

## SCIENCE AND TECHNOLOGY

South Africa's scientists and infrastructure are world-class and the country is rapidly positioning itself among the global leaders in innovation, science and technology (S&T).

## Pocket Guide to South Africa 2009/10

# SCIENCE AND TECHNOLOGY

The Department of Science and Technology seeks to realise the full potential of S&T in social and economic development, through the development of human resources (HR), research and innovation.

The department primarily focuses on implementing the National Research and Development Strategy (NRDS), which provides for an integrated approach to HR development, knowledge generation, investment in infrastructure and improving the strategic management of the public S&T system.

Over the past five years, government has improved funding to S&T and innovation. The budget has grown from R2 billion in 2005/06 to R5,1 billion projected for 2011/12. In the 2009/10 financial year, the budget was R4,2 billion.

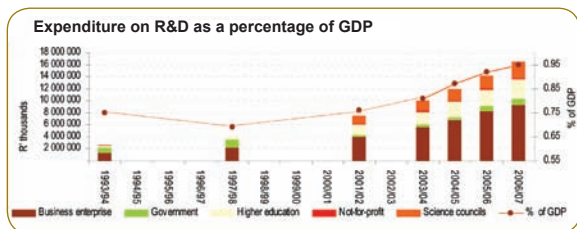
Moreover, in 2006, South Africa's gross expenditure on research and development (R&D) was more than R16,5 billion.

Although this is close to the target of 1% of gross domestic product (GDP), the investment is modest, and it's time the target is increased beyond the 1% of GDP funding for research.

To encourage private-sector investment in R&D, the R&D Tax Incentive Programme was introduced, giving a 150% deduction on eligible activities, and an accelerated depreciation allowance on assets used for R&D over three years, at a rate of 50:30:20.

## Strategies and programmes

The department continues to develop strategies in new areas of knowledge and technology. Strategies for indigenous knowledge, nanotechnology, astronomy and intellectual property, derived from publicly funded research, have been developed.



In 2009, the Department of Science and Technology was committing R150 million over three years for new research chairs. By December 2008, 72 research chairs had been awarded in key areas aligned to the national priorities, and a total of 374 postgraduate students had been supported through their supervision or mentorship.

In 2009, 10 more research chairs were awarded, bringing the total to 82.



The innovation towards a knowledge-based economy plan aims to drive South Africa's transformation towards a knowledge-based economy in which the production and dissemination of knowledge lead to economic benefits and enrich all fields of human endeavour.

To this extent, success will be measured by the degree to which S&T plays a driving role in enhancing productivity, economic growth and socio-economic development.

The plan addresses an array of social, economic, political, environmental, scientific and technological benefits and is designed to stimulate multidisciplinary thinking and challenge South Africa's researchers to answer existing questions, create new disciplines and develop new technologies.

### **Biotechnology innovation centres (Brics)**

The National Biotechnology Strategy (NBS), which was launched in 2001, sets the agenda for the development of South Africa's biotechnology industry.

Initiatives include establishing Brics, such as BioPAD, Cape Biotech, LIFElab and the Plant Biotechnology Innovation Centre. Brics were created to act as instruments for the implementation of the National Biotechnology Strategy.

The Brics' focus areas cover a wide spectrum of the subdisciplines in biotechnology. These include human and animal health, biopharmaceuticals, industrial bioprocessing, mining biotechnology, bio-informatics and plant biotechnology. One of the challenges facing the South African biotechnology sector is the public's lack of understanding and knowledge of biotechnology applications and benefits.

## **Astronomy**

South Africa continues to promote high-technology investment in space science to ensure that local researchers and students are able to participate in international astronomy.

A key result was the launch of the Southern African Large Telescope (Salt) in November 2005, in Sutherland in the Northern Cape. Salt is a multimillion rand project involving Germany, Poland, the United States of America, New Zealand and the United Kingdom. Salt is the largest single optical telescope in the southern hemisphere.

South Africa has been shortlisted, along with Australia, as one of the sites for the world-class radio telescope, the Square Kilometre Array. A final decision in this regard is expected in 2012.

In January 2009, former President Kgalema Motlanthe signed the South African National Space Agency Bill.

The agency will promote the peaceful use of outer space; foster research in astronomy, Earth observation, communications, navigation and space physics; encourage international cooperation in space-related activities; and advance scientific, engineering and technological competencies through human-capital development and outreach programmes.

The agency must facilitate the development of space missions, expand technology platforms and acquire, assimilate and disseminate space satellite data for any organ of state. It will also implement the National Space Strategy, which was approved by Cabinet in December 2008, to stimulate the capability to place South Africa among the leading nations in the innovative use of space S&T.

## **Advanced Manufacturing Technology Strategy (AMTS)**

The AMTS guides efforts in the manufacturing sector, including the aerospace industry. It strives to:

- develop technology platforms that increase current and create new competitive advantages
- establish partnerships and human-capital development.

The aim is to enhance the knowledge base and the knowledge intensity of South Africa's manufacturing sector. In the Department of Science and Technology's Ten-Year Innovation Plan, the

In a major boost for South Africa's ambitions to host the Square Kilometre Array (SKA), a construction team installed the first antenna of the Karoo Array Telescope (Kat-7), a seven-dish prototype of the SKA, near Carnarvon in the Northern Cape, in July 2009.



The SKA is a planned future-generation international radio telescope that will enable astronomers to probe the early evolution of the galaxy. It will comprise about 3 000 antennae that, put together, will cover a square kilometre.

