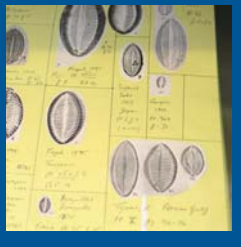
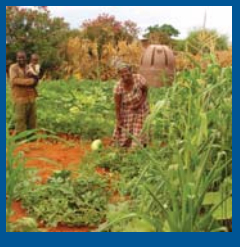
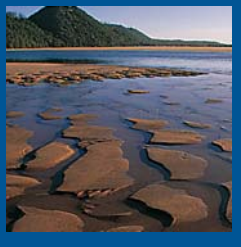
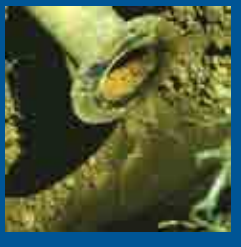
THE WRC...the visible difference

ANNUAL REPORT 2004/05


VISION

To be a globally recognised leader in providing innovative solutions for sustainable water management to meet the changing needs of society and of the environment.

MISSION

The WRC is a dynamic hub for water-centred knowledge, innovation and intellectual capital. We provide leadership for research and development through the support of knowledge creation, transfer and application. We engage stakeholders and partners in solving water-related problems which are critical to South Africa's sustainable development and economic growth, and are committed to promoting a better quality of life for all.

the visible difference

Members of the Board

Prof HC Kasan
(Chairperson) General Manager:
Water Treatment Technology
Rand Water

Dr R Kfir (ex officio)
Chief Executive Officer
Water Research Commission

Prof CG Palmer
(Vice-Chairperson)
(Resigned September 2004) Director:
Unilever Centre for Environmental
Water Quality Institute
for Water Research: Rhodes University

Dr SJ Khosa
Executive Manager:
Knowledge Management:
Development Bank of
Southern Africa

Mrs MM Matsabu
Director:
DYNACON Environmental

Mr NL Moikangoa

Mr AM Muller (ex officio)
Director-General:
Department of Water
Affairs and Forestry

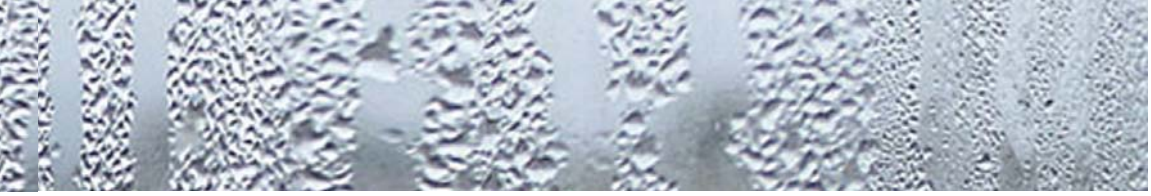
Dr BM Molope
Group Executive Officer:
Agricultural Research
Council

Mr RJC Nay
Africamanzi cc

Dr DJ Merrey
Director for Africa:
IWMI Africa Regional Office

Mr JS Vilakazi
Black Management
Fund Forum (BMF)

Mr MG Rall
Executive Director:
Mvula Trust





the visible difference

CONTENTS

| CHAIRMAN'S ADDRESS |

WRC - South Africa's Water Knowledge Hub

I take pride in the fact that, during the year under review, the WRC continued to make steady progress along the new strategic direction it assumed following successful transformation in 2001/02, more or less coincident with the start of my term as Chairperson of the Board. In the process, the organisation has consolidated its position as a strategic, dynamic, water-centred knowledge hub, which in the first instance serves South Africa, but which also, increasingly, is proving to be a credible role-player in Africa as well as globally.

The strong emphasis that the organisation has placed and continues to place on a number of strategic initiatives, such as capacity building, knowledge dissemination and the global positioning of South African water research, is proving to be most fruitful. These initiatives are of paramount importance in supporting the water sector, especially during this current period of challenges that relate to implementation of wide-ranging legislation and empowerment of new institutions charged with integrated water resource management and sustainable provision of water and sanitation services.

During the year under review, stakeholders were approached to provide their assessment of the WRC's performance in relation to its mission, vision and strategic objectives. The results were gratifying in that stakeholders not only agreed that the WRC is relevant and true to its mission and vision, but also indicated exceptional appreciation for the usefulness and applicability of WRC publications. Stakeholders viewed the support the WRC provides for the water sector in the particular areas of capacity building and knowledge application to be strong, but also indicated that in this regard, the WRC should play a more prominent role in the future.

Strengthening capacity building and knowledge application is in line with the organisational strategy. There is a strong drive to further develop and diversify the vitally important water-centred knowledge base (human capacity) in South Africa, as reflected in this Annual Report. The WRC investment in this area included the support of both institutions and students, especially the historically disadvantaged. During 2004/05, WRC projects supported 465 students (about 9% more than in 2003/04) of whom about 60% were from historically disadvantaged backgrounds. It is especially gratifying to note that capacity building through water research projects is no longer confined to academic institutions. Increasingly, science councils and even smaller firms of consultants have been including significant numbers of students in the research teams they appoint to undertake contract research for the WRC. In addition to supporting students, the WRC continued to promote the role of women in the field of water research through active partnership in the *Women in Water Awards* initiative. Furthermore, the WRC has been particularly active in building learning networks, a good example being its leadership role regarding the Water Information Network (WIN), which aims to strengthen the capacity of water services at local government level. Finally, the WRC's successful career guide, *Water@Work*, launched by the Minister in July 2004, was disseminated to some 25 000 learners and students in both urban and rural areas, in all provinces, inviting our youth to be a part of South Africa's vibrant water sector.

The year saw further expansion and intensification of initiatives relating to knowledge dissemination and sharing, as well as public understanding of water knowledge. The water sector is being provided with the appropriate knowledge required to both manage water resources and promote beneficial and efficient use of water. The WRC led more than 30 knowledge sharing workshops and was a prominent exhibitor of research products at virtually all

major water-related conferences in South Africa and many in Africa. Staff members regularly featured in both print and electronic media, improving public understanding of topical water-related issues. The WRC published numerous popular articles (in *The Water Wheel* and other journals) and held two successful open days, one held in the Eastern Cape in conjunction with the launch of the career guide *Water@Work* and the other in Pretoria, coinciding with the release of the WRC's most recent *Knowledge Review*.

The WRC has, during the review period, strengthened its regional (African) and global positioning of South African water research, thereby enhancing South Africa's position internationally and providing benefit to the South African water sector. The WRC has been involved in many Africa-based and -focused initiatives. It has expanded its role as an active member of the Global Water Research Coalition (GWRC), and South African research has also been showcased by WRC staff members through participation in many global events and several contributions to global training courses.

In conclusion, I wish to thank the Minister of Water Affairs and Forestry for her interest in, and support of, the WRC during the year. The sound partnership that has existed between the South African water sector (researchers and practitioners) and the WRC is something both I and the WRC have been especially grateful for. As this is my final year as Chairperson, as well as the final year of the current Board, I wish to take this opportunity to thank the members of the Board for their diligent support. It has been my great pleasure to lead such a dedicated team whose common purpose has provided the organisation with clear leadership and strategic direction. I also wish to thank the management and staff of the WRC for their commitment and to congratulate them on their achievements during the past year.

I trust that, building upon this sound foundation, the WRC and the South African water research community will continue to provide valuable and appropriate water-centred knowledge for South Africa, Africa and even further afield.

Prof H.C. Kasan

Water-Centred Knowledge - Empowering the People of South Africa

Why is water-centred knowledge crucial for the people of South Africa, both for our current generation and also for future generations? It is common knowledge that we live in a water-scarce country. Only through continuously creating, sharing and applying water-centred knowledge can we ensure that, with ongoing social and economic development, quality-of-life and sustainable livelihoods can be achieved for all our people, without irreversibly damaging our water resources and the sensitive ecosystems on which they depend.

Some of the highlights for the year 2004/05, described below, reflect the unique leadership role that the WRC, as the South African hub for water-centred knowledge, has played with respect to the **creation, sharing and application of knowledge** for the benefit of the water sector and citizens of South Africa, and even for people beyond our borders.

CREATING WATER-CENTRED KNOWLEDGE

WATER AND THE ENVIRONMENT

Water, through the hydrological cycle, provides the link between the subsurface, surface and atmospheric components of the environment. In order to safeguard our environment and our water resources, we must understand and be able to manage human impacts on water quantity and quality (pollution) that occur in one part of the environment, but because of inter-linkages, propagate along the hydrological cycle to other parts of the environment (air, soil, rivers, aquifers, etc.).

