

Water affairs and forestry

The aim of the Department of Water Affairs and Forestry is to ensure the availability and supply of water at national level to facilitate equitable and sustainable social and economic development; to ensure the universal and efficient supply of water services at local level; and to promote the sustainable management of forests.

Hydrological conditions

South Africa is located in a predominantly semi-arid part of the world. The country's climate varies from desert and semi-desert in the west to subhumid along the eastern coastal area, with an average rainfall of about 450 mm per year. This is well below the world average of about 860 mm per year, while evaporation is comparatively high.

South Africa's inland water resources include 22 major rivers, 165 large dams, more than 4 000 medium and small dams on public and private land, and hundreds of small rivers.

The country's water resources are, in global terms, scarce and extremely limited. The total flow of all the rivers in the country combined amounts to about 49 200 million cubic metres (m³) per year. This is less than half of that of the Zambezi River,

the closest large river to South Africa. Groundwater plays a pivotal role, especially in rural water supplies. However, due to the predominantly hard-rock nature of South Africa's geology, there are few major groundwater aquifers that can be used on a large scale.

Owing to the poor spatial distribution of rainfall, the natural availability of water across the country is also highly uneven. This is compounded by the strong seasonality of rainfall over virtually the entire country, as well as the high within-season variability of rainfall, and consequently, of run-off.

As a result, stream flow in South Africa's rivers is at relatively low levels for most of the time, with sporadic high flows occurring – characteristics which limit the proportion of stream flow that can be relied upon to be available for use, and which also have implications for water-related disasters such as floods and droughts.

To aggravate the situation, most urban and industrial development, as well as some dense rural settlements, have been established in remote locations away from large watercourses. As a result, the requirements for water already far exceed its natural availability in several river



basins. Widespread and often large-scale transfers of water across catchments have, therefore, been implemented in South Africa.

To facilitate the management of water resources, the country has been divided into 19 catchment-based water-management areas. Eleven water-management areas share international rivers.

Over the years, water-resource development and management in South Africa have continuously evolved to meet the needs of a growing population and a vibrant economy, within the constraints imposed by nature. These developments have largely been made possible by recognising water as a national asset, thereby allowing its transportation from where it is available to where the greatest overall benefits for the nation can be achieved.

Sufficient water resources have been developed and are available to ensure that all current requirements for water can reasonably be met, without impairing the socio-economic development of the country.

Where feasible, special management techniques may be applied to improve water quality to appropriate standards for particular uses. The quality of groundwater varies according to hydrogeological conditions and anthropogenic impact. However, most major aquifer systems contain potable-quality water.

Measures will also be introduced to ensure the most beneficial and efficient use of water in the country from a social and economic perspective.

Provided that South Africa's water resources are judiciously managed and wisely allocated and used, sufficient water of appropriate quality will be available to sustain a strong economy, high social standards and healthy aquatic ecosystems for many generations.

South Africa depends mainly on surface-water resources for most of the urban, industrial and irrigation water supplies in the country. In general, surface-water resources are highly developed over most of South Africa. Groundwater is also extensively used, particularly in the rural and more arid areas, contributing to some 60% of newly serviced households (since 1994).

In the northern parts of the country, both surface and groundwater resources are nearly fully developed and used. Some overexploitation occurs in localised areas, with little undeveloped resource potential remaining. The reverse applies to the well-watered south-eastern region of the country where there are still significant undeveloped and little-used resources.

The total mean annual run-off of water in South Africa under natural (undeveloped) conditions is estimated at a little over 49 200 million m³ per year, including about 4 800 million m³ per year of water

originating from Lesotho, and about 700 million m³ per year originating from Swaziland, which naturally drain into South Africa. Agricultural irrigation represents close to 60% of the total water requirements of the country, while urban requirements constitute about 25% as the second-largest user sector. The remaining 15% is shared by the other four sectors (all standardised to 98% assurance of supply).

The total net abstraction of water from surface water resources amounts to about 10 200 million m³ per year for the whole of South Africa, after allowing for the re-use of return flows. This represents about 20% of the total mean annual run-off of 49 200 million m³ per year (all standardised to 98% assurance of supply). A further 8% is estimated to be lost through evaporation from storage and conveyance along rivers, and 6% through land-use activities. As a national average, about 66% of the natural river flow (mean annual run-off) therefore still remains in the country's rivers.

Major dams of South Africa

Dam	Full supply capacity (10 ⁶ m ³)	River
Gariep	5 341	Orange
Vanderkloof	3 171	Orange
Sterkfontein	2 616	Nuwejaarspruit
Nuwejaarspruit Vaal	2 603	Vaal
Pongolapoort	2 445	Pongolo
Bloemhof	1 264	Vaal
Theewaterskloof	480	Sonderend
Heyshope	451	Assegai
Woodstock	380	Tugela
Loskop	361	Olifants
Grootdraai	354	Vaal
Kalkfontein	318	Riet
Goedertrouw	304	Mhlatuze
Albert Falls	288	Mgeni
Brandvlei	284	Brandvlei
Spioenkop	277	Tugela
Mthatha	253	Mthatha
Driekoppies	250	Lomati
Inanda	241	Mgeni
Hartbeespoort	212	Crocodile
Erfenis	207	Groot Vet
Rhenosterkop	204	Elands
Molatedi	200	Groot Marico
Ntshingwayo	198	Ngagane
Zaaihoek	192	Slang
Midmar	175	Mgeni

Source: Department of Water Affairs and Forestry

Water-resource management and development

Government is committed to ensuring that everyone in South Africa has access to functioning basic water-supply services and that everyone has access to a functioning basic sanitation facility by 2010. Government is also committed to eradicating bucket systems in formal settlements by 2007.

The substantial restructuring of the department, which is expected to be completed in eight to 10 years' time, includes:

- establishing catchment-management agencies (CMAs) to perform water-resource management functions currently performed by the Department of Water Affairs and Forestry's regional offices
- transferring water-service delivery and operations to water-services authorities (WSAs).

As WSAs are now responsible for providing water services, the department's role is to:

- act as custodian of the country's water resources
- provide water-services policy and guidelines
- provide ongoing support to the water sector
- act as a water-sector regulator.

The department remains focused on the phased implementation of the National Water Act, 1998 (Act 36 of 1998), with a particular emphasis on implementing a new organisational structure, which includes:

- establishing the National Water Resource Strategy (NWRS), which will set out the procedures, guidelines and overall strategy for managing water resources
- developing and testing a strategy for compulsory water-use licensing to facilitate equitable access to water resources for historically disadvantaged individuals

- enhancing water-use efficiency
- ensuring compliance with dam-safety regulations and enhancing public safety at water-resource installations
- investigating and implementing appropriate institutional arrangements for the optimal management of the Working for Water (WfW) Programme
- building national capacity to monitor the state of water resources, so that accurate information is used in decision-making about the use and management of water resources
- creating the National Water Resource Infrastructure Agency (NWRIA) to manage and develop national infrastructure.

In accordance with the international best practice of decentralising and democratising water-resource management, the Inkomati CMA has been established, with more agencies to follow.

The Thukela, Usutu-Mhlathuze, Gouritz and Olifants-Doorn CMAs were expected to be established in 2006/07.

Monitoring water resources

The oldest flow-gauging station still in operation in South Africa is on the Mooi River near Potchefstroom in North West. It celebrated a century of monitoring in August 2004.

River flow is monitored at 1 200 flow-gauging stations and some 260 major reservoirs are monitored. The evaporation and rainfall station network comprises 360 stations.

A new initiative to monitor precipitation in mountainous areas has been launched. There are 21 operational rainfall stations in the mountains of the Western Cape and five stations are operational in the Mpumalanga escarpment. Observations are relayed through the cellular short-message system. The data is updated daily on the Department of Water Affairs and Forestry's website at www.dwaf.gov.za.

Water levels are monitored at some 1 000 observation boreholes across South Africa. Particular attention is given to monitoring in dolomitic areas. In addition, a small network of rain gauges is in operation to monitor rainwater quality.

The importance of qualitative information on South Africa's water resources led to an increasing drive towards creating a national water-quality monitoring network.

In giving effect to the Department of Water Affairs and Forestry's aquatic-ecosystem-management responsibility, the National Aquatic Ecosystem Health Monitoring Programme (NAEHMP), initially known as the National Aquatic Ecosystem Biomonitoring Programme, was launched in 1994.

Until recently, the programme focused mainly on riverine ecosystems, and the short name, River Health Programme (RHP), was adopted for this component of the NAEHMP. However, the original broader focus of the monitoring programme remains valid, namely monitoring the ecological health of all aquatic ecosystems (estuarine and riverine ecosystems), managed by the department.

