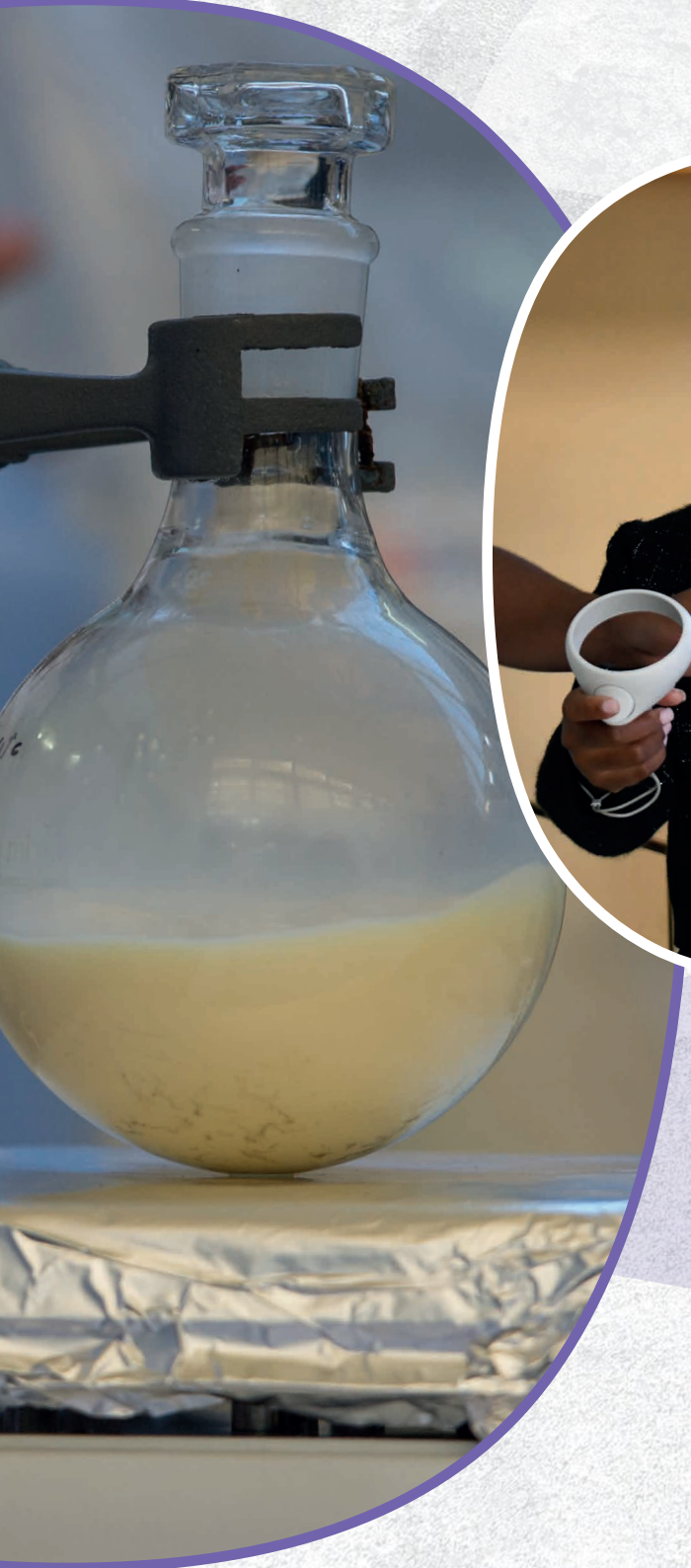

SOUTH AFRICA YEARBOOK 2023/24

Education, Science and Innovation

Education, Science and Innovation

The Constitution of the Republic of South Africa of 1996 declares basic education as an inalienable basic human right for all South Africans. In 2015, the United Nations Educational, Scientific and Cultural Organisation (UNESCO) adopted the global education agenda, Education 2030, which is part of the 17 UN Sustainable Development Goals (SDGs) that make up the Agenda 2030 for sustainable development. SDG 4 calls for an "inclusive, quality and equitable education and lifelong opportunities for all".

The National Development Plan (NDP) states that by 2030 South Africans should have access to education and training of the highest quality, leading to significantly improved learning outcomes. The education system will play a greater role in building an inclusive society, providing equal opportunities and helping all South Africans to realise their full potential. Education is governed by two national departments, namely the Department of Basic Education (DBE), which is responsible for primary and secondary schools, and the Department of Higher Education and Training (DHET), which is responsible for tertiary education and vocational training.

Basic education

The mandate of the DBE is to monitor the standards of the provision, delivery and performance of education annually or at other specified intervals across South Africa, with the objective of assessing compliance with the provisions of the Constitution and national education policy.

The department derives its mandate from the:

- National Education Policy Act, 1996 (Act 27 of 1996), which inscribes into law the policies and legislative and monitoring responsibilities of the Minister of Basic Education, and formal relations between national and provincial authorities;
- South African Schools Act, 1996 (Act 84 of 1996), which promotes access to education, supports quality and democratic governance in the schooling system, and makes schooling compulsory for children aged 7 to 15 to ensure that all learners have access to quality education without discrimination; and
- Employment of Educators Act, 1998 (Act 76 of 1998), which regulates the professional, moral and ethical responsibilities of educators, and the competency requirements for teachers.

Over the medium term, the department aimed to continue focusing on: accelerating the delivery of and improving school infrastructure; providing educational opportunities to learners with severe to profound intellectual disabilities; enhancing teaching and learning by ensuring access to high-quality learner and teacher support materials; increasing the supply of quality teachers and preparing teachers to teach new subjects that will prepare learners for a changing world; improving the quality and reach of early childhood development (ECD) services; and providing nutritious meals for learners through the national school nutrition programme (NSNP). Transfers and subsidies, mostly for conditional grants to provinces, account for 85.3% (R86.8 billion) of the department's allocation over the MTEF period, increasing at an average annual rate of 5.9%, from R25.3 billion in 2023/24 to R30 billion in 2026/27.

Cabinet-approved reductions of R2.8 billion over the medium term are effected on various programmes, including the school infrastructure backlogs grant (R1.2 billion), the education infrastructure grant (R611 million), the Funza Lushaka bursary scheme (R397.9 million) and workbooks (R97 million). Total expenditure is set to increase at an average annual rate of 5.3%, from R30 billion in 2023/24 to R35.1 billion in 2026/27.

Improving school infrastructure

The department is committed to ensuring that all schools have safe and appropriate infrastructure. This is delivered through the education infrastructure grant and the school infrastructure backlogs grant, which account for 95.8% (R47.6 billion) of spending over the MTEF period in the Planning, Information and Assessment programme.

The education infrastructure grant's allocation of R42.3 billion over the period ahead will be transferred to provinces as supplementary funding to accelerate the construction, maintenance, upgrading and rehabilitation of new and existing infrastructure in the basic education sector. The school infrastructure backlogs grant addresses infrastructure backlogs at schools that do not meet the norms and standards for basic school infrastructure.

This grant is allocated R5.3 billion over the MTEF period, which will be used to replace a targeted 100 inappropriate and unsafe schools with newly built schools, and to provide water to 350 schools, sanitation to 320 schools and 220 additional classrooms to address overcrowding.

Cabinet-approved reductions of R1.2 billion to the school infrastructure backlogs grant and R611 million to the education infrastructure grant will result in projects that are still in the planning phase being delayed so that those currently being implemented can be completed.

Supporting learners with intellectual disabilities

The learners with profound intellectual disabilities grant aims to improve the provision of quality education to learners with severe to profound intellectual disabilities. The grant is expected to provide access to quality publicly funded education to more than 13 000 such learners over the MTEF period through an allocation of R874.7 million in the Curriculum Policy, Support and Monitoring programme.