Linking the well-being of our water resources to climatic variability and change

South Africans commonly experience droughts and floods and, with the process of global warming now shown to be a reality, changes both in the frequency and impacts of such events may be expected. Three research projects concluded during the year have produced new knowledge of our climate system that will enable us to better predict and adapt to associated changes in the state of our water resources. Results from an investigation of cave speleothems (stalactites) add significantly to knowledge about historic and prehistoric climate change in southern Africa and help to distinguish between what is normal and what is human-induced climate change. Furthermore, new knowledge, resulting from collaborative research with organisations in Australia, the UK and the USA, done to improve and appropriately use climate models, has led to a better understanding of present-day climate variability at various space and time scales within the southern African region. Benefits, many of which are already being realised, are better, higher-resolution weather and climate forecasting tools (especially for rainfall), more plausible local-scale climate-change scenarios and consequently better ability to foresee potential impacts of climate change on water resources and improved preparedness for dealing with potentially adverse impacts of extreme events.

Competition for available cloud water- Can air pollution impact the hydrological cycle?

Air pollution, in itself, detracts from the quality of the environment in which we live. Completed research has, however, confirmed that polluting our air can also have unintended hydrological impacts. The industrialised Highveld is a major source of aerosols which may act as fine-sized cloud condensation nuclei (CCN). Depending on concentration, size distribution and chemical composition (especially hygroscopicity) relative to natural CCN, these anthropogenic CCN impact either negatively or positively on raindrop formation. Large numbers of fine-

sized CCN with a narrow particle spectrum, common in industrial emissions, compete for available cloud water and inhibit raindrop growth. By contrast, relatively fewer but on average larger particles, such as naturally found in cleaner air or air typical of coastal areas, result in reduced cloud droplet concentrations with a broader size spectra, faster drop growth rates and thus higher possibilities of rainfall. The processes are, however, extremely complex and dynamic. With further study it would become possible, more specifically, to predict and properly manage impacts of air pollution on local and regional rainfall, and therefore also on our water resources.

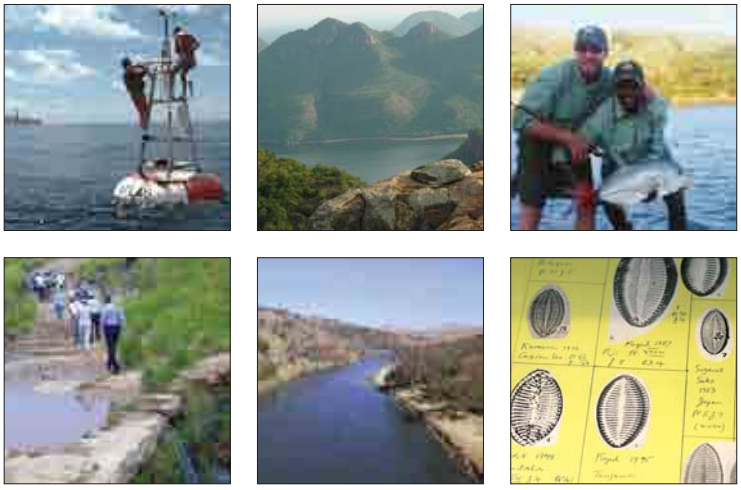
Safeguarding urban and rural groundwater resources

Without the appropriate knowledge upon which to act, contamination of South Africa's aquifers would present a serious threat to the sustainable use of groundwater resources.

Various research projects have therefore addressed the groundwater quality in both urban and rural areas. The type of groundwater contaminants found in urban areas of South Africa were identified and prioritised. For urban catchments, a database has been developed in which information on major contaminants and associated sources and properties are stored. Contaminants have been prioritised for the Gauteng, Durban, Cape Town and Port Elizabeth areas. Guidelines for assessing and evaluating impacts of human activities that contaminate groundwater resources in urban catchments have been compiled, and risk-based software developed in order to address risk associated with groundwater contamination. Special emphasis was given to the critical issue of nitrate contamination of groundwater (especially hazardous for infants) in rural areas where many people are totally reliant on groundwater for their water supplies. Nitrate and associated hazards have been quantified and mapped, heightening awareness of potential nitrate problems wherever they exist. Strategies have been developed for protecting rural water supplies from nitrate contamination, as far as this is possible. Where contamination may be of natural origin and unavoidable, research has provided an option of using low-cost, *in situ* groundwater treatment to make the water safe for rural water supply purposes.

Computer-based decision support for meeting the needs of water ecosystems

Protecting water ecosystems is synonymous with caring for our water resources, which is why the National Water Act conceptualised implementation of the Ecological Reserve, alongside the Act's major objective of ensuring beneficial use of water resources for social and economic development. Research projects completed during the past year have added greatly to the knowledge needed for the determination and effective application of the Ecological Reserve for different water ecosystems. An important research outcome that assists in addressing the complex, multi-faceted problem of Ecological Reserve determination in a consistent and manageable way is the development of a computer-based decision support system that uses best current knowledge to quantify components of the Reserve. Parallel to this, research projects that improve on this best current knowledge have also been completed. Two important tools for assessing in-stream flow requirements of rivers, which have significantly refined the ability to determine and implement the Reserve, are DRIFT (Downstream Response to Imposed Flow Transformations) and SPATSIM (Spatial and Time Series Information Modelling). DRIFT is a second-generation methodology for predicting the flow required to maintain the flow of goods and services from a water source. It provides a comprehensive multicriteria decision analysis tool within a framework in which relevant data from a range of experts is captured. It enables predictions of the bio-physical state which will result from flow manipulation to be made in a



way that shows the effects on the river and the goods and services it delivers. This, in turn, informs the decision making process. SPATSIM provides a consistent protocol for the quantification and assessment of the Ecological Reserve within a risk-based framework.

This has been developed in close collaboration with the Department of Water Affairs and Forestry (DWAF), and over the course of its development considerable effort has been put into training DWAF personnel to use the software. This software is modular, and so gives an effective method for the integration of the component disciplines which need to be considered when determining the Reserve. The fact that it is a consistent protocol means that non-specialists will get consistent results, and this allows for the tool to be more widely used.

Fish-friendly flow measurement in rivers

Knowledge gained through recent research in the area of hydraulics will allow much easier achievement of the key, dual objective of allowing unimpeded passage of migrating river organisms whilst obtaining accurate flow measurement in rivers. Flow-gauging weirs are usually complex obstructions that impact ecologically through modifying flows and obstructing the passage of migrating organisms. One of the innovative products of this research has been the calibration of natural hydraulic controls for flow measurement as an alternative to the construction of weirs. Natural controls which lend themselves to calibration are, for example, where the water plunges between rocks causing the flow to accelerate (Venturi effect) or where there is smooth (laminar) flow of water. The initial work consistently achieved accuracies of greater than 90%, at considerably less expense than in the case of weir construction.

Controlling river salinity-
Knowledge for appropriate land-use management

New knowledge regarding impacts of agricultural land use on river salinity has emerged from two research projects completed during the year. A study on non-point source pollution of agricultural origin, from field to catchment scale, has provided additional confirmation that irrigated agriculture has a major impact on salt loads in rivers, particularly in areas where irrigation is intensive and the geology of the area is naturally saline. Another study revealed the extent to which dry-land agriculture, also, may contribute to river salinity. In the drier parts of the Western Cape where renosterveld shrubs have been removed to make way for wheat on a scale that dominates land use in the catchment, aerial photography has indicated a widespread patchiness in wheat lands. Ground-truthing has confirmed that patches are associated with soil salinity of sufficient magnitude to cause poor growth of wheat. Modelling of runoff under different vegetation scenarios (winter wheat vs. renosterveld) suggests strongly that such land use changes potentially impact on salt release into surface waters. The switch from perennial deep-rooted renosterveld to annual shallow-rooted wheat results in less water use, a rising water table and therefore potentially enhanced discharge of salts into the river system. This is similar to the Australian situation, where clearance of natural, deep-rooted trees and shrubs to make way for cultivated crops and grassland resulted in a catastrophic dry-land salinity problem which also affects surface water resources. Greater insight into this process of salinisation enhances our capacity to manage the salt loads in affected rivers, helping to ensure that water remains fit for use by consumers.

WATER AND SOCIETY

Water, a social good, plays key roles in societal development and livelihoods of people. Knowledge concerning these roles of water, and how people perceive such roles, is crucial for ensuring equitable access to water and acceptable provision of water services, as well as for effective use of water to alleviate poverty, achieve sustainable livelihoods and promote quality of life.

Knowledge for gender mainstreaming in the water sector

Recent research has clearly shown that within the water sector, despite rhetorical and paper commitments to the mainstreaming of gender, little of this has as yet translated into tangible benefits for both women and society in general, and that a gap still remains between policy and reality. This research, which included focal interviews, questionnaires and a consultative workshop, produced an up-to-date situation analysis regarding the participation of women in decision making, with special reference to key water institutions such as DWAF and district municipalities, amongst others. Main issues that hinder gender mainstreaming in the water resource and water services sectors in South Africa have been revealed and recommendations made to effectively deal with these issues.

