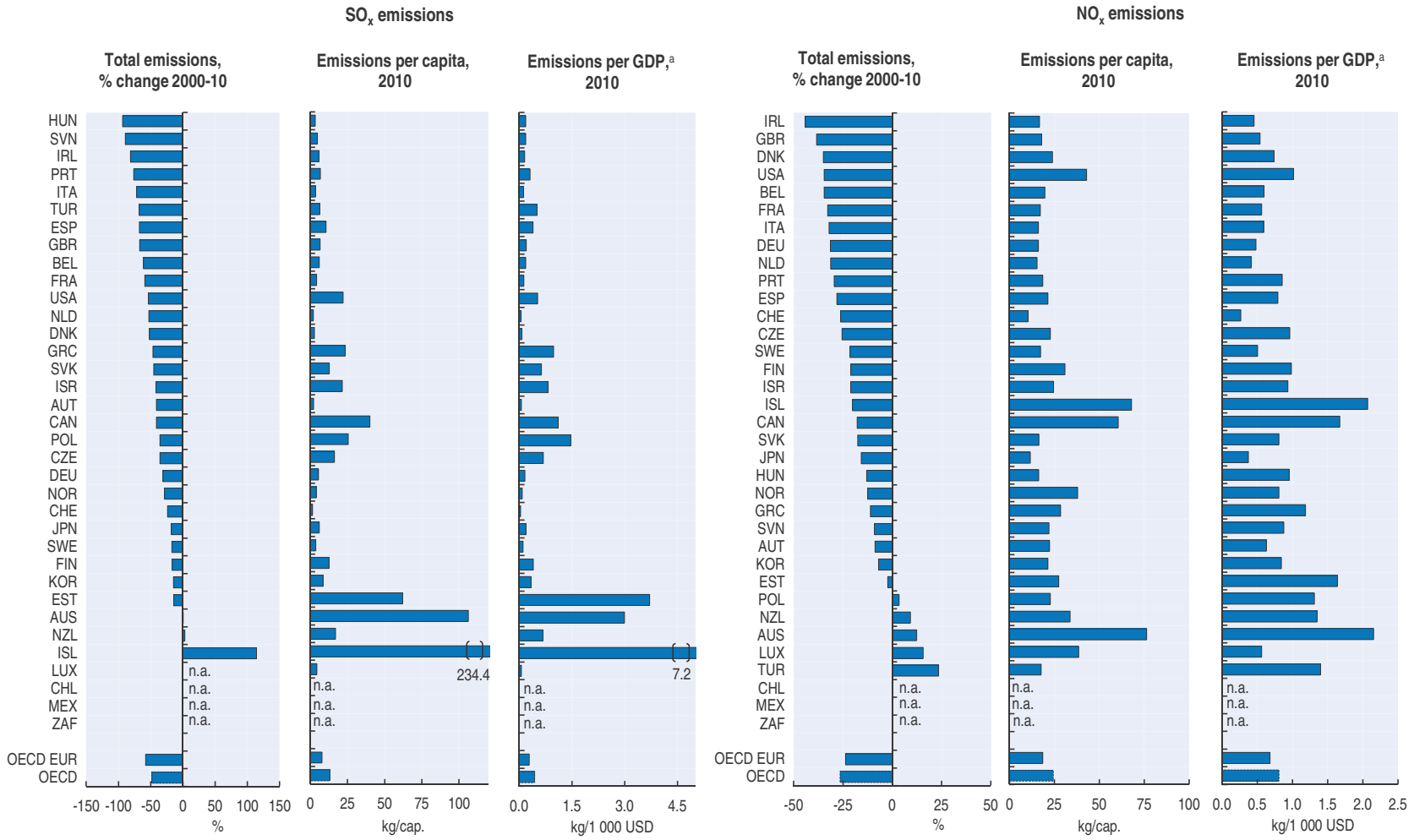
*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Partial totals are indicated by dotted borders.
a) Motor vehicles with four or more wheels. ZAF: 2000 data refer to 2004.
Source: OECD Environmental Data.