The NAEHMP focuses on the biological attributes of a river that serve as indicators of its ecological health. The rationale for initiating a biomonitoring programme is that the classic approach of monitoring only physical and chemical water-quality attributes was inadequate for generating information on the overall health of an aquatic ecosystem. Monitoring chemical attributes alone was found to be insufficient to detect, for example, the cumulative effects on aquatic ecosystems of extended exposure to multiple stressors.

Such stressors include habitat alteration, barriers that alter stream flow, water abstraction and alien species being introduced. Aquatic communities (e.g. fish, riparian vegetation and aquatic invertebrate fauna), however, are adapted to live within a certain range of environmental conditions.

These organisms/biological communities integrate, respond to and reflect the effects of chemical and physical disturbances that occur in aquatic ecosystems over extended periods, and

In February 2006, the Minister of Public Service and Administration, Ms Geraldine Fraser-Moleketi, announced that South Africa was set to eradicate the remaining 45 000 bucket toilets countrywide and provide those households with adequate sanitation by 2007. The initial target had been 2008.

Between 2000 and February 2006, government invested over R10,3 billion in basic municipal infrastructure through the Consolidated Municipal Infrastructure Programme and the Municipal Infrastructure Grant.

provide a direct, holistic and integrated measure of the ecological integrity of a river.

If healthy and diverse biological communities inhabit a watercourse, the watercourse as a whole is considered to be ecologically resilient and healthy. However, from an RHP point of view, a healthy water resource does not guarantee the fitness of that resource for domestic, recreational, industrial and agricultural use.

The NAEHMP's main objectives are to:

- generate a national perspective of the health of aquatic ecosystems in South Africa
- develop the capacity and information-base required to enable the department and other role-players to report on the status of, and trends in the ecological health of South Africa's river systems, in an objective and scientifically sound manner
- generate information products and audit-management strategies that could assist in distinguishing between aquatic ecosystems exposed to sustainable use and those experiencing ecological deterioration.

The NAEHMP, and in particular the RHP, is regarded as the 'flagship' for water-resource quality monitoring in South Africa. Products of the RHP have attracted wide attention and recognition, and provide strategic water-resource management information and training material for use in schools and universities, as well as in awareness creation.

The National Chemical Monitoring Programme assesses and reports on the chemical status of water resources in South Africa. Based on the report produced in 2002, the main water-quality challenges for domestic water-users are high totals of dissolved salts and, in some places, high fluoride concentration. The other challenge facing irrigated agriculture is the high sodium adsorption ratio, high electrical conductivity, high pH and high levels of chloride.

Another challenge, not only in South Africa, but globally, is eutrophication or excessive plant (including algae) growth in dams. This is due to high levels of nutrient input from point sources of pollution and diffuse sources of pollution from catchments. Annual reports indicate that 50% of dams in South Africa are seriously affected (hypertrophic), while the rest range from good (oligotrophic) to poor (mesotrophic).

Another problem facing South Africa is the sporadic outbreak of cholera and other water-borne diseases, mainly due to poor sanitation and hygiene at household level. The Eastern Cape and KwaZulu-Natal are prone to cholera outbreaks.

The Department of Water Affairs and Forestry is designing water-resource monitoring programmes to assess and report on the radiological (radioactivity) and toxicological quality status of South African water resources. The National Toxicity Monitoring Programme will also report on the status of DDT (dichloro-diphenyl-trichloroethane) and other persistent organic pollutants in South Africa. This information will be reported internationally to the Stockholm Convention through the Department of Environmental Affairs and Tourism.

Another international obligation includes reporting on chemical water quality through the Global Environmental Monitoring Systems Water Programme.

Water and sanitation

Water-supply and sanitation programmes

Since 1994, there has been a dedicated programme to provide water and sanitation services to the previously unserved population, located mostly in the rural areas. In 1994, there were 15,9 million people without clean, safe water, while 20,4 million people did not have access to adequate sanitation facilities.

The programme, initially the responsibility of the Department of Water Affairs and Forestry, began in 1994 as part of the Reconstruction and Development Programme. In 2002, responsibility for implementing the programme was transferred to the Department of Provincial and Local Government.

The Department of Water Affairs and Forestry now acts as sector leader by regulating, monitoring and supporting service-providers to ensure effective service provision.

On 7 March 2006, the former Minister of Water Affairs and Forestry, Ms Buyelwa Sonjica, launched the first Sanitation Week in South Africa. Sanitation Week aims to raise the profile of sanitation, health and hygiene.

By March 2006, 3,3 million people still lacked access to clean safe water, while 15,3 million were without adequate basic sanitation facilities. The Government remains on track to eradicate backlogs and is on target to exceed the millennium development goals set by the United Nations in 2000 (to reduce the portion of the population without access to basic water and sanitation by 50% in 2015).

The focus of water services broadened in 2001 to include the provision of free basic services to all indigent people in the country. By March 2006, 165 of the 170 WSAs provided Free Basic Water (FBW). In total, 36 million people received FBW, of which 15,5 million people were indigent (defined as households with less than R800 income/month).

The health and hygiene programme has reached some 2,3 million people.

Government has committed to eradicating all bucket sanitation systems in established settlements by December 2007, clearing the clinic sanitation backlog by 2007 and ensuring that all schools have adequate sanitation. The rural poor constitute 75% of the sanitation backlog.

In 2006/07, R1,2 billion out of the Municipal Infrastructure Grant (MIG) Programme for the water-services budget was set aside for the implementation of sanitation. In 2006 alone, R400 million was allocated for bucket-system eradication. To meet the 2010 target, about R3 billion is required per year to increase the sanitation target from 300 000 units in 2006 to one million toilets a year.

About 15 million people in South Africa (32% of the population), do not have access to basic sanitation, and about 151 660 people without access to basic sanitation still use the bucket system.

From April to September 2006, 74 188 households were provided with sanitation and 41 680 buckets were eradicated.

In collaboration with the Department of Health, the Department of Water Affairs and Forestry has developed a Health and Hygiene Strategy, which will guide municipalities in ensuring that health and hygiene are an integral part of sanitation delivery.

Municipal Infrastructure Grant

The MIG, a conditional grant from national government to local government to support investment in basic municipal infrastructure to eradicate backlogs, was implemented in April 2004.

The purpose of the MIG is to facilitate and ensure more effective and integrated service delivery by local government and the Department of Water Affairs and Forestry, working with the Department of Provincial and Local Government in seeking to ensure that funds are made available. (See Chapter 12: *Government system*.)

The department's support to municipalities comprises:

- planning support regarding integrated development plans (IDPs) and water-services development plans (WSDPs)
- monitoring the water-purification and wastewater treatment works' operations
- facilitating project selection, feasibility studies and service-level options
- supporting implementation of the tariff structure and the FBW policy

The European Union (EU) has committed about R1 billion towards supporting South Africa's water and sanitation provision programmes between 2007 and 2013.

Since 1994, the EU, through its European Programme for Reconstruction and Development, has donated more than R1,6 billion to water and sanitation projects in South Africa.

The first phase of the Government's water and sanitation provision programme – dubbed Masibambane – was implemented from 1994 until 2004. The second phase is currently being implemented, with nearly R22,5 billion having been committed.

The EU's new grant has been secured for the third phase, scheduled to begin in 2007.

The programme embraces infrastructure provision, capacity-building in local government, health and hygiene, environmental management, and monitoring and evaluation.

- supporting the section 78 process (division of powers and functions for water services between district and local municipalities) and selecting water-services providers
- training councillors and officials in water-services and water-demand management
- mobilising resources to support municipalities.

Policy and legislation


The Constitution of the Republic of South Africa, 1996 (Act 108 of 1996), and the Bill of Rights enshrine the basic human right to have access to sufficient water and a safe and healthy environment. The two Acts that enable government to fulfil these rights through the Department of Water Affairs and Forestry are the:

- Water Services Act, 1997 (Act 108 of 1997), which created a regulatory framework within which water services could be provided. Schedule 4 of the Constitution vests the responsibility for water and sanitation services in local government. National government, however, is responsible for the regulatory function.
- National Water Act, 1998, which aims to ensure that water resources are protected, used, developed, conserved, managed and controlled in a sustainable manner, for the benefit of everyone in South Africa.

National Water Act, 1998

The Act provides for:

- integrated management and sustainable use of surface water and groundwater
- devolution of surface and groundwater to catchment and local level
- government to play a support role through functions such as promoting awareness, information provision and capacity-building.

 National Water Week was held from 27 to 31 March 2006. It aimed to reiterate the value of water, the need for sustainable management of this scarce resource, and the role water plays in eradicating poverty and underdevelopment in South Africa.

