



# Water Research: Finding Solutions to Benefit All

***In South Africa, millions of Rands are spent on research and development (R&D) in the water field every year. In fact, the Water Research Commission (WRC), the country's main water research funder, allocated R53-7-million to research projects (knowledge creation) during 2004/05. But is this enough? And is this research making a difference in the lives of ordinary South Africans? Lani Holtzhausen investigates.***

Science and technology is recognised universally as an important tool which can help solve a myriad of problems, including food shortages, water-borne diseases, lack of access to basic services, environmental degradation and biodiversity depletion. Developing scientific research facilities is also said to help sustain economic growth and employment, as well as social equity.

As stated in the National Water Resources Strategy research has been fundamental to understanding South Africa's water resources, and has contributed to the development of many of the techniques and tools used for their management. Research is currently underway on the issue of integrating the voice of the people and the poor, and of equity into integrated water resource management, for example.

According to a survey undertaken by the Human Sciences Research Council (HSRC), South Africa spent about R10,1-billion or 0,51% of its gross domestic product (GDP) on research and development in 2003/04. It is not known exactly what slice of this goes to water research, however, the HSRC estimates that most R&D is performed in the areas of engineering sciences (comprising 24,8% of total R&D), followed by natural sciences (21,9%), and the medical and health sciences.

The South African government has realised that without adequate investment in R&D the country cannot move forward. According to Science & Technology Minister Mosibudi Mangena, innovation is the photosynthesis of economic growth. "Investment in research is the sunlight required for that process to occur; the more you have it; the greater the results."

Because of this, government has committed itself to creating a favourable environment that will see an increase in investment in R&D by the public and private sectors to levels above 1% of GDP by 2008.

## INVESTING IN WATER

The water-related research undertaken in South Africa at present is both practical and relevant, says Prof Eugene Cloete, Chair of the School of Biological Sciences at the University of Pretoria and Chair of the Strategic Council of the International Water Association. "One advantage that South African researchers have over the rest of the world is that out of necessity we have had to become much more practical. The fact that we are able to tackle problems in a very scientific way while having our feet firmly on the ground has given us the edge."

The relevance of this water research can also be seen in the strategic areas of the WRC. They are water resource management; water-linked ecosystems; water use (industrial and domestic) and waste management; as well as sustainable water use for agriculture. This is in line with international trends towards increased investment in research in water and health issues, water in arid regions, disaster management, water and the environment, and alternative methods of sanitation.

Talk to anyone involved in water research, and they will tell you that the quality of the work emanating from South Africa is on par with the rest of the world. "Many of our top researchers are considered international leaders in their field," Prof Cloete tells *the Water Wheel*. "They are true national assets, and we should do everything in our power to ensure that the South African water field remains attractive to them."

## MORE RESEARCH BUT BY WHOM?

One could always argue that not enough money is being spent on water research. Dr Joy Leaner of CSIR Environmentek mentions a few areas where more key research is needed, including managing water supply in rural areas (for example, developing integrated water resource management plans for rural areas); determining sources and sink pathways in the development of disease (assessing the burden of disease); developing interventions that reduce direct or indirect adverse effects on human health; developing policies and guidelines on preventing, correcting and controlling pollutants that pose a risk to human health; and early detection of infectious disease outbreaks.

However, increased funds require more people to make use of it. The fact is that there are just not enough water researchers in this country. "Our greatest challenge going forward is ensuring that we have a

scientifically literate new generation of water scientists with the confidence and ability to influence the way our country responds to an increasingly stressed planet," comments Christine Colvin of CSIR Environmentek. "This requires improving the level of science education at primary, secondary and tertiary levels."

Capacity building is strained not only by the limited number of students choosing the water research field, but

also by the dwindling number of lecturers to teach them. The University of Pretoria, for example, where much water-related research is undertaken, only has 25 lecturers dealing with various water-related subjects, including microbiology, soil science, hydro-politics and water engineering.

"We need to develop centres of excellence in water science and technology to build critical mass," maintains Prof Cloete. It has also



## MORE SCIENCE IN SCHOOLS

In a bid to meet its target of producing 50 000 Grade 12 students with mathematics and science as subjects by 2008, the Department of Education (DoE) has revealed plans to increase the number of schools under its Dinaledi initiative to 529 next year.

Dinaledi, meaning 'stars' in Sesotho, aims to increase mathematics and science teaching in schools in partnership with the private sector. The programme, launched in 2001, originally targeted 102 schools.

The new expansion strategy seeks to empower under-qualified and unqualified maths and physical science teachers. It also hopes to entice those who have left the sector back to teaching.

The DoE hopes to raise the number of schools under the Dinaledi programme offering maths and science in KwaZulu-Natal to 100; Eastern Cape to 65; Northern Cape to 12; Western Cape to 50; Free State to 31; Mpumalanga to 37; Gauteng to 71; North-West to 50; and Limpopo 113 from 23.

The expansion strategy is being spearheaded by DoE Deputy Minister Enver Surty.





**“The scientist does not study nature because it is beautiful; he studies it because he delights in it, and he delights in it because it is beautiful. If nature were not beautiful, it would not be worth knowing, and if nature were not worth knowing, life would not be worth living.”**  
 – Jules Henri Poincaré (French mathematician)



Prof Cloete agrees. “Whenever I attend an international conference, such as the last World Water Forum, in Kyoto, Japan, I am amazed that despite the number of water and sanitation specialists, there are still

been suggested that virtual networks of excellence, linking professionals from different locations working on similar problems through the power of information and communication technology, can multiply the potential effectiveness of individual centres, as can regional cooperation between countries.

The good news is that the need to strengthen the country’s scientific human capital has been recognised, and government has launched a number of initiatives in this regard. For example, every WRC funded research project is required to incorporate a strong element of capacity

building, especially among previously disadvantaged individuals.


### SHARING THE KNOWLEDGE

Another challenge remains the dissemination of the knowledge gained through research. Colvin points out that there is still a great need to communicate effectively to society and make sure that this knowledge influences decisions. “We need to improve the levels of science education for non-scientists so that this generation of decision makers understand how science can be used to support wise governance.”

**“We need more capacity for African countries to apply science to their problems, focusing on health, water, agriculture, and the environment, to increase economic competitiveness.”**

**John Mugabe (Science advisor to NEPAD)**

people that do not have access to safe water and sanitation. This is not like HIV/Aids where we still need to find a cure. The solutions are there, and they are mostly simple and cost-effective, for example, erecting a rain-water tank next to a low-cost house to supply the household with basic water. The problem is that people are not aware of these solutions.”

It was Minister Mangena who said: “The development of the continent will have to be knowledge driven. This is the dictate of the new global economic order.” Let South Africa’s water researchers lead the way. 

### THE BIG FIVE

South Africa’s science base – especially basic science – still resides in a small number of institutions. The so-called big five (the universities of Cape Town, KwaZulu-Natal, Pretoria, Stellenbosch, and Witwatersrand) produce 63% of all scientific output (peer reviewed articles); they also produce 53% of all PhDs in the country.



Source: Department of Science & Technology