Providing high-quality learning materials

Recognising that quality learning materials enhance the effectiveness of teaching and learning, the department plans to print and deliver grades R to 9 life skills, languages and mathematics workbooks to all public schools that request them. An estimated 60 million workbooks will be provided to about 9 million learners in each year of the MTEF period.

To fund this, R3.9 billion is allocated over the period ahead in the Curriculum and Quality Enhancement subprogramme in the Curriculum Policy, Support and Monitoring programme. Despite Cabinet-approved reductions of R97 million to the programme's budget over the MTEF period, the department still expects to print and distribute all workbooks requested by schools by maximising cost-saving measures, particularly on printing.

Increasing the supply of quality teachers

The Funza Lushaka bursary scheme provides bursaries to prospective teachers to address critical educator shortages in priority subject areas such as inclusive education, mathematics, coding, robotics, and science and technology. Despite Cabinet-approved reductions to the programme's funding, which amount to R397.9 million over the MTEF period, the department plans to increase the number of bursaries awarded from 9 700 in 2024/25 to 10 300 in 2026/27.

This will be done by funding more students completing the one-year postgraduate certificate in education and increasing the number of bursaries awarded to institutions with lower fee structures. The bursary scheme is allocated R4 billion over the MTEF period in the Teachers, Education Human Resources and Institutional Development programme.

Improving ECD services

The provision of ECD services in provinces is supported by the ECD grant. The grant is allocated R5.6 billion over the MTEF period to provide subsidies for children accessing ECD services, infrastructure support to ECD providers and pre-registration support packages; and to pilot the construction of low-cost ECD centres. An additional R197 million in 2024/25 is earmarked for piloting a nutrition support programme that targets low-cost ECD centres.

Providing nutritious meals for learners

The department plans to continue providing nutritious meals to more than 10 million learners on each school day at 19 950 schools each year over the period ahead, in line with the National Development Plan's priority of eliminating poverty and supporting food security. The programme is funded by the NSNP grant, which is allocated R30.9 billion over the MTEF period in the Educational Enrichment Services programme.

School attendance

According to the Statistics South Africa's General Household Survey of 2023, there were approximately 15,4 million learners at school in 2023. Participation in education institutions was virtually universal (97,3%) by the age of 15 years (the last compulsory school age). Approximately two-thirds (63,6%) of learners were still in school by the age of 18 which usually represents the age at which learners exit grade 12. A notable percentage of learners, however, remained in primary and secondary schools long after they should have exited those institutions.

Less than one-fifth (18,3%) of twenty-year olds were, for instance, still attending school. While the percentage of learners who have achieved grade 12 has been increasing, the survey shows that the percentage of individuals who attended post-school education has remained relatively low for youth aged 19 to 22 years of age. Although almost two-thirds (66,1%) of learners attended no-fee schools (up from 21,4% in 2007), the percentage varies from 87,3% in Limpopo to 51,0% in Western Cape.

Learners who dropped out of school before the age of 18 years cited reasons such as poor performance (29,1%), and a lack of money (19,5%) as the main reasons. Although 7,2% named family commitments as the main reason, it was more common for females (14,1%) than for males (0,1%). The percentage of individuals aged 20 years and older who did not have any education decreased from 11,4% in 2002 to 3,1% in 2023, while those with at least a grade 12 qualification increased from 30,5% to 50,8% over the same period.

Intergenerational functional illiteracy (where individuals have not attained Grade 7) has also decreased markedly. Although 34,4% of South Africans over the age of 60 years were still functionally illiterate, this figure dropped to only 3,2% for those aged 20 39 years of age.

Entities

South African Council for Educators (SACE)

The SACE is mandated by the South African Council for Educators Act, 2000 (Act 31 of 2000) to enhance the status of the teaching profession by providing for the professional registration of all educators, promoting the continuing professional development of educators, and maintaining ethical and professional standards in the teaching profession.

Expenditure and revenue are expected to decrease at an average annual rate of 0.9%, from R121.3 million in 2023/24 to R118.1 million in 2026/27. The decrease in revenue is mainly due to the expected decrease in the number of educators registered and reinstated.

The council expects to generate 81.2% (R285.3 million) of its revenue over the MTEF period through membership and registration fees, and the remainder through interest on investments, reprints of certificates and transfers from the department for continuing professional teacher development programmes.

Umalusi Council for Quality Assurance in General and Further Education and Training (FET)

The Umalusi Council for Quality Assurance in General and FET derives its mandate from the General and FET Quality Assurance Act (2001) and the National Qualifications Framework (NQF) Act of 2008. As an external and independent quality assurance body, the council is mandated to set and maintain standards in general and FET by developing and managing the general and FET qualifications sub-framework.

To fulfil this mandate, the council's expenditure is expected to increase at an average annual rate of 5.3%, from R197.4 million in 2023/24 to R230.4 million in 2026/27. The council is set to derive 80.4% (R686.4 million) of its revenue over the period ahead through departmental transfers, which increase at an average annual rate of 3.8%, from R162.9 million in 2023/24 to R182.4 million in 2026/27.

Role players

Provincial departments of education

The role of the DBE is to translate government's education and training policies and the provisions of the Constitution into a national education policy and legislative framework. The DBE works closely with provincial education departments to ensure that provincial budgets and strategies are in line with and support national policies.

The national department shares a concurrent role with the provincial education departments for basic schooling and ECD, but it is the responsibility of each provincial education department to finance and manage its schools directly.

District offices are the provincial education departments' main interface with schools. Not only are they central to the process of gathering information and diagnosing problems in schools, but they also perform a vital support and intervention function. This includes organising training for personnel, dealing with funding, resourcing bottlenecks and solving labour-relations disputes. District offices are key to ensuring that school principals remain accountable to provincial education departments and that accountability lines within the school, to the principal and school governing body, are maintained.

Council of Education Ministers

The council, comprising of the Ministers of Basic Education, and Higher Education and Training, as well as the nine provincial members of the executive councils for education, meets regularly to discuss the promotion of the national education policy, share information and views on all aspects of education in South Africa and coordinates action on matters of mutual interest.

Heads of Education Departments Committee

The committee comprises the Director-General (DG) of the DBE, deputy DGs of the national department and the heads of provincial departments of education. The purpose of the committee is to facilitate the development of a national education system, share information and views on national education, coordinate administrative action on matters of mutual interest and advise the DBE on a range of specified matters related to the proper functioning of the national education system.

National Education Evaluation and Development Unit (NEEDU)

The NEEDU facilitates school improvement through systematic evaluation. This subprogramme evaluates how district offices, provincial departments and the national department monitor and support schools, school governing bodies and teachers. This entails identifying critical factors that inhibit or advance the attainment of sector goals and school improvement, and making focused recommendations for addressing problem areas that undermine school improvement and the attainment of sector goals.

Education Labour Relations Council (ELRC)

The ELRC serves the public education sector nationally. It is a statutory council, initially established by the Education Labour Relations Act, 1993 (Act 146 of 1993), but draws authority from the Education Labour Relations Act, 1995 (Act 66 of 1995).

The establishment of the ELRC in 1994 at its founding meeting in Pretoria was a significant milestone for labour relations and education in South Africa. The main purpose of the council is to maintain labour peace within public education through processes of dispute prevention and resolution. These include collective bargaining between the educator unions and the DBE as the employer. The ELRC also conducts various workshops to increase the level of awareness and understanding of sound labour-relations procedures.

The ELRC has over the years succeeded in signing collective agreements that directly benefit educators in classrooms. The council serves educators in the public education sector, specifically those employed in terms of the Employment of Educators Act 76 of 1998. The Council also serves the learners of this country by effectively resolving disputes in public education that involve the child as victim or witness and therefore comply with Section 28 of the Constitution of South Africa of 1996, which provides that the child's rights is of paramount importance in every matter concerning a child.

