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OFFICIAL GUIDE TO  
SOUTH AFRICA



SCIENCE AND  
INNOVATION

The Department of Science and Innovation was renamed the Department of Science, Technology and Innovation (DSTI) on 27 September 2024. The name change, which was announced in the *Government Gazette* by President Cyril Ramaphosa, follows the splitting of the Ministry of Higher Education, Science and Innovation into the Ministry of Higher Education and Training and the Ministry of Science, Technology and Innovation under the Seventh administration.

The DSTI seeks to boost socio-economic development in South Africa through research and innovation. To achieve its goals, the department provides leadership, an enabling environment and resources for science, technology and innovation.

Over the medium term, the DSTI aimed to focus on providing funding for research infrastructure, developing human capital and advancing innovation to improve South Africa's competitiveness in the global market.

The department has adopted a new Vaccine Manufacturing Strategy (VIMS) to promote domestic design, development and production of vaccines. Through VIMS, the department is targeting vaccine development at the following high-priority afflictions:

- **Rift Valley Fever:** an emerging transboundary, mosquito-borne, zoonotic viral disease causing high morbidity and mortality in both human and ruminant populations;
- **Human Papillomavirus:** a major contributor to cervical cancer in women in South Africa;
- **Respiratory Syncytial virus:** a major cause of respiratory illness and death in young infants, particularly in low- and middle-income countries; and
- **Hepatitis B virus:** This is endemic in South Africa, with the highest rates in adults and prevalence is five times higher in people who are co-infected with HIV.

### Funding research infrastructure and innovation capabilities

The availability of adequate research infrastructure is vital to developing a robust and competitive national system of innovation. In support of this, the department will continue to implement research infrastructure roadmap projects. These include, among others, specialised facilities such as drug development and aerospace platforms, and small production plants where scientific processes are tested before being scaled up.

The national integrated cyberinfrastructure system is implemented by the Council for Scientific and Industrial Research. The system is intended to provide the necessary data processing, management and transportation capabilities to facilitate national projects. These include the MeerKAT radio telescope and the Square Kilometre Array, as well as other large research infrastructure projects that depend on robust cyberinfrastructure systems.

By mid-2024, the MeerKAT telescope had contributed to a number of important scientific discoveries. To improve its capabilities, a project to extend the telescope is under way in partnership with Germany and China. Accordingly, 13 new dishes were planned to be constructed at an estimated cost of R800 million over the next three years.

### **Developing human capital**

Human capital is key to South Africa's establishment of a national system of innovation that is globally competitive and responsive to the country's developmental needs. The department provides support for this by granting postgraduate bursaries and scholarships; sponsoring internships; and funding emerging and established researchers, including for strategic instruments such as the South African research chairs initiative and centres of excellence projects.

Centres of excellence serve as hubs that draw a range of universities and science councils together to tackle challenges in areas such as health, food security, human development, energy and biodiversity.

### **Advancing innovation to improve South Africa's competitiveness in the global market**

Challenges to competitiveness in areas such as market sustainability, access and exposure are effectively met through innovation. As such, in each year over the medium-term period, the department plans to support 15 commercial outputs in designated areas such as healthcare, and 85 technology demonstrations, prototypes, products and services.

Examples of these include locally developed fermentation-based skin care products and cotton baling machines for small-scale farmers. The department also plans to financially support emerging black farmers; train artisans in the space, energy and bioeconomy sectors; train graduates through experiential learning opportunities in the energy sector; and support learnership initiatives in publicly financed research and development institutions.

### **Square Kilometre Array**

The SKA project is an international effort to build the world's largest radio telescope, led by SKA Organisation based at the Jodrell Bank Observatory near Manchester. The SKA will conduct transformational science to improve our understanding of the Universe and the laws of fundamental physics, monitoring the sky in unprecedented detail and mapping it hundreds of times faster than any current facility.

The SKA is not a single telescope, but a collection of telescopes or instruments, called an array, to be spread over long distances. The SKA is to be constructed in two phases: Phase

1 (called SKA1) in South Africa and Australia; Phase 2 (called SKA2) expanding into other African countries, with the component in Australia also being expanded.

Already supported by 10 member countries – Australia, Canada, China, India, Italy, New Zealand, South Africa, Sweden, the Netherlands and the United Kingdom – SKA Organisation has brought together some of the world's finest scientists, engineers and policy makers and more than 100 companies and research institutions across 20 countries in the design and development of the telescope.

The core site is located at the Meerkat National Park, at an elevation of about 1000 metres, in the Karoo area of the arid Northern Cape. There are also distant stations in Botswana, Ghana, Kenya, Madagascar, Mauritius, Mozambique, Namibia and Zambia.

### **Entities:**

#### **Academy of Science of South Africa (ASSAf)**

The ASSAf was established in terms of the ASSAf Act of 2001, as amended, to promote outstanding achievements in all fields of scientific inquiry, recognise excellence, and provide evidence-based scientific advice to government and other stakeholders.