The theme for the 2006 celebrations was *Water for Growth and Development*.

The Act aims to control the use of water resources, protect them from being impacted on or exploited and polluted, and ensure that every person has equitable access to them.

The Act gives the Department of Water Affairs and Forestry the tools to gather the information it needs to optimally manage the country's water resources. The registration of water-use is one of these tools.

All water users instructed to register have the statutory obligation to do so. There are strict penalties, prescribed in the Act, for those who do not comply.

All water users who do not receive their water from a service-provider, local authority, water board, irrigation board, government water scheme or other bulk supplier, and who use water for irrigation, mining purposes, industrial use, feedlots or in terms of a general authorisation, must register. This includes the use of surface and groundwater.

Other uses of water that must be registered include:

- Diversion of rivers and streams.
- Discharge of waste or water containing waste.
- Storage. This includes any person or body storing water for any purpose (including irrigation, domestic supply, industrial use, mining, aquaculture, fishing, water sport, aesthetic value, gardening, landscaping, golfing, etc.) from surface run-off, groundwater or fountain flow in excess of 10 000 m³, or where the water area at full supply level exceeds one hectare (ha) in total on land owned or occupied by that person or body, and is not in possession of a permit or permission.
- Stream-flow reduction activities (afforestation). All afforestation for commercial purposes, including communal forestry for commercial gain, that took place prior to 1972, must be registered. Forest owners who have permits issued under forestry legislation need not register.
- Local authorities and other bulk suppliers with their own water sources and purification works.
- Controlled activities such as irrigating with waste, power generation with water, atmospheric modification or recharging an aquifer.

An assessment of the environmental requirements of the rivers and streams concerned is conducted before a licence can be issued.

The implementation of the National Pricing Strategy for Raw Water began in 2002 to ensure that, as far as possible, the costs of the management of water resources and water-supply infrastructure are borne by water users.

The majority of water users pay the water-resource charge or cost for which they are accordingly billed. However, underrecovery of costs remains considerable.

Action has been taken against a number of illegal water-users across South Africa in response to growing concern about an apparent increase in the rate of illegal water-use in some catchment areas.

National Water Resource Strategy

Cabinet approved the first edition of the NWRS in September 2004. The NWRS describes how the water resources of South Africa will be protected, used, developed, conserved, managed and controlled in accordance with the requirements of the National Water Policy and the National Water Act, 1998.

Through the NWRS, South Africa reached one of the first recommendations of the Johannesburg Plan of Action, adopted at the 2002 World Summit on Sustainable Development, to develop national water-resource management plans.

The strategy contains estimates of present and future water availability and water requirements. It also proposes actions to be taken to achieve a sustainable balance between water availability and requirements. This is necessary to provide sufficient water, which is essential for human life, for participation in economic activity and for the progressive re-allocation of water to sectors of society that were previously excluded.

A vital element of the NWRS is the progressive decentralisation of the responsibility and authority for water-resource management to CMAs and, at a local level, to WUAs. These institutions, representing water users and other stakeholders, will facilitate effective participation in water-resource management in their areas. It will also enable the Department of Water Affairs and Forestry to move from its present multiple roles as operator, developer and regulator to become the sector leader, policy-maker, regulator and monitor.

The department will lead the creation of new institutions over a number of years, and will support and guide them in executing their tasks.

While the actions include the construction of new infrastructure such as dams, pumping stations and pipelines to meet increasing water demands, attention is mainly given to arrangements for the careful management, use and protection of water resources.

Water Services Act, 1997

The Act aims to:

- set out the rights of consumers, and the rights and duties of those responsible for providing water services
- provide for the right of access to basic water supply, and the right to basic sanitation necessary to secure sufficient water and an environment not harmful to human health or well-being
- allow the Minister of Water Affairs and Forestry to set national standards (including norms and standards for tariffs) to ensure efficient, equitable and sustainable water services
- promote the effective and sustainable use of financial and natural resources
- establish effective and financially viable statutory institutions to assist local government to fulfil its obligations
- ensure the production by WSAs of WSDPs, within the framework of IDPs, required by municipal legislation
- provide a comprehensive framework for the oversight and regulation of water boards under the authority of the Minister of Water Affairs and Forestry
- provide a framework for the collection and publication of information about water services.

Strategic Framework for Water Services (SFWS)

In 1994, the *White Paper on Community Water Supply and Sanitation* played a key part in creating

In May 2006, the pilot project of the Department of Water Affairs and Forestry's rainwater-harvesting programme was nearing completion. Seventy-three rainwater-harvesting tanks were built in 25 villages across the Free State. During 2006/07, the department envisaged spending R12 million on a further 1 500 rainwater-harvesting tanks across five provinces.

an enabling policy framework for the delivery of water and sanitation services. However, since 1999, local government's responsibilities have changed significantly and the Department of Water Affairs and Forestry has transformed from being an implementer to a regulator. This necessitated the revision of the policy, which culminated in the SFWS. Cabinet approved the framework in September 2003, after extensive consultation with the relevant stakeholders.

The framework provides a comprehensive policy summary regarding the total water-services sector in South Africa, and sets out the vision, targets and policy for the next 10 years. The key challenges are to address prevailing inequality and to provide basic services, higher levels of service and sustainable service, including institutional sustainability.

In October 2003, following the approval of the SFWS, the department and the South African Local Government Association signed a joint declaration committing both parties to give effect to the SFWS.

The key policy themes of the SFWS are:

- eliminating the backlog in basic service provision
- providing higher levels of service
- providing free basic services (water supply and sanitation)
- credit control
- institutional reform of water-services providers
- a decentralised fiscal framework
- a long-term vision for regulation.

Existing policies on free basic services, the provision of basic household sanitation and the transfers of infrastructure from national to local government aim to ensure that:

- everyone in South Africa who has access to a functioning basic water supply is provided with FBW
- everyone who has access to a functioning basic sanitation facility is provided with free basic sanitation by 2010
- everyone has access to a functioning basic sanitation facility supply by 2010
- all assets of water-services schemes are transferred from the department to WSAs by 2008.

More detailed strategies to give effect to the implementation of the SFWS are the:

- Institutional Reform Strategy
- Regulatory Strategy
- Legislative Review (amendments to the Water Services Act, 1997)
- Sanitation Strategy
- Free Basic Services Strategy
- Transfer Strategy (of infrastructure assets to local government).

Water-resource management

Water-resource management in South Africa has undergone major revision along with the reform of water-policy and legislation. The National Water Act, 1998 provides the principles for water-resource management. This policy aims to manage water resources in an integrated manner to ensure a healthy and stable water-resource base to meet the current and future needs of South Africa.

Water Allocation Reform (War) Programme

The War Programme is a proactive approach towards redressing race and gender inequities regarding water use – where 'water use' refers to promoting access to water for productive purposes (and not to the provision of basic water services).

This includes actions ranging from promoting applications from historically disadvantaged individuals, to supporting the licence-evaluation process to promote equity, as well as implementing the compulsory licensing process itself. Through this programme, the Department of Water Affairs and Forestry is developing and overseeing the implementation of frameworks (policies, strategies, guidelines and procedures) for compulsory licensing, and the allocation of water between and among users.

By mid-2006, a document titled *Position Paper: Water Allocation in South Africa – A Framework for Water Allocation Reform*, under development since 2004, was being finalised. It outlines the high-level 'rules of the game' for allocating water to promote race and gender reform, while minimising potential negative impacts on existing lawful users and the economy. A draft position paper formed the basis for public consultation on reform, and was launched in April 2005.

Awareness material on the programme has been developed and will be available in the appropriate

By February 2006, 165 water-service authorities were providing 3,9 million poor households with free basic water.



official languages where the programme is being implemented. The material includes pamphlets on compulsory licensing and understanding the verification and validation of water use, and a booklet on the productive use of water.

A toolkit of methodologies in support of War has also been developed. The toolkit uses the position paper as its basis, and outlines practical implementation methods that promote the goals of the War Programme. The department's intention is to speed up the WAR Programme and to improve the efficiency with which licences are evaluated within the Batho Pele prescripts.

As key role-players in the programme, provincial and local government through their provincial growth and development plans (PGDPs) and IDPs are central to informing, and being informed by, the way water allocations are undertaken in their areas of jurisdiction. The awareness materials and toolkit will assist municipalities in determining water requirements in IDPs – in terms of WSDPs, and other plans, for example, local economic development, land-use, agriculture and the environment.

National Water Resource Infrastructure Agency

In August 2005, Cabinet approved the establishment of the NWRIA to ensure long-term water security for South Africa.

The NWRIA will develop and operate South Africa's major national dams and water-transfer schemes, which are currently managed directly by the Department of Water Affairs and Forestry. These include the Vaal Dam, the Tugela-Vaal transfer system, the Orange River Scheme and the Western Cape system.