Water and our Constitution-
Implementing human rights-based approaches to water resource management

The practical implications of human rights approaches for the water sector, as enshrined in South Africa's Constitution were clarified in recently completed research. Human rights are inherent entitlements of every person as a consequence of being human, and are founded on respect for the dignity and worth of each person. Water as a constitutional right is a significant departure from previous conceptions of water, for example, in terms of its being an economic good. The Constitution places a *legal obligation* on the government not to deny but rather to realise the right of every citizen to sufficient water. Few people, citizens as well as those working with water-related issues, as yet fully understand the implications of such a human-rights approach to water. Creation and application of a legal framework in order to evaluate implementation and to help build stakeholder capacity, from government officials and agents to individuals, with regard to understanding these constitutional obligations and entitlements, is therefore a vital need. This research has helped to satisfy this need through the development of learning support materials and the design of an appropriate workshop programme for stakeholders and government representatives.

Informing decision makers-
A knowledge base for water allocation reform

As South Africa moves further into reforming the water allocation process, it has become critical to clearly establish existing lawful (and some unlawful) water uses and entitlements; hence the urgency of providing a consolidated source of information on previous legal decisions and judgements with respect to water. A new knowledge base resulting from research on South African water law judgements and water law legislation has been created for all who deal with water law: the Minister of Water Affairs and Forestry and her staff and consultants; judges of all courts; Water Tribunal members; advocates, attorneys and other legal practitioners; the Department of Justice, including the prosecuting authorities; and water management institutions. This research was prompted by a gap keenly felt in water law circles, namely that the South African water law judgements and legal decisions from the past had not been reviewed and consolidated for easy access and reference. The project thus far has resulted in compilation of information on previous legal decisions and judgements with respect to water, including codification of reportable judgments, all high- and appeal-court cases, annotations and summaries thereof, as well as a full reference to all legislation, literature and even foreign law relating to the water law in South Africa during the period 1970-1998. The same will shortly be completed for the period 1912-1969.

Is the Free Basic Water Policy sustainable?

Recent studies indicated that while the Free Basic Water (FBW) Policy was rolled out relatively promptly and successfully in most urban areas, implementation in the rural areas of South Africa, whilst difficult, nevertheless remains feasible. This is despite the fact that there are still many rural areas that have not yet seen the implementation of FBW owing to varying financial, technical, political and logistical problems at the local and district municipality levesl. The studies suggested that with good management, FBW would be sustainable in the long term as long as national government provides sufficient levels of equitable share (ES) revenue to municipalities. Factors shown to be key for successful implementation are: good planning; honest assessment of water services authorities' (WSAs) capacity; political support for the FBW policy; and accountability. A common factor in efficient, cost-effective, provision of FBW is the contracting, by local authorities not having sufficient own capacity, of organisations with the necessary expertise to successfully manage water provision within a budget. In poor rural areas the affordability of FBW is primarily determined by the ES allocations. Currently the ES allocations are insufficient to cover operation and maintenance costs in all but one of several rural areas investigated. These problems of affordability also highlight the need for WSAs to have effective and efficient cost-recovery systems that ensure payment for water by those that are not poor, and by all users who consume more than the free basic allowance. Cost recovery, experienced as a problem in each of the case study areas, therefore needs to be addressed at both political and practical levels for FBW provision to be sustainable.

Payment for water services-
Understanding attitudes and behaviour of users

A better knowledge and understanding of the attitudes and behaviour of water users in relation to different payment strategies is crucial for sustainable provision of water services. Studies in this connection were undertaken among low-, mid- and high-income water users in the metropoles of Tshwane and Ethekwini and in the city of Cape Town.

These studies also provided a better grasp of how changes in the price of water will change the quantity of water being used for different purposes. Consequently, consideration can be given to the introduction of specific refinements in payment strategies and tariff structures as a means of encouraging better cost recovery for services. For the low-income group, in particular, a lack of understanding of water accounts requires that such accounts be made simpler and more user friendly and that the number of suitable payment points needs to be increased. Consideration also needs to be given to introducing payment incentives, for example discounts for early payment. Since implementation of payment strategies would derive benefit from users having a better understanding of water usage and the economic value of water, there is a particular need to implement an educational programme and, in addition, to encourage each household to record its own water usage.

Irrigation water measurement-
Guidance for water user associations

Water user associations (WUAs) will be assisted greatly by recently published guidelines addressing the choice, installation and management of water measuring devices for canal, pipeline and river distribution systems. Legislation now imposes much more stringent demands than before on irrigation water measurement. In researching the guidelines, a sound understanding was developed of constraints that WUAs have to face in meeting legal requirements for water measurement and also of the day-to-day activities on irrigation schemes. This helped to ensure the practicality of the developed guideline document, which recommends a phased approach to managing the implementation of irrigation water metering. Phases range from consideration of the measurement needs (triggers), gaining the acceptance and support of water users, situation assessment and system planning, choice of appropriate measurement technologies, correct installation, sound operation and maintenance procedures, data management, financial planning and procedures for dealing with disputes and the tampering with equipment. In the absence of any official irrigation water measurement policy, this guideline document serves the additional purpose of providing guidance to policy-makers regarding issues of water-metering for irrigation.

WATER AND THE ECONOMY

In a water-scarce country like South Africa, the economy and the creation of wealth are highly dependent on the way we develop, use and conserve our scarce water resources and sensitive water ecosystems. In this regard, development and selection of best practices and most appropriate measures need to be based on sound knowledge of economic relationships and impacts. Equally, such knowledge is useful in providing incentives for behavioural change with regard to the way people use water and water-linked ecosystems, as well as associated goods and services, in the interests of long-term economic sustainability.

The economy of water supply-
Levels of leakage in SA water distribution systems

The level of successful leakage management in drinking water distribution systems throughout South Africa was surveyed using the standard water auditing model BENCHLEAK, previously developed through a WRC-sponsored study. The approach made it possible to compare the data set obtained to several other international data sets compiled by various specialists from around the world. Even though the procedure was initially developed for complete water distribution systems, it has proved very versatile, being easily used for individual homogeneous management zones within a single supply system and allowing identification of problem management zones within a system as well as comparison of one system with another. The survey obtained data from approximately 60 water suppliers but, after careful data screening,

performance indicators related to infrastructure leakage could only be evaluated for approximately 30 of these. Since water supply systems in South Africa are poorly metered with regard to both bulk and consumer metering, the information required to calculate the various performance indicators needed for the case study were not always available from the water suppliers. Results of the survey showed that the South African water supply industry is generally lagging behind best international practice with respect to leakage management in potable water distribution systems. Nevertheless, performance indicators within the range of acceptability are common and indicative of systems in a reasonable condition.

Mining-related water resource contamination-
Reducing the economic burden

Research has revealed that unless an integrated regional strategy for approving the closure of individual, worked-out deep gold mines is devised and applied, there can be no rational apportionment of responsibility for containment of contaminated water that would continue to impact on surface or groundwater after mine dewatering ceases and as water tables rise. Because adjacent mines are mostly hydraulically and, more specifically geohydrologically interconnected, by continuing to consider and approve mine closure for individual mines, those mines that have the longest remaining working life in each region are at the highest risk of being held responsible for dealing with the cumulative regional problem – a situation which would be neither affordable nor equitable. Large-scale cessation of mining activities at deep underground gold mines has already occurred, is destined to continue and will probably even accelerate in future, thus threatening to have negative economic, social and environmental consequences for South Africa and its people, unless appropriate procedures for ensuring that effective closure planning occurs timeously and on an integrated regional basis. Procedures that are being suggested incorporate the principle that, while a conceptual closure plan can be developed for a single mine in the absence of a regional mine closure strategy, no mine closure plan can be finalised until an approved regional mine closure strategy, which would depend on the geology and geohydrology of the region, has been put in place.

Safe, economical control of water weeds

Water weeds impact negatively on economic use of water and the provision of goods and services by water ecosystems. Elimination of such weeds is therefore crucial for our water environment and its economic value. A study has shown that biological control of the exotic red water fern *(Azolla filiculoides)* has been extremely successful when using a weevil imported from South America, the home of this fern. Over 100 heavily infested sites have been totally cleared, with the process taking less than a year. Previously, this fern had been costing the irrigation sector and water supply managers considerable sums, because dense mats block pumps and cause them to burn out. In the case of the town of Warden in the Free State, the weed had rendered the local water supply almost unusable. In the Eastern Cape it had been responsible for the loss of habitat of endangered fish.

In-field rain-water harvesting improves small-scale farming income and profitability

Studies to assess economic viability, social acceptability and environmental sustainability have shown in-field rain-water harvesting (IRWH) to be a sustainable approach towards empowering rural people to fight food insecurity and improve livelihoods. Profitability analyses using enterprise budgets show that farmers who adopt even the simplest form of IRWH compared to conventional crop cultivation can increase their income by about R800/ha in the case of maize production. Participatory research techniques, such as Participatory Rural Appraisal and Participatory Action Research conducted in study villages confirmed that farmers are willing to apply IRWH techniques in their production activities, and that these techniques are not only economically viable but are also environmentally sustainable and provide social benefits.