Annex I.B. **Selected social data* – Social context**



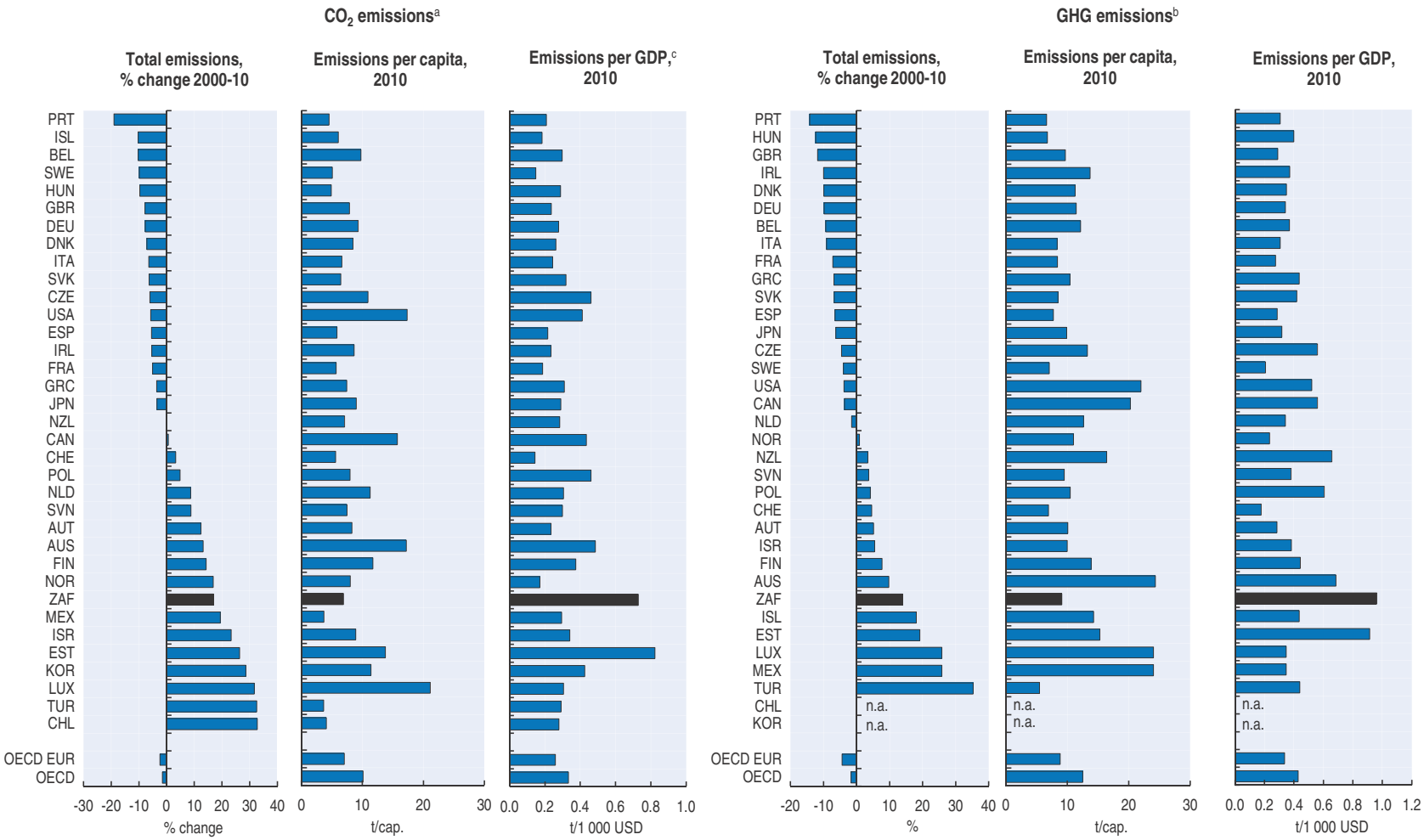
*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Partial totals are indicated by dotted borders.
a) Share of population with an income under 50% of the median income. OECD: average of rates.
b) Ranging from 0 (equal) to 100 (inequal) income distribution; figures relate to total disposable income (incl. all incomes, taxes and benefits) for the entire population. OECD: average of rates.
c) Share of population aged 25-64 years with at least upper secondary education. OECD: average of rates.
d) Harmonised unemployment rates.
Source: OECD Environmental Data; *OECD.Stat Data Warehouse* (*OECD Social Expenditure Statistics; OECD Education Statistics; OECD Main Economic Indicators*).