The agency will also integrate the Trans-Caledon Tunnelling Authority (TCTA), the parastatal organisation responsible for funding the Lesotho Highlands Water Project. It will not be responsible for domestic water supplies, which remain the responsibility of municipalities and regional water boards.

The Minister of Water Affairs and Forestry will be responsible for deciding what projects need to be built, in terms of the NWRIS. The agency will be required to make funding arrangements, and to ensure that projects are designed and built according to appropriate technical, social and environmental standards, and operated effectively and efficiently.

The NWRIA is expected to be up and running by April 2008.

Water-management institutions

The National Water Act, 1998 sets out the framework for the management of South Africa's water resources. This framework provides for the establishment of water-management institutions, which include CMAs and WUAs.

Catchment-management agencies

CMAs aim to ensure equitable, efficient and sustainable water-resource management. They are required to establish governing boards, which are responsible for integrated water-resource management and developing a catchment management strategy.

The boards have to represent the various sectors of society within their specific water-management areas and will consist of water users, potential water users, local and provincial government, and environmental interest groups.

The department aims to establish CMAs in South Africa's 19 water-management areas, as required by the National Water Act, 1998.

The Department of Water Affairs and Forestry's 2020 Vision Programme targets youths in schools and exposes learners to practical projects that will enable them to identify water and sanitation problems in their schools and communities, and to embark on action to solve them.

As part of the programme, three young girls from a rural school in KwaZulu-Natal, who won the Youth Water Prize in 2006, competed in Sweden against 27 other nations. They used their knowledge of water and science to find useful ways of turning household waste water into productive water that could be used to effectively grow plants and vegetables.

One of the projects of the 2020 Vision Programme is the Baswa le Meetse Awards, which links water and sanitation with arts and culture by encouraging learners to showcase their cultural heritage while respecting natural resources. The Grade 6 learners convey health and hygiene messages through drama, music, poetry, praise singing and poster development. The projects are guided by the theme: Washing of Hands, Caring of Sanitation Facilities for Healthy Life.

The department will devolve administration to local water users and communities, accompanied by vigorous capacity-building, so that historically excluded communities can participate in water management.

Internal strategic perspectives have been developed for the water-management areas.

Natural mean annual run-off and ecological reserve (million m/a)

Water management	Natural mean annual run-off ⁽¹⁾	Ecological reserve ^(1,2)
Limpopo	985	156
Luvuvhu/Letaba	1 185	224
Crocodile West and Marico	855	165
Olifants	2 042	460
Inkomati ⁽³⁾	3 539	1 008
Usutu to Mhlatuze ⁽⁴⁾	4 780	1 192
Thukela	3 799	859
Upper Vaal	2 423	299
Middle Vaal	888	109
Lower Vaal	368	48
Mvoti to Umzimkulu	4 798	1 160
Mzimvubu to Keiskamma	7 241	1 122
Upper Orange	6 981	1 349
Lower Orange ⁽⁵⁾	502	69
Fish to Tsitsikamma	2 154	243
Gouritz	1 679	325
Olifants/Doring	1 108	156
Breede	2 472	384
Berg	1 429	217
Total	49 228	9 544

1) Quantities refer to the water-management area under consideration only (water that originates or is required in that water-management area).

2) Total volume given, based on preliminary estimates, impact on yield being a portion of this.

3) Includes Komati catchment in Swaziland (mean annual run-off = 517 million m/a).

4) Includes Pongola catchment in Swaziland (mean annual run-off = 213 million m/a).

5) Includes contributions from Sengu and Caledon rivers in Lesotho (mean annual run-off = 4,765 billion m/a).

Source: Department of Water Affairs and Forestry

These are the forerunners of the catchment-management strategies that will be prepared by the CMAs when they are established. They describe the water availability and water requirements in each area, and outline the approaches to be adopted for managing water resources. In particular, they provide general principles for the CMAs to authorise water-use.

Water-related research

Research has been fundamental to understanding South Africa's water resources, and has contributed significantly to the development of many of the techniques and tools used for managing water resources and providing water and sanitation services.

The Water Research Commission (WRC), a statutory body funded by a levy on water-use, is the principal co-ordinator of water-related research and development in South Africa, and is committed to ensuring that the strategic direction of water research in South Africa is in step with the country's needs. Through its funding and networking activities, the WRC encourages the development of water-related knowledge and facilitates its dissemination and application.

The WRC's approach is to invest in research and development through the following water-centred key strategic areas:

- management, an integrating key strategic area that considers issues of equity and sustainability in managing water resources
- water-linked ecosystems, which address the protection of water resources
- water-use (industrial and domestic) and waste management, and sustainable water-use for agriculture, which address the sustainable use of water in their respective user sectors.

The WRC also invests in the transfer, dissemination and application of knowledge through a fifth, integrating key strategic area, water-centred knowledge, that addresses the mechanisms needed to ensure the effective dissemination of research results and products to water managers and other prospective users in an effective format.

To ensure that research results are also relevant to the broader objectives of water-resource management, the relevance and applicability of research in each key strategic area is maximised by addressing the relationships between water and society, the economy, health, and the environment.

The WRC's key objective is supporting the development of human resources in the water sector. Involvement in research is recognised as an important vehicle for building and developing expertise among water-resource practitioners. Every research project is required to incorporate a strong element of capacity-building, especially among previously disadvantaged individuals.

The Department of Science and Technology and the National Research Foundation are partners with the Department of Water Affairs and Forestry and the WRC in ensuring that approaches to water research are consistent with South Africa's broad policy on science and innovation.

Water boards

Water boards have been established as service-providers that report to the Minister of Water Affairs and Forestry. The boards manage water services in their supply areas and provide potable water at cost-effective prices. By mid-2006, there were 15 water boards. They have been set up as financially independent institutions, in terms of section 34(1) of the Water Services Act, 1997 and must aim to be financially viable.

The impact of their financial performance on the Department of Water Affairs and Forestry has been limited. Apart from providing seed funding for some of the newly formed water boards, and providing operating subsidies where they have undertaken specific functions on behalf of the department, the department has only had to provide financial assistance in exceptional circumstances.

The individual water boards are: Albany Coast Water, Ikangala Water, Overberg Water, Amatola Water, Lepelle Northern Water, Pelladriest Water, Bloem Water, Magalies Water, Rand Water, Botshelo Water, Mhlathuze Water, Sedibeng Water, Bushbuckridge Water, Namakwa Water and Umngeni Water.

Irrigation boards and water-user associations

In 2003/04, subsidies worth R28,4 million were awarded to water-irrigation boards and WUAs. These were increased to R30 million in 2004/05.

Working for Water Programme

Invasive species cause billions of rands of damage to South Africa's economy yearly, and are the single biggest threat to the country's biological

biodiversity. It is equally worrying that these species undermine ecological integrity when the land's ability to produce is compromised. Social issues like poverty and unemployment inevitably follow.

WfW has been recognised internationally as one of the most effective programmes for addressing the problem of invasive alien plants (IAPs), combining environmental issues with social-development objectives. It estimated that IAPs have invaded over two million ha of South Africa.

Since its inception, WfW has invested more than R2,5 million to clear invasive alien vegetation, establishing programmes in over 300 areas. About 20 000 short-term jobs have been created annually, providing employment opportunities for local community members, with a special focus on securing opportunities for the marginalised, such as women, youth and people with disabilities. By participating in the programme, workers are not only given the opportunity to develop new skills, they also have access to HIV and AIDS projects, childcare facilities and primary healthcare initiatives.

The programme is administered through the Department of Water and Forestry and works in partnership with local communities, to whom it provides jobs. It also works with government departments, including the departments of environmental affairs and tourism, of agriculture, of

The Rural Splash Programme will ensure that South Africa's water resources are accessible, and that the safety of communities, especially that of children, is addressed.

The programme is a partnership between the departments of water affairs and forestry, education, and sports and recreation, and consists of three elements:

- creating water-safety awareness, with the Department of Water Affairs and Forestry providing information on the quality and state of infrastructure, and of water in dams and rivers, and on the possibility of dangerous animals being near or in a water source
- educating learners and educators by giving Swimming South Africa access to schools
- ensuring skills development by teaching communities to swim.

trade and industry; provincial departments of agriculture, conservation and environment; research foundations and private companies.

The core business of the WfW Programme is to contribute to the sustainable prevention and control of IAPs, thereby optimising conservation and the use of natural resources. In doing so, it addresses poverty relief and promotes economic empowerment and transformation within a public works framework.

