CSIR General News

CSIR focuses on sustainable science for the future

An appropriate structure and environment where researchers can flourish and grow into the future generation of innovators - that is what the CSIR is creating. This observation is made by outgoing CSIR Board Chairperson, Roger Jardine, in the CSIR's 2005/6 annual report that was tabled in Parliament by the Minister of Science and Technology, Mosibudi Mangena in September 2006 2006. Jardine continues to express particular interest in the impact of the organisation's young researchers establishment fund aimed at assisting young researchers in following their own research ideas, developing their own areas of expertise and building their reputations as credible researchers.

"The organisation is agile and innovative enough to emerge as a global role model of a successful research and technology institute that has relevance and impact in our country and throughout the African continent," comments the new CSIR Board Chairperson, Nobusi Shikwane, on the CSIR's restructuring that was completed during the year under review. "Our conversations have changed from science for gain to science with impact ... We do business, but differently," she says in the annual report.

"Synergy must be encouraged between a business culture and a scientific culture in pursuit of virtuous developmental outcomes. The CSIR mantra must be one of sustainable development; sustainable knowledge base; sustainable business," says Dr Sibusiso Sibisi, CSIR President and CEO, in his overview in the annual report. In tandem with the organisation's revitalisation, the CSIR has launched a new brand with the positioning statement "our future through science". Sibisi states that the CSIR brand can realise its potential only "if we build a core or exceptional scientists - living legends who are serious about making a difference through science".

Read the CSIR Annual Report

Research and Development (R&D) Highlights

The CSIR conducts and applies directed research and innovation in science and technology to make a significant contribution towards socio-economic growth and development. The CSIR's research activities span the broad areas of biosciences; the built environment; defence, peace, safety and security; materials science and manufacturing; and natural resources and the environment. Other fields that the CSIR operates in are information and communications technology (ICT); laser R&D; metrology; and space science, including satellite applications.

Many CSIR research initiatives are aimed at improving the quality of life of the people of South Africa. Through the use of the latest technology, e.g. lasers and nanotechnology, researchers contribute towards improved health. An area of great concern in South Africa is the spread of tuberculosis (TB) and patient resistance to drugs. Herewith an article that appears in the Annual Report:

New nano drug delivery system targets TB sufferers

The World Health Organisation estimates that 1.7 million deaths resulted from TB in 2004. Both the highest number of deaths and the highest mortality per capita are in Africa, where HIV has led to rapid growth of the TB epidemic, and increases the likelihood of people dying from TB. An effective therapeutic regimen is available, but patient non-compliance (due to the need to take anti-TB drugs daily or several times a week for at least six months) results in treatment failure, while the emergence of drug resistance

can lead to multidrug-resistant (MDR) TB.

The CSIR, in collaboration with the universities of South Africa, Pretoria and Stellenbosch and the Medical Research Council, is developing a new method of drug delivery to TB sufferers, using nanotechnology. The aim is to develop a delivery or carrier system to release drugs slowly, over extended periods of time. In a country where the majority of people are poor and have to travel long distances to reach their nearest clinic or medical facility, shortening the duration of the treatment from six months to less than two months is likely to improve patient compliance. The slow release treatment will also minimise MDR-TB, through improved compliance, and hopefully contribute meaningfully to the total elimination of TB.

A safer environment has a direct positive impact on quality of life. Whether it is research in support of our defence industry or our peace-keeping forces, the CSIR contributes to improving the safety and security sector of South Africa:

Developing persistent maritime area surveillance

South Africa and its surrounding maritime areas are continuously being threatened by activities such as illegal fishing, illegal immigration, smuggling, piracy and oil pollution. These activities are mostly difficult to observe, as such forces usually work at night, in bad weather or in deserted places. South Africa has a 1,5 million square kilometre economic exclusion zone, but its naval and coast guard forces that have to patrol this vast region are small considering the area to be secured.

CSIR researchers are using their capabilities to develop a real-time persistent surveillance system to assist our defence, peace, safety and security-related agencies. The information from the surveillance system will ultimately enable these agencies to have real-time awareness of, among other things, the presence, movement, classification, intentions and threat levels of activities. Unmanned airships in constant flight high overhead, stationed at strategic points along the South African coastline and powered by solar cells during daytime and fuel cells at night, are likely to be used as the "vehicle" that will carry a multiple beam array radar with wide-band waveforms and multiple channel processing. Data will be transmitted as real-time information to the ground control station from where the processed data will be sent to various user control centres.

Many CSIR research projects are geared towards community empowerment, including interventions in the domains of ICT, the built environment, and natural resources. Herewith an example of one such community involvement project:

Working with communities to rehabilitate degraded catchments

Soil erosion is a major threat to water resources and land productivity throughout South Africa. The land in two rural communities at the foothills of the Drakensberg, which represents the main catchment area for KwaZulu-Natal (KZN), suffers from poor water filtration, increased run-off and severe soil erosion due to loss of grass cover on the steep mountain slopes.

The CSIR, in collaboration with the University of KwaZulu-Natal, the Farmer Support Group, the Department of Agriculture and KZN Wildlife, is assisting these rural communities with erosion control. The effect of different rehabilitation techniques is determined and interventions are identified and prioritised. The research also tries to establish land users' perceptions of soil erosion and rehabilitation in conserving water, and aims to identify soil conservation measures that will be acceptable and effective.

Job creation programmes have been launched, with community members being trained in various erosion control techniques including physical structures (stone packs, stone lines, cattle steps) and vegetative structures (indigenous and exotic grasses on eroded slopes, trees in micro catchments and grass on contour lines). The community is also involved in recording and analysing differences and changes, which contributes to their learning and decision-making.

Finance and Human Resources

The CSIR's total operating revenue for 2005/6 is R994,4 million, which is 0.4% higher than in the 2004/5 financial year. The Parliamentary Grant allocated to the CSIR for 2005/6 amounted to R394,4 million, representing an increase of 7.7% compared to the previous year. The overall financial position of the CSIR is positive, with a surplus of R52,9 million for the 2005/6 financial year. A post-retirement medical liability of R380 million existed at the end of March 2005, of which R107,3 million was unfunded. During 2005/6, the full liability was settled with all the eligible members, resulting in the actuarial gain of R56,6 million.

The growth of human capital and the retention of skills are crucial for the purposes of sustaining a strong science and technology base to enable the CSIR to fulfil its mandate. The CSIR's efforts towards building skills also contribute towards strengthening industry's research and development expertise to enhance economic competitiveness.

Professional growth of research staff, higher proportions of knowledge generation through a culture of learning and sharing, the creation of opportunities for young researchers and a strong transformation drive are fundamental to the CSIR's human resource development drive.

Of its total staff complement of just over 2 000, the number of professionals amounts to 52%. It is encouraging to note the increase in numbers in total black staff and black professionals. The CSIR has surpassed its targets with regard to the total number of black staff with Masters and Doctoral degrees, as well as women with Doctoral degrees.

The implementation of the CSIR's human capital development strategy will focus on, among others, further strengthening the number of post-graduate qualifications amongst CSIR staff.

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