Annex I.C. **Selected environmental data* – Air**



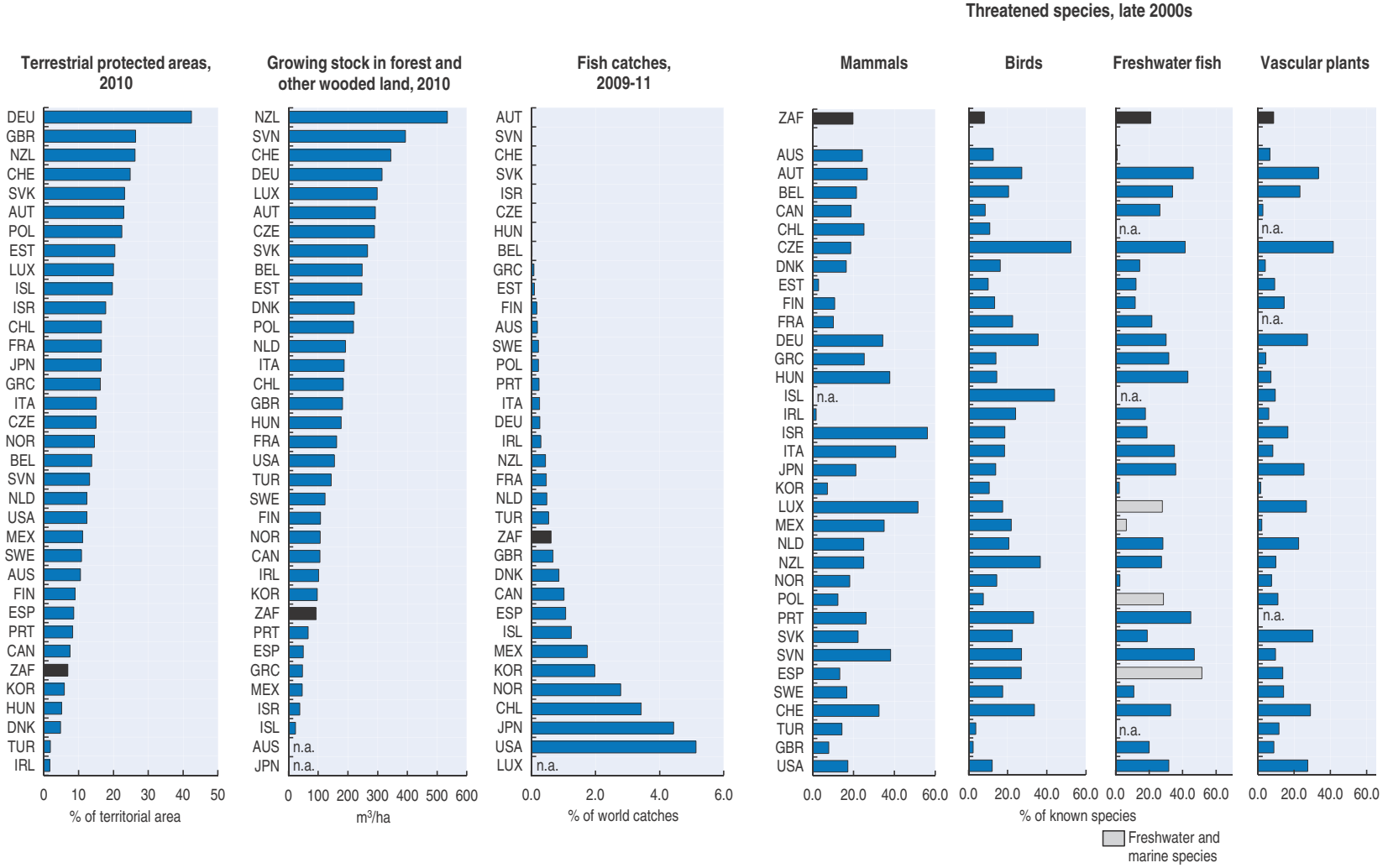
*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Varying definitions can limit comparability across countries. Partial totals are indicated by dotted borders.
a) GDP at 2005 prices and purchasing power parities.
ISL: SO_x emissions include emissions from geothermal energy (182 kg per capita in 2010). KOR: Data refer to 2006. LUX: NO_x emissions exclude "fuel tourism emissions" and refer to 2009.
Source: OECD Environmental Data.