More crop per drop-
Realising the economic potential of water-efficient sub-surface drip irrigation

New guidelines, based on WRC-sponsored research, enable irrigators with subsurface drip irrigation systems to maximise the efficiency with which water is fed to the root systems of crops. Drip irrigation is inherently the most efficient of irrigation systems, and by using this system below the soil surface, it can, potentially, be made even more efficient. In practice, however, even this approach can be rendered inefficient by use of bad-quality water, mismanagement and poor maintenance. Clogging of the emitters is one of the most serious problems associated with subsurface drip irrigation. The guidelines provide assistance in preventing and solving specific clogging

problems, including the use of water quality analyses and selection of appropriate water filters and emitter types. Preventative measures, as well as proper choice and management of equipment, will help to ensure that the potential of subsurface drip for more efficient and effective water utilisation can be fully realised.






WATER AND HEALTH

Water is essential for good health and hygiene but, when contaminated, water can be detrimental to health or even be life-threatening. Appropriate knowledge is the key to avoidance of diseases associated with either chemical or microbiological contamination. Such knowledge relates to measures for the prevention and treatment of water contamination, as well as the risks associated with various types and levels of contaminants. Of further importance is the role water plays as a habitat for organisms that serve as vectors of diseases associated with water.

Reducing health and environmental risks associated with pit latrines

Laboratory tests and on-site trials have confirmed that microbially-derived products can potentially be used to successfully treat organic waste in pit latrines. Because the process of anaerobic decomposition is very slow, such wastes normally accumulate, leading to odour production and posing health and environmental risks. A total of 12 of the most promising commercial products were tested for use in promoting biodegradation of faecal material. Most of these biological products have multiple purposes, with relatively few currently in use for pit latrine treatment. Nevertheless, in terms of their efficacy in digesting organic wastes, certain of these products appear potentially to be both beneficial and affordable for application in reducing health and environmental risks associated with pit latrines.

Municipal sewer systems-
Knowledge for achieving sustainability

Appropriately functioning municipal sewer systems are crucial for improving and maintaining human health. A survey conducted nationally produced alarming data regarding the state of municipal sewer systems and their ability to cope with impacts of stormwater inflows and groundwater infiltration. Furthermore, where outflows (leakages, exfiltration) occur, there can be groundwater pollution. Such extraneous flows adversely affect the urban water cycle and have health and cost implications. The survey detected low awareness among most South African Water Service Authorities/Providers (WSAs/WSPs) about such problems and the necessary remedial/rehabilitation techniques. Due to complexities inherent in water-borne sewer systems, few municipalities are able to make educated decisions on whether to develop new systems or upgrade/rehabilitate existing systems (or their key components). Also, because of a lack of field data on inflow/infiltration/exfiltration events and their consequences, the customary design approach is to allow for up to 50% of sewer capacity for extraneous inflows and infiltration and also to design waste water treatment plants to cope with such flows. Such assumptions increase the cost of sewers and wastewater treatment facilities substantially. Maintenance of aging sewer systems (most municipal sewer systems in South Africa have been in existence for 30 to 50 years), is mainly reactive, with problems being dealt with on a corrective basis as they arise. Maintenance budgets are commonly low and based on past expenditure on addressing clogging and collapses, rather than on anticipation of future maintenance and replacement needs. Already stoppages and clogging of sewers in South Africa per unit length of sewer are about ten times higher than the international average and the deterioration of municipal water-borne sewers threatens to continue to the point of failure and beyond. The knowledge generated by this research not only serves as a timely warning to raise the priority attached to design and

maintenance of municipal water-borne sanitation systems, but also provides information on alternatives approaches available to mitigate extraneous flows.

POPs- Knowledge for meeting international commitments

The first country-wide assessment of persistent organic pollutants (POPs) in a selection of major South African water bodies has been accomplished, thereby also contributing to South Africa's ability to meet its commitments under the Stockholm Convention, which arose out of a UNEP initiative to reduce risks to human and environmental health from release and long-range distribution of POPs. Although much is known about POPs in northern countries, far less is known elsewhere. Research based on studies at 22 aquatic sites in South Africa showed that detectable levels of specific POPs such as PCB and PCDD/PCDF are widespread in sediments, whether these are located in inland rivers and dams or in coastal harbours and river mouths. The values found for the Vaal and Gariep River systems, particularly at the Gariep River mouth, indicate the occurrence of some long-range transport of these pollutants and, therefore, a possible South African contribution to the global burden. With places such as Alexander Bay and the Umgeni River mouth also being affected, the occurrence of POPs is obviously not restricted to industrialised areas. However, the good news is that concentrations are generally low and do not exceed the USA's action level of 50ng/kg of sediment.

Cost-effective monitoring of pesticide pollution in rural water systems

Consistent findings of low-level pesticide contamination of rural water sources in three Western Cape agricultural areas prompted the search for cost-effective methods of monitoring pesticide pollution. The use of solid phase extraction (SPE) of pesticides, capable of yielding time-weighted average concentrations, together with the quicker and potentially more cost-effective alternative of using solid phase micro-extraction (SPME) fibres, produced quantitative data with good detection limits (for SPME, 0.01 to 0.02 µg/ℓ). Enzyme-linked immunoassays (ELISAs), which are capable of detecting low levels of pollutants with high specificity, were also assessed. Consistent detections by ELISA of pesticides in field samples seemingly indicated its potential as a semi-quantitative screening tool. However, a cost appraisal of the three analytical methods found ELISA to cost appreciably more than SPE, with SPME having the lowest cost per sample and thus the highest level of suitability for routine monitoring. Despite an *a priori* expectation that cost of the ELISA method might benefit from economy of scale, this was found not to be the case because of high reagent costs.

Are cyanobacteria a problem in South African water resources?

An investigation into the extent of the cyanobacterial problem in South Africa (toxic algal bloom events linked to both human and animal health) showed that the problem is frequent, widespread and typically seasonal in water resources that are subject to eutrophication. Geographical variation in the frequency, duration and severity of the problem, primarily due to the condition of the catchment, but also to the nature of the water source, abstraction points, and regional climatic conditions, exists. No national trend in frequency of cyanobacterial bloom events or associated toxin or unacceptable taste and odour occurrences could be established with currently available data. Toxin and geosmin/MIB data are extremely limited due to limited resources and high cost of analysis. Another study showed that N, P and C are important nutrients for high algal growth rates and the ratios in the supply concentrations are often decisive in determining cyanobacterial dominance. The organism, *Microcystis*, is often dominant and produces a vast number of peptides (microcystins), some of which are highly toxic. The toxicity may vary within the same strain, but non-toxic strains also occur. The studies showed that besides eutrophic conditions, high water temperature and alkaline water pH increase the probability that cyanobacteria may form blooms. Water temperature appeared to be the most important factor influencing bloom development in a eutrophic pond and little growth was seen at temperatures below 18˚C. Once blooms develop, toxin measurements are the only means of determining the presence or not of such secondary metabolites and, for this, PCR assays should be used.

Microbiological assessment of membrane technology in water treatment

Detailed studies have made it possible to draft general protocols for microbiological testing of membrane integrity when membrane systems are used in drinking water purification and supply. It is most important that membranes must have a high degree of integrity, i.e. they must be leak-free to micro-organisms. If not, it would not be possible to rely on the use of standard turbidity

measurements to reveal micro-organisms posing a health risk. Protocols for testing membrane performance with regard to removal of micro-organisms (spiked into the water or naturally-occurring) are, therefore, called for. In developing appropriate tests, bacteria, bacteriophages (to simulate virus removal), yeast cells, *Giardia* cysts and *Cryptosporidium* oocysts were used to determine the permeability of locally developed polysulphone ultrafiltration capillary membranes under different conditions. Passing such tests successfully ensures proper functioning of ultra-filtration membrane systems and reduces risks of infection from consumption of contaminated water.

Viruses in South African drinking water supplies- Knowledge for assessing health risks

Viral infections feature prominently among water-borne diseases that impact on public health, world-wide. Recent research has employed cutting edge technology and expertise to obtain the most comprehensive data yet collected on viruses in a representative selection of South African drinking water supplies. The waters tested had been treated and disinfected according to international specifications in terms of water quality indicators based on levels of faecal and heterotrophic bacteria. None-the-less, due largely to the use of more sensitive viral detection techniques than previously applied, viruses were detected at levels which, according to a guideline recommended for drinking water in the USA, exceeded the acceptable risk of one infection per 10 000 consumers per year. The results of this project do not necessarily imply unsafe drinking water quality, since similar risks that exceed currently recommended levels have also been reported from several other parts of the world where such studies have been carried out, the USA included. However, they do emphasise the need to rationalise guidelines for viruses in drinking water in order to avoid confusion in the water and public health sectors, and to ensure drinking water of acceptable quality in South Africa.