Over the medium term, the academy will aim to enhance South Africa's capacity to produce and publish research, provide evidence-based policy advice to government, and increase the quality and visibility of South African research publications. This entails undertaking various consensus studies in the categories of health, education, climate change, energy, the science policy nexus, biosafety and biosecurity, poverty reduction, and responding to issues concerning gender, youth and people with disabilities.

#### **Council for Scientific and Industrial Research (CSIR)**

The CSIR was established in 1945 and is governed in terms of the Scientific Research Council Act of 1988. The council fosters industrial and scientific development in the national interest through multidisciplinary research and technological innovation to improve the ability of the state to efficiently deliver basic services in fields such as health, education, social security, energy and shelter to all South Africans, and, in doing so, reduce inequality.

Over the medium term, the council aimed to continue focusing on conducting high-quality and relevant research, pursuing technological innovation to foster industrial and scientific development, and building on industrial development opportunities in fields such as pharmaceutical innovation and agro-processing.

To achieve this, the council aims to support 56 registered patents and publish 960 journal articles over the medium term. The council also plans to implement a range of research, development and innovation programmes in areas such as health, energy, defence and security.

### Human Sciences Research Council (HSRC)

The HSRC was established in 1968 to undertake, promote and coordinate research in the human and social sciences. The council is mandated to initiate, undertake and foster strategic, basic and applied research in human sciences; and address developmental challenges by gathering, analysing and publishing relevant data, especially through projects linked to collaborative programmes geared towards the public sector. The council's research outputs are widely disseminated to support policy development at all levels of government.

Over the medium term, the council will continue to focus on producing research that serves the public; contributing to good governance and public service delivery; and helping to address the challenges of poverty, inequality and unemployment. It will also seek to build the capacity of scholars and researchers through scholarship funding for early career researchers.

### National Research Foundation

The NRF was established in terms of the NRF Act of 1998, as amended. In terms of this legislation, the foundation is mandated to fund research, develop human resources and provide research facilities to enable knowledge creation, innovation and development in all fields of science and technology. It is also mandated to promote indigenous knowledge.

Over the medium term, the foundation aimed to continue focusing on implementing its Vision 2030 strategy. This involves interventions to catalyse transformation in the science and technology system through measures such as creating grant funding instruments aimed at women and black researchers; scaling up the development of a research and innovation workforce for renewing, regenerating and replenishing the cohort of South African researchers; establishing a transformed knowledge workforce with more diverse people and ideas to lead the knowledge enterprise; and advancing the international competitiveness of the science workforce.

Spending was expected on major infrastructure for the SKA, particularly the science processing and regional centres, the science operations centre building, the engineering operations centre building, and fencing for the MeerKAT national park.

### South African National Space Agency (SANSA)

The SANSA was established in terms of the SANSA Act of 2008. It became operational in 2010 and is broadly required to promote the peaceful use of space, foster international cooperation in space-related activities, and facilitate the creation of an environment conducive to space technology and industrial development. Over the medium term, the agency aimed to focus on building adequate space capacity; improving geospatial information; developing key infrastructure in support of the sector; and providing technical skills interventions, research capacity and knowledge management tools.

### **Technology Innovation Agency (TIA)**

The TIA draws its mandate from the TIA Act of 2008, as amended. The agency serves as the key institutional intervention to bridge the innovation gap between research and development outcomes from higher education institutions, science councils, public entities and private companies to maximise the potential of technological innovation for stimulating the economy.

Over the medium term, the agency will focus on providing financial support to ensure that 108 products or technologies are developed, launched or licenced, with priority given to innovation that has the potential to address issues of national importance, such as alleviating poverty, creating jobs and reducing the burden of disease.

The provision of this support will prioritise small, medium and micro enterprises with the commercialisation of innovative technologies and marginalised segments of society, such as people in townships, rural communities, women, young people and people with disabilities. It will seek to empower historically disadvantaged individuals through deliberate investment, stakeholder engagements and general mobilisation initiatives.

### **Research and science bodies**

#### **South African Bureau of Standards (SABS)**

The SABS was established as a statutory body in terms of the Standards Act of 2008 and is part of South Africa's standardisation, quality assurance, accreditation and metrology technical infrastructure institutions. The bureau is mandated to develop, promote and maintain South African national standards; render conformity assessment services; and promote the quality of commodities, products and services in an effort to protect the integrity of the South African market, protect consumers, create a competitive advantage, and facilitate access for South Africans to local and international markets.

Over the medium term, the bureau aimed to continue implementing the digital transformation and infrastructure plan, revitalise testing operations and implement local content verification projects submitted to the bureau by government entities. The bureau also intends to improve its standard development processes to enable faster turnaround times and industrialisation. It expects to do this by enhancing digital collaborative tools to effectively engage with stakeholders that participate in its technical committees. This project, however, is still at an early stage.

#### **National Intellectual Property Management Office (NIPMO)**

The NIPMO is mandated to ensure that intellectual property from publicly financed research and development is identified, protected, used and commercialised for the benefit of the people of South Africa, whether it be for social, economic, military or any other benefit.