Annex I.C. **Selected environmental data* – Climate**



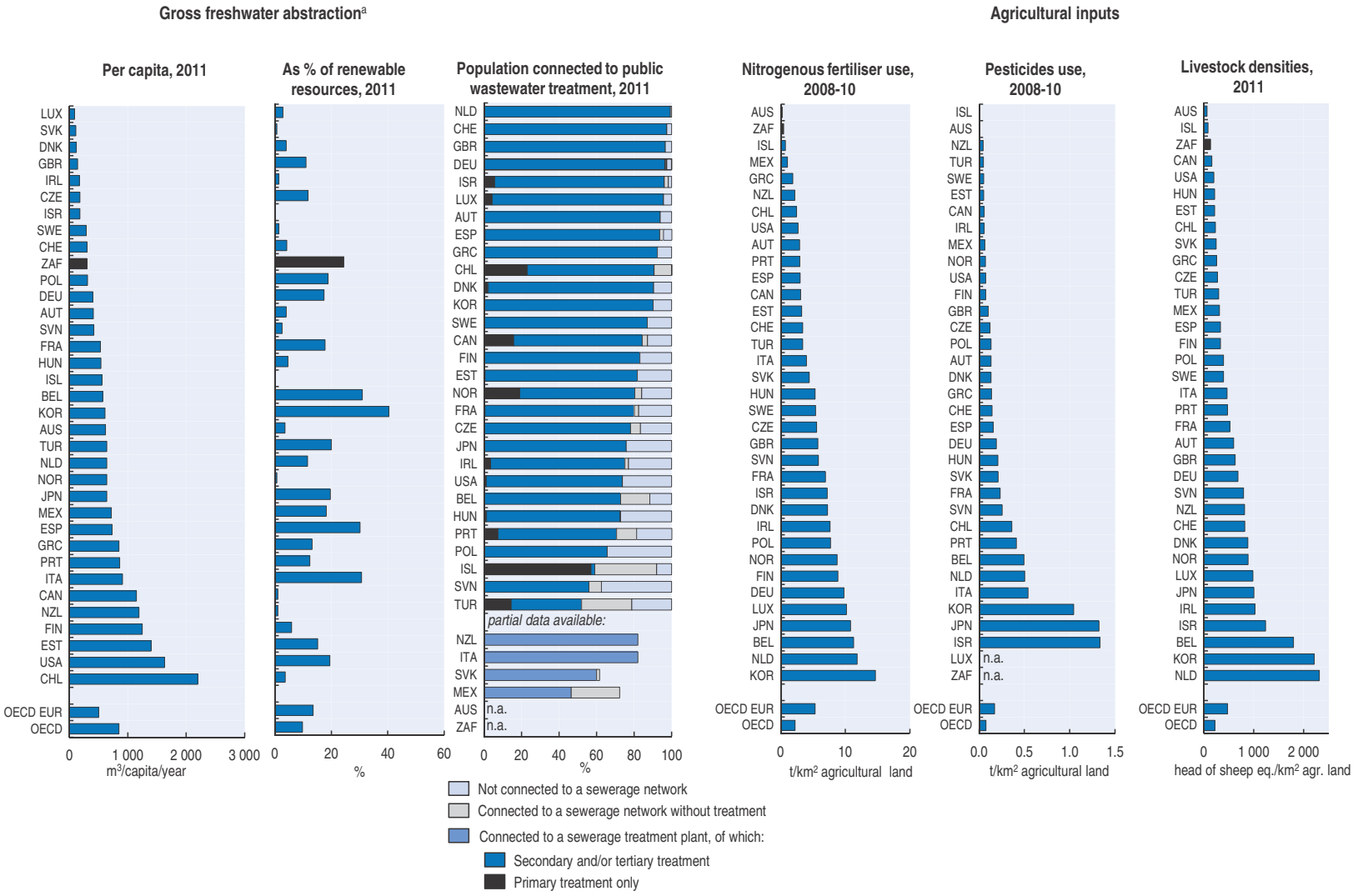
**)* Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Varying definitions can limit comparability across countries. Partial totals are indicated by dotted borders.
a) Emissions from energy use only; excluding international marine and aviation bunkers; sectoral approach.
b) Exluding emissions/removals of the land use, land-use change and forestry sector. ISR: 2000 data exclude F-gases.
c) GDP at 2005 prices and purchasing power parities.
Source: OECD Environmental Data.