Campaigns such as WeedBuster Week provide the opportunity for WfW to raise awareness of its activities, and bring the importance of IAP control to the public's attention. While WeedBuster Week specifically highlights the problem within South Africa, it is linked bilaterally to Australia and New Zealand, and through multilateral agreements to the broader Global Invasive Species Programme.

Flood and drought management

The latest South African Disaster-Management Policy and ensuing legislation brought about a major shift in focus from reactive to preventative and mitigative disaster management.

From a flood-management perspective, the South African focus has shifted from primarily structural to non-structural, accentuating the value of, for example, floodplain zoning and flood warnings.

Dams and water schemes

The first edition of the NWRS describes how the water resources of South Africa will be protected, used, developed, conserved, managed and controlled in accordance with policy and legislation. The central objective of managing water resources is to ensure that water is used to support equitable and sustainable social and economic transformation and development.

Dams and water schemes form an integral component of the strategy to meet these objectives. The NWRS provides details on possible major water schemes to be developed in the next 25 years, amounting to about R21 billion at 2004 price levels.

The Department of Water Affairs and Forestry follows an integrated approach to managing South Africa's water resources. Proposed new water schemes need to comply with the NWRS, requiring that water-demand management programmes be implemented before embarking on new infrastructure development.

Strict environmental-impact assessments must also be performed in accordance with laws and regulations administered by the Department of Environmental Affairs and Tourism. The guidelines issued by the World Commission on Dams must be followed.

The following major schemes are under construction or reaching the implementation stage:

- **Berg River Project:** The Minister of Water Affairs and Forestry has directed the TCTA to implement the R1,55-billion privately funded scheme comprising the Berg River Dam near Franschoek in the Western Cape, and the associated supplement scheme comprising a weir, pumping stations and pipelines to augment the water supply to the Western Cape. Construction of the dam by a private contractor started in June 2004 and is due for completion in 2007. Construction of the supplement scheme, using government and private resources, was expected to commence in 2005 for commissioning during 2007. At 70 m, the 990 m-long dam wall will be the highest concrete-faced, rock-filled dam in South Africa.
- **Luvuvhu Government Waterworks:** This scheme, worth more than R900 million, funded by National Treasury and implemented by the Department of Water Affairs and Forestry, comprises the Nandoni Dam, pumping station and water treatment works (WTW), and the Xikundu weir, pumping station and WTW. The scheme will provide potable water to more than a million people in Limpopo. It will stabilise the water flow in the Luvuvhu River for irrigation and ecological-flow requirements, and will alleviate water shortages in the Kruger National Park. The Nandoni pumping station and WTW will be completed during 2007.
- **Vaal River Eastern Subsystem Augmentation Project:** The Minister of Water Affairs and Forestry directed the TCTA to augment the water supply to Sasol and Eskom by implementing abstraction and desilting works alongside the Vaal Dam shoreline, and a pumping station and a 120 km-long steel pipeline of 1 900 mm diameter to the Bosjesspruit and Trichardsfontein dams in Mpumalanga. Construction of the privately funded project was expected to be completed in 2007 at an estimated cost of more than R2 billion.
- **Olifants River Water-Resources Development Project:** This development in Limpopo and

Mpumalanga will enable considerable mining expansion (mainly platinum) and sustained water supply to local authorities and communities. The project is to be developed in two phases. Phase one comprises raising the Flag Boshielo Dam on the Olifants River near Marble Hall by five metres, at an estimated cost of R234 million in a public-private partnership arrangement with the Lebalelo WUA. Construction started during 2004 and was expected to be completed in 2006. The proposed second phase of the project will comprise the 70 m-high De Hoop Dam located 40 km south of Steelpoort on the Steelpoort River, and a substantial primary bulk distribution system from the De Hoop and Flag Boshielo dams. It is envisaged that the project, costing over R3 billion, will be implemented by the department and the private sector in phases, starting during 2006.

- Mooi-Mgeni River Transfer Scheme: Phase one of the water-transfer project comprising the new Means weir on the Mooi River near the town of Mooi River and the raised Midmar Dam near Howick on the Mgeni River was commissioned during 2003 to augment the water supply to the Umgeni area in KwaZulu-Natal. Phase 2A, to be completed towards the end of the decade, will include the construction of the Spring Grove Dam on the Mooi River near Rosetta. The Spring Grove pumping station (Phase 2B) will follow at a later stage to suit the demand requirements of Umgeni Water.

Groundwater resources

Groundwater, despite its relatively small contribution to bulk water supply (13%), represents an important and strategic water resource in South Africa, since it services between 52% and 82% of community water-supply schemes in the Eastern Cape, Limpopo, Northern Cape, North West and KwaZulu-Natal.

Owing to the lack of perennial streams in the semi-desert to desert parts, two-thirds of South Africa's surface area is largely dependent on groundwater. Although irrigation is the largest user, the supply to more than 300 towns and smaller settlements is also extremely important. Through government's commitment to meeting the basic water needs of communities, groundwater has become a strategic resource for village water supply in the wetter parts of the country, because of

its cost-effectiveness in a widely scattered small-scale-user situation.

Groundwater also contributes a considerable portion to river flow. This requires reserving a significant share of groundwater resources to protect aquatic ecosystems in terms of the National Water Act, 1998. The maximum quantity of groundwater that can be developed economically is estimated at about 6 000 million m³ a year, while some 4 000 million m³ of groundwater (mainly in dry season) contributes to surface-water flow annually.

Regional and international co-operation and initiatives

South Africa has signed co-operative agreements with a number of countries in the southern African region with which it shares water resources, such as:

- Mozambique and Swaziland on the Incomati and Maputo rivers
- Botswana, Lesotho and Namibia on the establishment of the Orange Senqu River Commission
- Botswana, Zimbabwe and Mozambique on the establishment of the Limpopo Watercourse Commission
- Botswana
- Lesotho on the Lesotho Highlands Water Project
- Swaziland on the Komati River Development Project.

These co-operative agreements improve South Africa's bilateral and multilateral relations in the African Union. All the countries involved benefit, while sharing development costs.

The African Ministers' Council for Water was established in December 2003. It has become a platform to share experiences on all water-related matters.

Forestry

The Chief Directorate: Forestry has developed and adopted a new vision for forestry. South Africa needs to create an enabling environment for economic and social development through sustainable forestry, especially at local level.


Forestry encourages growth and development of the First Economy, thereby increasing its potential to create jobs. Following a recently published supply-and-demand study on softwood sawlogs in South Africa, the department commissioned a similar study for roundwood. The objective of this

report was to establish the supply and demand at regional and national levels.

Forestry contributes to the Second Economy, supporting small growers and facilitating new afforestation, especially in the Eastern Cape and KwaZulu-Natal. Growing trees in these areas will add to the economy, and will provide employment and entrepreneurial opportunities to local people.

The department has been involved in planning for the expansion of forest areas in the Eastern Cape, where most forestry opportunities are available and where the local rural economy needs stimulation. A strategic environmental assessment conducted in the Eastern Cape has identified areas for new afforestation, which are being pursued.

It is estimated that at least an initial 30 000 ha of land could be afforested and that this could be increased to more than 150 000 ha of land once the project gains momentum. The areas could accommodate small growers and community afforestation, if correctly planned, and could expand the broad base of black people engaged in forestry. Within KwaZulu-Natal, options for new afforestation also exist, and conservative estimates show between 30 000 ha and 40 000 ha suitable for this purpose. This will create substantial employment opportunities in the Eastern Cape and KwaZulu-Natal.

 As from 1 April 2006, forestry workers who plant, grow, tend and harvest trees for commercial purposes countrywide earn a minimum wage of R836 per month or R4,28 per hour.

The sectoral determination prescribes minimum rates of pay for a period of three years, with an annual increase equal to CPIX (Consumer Price Index excluding interest on mortgage bond payments) plus two percentage points.

The determination applies to the plantation operations of commercial, small and emergent timber growers which end at the point where the logs are stacked for transportation.

Community forestry and conservation forestry are excluded from the scope of the new law because they are non-commercial by nature. However, out-grower schemes are not excluded from the scope of the determination, although they have a community forestry component.

Indigenous forests are indispensable to the country's heritage, beauty, wildlife and environment, while commercial forests provide jobs and economic opportunities for many people, especially in rural areas. Forestry represents a substantial investment in the country and plays an important role in the Integrated Rural Development Programme.

Plantations cover about 1,3 million ha of South Africa. Over 80% of them are found in Mpumalanga, KwaZulu-Natal and the Eastern Cape. They produced more than 22 million m³ of commercial roundwood, worth an estimated R5,1 billion, according to a study done in 2005. They provide direct employment for about 107 056 people, of which 67 556 are in formal employment, 30 000 are contract workers and 39 500 are small growers and their helpers.