Health risk assessment relating to the use of microbiologically contaminated source waters for irrigation

A recent study has provided a general overview of water pollution problems associated with dense settlements along river banks in the Western Cape and recommended appropriate pollution prevention and remedial measures. Most of the water pollution encountered can be attributed to severe overcrowding in these settlements, inadequate sanitation, as well as failing sewerage systems. Pathogens carrying considerable health risks were responsible for a high incidence of diarrhoea. Of concern was that a number of organisms in the water and in biofilms on stones in the water exhibited signs of antibiotic resistance and also resistance to chlorination. The isolation and detection of enteroviruses, human adenoviruses, HRVs and HAstVs in river water used for domestic purposes and as irrigation water suggests that the water could pose a potential health risk, although more data are required to quantify the risk. Pathogenic bacteria such as *Salmonella, Shigella* and *E. coli* were detected in a number of irrigation water samples and samples of minimally-processed food samples from crops irrigated with the sampled water. Although minimally-processed foods are usually contaminated through human contact during harvesting or processing, contamination via polluted irrigation water, associated with a lack of sanitation or wastewater plants not complying with standards, could therefore elevate the risk of food contamination.

SHARING KNOWLEDGE

Water @ Work-
A capacity-building initiative

The WRC launched an initiative to attract professionals and other workers of high calibre to the South African water sector, especially individuals from historically disadvantaged backgrounds. A career guide, *Water @ Work*, was produced and after being launched by Minister Sonjica in Grahamstown in June 2004, was distributed to every high school in the country. Furthermore, these guides were made available at various events during *National Water Week* and at fora such as Baswa le Meetse (Youth in Water), SciTech and the ever popular SABC Career Faire, which held exhibitions in 3 centres throughout the country during the year under review. The guide shares information with learners, students and job-seekers about the exciting career opportunities that exist in the water sector for people from a surprisingly wide range of backgrounds.

The Water Wheel-
Water-centred knowledge for the nation

The Water Wheel, one of the WRC's publications aimed specifically at enhancing public appreciation and understanding of water-related issues, grew its circulation to 7 000 during the year. The magazine covered a range of topics, ranging from catchment management and mine-water treatment to the conservation of ecosystems and artificial groundwater recharge. A special edition of *The Water Wheel* was published to commemorate *National Water Week 2005*. This edition, which featured articles of interest to school learners and included a water quiz, was distributed at the SABC Career Faire, SciTech and delivered to schools in the Gauteng area. The magazine has also undergone a change in appearance, sporting a new layout and added regular features.

The WRC and WISA-
A merging of two powerful streams of knowledge

The WRC co-ordinated 8 workshop sessions at the WISA Biennial Conference held at the ICC, Cape Town in May 2004. Another highlight of the conference was the inauguration of the WRC's Mr Jay Bhagwan as the new President of WISA.

Knowledge management-
Water-centred knowledge for Africa

The WRC, in its capacity as a hub for water-centred knowledge, contributed to the Knowledge Management Africa Conference, held in Johannesburg in March. The conference, which attracted about 500 delegates from all over the continent, was sponsored by the Development Bank of Southern Africa (DBSA). Themed "Knowledge to Address Africa's Development Challenges", the conference was aimed at providing a platform for knowledge dissemination and exchange among African stakeholders, including researchers, donors, academics, sector professionals, private sector and not-for-profit organisations. The WRC provided one of the keynote speakers and Dr Kfir served as chairperson of the breakaway session on water.

Knowledge regarding wetland functioning-
Fruitful interaction with the RAMSAR Convention

Excellent links with the RAMSAR Convention on Wetlands have been developed through one of the WRC's research managers both serving as vice-chair of the Scientific and Technical Review Panel (STRP) of the Convention and leading the working group on water-related issues. The panel provides specialist technical advice to contracting parties of the convention regarding protection and management of wetlands. During the past three years, the panel's working group on water has researched and prepared four key new guidance documents for RAMSAR contracting parties. Of these, three are based on previous research funded by the WRC, including the significant body of WRC research on environmental flows, the WRC's research strategy for the crosscutting domain, **Water and**






the Environment, and a very successful project on integration of wetlands into catchment management planning.

The WRC and the WSSCC- Improving the lives of people

The WRC formed an integral part of the Global Wash Forum held on 28 November - 2 December 2004 in Dakar, Senegal. Part of the WRC initiative involved co-ordinating a South African water sector exhibition. Dr Rivka Kfir was appointed as chief rapporteur and Mr Jay Bhagwan was appointed rapporteur of the thematic streams addressing local government. Furthermore, the WRC was contracted to produce the conference documentation (hard copies and CDs) and the logo of the WRC appeared on these products. Mr Jay Bhagwan was also appointed as a member of the steering committee of the WSSCC.

International exchange of knowledge on drinking water technology

The WRC is involved in a number of international water treatment-related liaison and collaborative activities. This is done in order to prevent duplication of research, and to leverage local input and value obtained by collaborative research in large international projects. In the 'Emerging Technologies' Programme, hosted by the American Water Works Association Research Foundation, a number of countries congregate biennially to exchange information on the latest, emerging and innovative, research results emanating from each country. At the most recent meeting in April 2004, attended by research institutions from 17 countries in Rapallo, Italy, Dr Gerhard Offringa of the WRC presented information on 10 innovative research results and technologies from South Africa - nine of which were achieved through WRC support.

The WRC- A player contributing to global sustainability

The WRC participated in the annual meeting of the Alliance for Global Sustainability (AGS) in Sweden. The AGS brings together research teams from the following Universities: Chalmers University of Technology, The Massachusetts Institute of Technology; the Swiss Federal Institute of Technology, Zurich and the University of Tokyo to study large-scale multi-disciplinary environmental problems that are faced by the world's ecosystems, economies and society. The WRC's Dr Kevin Pietersen presented a paper on the 'Water Resource Management Challenges of South Africa and the Dynamic Role of Research in IWRM'.

A partner in WaterNet consortium for basin-scale research on integrated water resource management

The WRC is part of a WaterNet-led research consortium on a Challenge Programme project on Water for Food. The project focuses on managing risk, mitigating drought and improving water productivity in the water-scarce Limpopo Basin. It aims to generate a new knowledge base on appropriate agricultural water management. Guidelines for catchment management will be developed and further up-scaled to a needs-based IWRM framework for sustainable water for food development at basin scale.

The knowledge hub joins the training hub

It was an interesting mix of site visits, indoor sessions, poster displays and videos that characterized the IWMI World Bank Africa Training Hub during December 2004 at the Blydepoort Resort, Mpumulanga. The WRC played a significant role at this event that attracted professionals from various countries. The focus of the event was to enhance the operational understanding by World Bank staff of water, soil and natural resource management by sharing knowledge on best policy and practices; generate issue-based and operation-orientated guidance for current/future research agenda for IWMI, other CG centres, and partners and to explore options for organisational synergies to link research, policy and operation.

The WRC as part of the Global Water Research Coalition - Knowledge creation on a global scale

The WRC is a member of and participates in eight of the ten main international collaborative research programmes of the Global Water Research Coalition (GWRC).The GWRC consists of 13 water research institutions from seven different countries. Leading roles are played by several WRC staff members. During the year, the WRC arranged a workshop, attended by GWRC member countries, to review progress in collaborative research on endocrine-disrupting compounds, and also hosted one of the Board meetings in Pretoria. Outcomes of GWRC research are published internationally and publications are available, free-of-charge, to all of its members, thereby providing a powerful leveraging of knowledge for the South African water sector.

International partnerships in research projects

Many individual research projects funded and managed by the WRC are done in partnership with leading international research organizations. One example is a partnership between the University of Pretoria and the Australian CSIRO, which resulted in significant improvements to a CSIRO regional atmospheric circulation model, especially in as far as Southern Africa-specific applications are concerned. This sharing of expertise has contributed enormously to South African capacity in the area of atmospheric modelling, with additional spin-offs being enhanced capabilities in the areas of weather and climate forecasting and climate-change prediction.

Water Utility Partnership

The Water Utility Partnership in collaboration with the World Bank Institute and the WRC held a five-day intensive training seminar on undertaking institutional reforms in the urban water supply and sanitation sector. The course was undertaken with the acknowledgement that one of the weaknesses in the implementation of water sector reforms is a lack of a clear understanding of the dynamics of institutional arrangements which are peculiar to the water and sanitation sectors. Representatives from 15 African countries attended this course and added value by sharing valuable experiences which typified conditions that existed in Africa.

Learning Network for District Municipality Water Services Managers

The WRC with its research agents conceptualised and identified the dire and specific need for district managers (DM) in the country to share their experiences regarding their water and sanitation delivery challenges. The concept was taken further through a WRC project aimed at improving knowledge sharing amongst DMs and influencing the direction of further research that the WRC and others can provide in support of enhancing capacity of DMs to function efficiently. The outcome was the identification of a number of key water-services issues affecting DMs and the commitment of the managers to collectively share knowledge and generate solutions. Their commitment was formally expressed through the launching of the Learning Network for District Municipality Water Services Managers.

The WRC - Streamlining knowledge

The WRC plays a leadership role in *Streams of Knowledge*, which is a global coalition of water and sanitation resource centres, that has agreed to work together to reach the Millennium Development Goals (MDG) via the core principles embodied in VISION 21. Resource centres in the field of water and sanitation are well placed to support national and international efforts to accelerate these developments in the sector. The organization held its management Board meeting at the WRC in May 2004. Dr Rivka Kfir is the Chairperson of *Streams of Knowledge*.