Educator unions

Educators are organised into six educator unions:

- National Professional Teachers' Organisation of South Africa.
- National Teachers' Union.
- South African Teachers' Union.
- Professional Educators' Union.
- Cape Professional Teachers' Association.
- South African Democratic Teachers' Union.

There is an existing labour relations framework agreement between the DBE and unions. It encompasses both traditional areas of negotiation and issues of professional concern, including pedagogy and quality improvement strategies. An agreement was reached on the Framework for the Establishment of an Occupation-specific Dispensation (OSD) for educators in public education. The OSD provides for dual career paths, where educators and specialists in classrooms can progress to levels where they earn salaries that are equal to, or higher than, those of managers without moving into management/supervisory posts.

It also provides for a new category of posts for teaching and learning specialists and senior learning and teaching specialists, as well as the creation of a cadre of education managers at school and office level.

Higher Education, Science and Innovation

The DHET and the Department of Science and Innovation (DSI) report to the Ministry of Higher Education, Science and Innovation but exist as separate votes.

Higher Education and Training

The NDP envisages that by 2030, South Africans should have greater access to post-school education and training (PSET) opportunities through a system that is responsive to their needs. The DHET's vision is to have an integrated, coordinated and articulated PSET system for improved economic participation and the social development of youth and adults. The 2014 White Paper for Post-School Education and Training points out that the PSET system is an important institutional mechanism that must be responsive to the needs of society.

The system should be inclusive and cut across state boundaries, ethnic, gender, disability, class and socio-economic status, and national and religious identities, to achieve a united human race based on human dignity. This is supported by Priority 2 (education, skills and health) of government's 2019-2024 Medium Term Strategic Framework (MTSF).

The mandate of the DHET is to develop a skilled and capable workforce while broadening the skills base of the country to support an inclusive growth path. The department derives its mandate from the:

- Higher Education Act, 1997 (Act 101 of 1997), which provides for a unified national system of higher education;
- Skills Development Act of 1998, which enables the creation of the National Skills Authority, sector education and training authorities (SETAs), the establishment of the Quality Council for Trades and Occupations, and the regulation of apprenticeships, learnerships and other matters relating to skills development
- National Student Financial Aid Scheme (NSFAS) Act of 1999, which provides for the granting of loans and bursaries to eligible students attending public higher education and training institutions, and the subsequent administration of such loans and bursaries
- Skills Development Levies Act of 1999, which provides for the imposition of skills development levies
- Continuing Education and Training Act of 2006, which provides for the regulation of continuing education and training, the establishment of governance structures for and the funding of public technical and vocational education and training (TVET) colleges and community education and training (CET) colleges, the registration of private colleges, and the promotion of quality in continuing education and training
- NQF Act of 2008, which provides for the NQF, the South African Qualifications Authority (SAQA) and quality councils for the issuing and quality assurance of qualifications required by the sub-frameworks of the NQF.

As part of implementing its mandate, the department oversees universities, TVET colleges, CET colleges, SETAs, quality councils and private education providers. Its goals include expanding access to higher education and training opportunities, and improving the quality of the provisioning, responsiveness and efficiency of the post-school education and training system. It aims to give effect to these goals over the medium term by focusing on upgrading ailing infrastructure at higher education institutions, and providing bursaries and loans to students from poor and working class backgrounds.

The department's expenditure is expected to increase at an average annual rate of 4.8%, from R130.5 billion in 2023/24 to R150.2 billion in 2026/27, driven mainly by transfers and subsidies to departmental agencies and accounts and higher education institutions. These account for an estimated 90.6% (R389.8 billion) of total spending over the period ahead.

Spending on compensation of employees accounts for an estimated 8.6% (R37.3 billion) of the total budget over the same period, mainly in the Technical and Vocational Education and Training programme for TVET college lecturers (R26.6 billion) and the Community Education and Training programme for CET college lecturers (R8.6 billion). Cabinet-approved reductions amounting to R27 billion over the medium term are mainly on transfer payments to the university infrastructure and efficiency grant and TVET infrastructure and efficiency grant, university subsidies, and the NSFAS.

Of these reductions, an estimated R4.9 billion over the MTEF period is on university subsidies. Although these subsidies are set to be reduced over the period ahead, the main funding source for universities is set to increase at an average annual rate of 3.7%, from R44 billion in 2023/24 to R49 billion in 2026/27.

Universities will need to implement cost-containment measures – including revisiting contracts, and reducing travel and subsistence costs – to accommodate the reduction. This takes into account the expected increase in university enrolments from 1.1 million in 2023 to 1.2 million in 2027.

Upgrading ailing infrastructure at higher education institutions

Although reductions of R6 billion to infrastructure grants over the MTEF period are expected to lead to delays in the start of new capital projects, they will also ensure closer alignment with the sector's capacity to spend infrastructure allocations as these grants have been underspent in recent years.

The department plans to ensure that institutions have appropriate infrastructure to accommodate students accessing higher education. The university infrastructure and efficiency grant is allocated R4.5 billion over the medium term, decreasing at an average annual rate of 24.3%, from R2.2 billion in 2024/25 to R1.2 billion in 2026/27.

The TVET infrastructure and efficiency grant is allocated R539.4 million over the same period, decreasing at an average annual rate of 41.7%, from R491.9 million in 2023/24 to R97.6 million in 2026/27. Despite these decreases, these allocations will enable infrastructure repairs and maintenance in priority areas such as bulk services, sanitation, teaching and learning facilities, and student accommodation. Allocations amounting to R989.4 million will be used to construct basic skills centres, teaching and learning facilities, workshops and ICT laboratories at CET colleges.

Providing bursaries and loans to students from poor and working class backgrounds

The department will endeavour to ensure that all students who are offered a place to study at a university or TVET college based on academic merit will be afforded that opportunity. The NSFAS provides bursaries that cover tuition at these institutions and living expenses to students from families earning below R350 000 per year.

Despite reductions of R16 billion over the MTEF period, transfers to the NSFAS to provide a projected 2.9 million students with loans and bursaries are expected to increase at an average annual rate of 3.6%, from R45.6 billion in 2023/24 to R50.8 billion in 2026/27. The reductions will, however, affect the number of bursaries the scheme is able to award over the medium term.

Historically Disadvantaged Institutions Development Programme

The programme is fully described in the draft HDI-DP Framework that has been fully consulted with historically disadvantaged institutions in the university sector. The HDI-DP Framework seeks to address challenges that threaten the viability and sustainability of historically disadvantaged institutions and will draw on the Historically Disadvantaged Institutions Development Grant as a resource.

It will also draw on a range of other institutional, department and partner resources.

The framework sets the following strategic priority areas for development focus:

- strengthen institutional management and governance systems,
- improve institutional infrastructure and facilities,

- enhance effective staff recruitment, development and retention,
- strengthen the academic enterprise, and
- leverage locality and community.

The notion of universities as anchor institutions will be a key feature of the programme. Once it is presented and approved, the DHET plans to roll out its full implementation in the next five years.

Student accommodation

Plans are underway to develop and finalise a multi-faceted and comprehensive strategy for student housing. The strategy will include a range of possibilities for increasing the availability of student housing on and off university and TVET campuses.

This will include accelerating the Student Housing Infrastructure Programme, which is already underway, through which university- and college-owned housing will be developed, leveraging private sector investments and development potential, as well as developing a policy framework on the accreditation of private student accommodation.

The norms and standards for student housing for the PSET system is also expected to be developed and implemented.

Expanding access to TVET colleges and improving their performance

Expanding access to skills programmes that address the labour market's need for intermediate skills that include practical components is one of the DHET's key mandates. Over the medium term, the department will work towards improving the quality of the PSET system by establishing more entrepreneurship hubs to enable TVET college students to realise their potential and become actively engaged in the economy, either through employment in the labour market or self-employment.