Together with the processed products, the total industry turnover was about R15,4 billion in 2005, including R9,7 billion worth of wood-pulp.

Pulp and paper annual log intake of about 9,2 million m³, mining timber of one million m³, charcoal of two million m³, and almost six million m³ of sawlogs, veneer of about 0,7 million m³ and poles of about 0,75 million m³, were sold in this period.

Taking into account the multiplier effect of plantation forestry through its downstream value-adding activities and the effect it has on local (mostly rural) economies, between 390 000 and 560 000 people depend on plantation forestry for their livelihoods.

About half of the more than 1 700 indigenous tree and shrub species found in South Africa grow along the south and east coasts and on the southern and south-eastern slopes of inland mountains. The other half is spread over the interior plateaux.

The Department of Water Affairs and Forestry intends to transfer the management and control of all state natural (indigenous) forests by the end of 2008/09 to other competent management agencies, primarily to provincial government departments or national and provincial conservation agencies.

This includes the official handover to South African National Parks (SANParks) of about 97 000 ha of state forest land in the southern Cape and Tsitsikamma areas from April 2005. SANParks, as a

conservation agency, will manage natural forests in terms of all the provisions of the National Forests Act, 1998 (Act 84 of 1998).

Progress was made in releasing state forest land that was no longer required for forestry purposes as part of the process to deproclaim state forests in mountain-catchment areas. The total area released in the Western Cape, Sederberg and De Mond areas comprised 146 888 ha. In the Eastern Cape, the transfer of uncontested natural forests has begun. Agreement has been reached on the transfer of contested areas.

A socio-economic impact analysis will inform the finalisation of an exit strategy for Blyde state forest land. Findings are that there will be no job losses on the side of government for the duration of the rehabilitation process, lasting between five and 10 years; and that there will be a net increase in job opportunities in the medium to long term.

The Real Yellowwood (*Podocarpus latifolius*) is South Africa's national tree. There are different species of yellowwood trees that can grow higher than 40 m with a girth of 8 m, and can live for up to 800 years. The Big Tree near the Storms River Bridge (46 m), the King Edward VII in the Knysna Forest (46 m) and the Eastern Monarch in the Amatola mountains (44 m) are the best-known giants.

National Arbour Week is celebrated annually at the beginning of September to encourage the greening of South Africa. Two different trees of the year are nominated annually: a common variety and a scarcer, possibly endangered, species. The 2006 trees of the year were the wild pomegranate (*Burchellia bubalina*) and the Kosi palm (*Raphia australis*).

The aim of Arbour Week is to promote awareness of the need for planting and preserving indigenous trees throughout South Africa. It highlights the opportunities for sustainable economic development, community participation, poverty alleviation and job creation in forestry to create a better life for all. The theme for 2005 was *Plant a Tree – Grow our Future*. Through Arbour Week, the department hopes to:

- promote better knowledge of trees, particularly indigenous trees
- highlight the important role that forestry plays in South Africa's economy, especially in the rural areas
- raise awareness of the dangers of veld and forest fires

- highlight the vital role of trees in people's lives by organising a variety of greening events
- encourage everyone to participate in tree-planting and greening activities.

Contributing to socio-economic reform and growth

The Broad-Based Black Economic Empowerment (BBBEE) Charter is one of many strategies that government is implementing to transform the economy. Government recognises that its BEE strategy will not be effective if it does not have the support of the private sector. The BBBEE charter for the forestry sector will be instrumental in achieving the objectives of the scorecard as suggested by the Department of Trade and Industry. The Forestry BBBEE Charter process was launched at the Forestry Indaba in April 2005. The charter was expected to be finalised in 2006/07.

Forestry Enterprise Development (FED) relates to the concept of using forests and forest-based resources as a vehicle for economic growth, employment and socio-economic upliftment that takes people from a subsistence livelihood system into a market economy. The concept is also central to the department's pro-poor agenda and a key component of BBBEE in the forestry sector.

The Department of Water Affairs and Forestry supports FED. This includes transferring state forests, developing an afforestation strategy for the Eastern Cape and KwaZulu-Natal, and including forestry as a key sector in the PGDS. A wealth of information has been gained from these initiatives and the subsector report that was produced.

The Directorate: Forestry Development supports establishing community projects through regional forestry staff. An estimated R2 million from the Community Facilitation Fund has been spent to support the establishment of projects. Current projects include bee-keeping, which is a partnership with the Agricultural Research Council, and establishing medicinal nurseries, in partnership with various stakeholders.

In January 2005, the Minister of Water Affairs and Forestry signed agreements that transferred the management of 140 000 ha of state-forest land to new operators. This is part of government's ongoing restructuring of state-owned forests. One agreement relates to 25 000 ha in the Hogsback and Stutterheim areas of the Eastern Cape, where

Amathole Forest Holdings, and its BEE partner, Wildbreak Investment Holdings, will take over running the forests. The other covers forests in the southern and Western Cape, where the management of about 115 015 ha of state-forest land will be taken over by the BEE company, Cape Timber Resources.

These agreements follow two others concluded in 2001 with Singisi Forests in the Eastern Cape and the Siyaqhubeka Consortium in KwaZulu-Natal.

The benefits of restructuring to government and citizens include the annual lease rental payments of about R20 million, which is generated from land leases, as well as various socio-economic undertakings that the successful bidders for the various packages have committed to as part of the restructuring transactions. The shareholding of each of the successful bidders includes significant black ownership, varying between 10% and 50% of the bidding vehicles.

The forest land is not sold as part of the packages, but leased to the successful bidders for 70 years with an option to renew for a further 35 years. In 2005, the total leased area comprised 118 000 ha with a total rental income of over R60 million, which will either be used to compensate any successful land claimants or will revert to the State.

These transactions are in line with government's policy of exiting from direct forest-management activities while promoting BEE in the forestry industry. At the same time, land that is less suitable for forestry will be converted to other uses or reserved for conservation.

In the southern and Western Cape, 44 000 ha of marginal state-forest land will be clear-felled and handed over for other uses. This includes 29 000 ha for conservation, 9 000 ha for agriculture, 6 000 ha for community forestry and 200 ha for settlement.


The minister also assigned management responsibility for the Tokai Cecilia state forests in Cape Town to SANParks. This follows Cabinet's decision in 1996 to develop the Cape Peninsula Protected Natural Environment. The Tokai and Cecilia forests are located in a protected environment area and contain important lowland and mountain fynbos, as well as pockets of Afro-montane forest, which need to be maintained. Eventually, the two forests will be incorporated into the Table Mountain National Park.

In August 2006, Cabinet approved the recommendation of the Cabinet Economic Cluster Committee to retain the forests managed by Komatiland Forests (KLF) in public ownership, for the foreseeable future.

During the hearings of the tribunal into the proposed merger of KLF with the Bonheur Consortium, concerns were expressed about the structure of the saw-log supply industry in Mpumalanga and Limpopo.

As a result, the Department of Public Enterprises, in consultation with other departments, began reviewing the future role of the South African Forestry Company (Safcol), the state-owned forest management company, and its wholly owned subsidiary KLF.

The review aims to ensure that state-owned forests contribute optimally to government's objectives for the forestry, timber, pulp and paper sector.



In March 2006, the Government allocated an additional R9,4 million towards the Working on Fire Programme, which combines firefighting aircraft with highly trained ground crews drawn from previously unemployed people.

According to the Department of Water Affairs and Forestry, it costs close to R23 000 to keep a Working on Fire-programme helicopter in the air for one hour, on top of an annual standing fee of R1 million per helicopter.

About 46 firebases have been established throughout South Africa, each with a 22-member firefighting crew selected from formerly unemployed people and trained under the Working on Fire Programme.

The programme won an Impumelelo Award for its innovative combination of firefighting aircraft with highly trained ground crews.

Through the National Disaster Management Centre, the programme supplies two helicopters and two fixed-wing spotter aircraft to supplement local aerial firefighting efforts.

South African Forestry Company Limited

Safcol, a wholly owned state enterprise, was formed in 1992 and acquired the Department of Water Affairs and Forestry's commercial forestry assets and related business with effect from 1 April 1993.

Safcol's objectives are to enhance the development of the local forestry industry and to optimise the State's forestry assets. This is achieved by running the business according to accepted commercial management practices and sustainable forestry management (SFM) principles.

Industry and exports

The industry was a net exporter to the value of over R3,4 billion in 2005, more than 98% of which was in the form of converted value-added products. Had it not been for this trade surplus in forest products, the country's trade deficit in 2005 of R22 billion would have been 14% higher.

The forest-product industry ranks among the top exporting industries in the country, having contributed 2,91% to total exports and 1,74% to total imports in 2005. Capital investment in the industry amounted to some R35 billion in 2005.