WIN - A winning solution to information networks

Between February and July 2004, an information needs analysis was conducted by DFID-funded consultants to identify critical challenges that exist in the water services sector that a water information network (WIN) had to address. In July 2004 WIN was initiated at the WRC, and a coordinator was appointed. After in-depth consultation, the WIN Business Plan was completed in October 2004. In November 2004 WIN participated in the African Regional Training of Resource Centre Development (RCD) Facilitators organized by the International Water and Sanitation Centre, previously known as the International Resource Centre (IRC) as part of its global RCD Programme. In November 2004 WIN undertook a six-month project known as the Sector Collaboration Review, which aims at documenting the success/failures of sector collaboration in South Africa, and to disseminate the good lessons. This will be finalised at the end of May 2005. In January 2005, WIN

received portal architecture from the IRC. A fully fledged WIN website is now available, and will be launched shortly.

Launch of WRC career guide and Open Day in Grahamstown

On 22 July 2004 the Minister of Water Affairs and Forestry, Honourable Minister Buyelwa Patience Sonjica, launched the WRC career guide, *Water @ Work*, at Rhodes University, Grahamstown. The event served a dual purpose: the launch of the career guide as well as showcasing WRC projects in the Eastern Cape. The WRC Executive and Board played host to academia, Government officials, students and learners. Poster displays, video screenings and demonstrations formed part of the proceedings. Project leaders, research managers and members of the WRC Executive were on hand to answer questions and to share knowledge.

Annual packaging of knowledge- Handover of *2003/04 Annual Report* and launch of *2003/04 Knowledge Review*

On 5 October 2004 the WRC handed over its *2003/04 Annual Report* to Mr Rashid Khan (Regional Director, DWAF, Western Cape) who accepted the Report on behalf of Minister Sonjica. On 13 October 2004 the WRC hosted its *Research Expo 2004*. WRC research outputs were showcased in the form of posters, demonstrations and videos. The WRC *2003/04 Knowledge* Review was launched.

Parliamentary briefings- Reaching out to Government

WRC Executive presented the roles and functions of the WRC to the Parliamentary Portfolio Committee on Water Affairs and Forestry as well as the Select Committee on Land and Environmental Affairs on 6 October 2004. The programme included presentations on the impacts of research in four key strategic areas (KSAs) as well as on the dissemination of knowledge generated through research.

APPLYING KNOWLEDGE

Petro™ - Water technology goes abroad

The Petro™ system is finding growing market acceptance in Southern Africa and the rest of the world. This outcome of WRC research funding relates to a wastewater treatment process that involves passing wastewater through an anaerobic reaction zone so that the organic matter in the wastewater is subjected to anaerobic biological degradation. The wastewater is then passed through an aerobic reaction zone in which the organic matter is subjected to aerobic biochemical breakdown. The latest Petro™ installation is being implemented at a plant in Botswana. The technology has also been implemented at the world's largest pond system in Melbourne, Australia, where the upgrade to Petro™ technology will decrease nitrogen discharge into Port Philip Bay, which lies alongside many Melbourne suburbs. The upgraded system will service 1.6 million people, or about half of the population of Melbourne, processing some 500 Mℓ/d of wastewater.






BioSURE™ - An international breakthrough

History was made in South Africa on 18 January 2005 with the launch of the first full-scale plant in the world using the Rhodes BioSURE™ process, a locally-developed, first-of-its-kind solution for treating acid mine water drainage. Developed by Rhodes University's Environmental Biotechnology Research Unit over the past eight years with the support of the WRC, ERWAT and BioPAD, the Rhodes BioSURE™ process removes sulphate from acidic sulphate-rich mine water. Instead of expensive carbon and

electron donor sources, primary sewage sludge, a by-product from ERWAT, is being used. These two waste products are co-treated in the BioSURE™ process to give an improved water quality for discharge into the Blesbokspruit RAMSAR site. At the same time, safe and stable biosolids are produced. In 2004 a worldwide licensing agreement was entered into with ERWAT to market and commercialise the BioSURE™ technology.

NATSURV

Two further issues in the NATSURV series of *Guides to Water and Wastewater Management* in various industries have been published, bringing the total number of publications in this series now to 16. The latest issues cover the *Oil Refining and Re-Refining Industry* (NATSURV No. 15) and the *Power Generating Industry* (NATSURV No. 16). The NATSURV series has been amongst the most widely-sought and applied publications of the WRC. Previous issues have dealt with water and wastewater management in malt brewing, metal finishing, soft drinks, dairy products, sorghum malt, laundry operations, poultry abattoirs, red meat abattoirs, sugar production, pulp-and-paper, textiles, wine-making, leather tanning, fruit-and-vegetable processing, and pelagic fishing. The NATSURV series will shortly be downloadable from the WRC website.

Waste Minimisation Guide for the Textile Industry- A step towards cleaner production

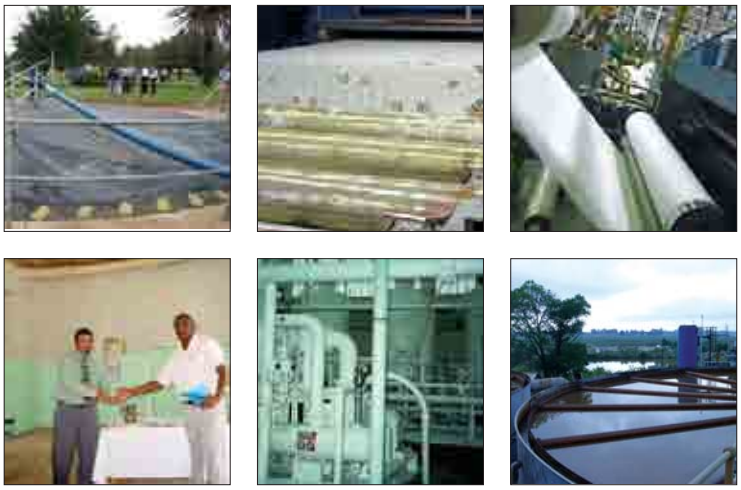
The guide *Waste Minimisation Guide for the Textile Industry*, a two-volume publication, was devised to enable the RSA textile industry to implement waste minimisation and pollution prevention programmes, so as to be internationally competitive in terms of environmental performance. The textile industry can use the guide to provide benchmarking, to give insights into measures to reduce emissions at source, and to self-assess and improve its implementation of waste minimisation practices and hence its environmental performance. Use of the Guide will also assist factories in achieving compliance with environmental management standards. Local regulatory authorities can use the Guide both as a training as well as a management tool for monitoring and assessing the performance of textile manufacturers in their area of jurisdiction.

Waste minimisation clubs- The story continues

The feasibility of waste minimisation (WasteMin) clubs as a model for achieving significant improvements in environmental performance by local industry has been conclusively established. In this multi-stakeholder approach, the interests of industry, regulatory authorities and affected communities are constructively combined. Two pilot WasteMin clubs established in the Durban metropolitan region have spawned more than 30 other WasteMin clubs nationally and the approach has been adopted in the DWAF/DEAT National Waste Management Strategy. Research has provided a practical and comprehensive guide for establishing, managing and sustaining WasteMin clubs in the RSA, along with detailed information and material for facilitating the training of practitioners in such clubs. An interesting adjunct to this success story is that, with permission from the WRC, the EU-China Environmental Management Cooperative Programme translated the above manuals into Chinese.

Acid mine drainage- Process for metal removal

A 'Steady State - Continuous Flow - Ambient Temperature Ferrite Process' has been patented jointly by WRC and UCT and was recently licensed to a South African consultant for exploring the international potential for application. This novel, low-cost, one-step, ambient-temperature ferrite process for the removal of metals from acid mine drainage (AMD), without using expensive oxygen-oxidation, was developed by researchers at the University of Cape Town. Batch tests were first carried out and a continuous-flow process with sequential back-mix reactors was then



developed and successfully tested on both simulated and actual AMD waters.

Knowledge for water policy development and implementation-
Review, consolidation and transfer

The policy development and implementation process over the past 10 years (1994 to 2003) in the water field in South Africa has been reviewed and much of the associated learning packaged in an explicit form for wider sharing and communication, as well as for ensuring retention of such knowledge in the institutional memory.

An application has been the establishment of a 3-day professional seminar on management of public policy in the water sector. The seminar, developed jointly between the WRC, CSIR Environmentek, Wits University (School of Public Development Management) and DWAF, is seen as a primary vehicle for achieving knowledge transfer and for the building and maintaining of capacity regarding policy development and implementation.

Solar distillation-
A solution for small-town water supply in dry areas

In September 2004 the WRC handed over the solar still system to the Kannaland Municipality This affordable and simple-to-operate solar distillation system, developed primarily for the provision of potable water from brackish or sea-water sources, has proved to be an effective solution to water provision to small rural communities. The system supplies desalinated water to a community of 40 people. It derives from the re-design of an international unit so as to make it more affordable and applicable to South African rural conditions. The retail cost of the local unit is less than R 900, compared to approximately R 3 000 for the international unit. During summer the plant can produce up to 200ℓ of water a day. The success of the project has prompted DWAF to fund another experimental station in the Karoo and the Development Bank of Southern Africa (DBSA) to express interest in funding further systems for small communities.