While the enrolment projections in TVET colleges are held constant over the next five years in order to eliminate funding gaps, the DHET is committed to expanding provision in the TVET college system through the development of comprehensive proposals involving a diversity of stakeholders and modalities of delivery, and to grow the number of students who can access vocational education and training. However, growth in the TVET college core programmes must take cognisance of the number of opportunities available to students for work-integrated learning.

Among these proposals will be the provision of open learning opportunities, primarily in the form of e-learning, as a key strategy towards reaching out and expanding access to students in remote locations, as well as to those already in employment. Furthermore, it is becoming evident that highly responsive and quality short skills programmes will grow in demand as organisations seek to reskill and upskill employees to meet rapidly changing workplace practices and standards.

Colleges will, therefore, partner with a diversity of stakeholders to deliver fit-for-purpose training in order to meet these localised needs. Programme diversification will constitute the cornerstone of expansion of the TVET system. The DHET will work collaboratively with the DSI to leverage the innovation service points already in existence nationally, for the enhancement of skills development in TVET colleges.

Initial engagements will focus on augmenting and modernising current provision in TVET colleges through innovation and creativity to prepare students for the world of real work in a 21st Century context. To facilitate this, teaching and learning support plans will be implemented in TVET colleges.

Establishing and operationalising Centres of Specialisation

Establishment and operationalising centres of specialisation in TVET colleges is a critical project for which the DHET continues to engage employers to work with young people as apprentices. The project aims to provide fully qualified artisans for a range of sectors in the economy, including high-technology manufacturing, the creative industries, computer software and aerospace engineering.

The department has also expanded our Centres of Specialisation from 26 to 34 centres at 20 TVET colleges with a further investment of R68 million and 16 colleges now have 35 Trade Test centres. These trade test centres have trade tested over 600 artisans of which over 500 have qualified as artisans.

Developing artisans

Over the medium term, the DHET aims to improve the public skills development system by managing the performance of service-level agreements with sector education and training authorities (SETAs) more effectively, and by providing funding to trade and quality assurance institutions for occupational qualifications. These institutions play a pivotal role in increasing the number of qualified artisans by rolling out skills programmes, learnerships, internships and apprenticeships, and by establishing partnerships with TVET colleges, universities and the labour market to provide opportunities for workplace experience. Through the SETAs, over the medium term, 93 000 new artisans are expected to be registered for training and 75 000 artisan learners are expected to qualify. For this purpose, R347.8 million over the medium term is allocated.

Through the Economic Reconstruction and Recovery Plan, the DHET has targeted 30 000 artisans per annum over the medium-term period to address shortage of artisanal skills in the country. Income generated through the skills development levy, which is collected from employers by the South African Revenue Service (SARS) and transferred to SETAs and the NSF as a direct charge against the National Revenue Fund, contributes significantly to key performance areas of the public skills development system, including artisan development.

Strengthening governance of the CET sector

The DHET recognises that improving the CET sector is key for development as it has the potential to provide students with access to a comprehensive range of programmes that lead to part and full qualifications and employment opportunities, including entrepreneurial opportunities. To ensure that the sector rises to its potential, the DHET will continue to prioritise the development and training of lecturers in CET colleges and learning centres by enabling them to upgrade their qualifications, with a particular focus on mathematics and science. The DHET has also strengthened its recruitment policies so that only qualified lecturers are employed in the sector.

Establishing the Imbali Education Precinct

The Imbali Education Precinct will be made up of an interconnected network of education and support institutions that will work together in a locality for the mutual benefit of all involved – to create seamless, enhanced, quality education pathways from early childhood education to higher education for the community it serves.

Some progress has been made in implementing the Imbali Education Precinct Development Plan, mostly on the Indumiso Campus of the Durban University of Technology (DUT) through the allocation of existing resources, including significant infrastructure developments,and the development of a range of new teacher education programmes for TVET and CET college lecturers. However, there has been slow progress for a range of reasons, including changed leadership at DUT and a lack of on-the-ground champions.

A project team and project office will be established to take the work forward over the next five years. The idea and model of the development of education precincts will be tested in terms of the Imbali Project. It is envisaged that, over the next 10-year period, at least three such precincts will be developed across the country.

This approach will support the District Development Model. South African Institute for Vocational and Continuing Education and Training Colleges must evolve into institutions that are highly responsive to the mid-level skills demands in the labour market. This requires expert and accurate planning in identifying much-needed skills sets, identifying appropriate modalities of skills training and delivery, efficient turnaround times in the development and delivery of occupational curricula, and vastly expanding the opportunities for work-based experience and learning through stakeholder engagements and partnerships.

The DHET will, in partnership with the German government, seek to strengthen the TVET system through:

- sectorial coordination and cooperation to implement governance and policy through the facilitation of cooperation agreements between the public and private sectors that build on existing initiatives and take forward new initiatives.
- private-sector engagement by assisting partner organisations to increase the level of private sector representation in decision-

making bodies and to promote systematic stakeholder dialogue.
- the implementation of reformed vocational and technical skills development to support the provision of demand- oriented skills development to youth by promoting on-the-job or work-based training approaches, the training of vocational teaching personnel, and strengthening the quality of artisan training in centres of specialisation.

Legislation

Key policies and legislation relating to Higher education and training in South Africa include the:
- Continuing Education and Training Act, 2006 (Act 16 of 2006), which provides for the regulation of continuing education and training, the establishment of governance structures for, and the funding of, public TVET colleges and CET colleges, the registration of private colleges, and the promotion of quality in continuing education and training;
- Higher Education Act, 1997 (Act 101 of 1997), which provides for a unified national system of higher education;
- NQF Act, 2008 (Act 67 of 2008), which provides for the NQF, the SAQA and quality councils for the issuing and quality assurance of qualifications required by the sub-frameworks of the NQF;
- NSFAS Act, 1999 (Act 56 of 1999), which provides for the granting of loans and bursaries to eligible students attending public higher education and training institutions, and the subsequent administration of such loans and bursaries;
- Skills Development Amendment Act, 2008 (Act 37 of 2008), which enables the creation of the National Skills Authority, SETAs, the establishment of the Quality Council for Trades and Occupations (QCTO), and the regulation of apprenticeships, learnerships and other matters relating to skills development; and
- Skills Development Levies Act, 1999 (Act 9 of 1999), which provides for the imposition of skills development levies.

Entities

Council on Higher Education (CHE)

The CHE is a statutory body established in terms of the Higher Education Act of 1997, as amended. It is mandated to advise the minister responsible for higher education on all matters pertaining to higher education, develop and manage the higher education qualifications sub-framework, and develop and implement a suite of policies and criteria to facilitate the implementation of the framework and subframework and protect their integrity.

The CHE's ongoing focus is to be a recognised centre for information and policy analysis on higher education by conducting sector research and monitoring all higher education matters to advise the Minister. Spending on the compensation of its 52 employees constitutes an estimated 45.3% (R135.4 million) of total expenditure over the MTEF period, increasing at an average annual rate of 4.1%, from R41.9 million in 2023/24 to R47.2 million in 2026/27. Transfers from the department account for an estimated 91.3% (R266 million) of revenue over the period ahead, increasing at an average annual rate of 0.5% from R91.1 million in 2023/24 to R92.6 million in 2026/27.

The remainder is set to be generated through interest on investments and fees charged for accreditation services provided to private higher education institutions. Total revenue is expected to increase at an average annual rate of 0.6%, from R99.7million in 2023/24 to R101.6 million in 2026/27.

National Skills Fund

The NSF was established in terms of the Skills Development Act of 1998. It funds projects identified in the national skills development strategy as national priorities; projects related to the achievement of the purposes of the act, as determined by the Director-General; and any activity undertaken by the Minister to achieve a national standard of good practice in skills development.