The value of forest-product exports has grown by 307% over the past decade, from R2,3 billion in 1992 to R9,5 billion in 2005. In real terms (taking inflation into account), this growth was 77,3% or a compounded real growth of 4,8% per year over that period. The net trade balance in foreign trade in forest products increased by 273% in nominal terms (63% in real terms) to R3,4 billion in 2005.

In 2005, solid wood products were the most important (R3,463 billion or 36% of the total), followed by paper (R3,218 billion or 34%), pulp (R2,607 billion or 27%), and other products (R236 million or 3%). Woodchip exports, which are exported mainly to Japan, accounted for 62% (R2,135 billion) of total solid-wood product exports.

As with other export-based industries, the strength of the Rand has had a negative effect on the Rand-value of forest-product exports during the past two years, with the total value of exports in 2005 being only R502 million more than in the previous year, but some R395 million or 4% less than in 2003.

Stringent environmental codes of practice are implemented in all plantation and processing activities. The Chief Directorate: Forestry of the Department of Water Affairs and Forestry promotes

optimal development of forestry and arboriculture in South Africa.

The National Forests Advisory Council (NFAC) was established in terms of the National Forests Act, 1998. It advises the Minister of Water Affairs and Forestry on all aspects of forestry in the country. The NFAC is actively involved in developing local criteria, indicators and standards for SFM, and makes recommendations on how public access to state-owned forests can be improved.

Achieving sustainable forest management

Apart from ecological considerations in determining where it is appropriate to grow trees, there are other ecological, social and economic considerations that must be addressed when growing trees.

These criteria, indicators and measures will form the basis for monitoring the sustainability of forestry operations in commercial and natural forests. Managers and owners will be required to report against these criteria, which also form useful guidelines for new entrants to the sector.

The commercial forestry industry in South Africa is committed to practising SFM and is a world leader in forest certification. Over one million ha, or over 80% of the entire planted area of commercial forestry plantations in South Africa, is certified by the Forest Stewardship Council (FSC) and the ISO 14001 certification schemes as being sustainably managed. By March 2005, nearly 1,091 million ha of forestry land in South Africa was certified by the FSC, the second-largest area in the southern hemisphere after Brazil. There were no certified plantations in 1996.

Although large forestry companies do not own all the certified forests, having their own specialist environmental departments has helped the rapid expansion of certification, as they ensure that their land is managed according to their own stringent environmental codes of practice. To promote transparency, members of the public are invited to join company staff when regular audits are done.

There has also been a large increase in the number of non-corporate growers who have become certified. This can be attributed to factors such as the FSC's acceptance of 'group-certification schemes' and the availability of local FSC auditors, both of which have reduced the cost of certification considerably.

The introduction of small low-intensity managed forest audits enables small and community forestry schemes to be FSC-certified. As part of its commitment to the practice of SFM, the forestry industry is also involved in the NFAC's Committee for SFM, which develops criteria, indicators and standards (measures) for SFM, tailored to meet South Africa's specific conditions.

After extensive consultation, the Institute of Natural Resources, which was contracted by the Committee for SFM to develop these criteria, has developed a draft set which was tested in 2004 and accepted in 2005. A manual was produced with guidelines, standard operating practices and checklists for reporting on criteria and indicators for plantations. A training course was developed and staff in the cluster were trained to use the manual.

Through the Forestry Industry Environmental Committee, a set of environmental guidelines was published in 1995 to encourage and facilitate timber growers to practise SFM, implementing best environmental practices.

These guidelines were widely used in South Africa and abroad. A second updated and more comprehensive and user-friendly edition of the guidelines was published in July 2002. These are used by certification agents in completing the physical environment component of their FSC audits.

The indigenous forests of the southern Cape, previously managed by the Department of Water Affairs and Forestry, received FSC-certification, which is a first on the continent for high forests. It is a major step towards the sustainable management of the country's natural forests.

Legislation

The National Forests Act, 1998 reflects the vision for the future of forestry in South Africa, which emphasises SFM. It explains how people and communities can use forests without destroying them, and sets out rules for protecting indigenous forests. The Act ensures that the public has reasonable access to state-forest land for recreational, cultural, spiritual and educational purposes.

South Africa is richly endowed with more than 1 700 tree species. Some are threatened and a list of 47 species is now protected under the Act. Protected trees may not be cut, damaged or sold without a licence. The listing of protected trees is not primarily aimed at preventing the use of such

trees, but at ensuring sustainable use through licensing-control measures. A list of protected tree species is available on the Department of Water Affairs and Forestry's website at www.dwaf.gov.za.

The National Veld and Forest Fire Act, 1998 (Act 101 of 1998), bans open-air fires when the risk of veld blazes in an area is high. It also introduces the concept of voluntary fire-protection associations (FPAs) formed by landowners. It furthermore obliges the Minister of Water Affairs and Forestry to operate a national fire-rating system in consultation with the South African Weather Service (SAWS) and fire associations. The Act also allows the minister to impose minimum firefighting requirements on landowners.

Protection of life and property is a basic human need and the department has been moving ahead in implementing the National Veld and Forest Fire Act, 1998. Due to the high incidences of fires during extreme weather conditions, it is a priority for the department to ensure registration of FPAs. By mid-2006, 59 FPAs were registered. The department advised and assisted FPAs in compiling business plans, including the principles of risk assessment. By mid-2006, 36 FPAs had been assisted with their business plans. The department plans to review FPAs' performance regularly. There is also ongoing awareness-raising and information-provision on policy matters.

The department's *Veldfire Bulletin* is produced quarterly. Bulletins are also produced occasionally depending on the need, such as the special *Veldfire Bulletin on FPAs*.

The National Fire Danger Rating System (NFDRS) was launched during Arbour Week in September 2005. The NFDRS is an early warning system for veldfires. The Department of Water Affairs and Forestry has delegated the operation of this system to the SAWS. The SAWS will operate the system and issue daily veldfire warnings as it does with other weather information. Warnings will be communicated to FPAs, the department fire advisers, Disaster Management, Department of Provincial and Local Government and other role-players.

Indigenous forests

There are around 530 000 ha of indigenous or natural forests in the country, which occur mainly along the southern and eastern escarpment, the coastal belt and in sheltered kloofs or ravines.

Natural forest cover is slow, which led to the development of the commercial forest sector in South Africa over the last 100 years. Nonetheless, natural forests have continued to play a major role in the livelihoods and well-being of many rural communities.

There has been an increase in the use of natural forests as sources of medicine, building material, fuel wood and food. An estimated 80% of South Africa's population still uses medicinal plants, most of which are sourced from natural forests.

For the first time, South Africa now has a detailed inventory of all its natural forests, which will be used to accurately monitor changes in forest areas. The Department of Water Affairs and Forestry also completed a forest-type classification for natural forests, which are represented by 24 broad forest types. The Natural Forests Protected Areas System, completed for all forests in 2004, guides the setting aside and demarcation of natural forests as protected areas.

Systematic timber harvesting occurs in areas of the production-management class. Harvesting is concentrated on overmature trees, with logs being sold by tender and/or on public auction. On average, 3 750 m³ of round logs are harvested annually (150 m³ of stinkwood, 750 m³ of yellowwood, 2 500 m³ of Australian blackwood and 350 m³ of other species).

Another valuable product of the indigenous forests of South Africa is the seven-week fern (*Rumohra adiantiformis*), which is harvested in the Knysna and Tsitsikamma forests. The South African market for the seven-week fern is considerable and reaches its peak in September when sales exceed 420 000 bunches, and only slightly fewer in December.

Woodlands

Woodlands can be defined as vegetation formation dominated by trees, but not to the extent that the canopies are continuous and overlapping. Woodlands cover 29 million ha, constituting 21% of land cover. This vegetation covers extensive areas in the low-lying, drier areas of Limpopo, KwaZulu-Natal and Mpumalanga. Woodlands have thousands of species (5 900 plants, 175 mammals, and 540 birds), of which the majority are used for one purpose or another.

Woodlands are the most extensive vegetation type in southern Africa and dominate Africa as a

whole. Globally, woodlands cover between an eighth and a sixth of the Earth's land surface.

The woodlands are, however, a valuable source of fuel, building material, craft-timber and a variety of non-timber products. These include fruit, fodder, medicinal compounds, honey, meat and mushrooms, and form the backbone of the livelihoods of millions of people. The annual Marula-fruit harvest (*Sclerocarya birrea*) is worth some R1,1 million a year to rural communities.

Commercial forests

During the 1930s, government started establishing extensive plantations to make South Africa self-sufficient in its timber requirements, and to provide more job opportunities in a diversified economy during the depression. Commercial plantations of exotic species proved to be a sound investment and the private sector established large plantations of pine, eucalyptus and wattle trees.