Annex I.C. **Selected environmental data* – Biodiversity conservation and sustainable use**



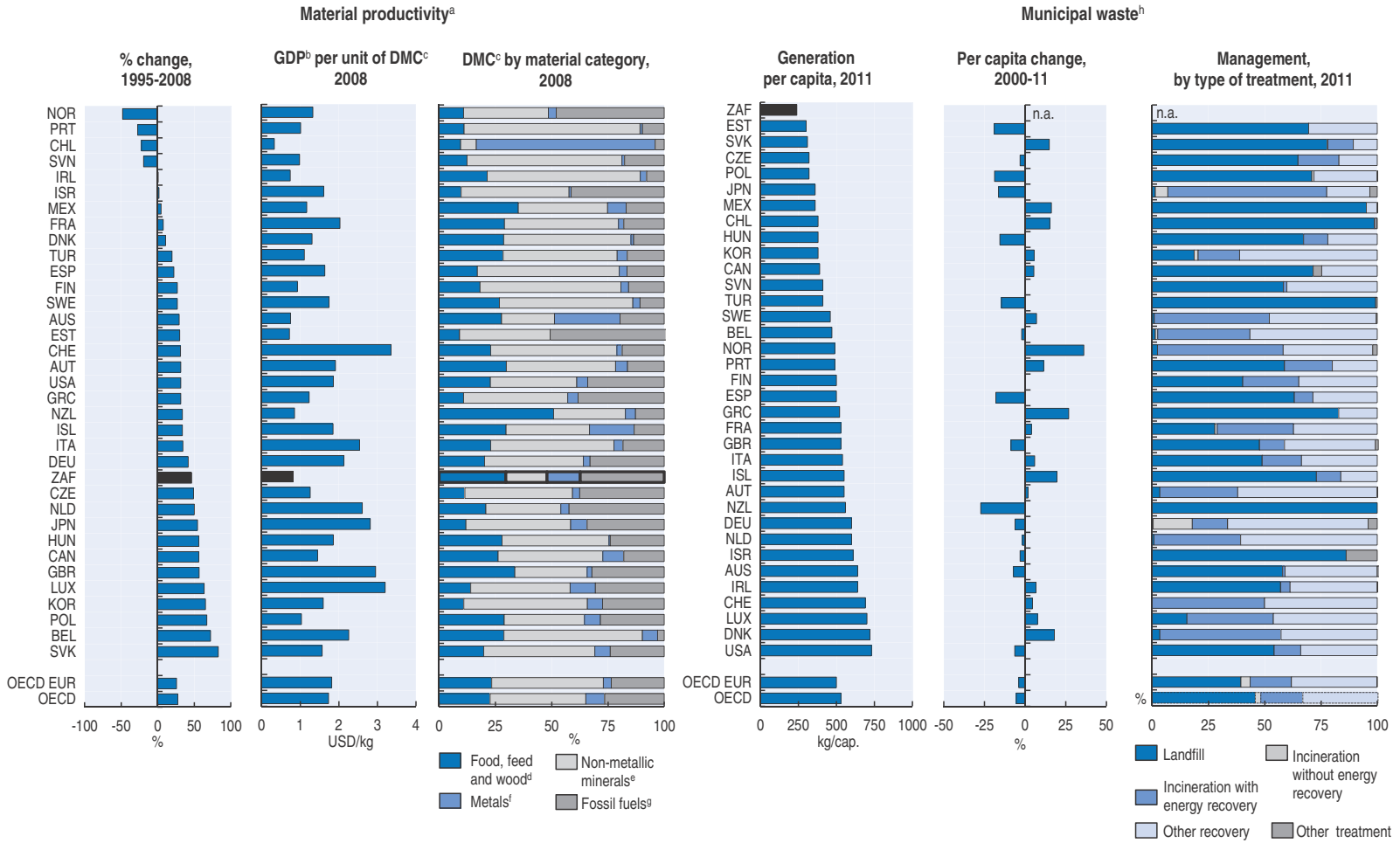
*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Varying definitions can limit comparability across countries.
a) Includes different level of protection ranging from IUCN categories I to VI. National classifications may differ.
NOR: threatened fish species: marine species only.
Source: OECD Environmental Data.