Over the medium term, the fund aims to: contribute to the development of skills for small, medium and micro enterprises and cooperatives; fund 19 100 learners and 15 000 bursary students for qualifications in occupations in high demand; facilitate the acquisition of various skills for 3 450 participants through constituency-based skills development initiatives; fund education and training programmes for 187 500 learners from rural areas; and fund workplace experience for 2 300 learners. The fund will also undertake priority projects such as developing infrastructure at TVET and community colleges, research, and innovation aimed at expanding, integrating and improving the effectiveness of the post-school education and training system. An estimated R16.8 billion over the medium term is allocated to fund these skills development and infrastructure projects.

The fund is set to derive 87.6% (R15.9 billion) of its revenue over the medium term through the skills development levy and the remainder (R2.3 billion) through interest on investments held by the Public Investment Corporation. The skills development levy is collected from employers by the SARS and transferred to the fund as a direct charge against the National Revenue Fund. This transfer is projected to increase at an average annual rate of 8%, from R4.5 billion in 2023/24 to R5.7 billion in 2026/27.

National Student Financial Aid Scheme

The NSFAS was established in terms of the NSFAS Act of 1999. The scheme is responsible for providing bursaries and loans to students; developing criteria and conditions for the granting of loans and bursaries to eligible students in consultation with the Minister; raising funds; recovering loans from debtors; maintaining and analysing a database of funded students; undertaking research for the better use of financial resources; advising the Minister on matters relating to student financial aid; and undertaking other functions assigned to it by the act or by the Minister.

Over the medium term, 1.5 million university students and one million TVET students from poor and working class backgrounds at 76 public higher education institutions are expected to be awarded bursaries through the scheme. The estimated cost to carry this out is R168.9 billion over the period ahead.

Transfers from the department constitute an estimated 90.4% (R146.9 billion) of the scheme's total revenue over the medium term. Allocations are set to increase at an average annual rate of 3.6%, from R45.9 billion in 2023/24 to R51.1 billion in 2026/27.

Quality Council for Trades and Occupations

The QCTO was established in terms of the Skills Development Act of 1998. It is mandated to oversee the development and maintenance of the occupational qualifications sub-framework in the NQF and advise the minister on all policy matters concerning occupational standards and qualifications.

Over the medium term, the council will focus on ensuring the development and quality assurance of occupational qualifications, part qualifications and skills programmes that are responsive to the labour market and developmental state initiatives; maintaining and quality assuring a single national occupational qualifications sub-framework that promotes synergy, simplification and effectiveness; and embedding a culture of responsive learning within the organisation.

An amount of R484.7 million is set aside over the medium term to carry out these activities. Expenditure is expected to increase at an average annual rate of 2.1% over the MTEF, from R157.8 million in 2023/24 to R167.7 million in 2026/27. The council is set to derive 75.8% (R369.6 million) of its revenue over the period ahead from SETA grant funding and 19.9% (R94 million) through transfers from the department.

Departmental transfers increase at an average annual rate of 3.8%, from R29.2 million in 2023/24 to R32.7 million in 2026/27. The remaining revenue of R21.1 million over the medium term is expected to be generated by charging verification, accreditation and certification fees.

Sector education and training authorities

The Skills Development Act of 1998 mandates SETAs to fund skills development; implement national, sector and workplace strategies to develop and improve skills in the South African workforce; and provide learnerships that lead to recognised occupational qualifications. Over the medium term, SETAs will focus on strengthening and delivering the relevant priority skills for South Africa's labour market.

They will seek to foster and enhance partnerships among industry, universities and TVET colleges to scale up workplace placement for graduates, work-integrated learning as well as opportunities for TVET

college lecturers to gain more industry-relevant experience. The authorities will also continue to provide bursaries to students from poor families to gain qualifications in priority skills programmes. Over the medium term, SETAs plan to spend R69 billion on these programmes, increasing at an average annual rate of 0.3%, from R23.9 billion in 2023/24 to R24.1 billion in 2026/27.

SETAs derive and estimated 87.4% (R59.9 billion) of their revenue over the period ahead through the skills development levy, which is collected from employers by the South African Revenue Service and transferred as a direct charge against the National Revenue Fund. SETAs' revenue is expected to increase at an average annual rate of 5.2%, from R18 billion in 2023/24 to R21 billion in 2026/27. Any additional revenue will be derived through interest on investments.

South African Qualifications Authority

The SAQA is a statutory body that was established in terms of the SAQA Act of 1995 and exists in terms of the NQF Act of 2008, as amended. The authority is mandated to advise the minister on matters related to the NQF; oversee, liaise and consult with the quality councils on the implementation of the NQF; develop policies and criteria for the registration of qualifications; maintain a national learner records database; and conduct or commission research into matters related to the NQF.

Over the MTEF period, the authority will focus on streamlining and automating its processes to become more efficient. It plans to do this by enhancing its IT infrastructure to enable automation for verification on the national learner records database and for foreign qualifications, and promoting the national qualifications.

Universities

South Africa's higher education landscape comprises the following institutions:

- Cape Peninsula University of Technology
- Central University of Technology, Free State
- Durban Institute of Technology
- Mangosuthu University of Technology
- National Institute for Higher Education, Northern Cape
- National Institute for Higher Education, Mpumalanga
- Nelson Mandela University (NMU)
- North-West University
- Rhodes University
- Sefako Makgatho Health Sciences University
- Sol Plaatje University, Northern Cape
- Tshwane University of Technology
- University of Cape Town (UCT)
- University of Fort Hare
- University of the Free State
- University of Johannesburg
- University of KwaZulu-Natal
- University of Limpopo
- University of Mpumalanga
- University of Pretoria
- University of South Africa
- University of Stellenbosch
- University of Venda
- University of the Western Cape
- University of the Witwatersrand
- University of Zululand
- Vaal University of Technology
- Walter Sisulu University, Eastern Cape.

Science and Innovation

The DSI derives its mandate from the 1996 White Paper on Science and Technology, which introduced the concept of the national system of innovation – a set of interacting organisations and policies through which South Africa creates, acquires, diffuses and puts into practice new knowledge to help achieve individual and collective goals.

A coordinated and efficient national system of innovation will help the country achieve its national development priorities by promoting change through innovation, and enable all South Africans to enjoy the economic, sociopolitical and intellectual benefits of science, technology and innovation. The department's focus over the medium term will be on providing funding for research infrastructure; developing human capital; and advancing innovation to improve South Africa's competitiveness in the global market. Transfers and subsidies to the department's entities account for an estimated 93.1% (R26.1 billion) of total expenditure over the MTEF period.

These funds are intended to support entities in carrying out various research and development projects, maintaining national research infrastructure and administering grants for scientific research. The department's second-largest cost driver is compensation of employees, spending on which increases at an average annual rate of 2.7%%, from R389.5 million in 2023/24 to R422.3 million in 2026/27.

Total expenditure is expected to decrease at an average annual rate of 3.4%, from R10.6 billion in 2023/24 to R9.5 billion in 2026/27. This is due to Cabinet-approved reductions to the department's budget amounting to R3 billion over the MTEF period. These are likely to affect performance across the department's programmes. To mitigate against this, the department will seek to contain costs on non-essential line items and reprioritise funds where necessary to meet contractual commitments.

Amounts of R26.3 million in 2024/25, R28 million in 2025/26, and R26.3 million in 2026/27 are shifted to the Department of Health for the social impact bond, an outcomes-based financing mechanism, for adolescent girlsand women. This work will be led by the South African Medical Research Council.

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.

To provide for this, R16.1 billion is allocated over the medium term in the Research Development and Support programme. The national integrated cyberinfrastructure system is implemented by the Council for Scientific and Industrial Research (CSIR). 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.

To implement the system, R923.8 million will be transferred to the council over the medium term through allocations in the Basic Science and Infrastructure subprogramme in the Research Development and Support programme.