By mid-2005, the private sector owned 1 033 320 ha (or 77%) of the total plantation area of 1 339 282 ha, as well as virtually all the processing plants in the country. The remaining 23% (305 962 ha) was under public ownership. The extent of public ownership will decrease significantly due to restructuring.

In 2005, capital investment in these plantations stood at R16 billion, 55% of which was attributable to investment in trees. A further 23,3% was tied up in land, 13% in roads, 7,2% in fixed assets and 1,4% in machinery and equipment.

Plantation yields

Of the 1 339 282 ha of plantations in 2004, 51% were softwood species and 49% hardwood species. Some 37% of the plantation area was managed mainly for saw-log production, 54% for pulpwood and 6% for mining timber, while the balance of 3% was grown for the production of poles, matchwood (poplar) and other minor products. Plantation yields vary from an average of 16 m³ per ha per year for softwood, to 21 m³ per ha per year for eucalyptus and 10 m³ per ha per year for wattle (timber and bark).

Likewise, the rotation ages vary from a maximum of 30 years in the case of pine saw-logs, to six to 10 years in the case of eucalyptus pulp and mining timber.

Production from plantations amounted to some 22 million m³ in 2005.

Primary wood-processing

South Africa has 203 primary wood-processing plants, 198 of which are owned by the private sector and five of which are owned by local and state authorities. Of these, some 113 are sawmills; 15 mining-timber sawmills; 45 pole-treating plants; 24 pulp, paper and board mills; one match factory; and five charcoal plants. The total roundwood intake into these processing plants in 2004 was 22,2 million m³ valued at R4,2 billion. The value of sales of timber products produced by these primary processing plants totalled R14,815 billion. Some R20,746 billion was invested in primary roundwood-processing plants (at book value). At market value, this increased to an estimated R35 billion.

The pulp industry in South Africa is dominated by two main pulp-and-paper manufacturing companies, Sappi and Mondi. They rank among the largest in the southern hemisphere, own assets in many parts of the world, and are internationally listed.

The saw-milling industry produces sawn timber, which is used in producing solid wood products, such as lumber for roof trusses, flooring, etc. and consumer products such as furniture. The furniture industry consumes about 250 000 m³ of mainly industrial timber. A large number of companies operate in this sector, with the five biggest companies contributing 51% of total production. Some 52% of total sawn timber is produced in Mpumalanga.

Research and training

South Africa has world-class forestry-research infrastructure and personnel, with almost 2% of the forestry industry's turnover (private and public sectors) devoted to research. The priority fields of research include tree-breeding through applied silviculture, climate and soils, environmental impact and management solutions, forest biology, hydrology and forest protection.

The major institutes servicing the research needs of the industry are the Institute of Commercial Forestry Research in Pietermaritzburg, the Forestry and Agriculture Biotechnology Institute, and the Council for Scientific and Industrial Research in Pretoria. The National Biodiversity Institute also plays an important role in terms of species protection.

The total annual forest sector research and development (R&D) investment in South Africa is approximately R163 million, more than 80% of which is funded by the commercial forest industry.

The breakdown of forest sector R&D funding for 2005 was as follows:

- government – R9 million
- universities – R9,7 million
- forest industry – R136 million
- other (donors etc.) – R7,75 million.

The Faculties of Agricultural and Forestry Sciences at the universities of Stellenbosch, KwaZulu-Natal and Venda offer forestry degrees. The Nelson Mandela Metropolitan University, George (Saasveld Campus), offers diplomas and limited degree courses in forestry disciplines. The Natal University of Technology offers a diploma in Pulp and Paper Technology, and the Fort Cox College of Agriculture and Forestry a diploma in Social Forestry.

Skills training is provided by a number of industry-sponsored and in-house training centres. Industry-sponsored bursaries are available, as are company-sponsored bursaries for study at these institutions.

The Forest Industries Education and Training Authority (Fieta) is, among other things, responsible for ensuring that the training undertaken by the industry meets certain quality standards. It also manages the distribution of training grants to employers and to Fieta-sponsored projects which will help meet the goals of the National Skills Development Strategy within the sector.

Over the past two years, the department, together with Fieta, has been offering bursaries to students who choose to study in the forestry field.

Community forestry

The *White Paper on Sustainable Forest Development in South Africa* states that community forestry is designed and applied to meet local social, household and environmental needs and to favour local economic development.

Community forestry is implemented by communities or with the participation of communities, and includes tree-centered projects in urban and rural areas, woodlots, and woodland management by communities and individuals. Community forestry has gained impetus through more focused core functions, particularly in urban greening and forest enterprise development.

Participatory Forest Management (PFM) of the Department of Water Affairs and Forestry is an integrated approach that contributes to achieving the SFM of South African forests.

Elements of PFM were initially developed for indigenous state forests. However, the aim is to use PFM as an approach to managing all forest types where feasible (indigenous forests, plantations, woodlots and woodlands) and where different types of ownership and management (state, provincial, communal, private and community) exist.

Oversight of the forestry sector

South Africa's National Forestry Programme (NFP) contributes to poverty reduction. To ensure planning and monitoring take place in the forest sector, a research framework needs to be developed. The process started with stakeholder consultations and a report produced with recommendations and information for the Forestry Sector R&D plan. The Woodlands Framework Strategy was approved.

To raise the profile of forestry, a number of initiatives were launched during 2005/06. A new forestry website and linked online resource centre was created. The department supported important conferences and symposia, for example the National Climate Change Conference, highlighting the implications of climate change for forestry and the contribution of forestry towards climate.

The International Precision Forestry Symposium was held in South Africa. The department initiated the Champion Tree Programme to identify and protect individual trees or groups of trees of national conservation importance. This is the first programme of its kind in Africa. A notice of the first short list of 27 trees was published in December 2005 for public comment.

Food and Trees for Africa (FTFA)

FTFA is the sub-Saharan African partner of Global Releaf, an international greening organisation.

FTFA's mission is to contribute to a healthy and sustainable quality of life for all, through environmental awareness and greening programmes.

Since its inception in 1990, FTFA has developed, managed and promoted numerous sustainable greening programmes, including land-use management and food security through permaculture.

FTFA works in partnership with government, the private and public sectors, and civil society.

FTFA attempts to provide trees to as many underserved communities as possible through the help of sponsors and certificate programmes.

The Urban Greening Fund is managed by the FTFA, the departments of water affairs and forestry and of agriculture, and the Institute of Environment and Recreation Management. It was set up with donor funds, which included R1,2 million from the Department of Water Affairs and Forestry.

It is a collective fund that supports partnerships aimed at sustainable development through tree planting, parks, food-gardening projects and environmental education.

Organisations, companies and individuals can contribute to the fund to help disadvantaged South Africans to create a greener, healthier and more secure life.

In 2005 alone, the FTFA achieved the following:

- 293 communities received 55 433 trees
- 41 active permaculture food-gardening projects were started
- 5 200 educators from all over South Africa attended 87 permaculture workshops
- permaculture gardens were established in 36 communities
- 615 community members were trained in basic urban greening
- 15 000 trees were distributed at 125 Arbour Week events
- short-term employment was created for over 160 community members
- 30 000 fruit trees were distributed to 30 000 low-income households
- 60 000 packets of vegetable seeds and seedlings were provided for 3 000 home food-gardens.

The FTFA distributed 105 438 trees in 2005/06.

Eduplant

Eduplant, an empowerment initiative that teaches people the life skill of growing food for themselves, is co-ordinated by the FTFA, and is a Woolworths Trust social investment project. EduPlant makes a difference by contributing to food security, sustainable development and building capacity in South African communities.

Through the Woolworths Trust EduPlant programme, schools develop food-gardens using permaculture techniques. In harmony with nature,

EduPlant schools grow vegetables, fruit, herbs and medicinal plants. These schools provide food for hungry children and their families.

International engagements

To promote international initiatives, the Department of Water Affairs and Forestry produced the Final Country Report on Forest Resource Assessment 2005 and submitted it to the Food and Agriculture Organisation. This will assist the global effort to improve knowledge on the world's forests and forestry. Several international delegations visited South Africa and delivered detailed presentations.

This also led to the signing of an agreement with the Russian Federation on forestry in terms of exchange of expertise and information between the two countries.

A number of international visits took place during 2005/06. A forestry delegation participated in the United Nations Forum on Forests (UNFF-6) held in February 2006, at the United Nations headquarters in New York. The two-week session addressed unfinished business from UNFF-5 regarding the development of the international arrangement on forests. Resolution on many of the actions was achieved.

Acknowledgements

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