South Africa is competing against Australia to be selected as the preferred site for the SKA, the two countries having beaten bids from Argentina and China to make the SKA shortlist.

The International SKA Steering Committee in the Netherlands is expected to make a final decision on the host country in 2012.

development of space S&T has been identified as one of the five priority areas.

## Nanotechnology

South Africa's National Nanotechnology Strategy recognises the needs of local industry and focuses on the essential building blocks of nanoscience, namely synthesis, characterisation and fabrication.

The country's first two nanotechnology innovation centres, based at Mintek and the Council for Scientific and Industrial Research (CSIR), were established in 2007. These centres play a central role in implementing of the Nanotechnology Strategy and are expected to provide a platform for world-class research in the fields of nanoscience and nanotechnology.

The High-Performance Computing Facility was officially launched by the Department of Science and Technology at the North West University's Potchefstroom Campus in October 2009.



The facility was established in response to the ongoing demand for computing power, particularly in the field of natural-sciences research. It will enhance the university's capacity to deliver research excellence, ensuring that it remains one of the country's top research institutions.

Pocket Guide to South Africa 2009/10  
**SCIENCE AND TECHNOLOGY**

These include, among other things, aerospace, manufacturing and automotive industries; energy conversion, storage and distribution; the hydrogen economy; chemicals; electronics and information processing; as well as biotechnology and medicines.

The South African industry and researchers have been key players in nanotechnology and the practical application of nanoscience for a number of years; for example, Sasol's chemical processing by catalysis.

### **Indigenous Knowledge System (IKS)**

The Department of Science and Technology established the National Indigenous Knowledge Systems Office (Niko) to, among other things, increase public awareness, understanding, knowledge and appreciation of the IKS. Niko has created an appropriate platform through the Interdepartmental Committee on IKS to coordinate and promote the work of different departments.

In 2008, the Department of Science and Technology announced several initiatives to promote and protect the IKS in the country.

These included the design of a degree in IKS being reviewed by the South African Qualifications Authority and the establishment of a pilot centre at the University of Zululand to be used for recording, codification and dissemination of the IKS.

Also to be set up are research chairs on IKS, which would be based at Higher Education (HE) institutions in the country to help increase the human capital required to conduct research and develop appropriate skills in indigenous knowledge.

### **Information and communications technology (ICT)**

South Africa devotes 10,5% of its R&D expenditure to ICT. South African researchers have the advantage of using massive computing power in their quest for new knowledge and applications.

The Centre for High-Performance Computing (CHPC) in Cape Town was the first of its kind in South Africa. Hosted by the University of Cape Town and managed by the CSIR's Meraka Institute, the CHPC is making scientific supercomputing a reality for South Africa.

National Science Week is an annual week-long event aimed at encouraging the youth to pursue careers in science and technology, and highlighting the importance of science in everyday life.



## Supporting innovators Technology Innovation Agency (TIA)

The TIA was launched in 2009 and is intended to enhance the country's capacity to translate local R&D outcomes into commercialisable products and services.

This should result in the establishment of new high-tech companies, a wider tax base, the creation of new jobs, advanced technological solutions for socio-economic problems, exports of high value-added products, and a diversified export portfolio, moving away from dependency on natural resources.

The agency aims to take over some of the budget and functions of existing programmes, like the Innovation Fund; Tshumisano; the Advanced Manufacturing Technology Strategy; the Advanced Metals Initiative; the Hydrogen and Fuel Cell Research, Development and Innovation Strategy of South Africa; as well as the National Biotechnology Strategy.

## Innovation Fund

The IF was created to promote technological innovation, increase networking and cross-sectoral collaboration, enhance competitiveness, improve quality of life, ensure environmental sustainability and harness information technology.

Between 1999 and 2009, the IF invested R1,2 billion in 270 projects.

## Tshumisano

Tshumisano, a joint venture between government, the German Agency for Technical Cooperation and the Committee of University of Technology principals, was established in 2002 to provide support for the small, medium and micro-enterprise (SMME) sector through its Technology Stations Programme.

Pocket Guide to South Africa 2009/10  
**SCIENCE AND TECHNOLOGY**

One of the aims of this programme is to strengthen technological innovation activities and related skills-upgrading, increasing the relative competitiveness of SMMEs in targeted sectors like automotive, agrifood processing, electronics, metal value-adding, chemicals, metal casting, and composite and moulded plastics sectors.

### **National Advisory Council on Innovation (Naci)**

Naci advises on the role and contribution of innovation, including S&T, in promoting and achieving national objectives. These include:

- improving and sustaining the quality of life of all South Africans
- developing HR for S&T
- building the economy
- strengthening the country's competitiveness in the international sphere.

### **National research facilities**

The National Research Foundation (NRF) manages South Africa's national research facilities. It promotes and supports basic and applied research. The NRF oversees the following national research facilities:

- South African Astronomical Observatory
- Hartebeesthoek Radio Astronomy Observatory
- Hermanus Magnetic Observatory
- South African Institute for Aquatic Biodiversity
- South African Environmental Observation Network
- National Zoological Gardens
- iThemba Laboratory for Accelerator-Based Sciences.

### **Science councils**

South Africa has the following science councils:

- CSIR
- Mintek
- Human Sciences Research Council
- Medical Research Council
- Agricultural Research Council
- Council of Geoscience
- South African Bureau of Standards.