To date, the MeerKAT telescope has 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 are planned to be constructed at an estimated cost of R800 million over the next three years. The department is set to cover 50% (R400 million) of this amount through the Research Development and Support programme.

Developing human capital

Challenges to competitiveness in areas such as market sustainability, access and exposure are effectively met through innovation. As such, in each year over the MTEF period, the department plans to support 15 commercial outputs in designated areas such as health care, 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 DSI 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. Spending for these activities is expected to amount to R5.3 billion over the MTEF period in the Technology Innovation programme.

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

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Legislation

Legislation governing the DSI include the:

- Intellectual Property (IP) Rights from Publicly Financed Research and Development Act, 2008 (Act 51 of 2008), provides for the more effective use of IP emanating from publicly financed R&D, through the establishment of the National Intellectual Property Management Office (NIPMO), the IP Fund, and offices of technology transfer at institutions;
- Technology Innovation Act, 2008 (Act 26 of 2008), intends to promote the development and exploitation in the public interest of discoveries, inventions, innovations and improvements, and for that purpose establishes the Technology Innovation Agency (TIA);
- SANSA Act, 2008 (Act 36 of 2008), establishes the SANSA to promote space science research, cooperation in space-related activities and the creation of an environment conducive for the development of space technologies by industry;
- Natural Scientific Professions Act, 2003 (Act 27 of 2003), establishes the South African Council for Natural Scientific Professions, and legislates the registration of professional natural scientists, natural scientists-in-training, natural science technologists and natural science technologists-in-training;
- National Research Foundation (NRF) Act, 1998 (Act 23 of 1998), establishes the NRF to promote basic and applied research, as well as the extension and transfer of knowledge in the various fields of science and technology;
- National Advisory Council on Innovation (NACI) Act, 1997 (Act 55 of 1997), establishes the NACI to advise the Minister responsible for science and innovation on the role and contribution of science, mathematics, innovation and technology in promoting and achieving national objectives;
- Africa Institute of South Africa (AISA) Act, 2001 (Act 68 of 2001), establishes the AISA to promote knowledge and understanding of African affairs by encouraging leading social scientists;
- Human Sciences Research Council (HSRC) Act, 2008 (Act 17 of 2008), provides for the HSRC, which carries out research that generates critical and independent knowledge relative to all aspects of human and social development;
- Scientific Research Council Act, 1988 (Act 46 of 1988), refers to the activities of the CSIR, one of the leading scientific and technological research, development and implementation organisations in Africa, which undertakes directed R&D for socio-economic growth in areas including the built environment, defence, the environmental sciences, as well as biological, chemical and laser technologies;
- Astronomy Geographic Advantage Act, 2007 (Act 21 of 2007), provides for the preservation and protection of areas in South Africa that are uniquely suited to optical and radio astronomy, and for intergovernmental cooperation and public consultation on matters concerning nationally significant astronomy advantage areas;
- Geoscience Amendment Act, 2010 (Act 12 of 2010), amends the Geoscience Act, 1993 (Act 100 of 1993), to mandate the Council for Geoscience to be the custodian of geotechnical information; to act as a national advisory authority in respect of geohazards related to infrastructure and development, and to undertake exploration and prospecting research in the mineral and petroleum sectors;
- South African National Research Network (SANReN), which is responsible for the roll-out of a high-speed broadband network to all academic and research institutions in the country, was awarded a private electronic communications network licence exemption under the Electronic Communications Act, 2005 (Act 36 of 2005); and
- Science and Technology Laws, Amendment Act, 2014 (Act 7 of 2014), seeks to, among other things, streamline the process for the nomination and appointment of members of the boards or councils of such entities as well as the filling of vacancies on the boards.

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, andresponding to issues concerning gender, youth and people with disabilities. Expenditure is expected to decrease at an average annual rate of 9.3%, from R50.9 million in 2023/24 to R38 million in 2026/27. This is due to contract funding for certain projects ending in 2023/24. Transfers from the department account for an estimated 92.3% (R102.2 million) of projected revenue over the period ahead. Revenue is in line with spending.

Council for Scientific and Industrial Research

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 will continue to focus 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. Spending on these activities amounts to an estimated R9.6 billion over the MTEF period.

As the council's work requires highly specialised skills and is labour intensive, spending on compensation of employees accounts for 56.8% (R5.9 billion) of planned expenditure over the medium term, increasing at an average rate of 3.9%, from R1.8 billion in 2023/24 to R2 billion in 2026/27. Total expenditure is expected to increase at an average annual rate of 3.1%, from R3.3 billion in 2023/24 to R3.6 billion in 2026/27.

Transfers from the department account for an estimated 21% (R2.1 billion) of the council's total revenue over the period ahead. The remainder is set to be generated through services rendered, such as contract research and development, income from intellectual property, proceeds from technology transfers, and royalties. Revenue over the period ahead is projected to amount to R10.2 billion.

Human Sciences Research Council

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.

Human capital is essential for the council to produce research. As such, spending on compensation of employees accounts for an estimated 56.4% (R970.3 million) of the council's total expenditure over the medium term, increasing at an average annual rate of 4.6%, from R297.6 million in 2023/24 to R340.9 million in 2026/27.

The council is set to receive 55.7% (R931.4 million) of its revenue over the period ahead through transfers from the department, increasing at an average annual rate of 0.1%, from R570.9 million in 2023/24 to R583.5 million in 2026/27. The remainder is expected to be generated through research contracts and grants from national and international agencies, government departments and private-sector foundations.

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 will continue to focus 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.

An estimated 31.4 per cent (R5.4 billion over the MTEF period) is allocated for capital expenditure. Included in this amount is R417 million for spending on major infrastructure for the Square Kilometre Array, particularly the science processing and regional centres, the science operations centre building, the engineering operations centre building, and fencing for the MeerKAT national park.

Spending on compensation of employees accounts for an estimated 23.4 per cent (R4 billion) of the council's total expenditure over the medium term, increasing at an average annual rate of 8.5 per cent, from R1.1 billion in 2023/24 to R1.4 billion in 2026/27. Total expenditure is expected to increase at an average annual rate of 6.9 per cent, from R4.8 billion in 2023/24 to R5.9 billion in 2026/27.

South African National Space Agency

The SANSA was established in terms of the South African National Space Agency 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 will 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.

Spending on compensation of employees comprises an estimated 34.8 per cent (R901.2 million) of expenditure over the period ahead. Total expenditure is expected to increase at an average annual rate of 3.5 per cent, from R579.9 million in 2023/24 to R643.7 million in 2026/27.

Transfers from the department account for an estimated 67.3 per cent (R2 billion) of total revenue over the next three years. The remainder is expected to be generated through the sale of goods and services other than capital assets and other non-tax revenue. Revenue is set to increase in line with spending.

Technology Innovation Agency

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.

These activities are expected to drive an increase in expenditure from R615.5 million in 2023/24 to R669.4 million in 2026/27, at an average annual rate of 2.8 per cent. The agency expects to receive 96.3 per cent (R1.8 billion) of its revenue over the MTEF period through transfers from the department. These are set to increase at an average annual rate of 2.6 per cent, from R595 million in 2023/24 to R643.3 million in 2026/27.

Role player

South African Council for Natural Scientific Professions (SACNASP)

The SACNASP's mandate is to provide a credible professional registration and regulatory body that allows natural scientists to establish, direct, sustain and ensure a high level of professionalism and ethical conscience in the natural scientific professions sector. Their conduct should be internationally acceptable and in the broad interest of the community as outlined in the SACNASP Code of Conduct.

Policy mandate and programmes

Technology Innovation

The programme aims to enable R&D in space science and technology, energy security and the bioeconomy, and in the emerging and converging areas of nanotechnology, robotics, photonics and indigenous knowledge systems (IKS), to promote the realisation of commercial products, processes and services. It also promotes the protection and utilisation of IP, technology transfer and technology commercialisation through the implementation of enabling policies and interventions along the entire innovation value chain.