### **Agricultural Research Council (ARC)**

The ARC was established by the Agricultural Research Act of 1990 and is the main agricultural research institution in South Africa. The entity's primary mandate in terms of the act is to conduct research and development and effect the transfer of technology to promote agriculture and industry, contribute to a better quality of life, and facilitate and ensure the conservation of natural resources.

Over the medium term, the council aimed to focus on: generating knowledge and technologies that enhance efficiencies of crop production, animal production and health, the management of natural resources, and research and development; developing a foot-and-mouth disease facility at Onderstepoort to reduce reliance on imports; maintaining national assets such as irrigation and mechanisation laboratories; and providing diagnostic and analytical services on behalf of the department and industry stakeholders.

### **Mintek**

Mintek's mandate, as set out in the Mineral Technology Act of 1989, is to maximise the value derived from South Africa's mineral resources through activities including research and development, technology transfer, and the creation of an enabling environment for the establishment and expansion of mineral industries. To this end, Mintek develops appropriate, innovative technology for transfer to the industry, and provides test work, consultancy, and analytical and mineralogical services to clients across the world.

Over the period ahead, the entity aimed to focus on implementing a new operating model while continuing further research in key strategic programmes. These include establishing a local rare earth element mining and manufacturing industry, developing rapid diagnostic medical test kits, expanding fuel cell manufacturing infrastructure across the fuel cell value chain, and developing processes to recycle e-waste such as printed circuit boards and cathode ray tubes.

### **Council for Geoscience (CGS)**

The CGS was established in terms of the Geoscience Act of 1993 to promote the search for and exploitation of minerals in South Africa. Its mandate is to generate, compile, curate and publish world-class geoscience knowledge products, provide geoscience-related services to the South African public and industry, and render advisory services related to geohazards and geo-environmental pollution. The data generated by the council enables key activities such as the assessment of environmental impacts from mining, geohazards and shale gas development.

### **South African Medical Research Council (SAMRC)**

The council's mandate in terms of the SAMRC Act of 1991 is to promote the improvement of the health and quality of life of the population through research, development and technology transfer. In line with this mandate, the council conducts and funds relevant and responsive health research, capacity development, innovation and research translation.

### **National Health Laboratory Service (NHLS)**

The NHLS was established in terms of the NHLS Act of 2000 and provides pathology services for the majority of the South African population through its 233 laboratories across the country. From 2022/23, it assumed responsibility for forensic chemistry laboratory services from the Department of Health. The entity also houses the National Institute for Communicable Diseases and the National Institute for Occupational Health.

The entity will continue to play a critical role in the diagnosis of HIV and TB over the medium-term period. To ensure early detection in cervical cancer, in addition to cervical smear testing, the entity plans to implement human papillomavirus testing in 2024/25.

### **South African National Energy Development Institute (SANEDI)**

The SANEDI was established in terms of the National Energy Act of 2008. It is mandated to direct, monitor and conduct applied energy research and development, and demonstrate and deploy specific measures to promote the uptake of green energy and energy efficiency in South Africa.

Over the medium term, the institute aimed continue focusing on conducting and implementing energy research in all energy fields other than nuclear energy; registering patents and intellectual property from its activities and issue licences for their use; making grants available for research; promoting the training of research workers; and advising the Minister of Mineral Resources and Energy and the Minister of Science and Innovation on research in the field of energy technology. In giving effect to this focus over the medium-term period, the institute aimed to develop three solutions for cleaner mobility, nine solutions for clean energy and six solutions for smart grids.

### **Water Research Commission (WRC)**

The legislative mandate of the WRC is set out in the Water Research Act of 1971. Its primary functions include promoting coordination, cooperation and communication in water research and development; establishing water research needs and priorities; enhancing knowledge and capacity building within the water sector; and stimulating and funding priority-based water research.

Over the medium term, to ensure that water is supplied efficiently and predictably while ensuring transparency, the WRC aimed to maintain the percentage of resilience-related projects per total number of research, development and innovation projects per year at 30%, and the percentage of adaptation-related projects at 50%.



### South African Environmental Observation Network (SAEON)

The SAEON is a long-term environmental observation and research facility of the NRF. The SAEON's three focus areas are environmental observation, data management and education outreach.

The DSTI provides core funding for these activities. The SAEON has a distributed network of seven nodes, two research infrastructures and a national office. The research network covers the major terrestrial and marine ecosystems in South Africa and supports well over 100 researchers and students a year.

### South African Astronomical Observatory (SAAO)

The SAAO is South Africa's leading astronomy research institute and home to the Southern African Large Telescope, the largest optical telescope in the southern hemisphere. Founded in 1820, the SAAO is the national centre for optical and infrared astronomy in South Africa. Its primary role is to conduct fundamental research in astronomy and astrophysics by providing a world-class facility to scientists.

The SAAO also promotes astronomy and astrophysics in southern Africa, by sharing research findings and discoveries, and participating in outreach activities to enthuse citizens about physics and astronomy.