EXECUTIVE REPORT

WRC - Revitalisation and Renewal

This report was compiled in accordance with the requirements of the Public Finance Management Act (PFMA) and forms part of the Water Research Commission (WRC) audited financial statements for the period 01 April 2004 to 31 March 2005. The report addresses corporate governance practices and structure, the mandate and core business of the WRC, the WRC's achievements and progress made during the year under review with regard to key performance areas and relevant short- and long-term strategic objectives. The members of the Executive of the WRC submit this report, as approved by the WRC's Board, to the South African Parliament through the Minister of Water Affairs and Forestry.

During the year under review the WRC has steadily progressed towards revitalisation and renewal. This year marked the 3rd year along the strategic transformation process set during 2002. Based on recent external and internal surveys, this process has succeeded in transforming the organisation into a dynamic hub of water-centred knowledge, in providing leadership locally (in South Africa) and in gaining the WRC recognition as a global leader with special emphasis on Africa.

The focus has been on building a culture of continuous growth and sustainability whilst allowing for ongoing organisational renewal. A clearer path for sustainability and growth was designed and defined quantitative objectives were set for each of the key performance areas (KPAs).

The various initiatives undertaken by the WRC were directed by its mission, to serve South Africa as a water-centred knowledge hub, and guided by its vision, to become a global player, linking South Africa's water-centred knowledge base with that of both the developed and the developing parts of our world. This has resulted in growth of South Africa's water-centred knowledge (through sharing and use) and progress towards achieving sustainability of use of our limited water resources with the prospect of improving the quality of life of all South Africans.

MANDATE

The mandate of the WRC (Water Research Act, Act No 34 of 1971) highlights the following functions to be carried out by the organisation:

- Promoting co-ordination, co-operation and communication in the area of water research and development
- Establishing water research needs and priorities
- Stimulating and funding water research according to priority
- Promoting effective transfer of information and technology
- Enhancing knowledge and capacity building within the water sector

Being a water-stressed country, South Africa needs progressively to find innovative ways of managing water resources to ensure that the basic needs of its citizens are met, that social and economic development are not restricted through lack or poor quality of water, and that sustainability of water resources and of water-dependent ecosystems is secured.

South Africa remains threatened by water shortages. At the same time, water quality issues are becoming more acute

and climate change may result in a higher frequency of extreme events. The management of water resources needs to adapt dynamically to such changing circumstances. Challenges posed by the integrated management of both the resource and its uses, issues of water supply and sanitation and the provision of related services and the building and sustaining of a competence-base that will allow the water sector to maintain and further grow its capabilities, skills and ability to address these key issues, are overwhelming. The role of the WRC as a water-centred knowledge hub and its dynamic, strategic realignment with the needs of our country and more specifically, the water sector, are therefore critical to meeting these challenges.

Functioning as a 'hub' for water-centred knowledge, the WRC links various players within the water sector by working through local and global partnerships. The WRC provides novel (whilst practical) ways of packaging knowledge and transforming knowledge into knowledge-based products which form the basis for new water resource and water service management practices for the water sector and the community at large, both locally and globally. The WRC strives to expand its role as a global leader in water-centred knowledge, a position toward which it has made great progress, playing increasingly key roles in the SADC region, the African continent and within a number of global networks and other initiatives.

GOVERNANCE

GOVERNANCE FRAMEWORK

During the year under review the organisation functioned under a clear governance framework and strongly adhered to sound management and control practices. The various committees of the Board provided an effective structure for guiding the WRC throughout the year.

The WRC, under the competent direction of its Board, continues to manage its strategic and operational affairs within a sound corporate governance framework, complying strictly with both the Water Research Act and the PFMA and Treasury Regulations and providing the organisation and its leadership with integrity, accountability and transparency.

RISK MANAGEMENT, AUDIT AND FRAUD PREVENTION RELATED POLICIES

Risk management is integrated into the WRC's short- and long-term strategic plans as well as its day-to-day operations. During the year under review the risk management framework developed by the WRC addressed key strategic and operational issues relating to the WRC's macro- and micro-environment. The risk framework developed was based on re-assessment of previously identified risks and the identification of new risk areas, as well as the revision of risk-severity ratings, taking into consideration the internal and external environment in which the WRC operates. The WRC developed and implemented its strategic and operational plan based on the risk areas identified. The plan that had been approved by the Board of the WRC, was used as a basis for the internal audit of the organisation.

The plan meets the requirements of both the PFMA, which requires all public entities to maintain an effective, efficient and transparent system of financial and risk management and internal control, and of the Treasury Regulations which specify that the accounting authority (the Board) must ensure that risk assessment is conducted regularly to enable emerging risks to be identified and addressed timeously.

The WRC appointed an audit firm to undertake an internal audit of the organisation. Prior to the audit, the audit plan had been reviewed and recommended for approval by the Audit Committee of the Board, and thereafter approved by the Board of the WRC. The audit addressed financial and other strategic risk areas. The outcomes of the audit indicated significant improvements in many of the WRC's financial practices. Both the audit results and the WRC management's reply, addressing planned actions intended to bring about further improvements, were reviewed and approved by the Audit Committee and the Board.

A number of operational policies were developed by the WRC over the course of the year, supporting its ability to

VALUES

- Service oreintated
- Care for people, society and the environment
- Fairness to all
- Dedication to quality
- Integrity and ethical behaviour
- Respect for human and individual rights
- Innovation and learning

manage risks and enhance corporate governance.
The existing fraud prevention plan and code of ethics were re-visited. The WRC has adhered to its corporate values and integrated these values into all its undertakings, both internal and external.

GOVERNANCE STRUCTURES

During the year 2004/05 the WRC operated under the leadership of its current Board. Board Members, appointed (or re-appointed) by the Minister of Water Affairs and Forestry on 1 June 2002 for a period of three years ending 31 May 2005, were as follows:

BOARD MEMBERS

Prof HC Kasan (Chairperson)
Prof CG Palmer (Vice-Chairperson, resigned in September 2004)
Dr R Kfir
Dr SJ Khoza
Ms MM Matsabu
Dr DJ Merrey
Mr NL Moikangoa
Dr BM Molope
Mr AM Muller
Mr RJC Nay
Mr MG Rall
Mr JS Vilakazi

Mr AM Muller, Director-General of the Department of Water Affairs and Forestry and Dr Rivka Kfir, Chief Executive Officer of the WRC are *ex officio* members.

BOARD MEETINGS HELD 2004

4 March 2004	Board meeting
22 July 2004	Board meeting (in Grahamstown)
14 September 2004	Board meeting
7 December 2004	Special Board meeting (strategic planning)
3 March 2005	Board meeting

The committees established by the Board to assist in the execution of its various duties, together with the membership, terms of reference and meeting dates of these committees are as follows:

Executive Committee of the Board (ExCo)

Members
Prof HC Kasan (Chairperson)
Dr R Kfir (CEO)
Dr SJ Khoza
Dr BM Molope

Meetings
27 May 2004 (joint meeting with the Audit and Finance Committee)

Terms of Reference
The main function of the ExCo is to perform specific tasks, at the request of the Board, which need to be addressed as matters of urgency

Audit and Finance Committee of the Board

Members
The Audit and Finance Committee currently consists of the following members
Mr RJC Nay (Chairperson)
Dr R Kfir (CEO)
Mr JN Campbell (co-opted)
Ms MM Matsabu
Prof EM Stack (co-opted)
Mr JS Vilakazi
Ms Z Scholtz (Com. Secretary)

The following representatives from the organisations (as indicated), attended meetings during 2004/05:

WRC
Mr A Rampershad

Office of the Auditor-General:
Mr J Grobbelaar, Ms SM Taljaard, Ms S Nieft, Ms N Mankungu

PriceWaterhouse Coopers
Mr G de Jager, Ms JL Fuller, Ms G de Risi

Meetings
20 February 2004
27 May 2004 (joint meeting with ExCo)
17 June 2004
26 August 2004
17 February 2005

Terms of Reference

- Ensure compliance with the PFMA and advise on applications for exemption deemed necessary in the interests of enhancing the WRC's performance
- Monitor and advise on the collection of revenue due to the WRC
- Evaluate short-, medium- and long-term plans and budgets
- Assess requests by management for adjustments in water research rates and charges (levies) and make recommendations to the Board
- Review the external audit process at key stages of planning and execution, in terms of addressing (i) critical risk areas (ii) scope and (iii) effectiveness
- Review external audit results, and make recommendations to the Board on acceptability of financial statements and on addressing significant differences between management and the external auditors
- Review, from time to time, the WRC's financial policies and accounting procedures and controls, *inter alia* in the light of external audit results
- Advise on labour dispute strategies
- Monitor the scope and effectiveness of the internal audit function from the financial perspective
- Monitor the ethical conduct of the WRC, its management and senior officials, from the financial perspective
- Report to the Board on an ongoing basis