Its subprogrammes include the:

- Space Science, which supports the creation of an environment conducive to the implementation of the national space strategy and South African earth observation strategy, and that addresses the development of innovative applications and human capital to respond to national priorities and support socio-economic development.
- Hydrogen and Energy, which provides policy leadership in research, development and innovation initiatives in the energy sector. This subprogramme plays a key role in developing a sustainable and globally competitive South African energy knowledge base and industry.
- Bio-innovation, which leads the implementation of the national bioeconomy strategy.
- Innovation Priorities and Instruments, which supports and strengthens the innovation policy package aimed at creating and sustaining an enabling environment for innovation, technology and development, and the commercialisation of publicly funded R&D initiatives.
- NIPMO – the implementing agency established to provide for the more effective use of IP emanating from publicly financed R&D.

International Cooperation and Resources

The programme strategically develops, promotes and manages international partnerships that strengthen the National System of Innovation. It enables an exchange of knowledge, capacity and resources between South Africa and its international partners, with a focus on building capacity to support science, technology and innovation in Africa.

It also supports South African foreign policy through science diplomacy. Its subprogrammes include:

- Multilateral Cooperation and Africa, which advances and facilitates South Africa's participation in bilateral science, technology and innovation cooperation initiatives with other African partners; in African multilateral programmes, especially those of the Southern African Development Community and African Union; and in broader multilateral science, technology and innovation and innovation partnerships, with a strategic focus on South-South cooperation.
- International Resources, which works to increase the flow of international funding into South African science, technology and innovation initiatives, as well as African regional and continental programmes, through concerted efforts to promote foreign investment and the fostering of strategic relations with partners such as the EU, as well as foundations and philanthropic organisations and the multinational private sector.
- Overseas Bilateral Cooperation, which promotes and facilitates South Africa's cooperation in bilateral science, technology and innovation agreements with partners in Europe, the Americas, Asia and Australasia, especially for human capital development and collaborative research and innovation; and secures support for joint cooperation with other African partners.

South Africa is regarded by many countries and private sector partners as a preferred and privileged partner for international cooperation. On average, approximately 15% of annual R&D funding in South Africa comes from international investors.

Research, Development and Support

The programme provides an enabling environment for research and knowledge production that promotes the strategic development of basic sciences and priority science areas through the promotion of science human capital development, and the provision of research infrastructure and relevant research support, in pursuit of South Africa's transition to a knowledge economy.

Its subprogrammes include:

- Human Capital and Science Promotions, which formulates and implements policies and strategies that address the availability of human capital for science, technology and innovation; provide fundamental support for research activities; and contribute to the development of a society that is knowledgeable about science, critically engaged and scientifically literate.
- Science Missions, which promotes the development of research, the production of scientific knowledge, and the development of human capital in fields of science in which South Africa enjoys a geographic advantage.
- Basic Science and Infrastructure, which facilitates the strategic implementation of research and innovation equipment and facilities to promote knowledge production in areas of national priority, and sustain innovation led by research and development.
- Astronomy, which supports the development of astronomical sciences around a new multiwavelength astronomy strategy, and provides strategic guidance and support to relevant astronomy institutions in the implementation of strategic astronomy programmes.

Socio-economic Innovation Partnerships

The programme enhances government's growth and development priority areas through targeted science and technology-based innovation interventions, and the development of strategic partnerships with other government departments, industry, research institutions and communities. Its subprogrammes include:

- Sector Innovation and Green Economy, which provides policy, strategy and direction for research and the development-led growth of strategic sectors of the economy; and supports the transition to a green economy.
- Innovation for Inclusive Development, which supports the development of science and technology-based innovations for tackling poverty, including the creation of sustainable jobs and human settlements, and the enhanced delivery of basic services.
- Science and Technology Investment, which leads and supports the development of indicators and instruments for monitoring investments in science and technology, the performance of the National System of Innovation, and ways of strengthening policy.
- Technology Localisation, Beneficiation and Advanced Manufacturing, which funds technology and innovation development programmes to advance strategic, sustainable economic growth for the medium and long term; sector development priorities; and service delivery.

National research facilities

The national research facilities managed by the NRF are clustered on the basis of their areas of specialisation aligned to the science missions of the National Research and Development Strategy.

South African Astronomical Observatory (SAAO)

The SAAO is the national centre for optical and infrared astronomy in South Africa. Its prime function is to conduct fundamental research in astronomy and astrophysics by providing a world-class facility and by promoting astronomy and astrophysics in southern Africa. The SAAO contributes to South Africa's future development by creating and disseminating scientific knowledge, providing research infrastructure and providing an interface between science and society. It is also responsible for managing the operations of the South African Large Telescope.

Hartebeesthoek Radio Astronomy Observatory (HartRAO)

The HartRAO is a national facility of the NRF. Its radio astronomy research focuses on stellar evolution, pulsars and masers; and its space geodesy research uses space-based techniques to study the earth. The facility is also used by university students for carrying out research. It also undertakes science awareness programmes for schools and the general public.

South African Institute for Aquatic Biodiversity (SAIAB)

A national facility of the NRF, the SAIAB is famous for its association with the discovery of the enigmatic coelacanth and is internationally recognised for ichthyological research, dynamic research staff and active postgraduate school. The SAIAB provides unique skills and infrastructure support in marine, estuarine and freshwater ecosystems research, molecular research, collections and bioinformatics.

South African Environmental Observation Network (SAEON)

The SAEON is a business unit of the NRF and serves as a national platform for detecting, translating and predicting environmental change through scientifically designed observation systems and research. The SAEON also captures and makes long-term datasets freely accessible, and runs an education outreach programme. The SAEON has six nodes dispersed geographically across the country.

National Zoological Gardens (NZG)

The NZG is a rapidly transforming facility reporting to the NRF. It owns an impressive animal collection, conservation centres, the Centre for Conservation Science and the NZG Academy. The NZG is well placed as an education and awareness platform for visitors comprising educators, learners, students, special interest groups and the general public.

iThemba Laboratories for Accelerator-Based Science (LABS)

iThemba LABS is a business unit of the NRF, dedicated to investing in the growth and development of scientific and technical expertise in accelerator-based science, with a particular focus on women and underrepresented communities.

It provides access to state-of-the-art research infrastructure, both locally and globally, enabling research into the nature, structure, and properties of matter and materials, as well as the production of radioisotopes for use in nuclear medicine diagnostics, imaging, and therapy. As the largest facility of its kind in Africa, iThemba LABS is home to several particle accelerators located in Cape Town and

Johannesburg. The centerpiece of the facility is the 200-MeV Separated Sector Cyclotron (SSC), which is powered by two solid-pole injector cyclotrons. Since its inception in the 1980s, the SSC has supplied particle beams to two primary user communities: nuclear medicine and nuclear physics research (both fundamental and applied).

The establishment of the South African Isotope Facility (SAIF) in 2023 marks a significant milestone, ushering in a new era where all beam time from the SSC will be allocated exclusively to nuclear physics research. The SAIF not only enhances radiopharmaceutical production but also supports research and development in isotope production.

In addition, iThemba LABS hosts two laboratories focused on atomic-scale research using particle beams from a 3-MV Tandetron and a 6-MV Tandem accelerator. The 6-MV Tandem accelerator, located in Johannesburg, is equipped with an Accelerator Mass Spectrometer (AMS) for applications in fields such as climate change, archaeology, and cultural heritage.

The NRF's Vision 2030 emphasises Transformation, Innovation, Impact, Excellence, and Sustainability as key pillars of its national research agenda. In alignment with this vision, iThemba LABS is committed to prioritizing education and training to nurture the next generation of researchers and technicians. Science Engagement initiatives play a crucial role not only in attracting talent but also in disseminating information to various stakeholders, including educators, students at all levels, and the general public.