Annex I.C. **Selected environmental data* – Water and land**



*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Varying definitions can limit comparability across countries.
a) For some countries, data refer to water permits and not to actual abstractions.
CHL: data for public wastewater treatment refer to population living in urban areas. GBR: Water abstraction and public wastewater treatment: England and Wales only; pesticides use: Great Britain only.
Source: OECD Environmental Data.

Annex I.C. **Selected environmental data* – Material productivity and waste**



*) Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Varying definitions can limit comparability across countries. Partial totals are indicated by dotted borders.

a) Amount of GDP generated per unit of materials used, ratio of GDP to domestic material consumption (DMC).

b) GDP at 2005 prices and purchasing power parities.

c) DMC equals the sum of domestic (raw material) extraction used by an economy and its physical trade balance (imports minus exports of raw materials and manufactured products).

d) Domestic production from agriculture, forestry and fisheries, plus trade of raw and processed products from these sectors.

e) Domestic extraction and trade of minerals used in industry and construction, plus trade of derived processed products.

f) Domestic extraction of metal ores, plus trade of metal ores, metal concentrates, refined metals, products mainly made of metals, and scrap.

g) Coal, crude oil, natural gas, peat and traded derived products.

h) Waste collected by or for municipalities and includes household, bulky and commercial waste, and similar waste handled at the same facilities. CAN: household waste only and total incineration; NZL: lanfdilled waste only; ZAF: excludes recyclable waste.

Source: OECD Environmental Data.

ANNEX II

Abbreviations

ABS	Access and benefit-sharing
ACAP	Agreement on the Conservation of Albatrosses and Petrels
AEWA	Agreement on the Conservation of African-Eurasian Migratory Waterbirds
AMCEN	African Ministerial Conference on the Environment
AMCOW	African Ministers' Council on Water
AMD	Acid mine drainage
ASGI-SA	Accelerated and Shared Growth Initiative for South Africa
AU	African Union
BASIC	Brazil, South Africa, India and China
BBWW	Boat-based whale watching
BCC	Benguela Current Commission
BCLME	Benguela Current Large Marine Ecosystem
BITs	Bilateral Investment Treaties
BPEO	Best practicable environment option
BRICS	Brazil, Russia, India, China and South Africa
BWI	Biodiversity and Wine Initiative
BWM	Ballast water management
CBD	Convention on Biological Diversity
CBO	Community-based organisation
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CDM	Clean Development Mechanism
CERs	Certified emissions reductions
CFK	Cape Floral Kingdom
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMA	Catchment management agency
CMS	Convention on the Conservation of Migratory Species of Wild Animals
COP	Conference of the Parties
CSD	Commission on Sustainable Development
CSIR	Council for Scientific and Industrial Research
DAFF	Department of Agriculture, Fisheries and Forestry
DALYs	Disability-adjusted life years
DBSA	Development Bank of Southern Africa
DDT	Dichlorodiphenyltrichloroethane
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism

DEDEA	Eastern Cape Department of Economic Development, Environmental Affairs
DEDEAT	Eastern Cape Department of Economic Development, Environmental Affairs and Tourism
DoH	Department of Health
DoJ	Department of Justice
DMR	Department of Mineral Resources
DST	Department of Science and Technology
DTI	Department of Trade and Industry
EAPSA	Environmental Assessment Practitioners Association of South Africa
ECIC	Export Credit and Insurance Corporation of South Africa
EEAs	Environmental economic accounts
EIA	Environmental impact assessment
EFTA	European Free Trade Association
EMI	Environmental Management Inspectorate
EMF	Environmental management framework
EMP	Environmental management plan
EPWP	Expanded Public Works Programme
ESSP	Environmental Sector Skills Plan
FAO	Food and Agriculture Organization
FBE	Free basic electricity
GDP	Gross domestic product
GEA	Green Economy Accord
GEF	Global Environment Facility
GERD	Gross domestic expenditure on research and development
GHG	Greenhouse gas
GloBallast	Global Ballast Water Management Programme
GLP	Good Laboratory Practice
GMO	Genetically modified organism
GNI	Gross national income
HNS	Hazardous and noxious substances
IBSA	India-Brazil-South Africa Dialogue Forum
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICGEB	International Centre for Genetic Engineering and Biotechnology
IDP	Integrated Development Plan
IOTC	Indian Ocean Tuna Commission
IMO	International Maritime Organization
IPAP	Industrial Policy Action Plan
IPP	Independent power producer
IRC	Integrated Reporting Committee
IRP	Integrated Resource Plan
JPoI	Johannesburg Plan of Implementation
JSE	Johannesburg Stock Exchange
LMMC	Like-Minded Megadiverse Countries
LMO	Living modified organism
LTMS	Long-Term Mitigation Scenarios
LUDS	Land-Use Decision Support
MAD	Mutual Acceptance of Data

MARPOL	International Convention for the Prevention of Pollution from Ships
MCCM	Multi-stakeholder Committee for Chemicals Management
MDGs	Millennium Development Goals
MEAs	Multilateral environmental agreements
METT	Management Effectiveness Tracking Tool
MINMEC	Ministerial Forum
MINTEC	Ministerial Technical Committee
MTOE	Million tonnes of oil equivalent
NAM	Non-Aligned Movement
NBA	National Biodiversity Assessment
NBSAP	National Biodiversity Strategy and Action Plan
NBF	National Biodiversity Framework
NCSD	National Committee on Sustainable Development
NDFs	Non-detriment findings
NDP	National Development Plan
NEES	National Energy Efficiency Strategy
NEMA	National Environmental Management Act
NEMLA	National Environmental Laws Amendment Act
NEPAD	New Partnership for Africa's Development
NGO	Non-governmental organisation
NGP	New Growth Path
NIP	National Implementation Plan
NPA	National Prosecuting Authority
NPAES	National Protected Areas Expansion Strategy
NPO	Non-profit organisation
NSBA	National Spatial Biodiversity Assessment
NSSD	National Strategy for Sustainable Development
NWRS	National Water Resource Strategy
ODA	Official Development Assistance
ODP	Ozone depletion potential
ODS	Ozone-depleting substance
OPRC	International Convention on Oil Spill Preparedness, Response and Co-operation
PAIA	Promotion of Access to Information Act
PES	Payment for ecosystem services
PSDFs	Provincial spatial development frameworks
PSE	Producer support estimate
PCBs	Polychlorinated biphenyls
PCDD	Polychlorinated dibenzo-p-dioxins
POPs	Persistent organic pollutants
RDP	Reconstruction and Development Programme
RISDP	Regional Indicative Strategic Development Plan
SAAQIS	South African Air Quality Information System
SACU	Southern African Customs Union
SADC	Southern African Development Community
SADPA	South African Development Partnership Agency
SAEO	South Africa Environment Outlook

SAEON	South African Environmental Observation Network
SAICM	Strategic Approach to International Chemicals Management
SAMA	South African Mercury Assessment Programme
SAMBF	South African Mining and Biodiversity Forum
SAMSA	South African Maritime Safety Authority
SANBI	South African National Biodiversity Institute
SAPIA	Southern African Plant Invaders Atlas
SAQA	South African Qualifications Authority
SDF	Spatial development framework
SEA	Strategic environmental assessment
SEAFO	Southeast Atlantic Fisheries Organisation
SIOFA	South Indian Ocean Fisheries Agreement
SMMEs	Small, medium-sized and micro-enterprises
Solar PV	Solar photovoltaics
SPLUMB	Spatial Planning and Land-Use Management Bill
SWIOFC	Southwest Indian Ocean Fisheries Commission
TAC	Total allowable catch
TAE	Total allowable effort
TFCAs	Transfrontier conservation areas
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
WUA	Water user association

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