Infrastructure projects

Square Kilometre Array

The multibillion-rand SKA, to be hosted in South Africa and Australia, will eventually extend into eight African countries and will be the world's biggest telescope. It is also one of the biggest-ever scientific projects and multinational collaborations in the name of science. The SKA organisation is progressing well, and South Africa continues to play an active role in the project. It was one of seven countries (with Australia, China, Italy, the Netherlands, Portugal and the United Kingdom (UK)) that signed a treaty establishing the SKA Observatory in March 2019.

South Africa is also working on getting the SKA Observatory treaty ratified by Parliament. The SKA Observatory is an intergovernmental organisation tasked with the construction and operations of the SKA radio telescope. The quality of astronomy infrastructure will allow world-class research. With thousands of linked radio wave receptors in Australia and in southern Africa, the SKA radio telescope will constantly scan space and feed the data to astronomers around the world.

The amounts of data being collected and transmitted by the SKA in a single day would take nearly two million years to play back on an iPod. This means the project requires supercomputing power and Big Data management and analytics capabilities on an unprecedented scale. The SKA is working with the world's most significant ICT powerhouses on the project. One aspect of the project will see the Netherlands Institute for Radio Astronomy and the International Business Machines Corporation collaborating to research extremely fast, but low-power exascale computer systems, data transport and storage processes, and streaming analytics that will be required to read, store and analyse all the raw data that will be collected daily.

The SKA project will also have unprecedented data-connectivity needs. Meeting the advanced technological and engineering needs of this project will result in significant local skills development, revolutionise science and technology research and enable innovative new businesses and employment in the science, technology and engineering fields.

The facility was upgraded to meet the growing demand for use by university and industrial researchers. The SKA remains a major platform for cutting-edge innovation in domains such as supercomputing the high-speed transmission and processing of massive data sets. Going forward, there will be a strong drive to leverage the SKA as a spearhead for other programmes – including next generation high performance computing challenges and Big Data challenges.

The South African consortium, Infrastructure South Africa, was led by the South African Radio Astronomy Observatory, which designed, built and operates the 64-dish SKA precursor telescope, the MeerKAT.

National Integrated Cyberinfrastructure System

The National Integrated Cyber Infrastructure System (NICIS) promotes scientific and industrial development through the provision of high-performance computing capability, high-speed network capacity and a national research data infrastructure integrated hierarchically into globally connected systems and into local system systems, providing seamless access for the research and education communities of South Africa. It is a national initiative of the DSI and implemented by the CSIR.

The Centre for High Performance Computing (CHPC) is one of the three pillars of the NICIS. It provides massive parallel processing capabilities and services to researchers in industry and academia. The other main pillars are the SANReN, which provides high-speed connectivity and advanced networking services, as well as the Data Intensive Research Initiative of South Africa (DIRISA), which implements services that enable sound data management practices and support efficient data-driven scientific and engineering discoveries..

South African Research Infrastructure Roadmap (SARIR)

Through a joint agreement between South Africa and the EU, the SARIR Framework was developed as the basis for prioritising the development of national research infrastructure needs. The SARIR is a high-level strategic and systemic intervention to provide research infrastructure across the entire public research system, building on existing capabilities and strengths, and drawing on future needs.

This roadmap will provide guidance to the DSI on the strategic development, acquisition and deployment of research infrastructure as a necessary enabler for research, development and innovation. The SARIR is intended to provide a strategic, rational, medium to long-term framework for planning, implementing, monitoring and evaluating the provision of research infrastructure necessary for a competitive and sustainable national system of innovation.

It also provides a basis for discussion concerning financing future infrastructure for research in South Africa, and for participating in joint international research infrastructure. The roadmap was developed through a bottom-up process driven from within the national research community, moderated at a technical level by an expert steering committee and aligned with national research priorities through strategic moderation by the DSI.

Information and Communications Technology

The DSI is leading the implementation of the national ICT Research, Development and Innovation Strategy. The strategy's main purpose is to create an enabling environment for innovation and manufacturing facilities and resources in South Africa. The CHPC, SANReN and the Very Large Databases are the three pillars of cyberinfrastructure that the DSI supports. Hosted by the UCT and managed by the CSIR's Meraka Institute, the CHPC was the first of its kind in South Africa and is making scientific supercomputing a reality for the country.

A major project for SANReN is the national backbone network, which aimed to connect all major metros in the country with a 10 gigabyte per second link. SANReN, linking 215 research sites, consists of 1 500 kilometres (km) of dark fibre and 5 000 km of managed bandwidth.

This network is complimented by significant international broadband capacity on the West Africa Cable System and the east coast SEACOM system, ensuring that the DSI's projects support competitive research and innovation as it prepares the national innovation system for the future.

SANReN connects more than 200 sites from Thohoyandou to Cape Town, including all the main campuses of all South African universities and most public research institutions, as well as global projects such as the SKA and the MeerKAT.

Indigenous knowledge systems

The IKS Policy serves as a guide for the recognition, understanding, integration and promotion of South Africa's wealth of indigenous knowledge resources. One of the areas of action identified by the policy is the protection of indigenous knowledge and the holders of such knowledge against exploitation. This includes ensuring that communities receive fair and sustained recognition and, where appropriate, financial remuneration for the use of this knowledge.

The indigenous knowledge of many communities embodies a deeply spiritualised and ancient relationship with the Earth's systems and cycles. Traditional songs and languages, clothing, architecture, foods, motifs, daily rituals and mythological epics contain local survival information. Moreover, the diversity of indigenous cultures provides unique insights into how to live harmoniously within nature.

By sharing indigenous stories of vulnerability and adaptation, people learn how communities share ideas on how ancestral wisdom is being incorporated into climatic adaptation strategies. By cherishing the value of indigenous knowledge, people can discover how best to adapt to a changing climate.

The DSI has three IKS priorities:

- The development of a regulatory environment for the protection of IKS.
- The development of the National Recordal System for the collection, recording, documenting, storage and management and dissemination of IKS in communities in the nine provinces of the country. Until orally transmitted and rapidly disappearing indigenous knowledge is recorded, it will be difficult to protect. The National Recordal System is the largest fingerprint initiative of the region to document and record indigenous knowledge.
- Applied research, specifically bio-prospecting activities. An example would be the Moritela Tshwene Tea Project near Zeerust in the North West.

A major achievement was to put in place an information infrastructure that would hold IKS in oral format. In addition, two UK-South Africa bilateral research chairs have been awarded for research into food security – one co-hosted by the universities of the Western Cape and Pretoria, and the other based at the NMU.

The DSI has also established indigenous knowledge studies centres of excellence at some of the country's universities. The centres will play a defining role in generating highly qualified HR capacity in IKS.

Natural Resource Development

To reinvigorate the South African mining sector and to harness the vast amounts of existing and potential opportunities for industrial and manufacturing growth, it is crucial for the country to create the technologies and mining methods to push mining deeper in a commercially viable manner. South Africa needs a competitive mining industry. This will only be possible if science and innovation play the quintessential role of changing the cost and exploitation horizons of the sector.

None of the existing mining stakeholders (publicly funded research institutions, private sector companies, universities, unions or government) have the scale to impact the situation alone in the long run. To achieve this, a critical mass of science and knowledge to push the frontiers of mining will require a national effort consisting of deep partnerships and collaborations across institutions and industries.

Women in Science Awards

Every year since 2003, the DSI has held the SAWiSA to recognise the achievements of prominent women scientists and encourage the participation of women in research. The awards are held in August as part of National Women's Month celebrations, which take place to honour the women who marched to the Union Buildings in 1956 to protest the apartheid system's pass laws.