Human Resources Committee of the Board (HR Committee)

Members
Under the **current Board**, the Human Resources Committee consists of the following members:

Mr JS Vilakazi
(Chairperson until July 2004)
Mr M Rall
(Acting Chairperson from August to December 2004)
Dr S Khoza
(Chairperson from January 2005)
Dr R Kfir (CEO)
Ms MM Matsabu
Prof CG Palmer
(Resigned September 2004)
Ms Z Scholtz (Com. Secretary)

Meetings
21 July 2004
24 August 2004 (Special HR meeting)
8 September 2004 (Special HR meeting)
10 February 2004

Terms of Reference
- Draft the CEO's performance agreement and assess performance on an annual basis
- Advise on the structure and composition of the Executive
- Review transformation and employment equity plans and assess progress with respect to milestones and targets
- Review career pathing and personnel development strategies and monitor implementation of skills development programmes
- Review and advise on job level assessment policy and procedures
- Advise on amendments to the conditions of employment and remuneration structure
- Review and monitor the effectiveness of the WRC's performance management system
- Advise on labour dispute strategies
- Monitor the scope and effectiveness of the internal audit function from the human resource perspective
- Report to the Board on an ongoing basis

Remuneration Committee of the Board

Members
Under the current Board, the Remuneration Committee consists of the following members:

Prof HC Kasan (Chairperson)
Dr SJ Khoza
Ms MM Matsabu
Mr RJC Nay

Meetings
24 August 2004
8 September 2004

Terms of Reference
- Establish a tool for the evaluation of the performance of the organisation and the CEO
- Assess the performance of the organisation and the CEO using the above-mentioned tool
- Determine performance bonuses for the CEO and the organisation based on the outcome of the performance assessment and other criteria

Research Policy and Strategy Committee of the Board (RPS Committee)

Members
Under the **current Board**, the Research Policy and Strategy Committee consisted of the following members:

Dr S Khoza
(Chairperson, until December 2004)
Ms MM Matsabu
(Chairperson from January 2005)
Dr R Kfir (CEO)
Dr GC Green
Dr DJ Merrey
Mr NL Moikangoa
Dr BM Molope
Mr AM Muller
Prof CG Palmer
(resigned September 2004)
Mr MG Rall
Mrs Z Scholtz (Com. Secretary)

Meetings
24 August 2004
10 February 2005

Terms of Reference
- Review and advise on the alignment of research goals and plans with national policy and priorities and the mission of the WRC
- Assess and advise on the balance and appropriateness of research strategies (short-, medium- and long-term) in meeting such goals
- Ensure that research plans and strategies are aligned with the WRC's policy for capacity building and are appropriately designed to meet capacity-building objectives
- Advise on the partitioning of research funds among primary application areas
- Review and make recommendations regarding the acceptability of proposed research programmes
- Monitor progress at the level of research programmes and primary application areas and evaluate outcomes with regard to stated goals, including those concerned with capacity building, technology transfer and knowledge management
- Review policies and procedures for ensuring beneficial exploitation of research products
- Monitor the scope and effectiveness of the internal audit function from the research perspective
- Report to the Board on an ongoing basis

ACHIEVEMENTS

During 2004/05 the WRC successfully fulfilled its role as a water-centred knowledge hub, through provision of leadership, strategic direction, investment in the creation of new knowledge and the sharing, application and dissemination of water-centred knowledge.

LEADING WATER-CENTRED KNOWLEDGE

In line with national priorities and the objectives of the water sector as well as the science and technology sector, the WRC has led and played a key role in many local, regional and global initiatives.

In South Africa, there have been a number of national initiatives in which the WRC has played a key role. Staff members have occupied several key national leadership positions , including the position of President of The Water Institute of South Africa (WISA), chairpersons of various boards of scientific and capacity-building (training) organisations such as the National Community Water and Sanitation Institute (NCWSI) (University of the North), the Institute for Environmental and Coastal Management (Nelson Mandela Metropolitan University) and the Institute of Water Research (IWR) (Rhodes University). Staff members of the WRC have also chaired national committees and actively taken part in organising national conferences; examples being GROUNDWATER 2005, The South African National Committee on Irrigation and Drainage (SANCID) and the national conference of the Southern African Society of Aquatic Scientists (SASAqS). Staff members of the WRC have chaired or served as members of national committees and scientific associations, including the International Water Association (IWA) South Africa (member of the Executive), the Working for Water Hydrology Review Panel (chairperson) and the SA Coordinating Committee on the World Commission on Dams.

The WRC has been deeply involved in knowledge sharing initiatives and partnerships with other higher education institutions and national research organisations (science councils) and is an active member of both the National Science and Technology Forum (NSTF) and the Committee of Heads of Organizations of Research and Technology (COHORT). A staff member of the WRC serves on the Executive Committee of COHORT.

The WRC piloted an initiative on Benchmarking of Water Services, which has subsequently been fast-tracked and upgraded into a national initiative in co-operation with the Department of Water Affairs and Forestry (DWAF) and the South African Local Government Association (SALGA).

In Africa, the WRC took an active part in activities aimed at building water-centred knowledge. The WRC continues to play a key role in the Water Research Fund for Southern Africa (WARFSA), which supports water research in Southern Africa. A stronger working relationship was built with the SADC water community and the WRC was invited to take part in the SADC Water Division Strategy Workshop. In addition, the WRC was invited to attend the 2nd Regional Water Policy Workshop and the Harmonisation of Water Policy Workshop. The WRC participated (by invitation) in the launch of the African Water Facility (Tunis, June 2004) which took place during the African Water Week. The WRC also took an active part in the Africa Day and participated in the discussion on co-operation between African countries with regard to water, sanitation and hygiene during the Global WASH Forum (December, 2004, Dakar, Senegal). The WRC supported the African Water Utilities Partnership by providing a training course on Water Sector Reform. The course was attended by representatives from 15 African countries (May 2004). The Southern African Regional Irrigation Association (SARIA) was re-activated through a WRC initiative and representatives from Botswana, Lesotho and South Africa met to discuss future activities. The WRC initiated discussions with the NEPAD water unit. In addition, a staff member of the WRC serves on the NEPAD business working group while another is active in the science and technology group.

During March 2004 the WRC actively participated in KM Africa, a conference organised by The Development Bank of Southern Africa (DBSA) with the aim of building knowledge to address Africa's development challenges. A staff member of the WRC was invited to present and take part in a knowledge management panel during the first plenary session of the conference and to lead the session on water and service delivery.

Globally, the WRC participated in different global initiatives, with staff members serving as chairpersons and board members of key international organizations and networks including the Water Supply and Sanitation Collaborative Council (WSSCC) (member of the steering committee), the Global Water Research Coalition (GWRC) (board member), *Streams of Knowledge* Global Coalition of *Resource Centres (chairperson), RAMSAR Scientific* and Technical Review Panel (vice-chairperson) and the International Water Management Institute (IWMI) (board member, chair of the audit committee).

The WRC played a major role in the Global WASH Forum (Dakar, December 2004) where one staff member was appointed to the position of chief rapporteur of the Forum and another as rapporteur of the thematic streams addressing local government. In addition, the WRC was contracted to produce the WASH Forum Document (hard copies and CDs entitled *Global Wash Forum: Water Sanitation and Hygiene for All - Solutions and Actions; Local and National)* and the WRC logo will appear on these products. The WRC, in co-operation with DWAF and a number of other key organisations, organised a combined South African water sector exhibition focusing on South Africa's initiatives regarding water, sanitation and hygiene during the Global WASH Forum.

The WRC continues to participate actively in the GWRC. The WRC hosted the November 2004 meeting of the GWRC in Pretoria and presented its approach to knowledge management. A number of co-operative projects are ongoing, including projects addressing endocrine disrupting compounds (EDCs), algal toxins and membrane technology, as well as the assessment of water reuse technologies.

The WRC continues providing water-related guidance for RAMSAR contracting parties. The WRC has strengthened its links with IWMI. At the invitation of IWMI, the WRC participated in an African Training Hub meeting organised by IWMI and the World Bank (December 2004). The WRC hosted the meetings of the Management Board of *Streams of Knowledge*. A staff member of the WRC was elected a member of the World Bank Window on Environmental Flows, providing technical and policy support to Bank clients (primarily African countries) on issues related to environmental flows and water policy. The WRC has built good working relations with the French Agricultural Research Centre for International Development (CIRAD) and organised an international workshop on 'Water Resource Management for Local Development' in cooperation with CIRAD and DWAF (November 2004).

BUILDING THE WATER-CENTRED KNOWLEDGE BASE - CAPACITY BUILDING

An immense challenge facing our country is the building of future professional capacity and a future generation of researchers. This is a challenge facing many sectors of our economy including the higher education sector, the R&D sector and the water sector. The WRC has put great emphasis on strengthening the water-centred **knowledge base** of South Africa. In the area of **capacity building** the WRC has further improved its support to students, with special emphasis on historically disadvantaged students. Currently about 465 students are supported by WRC projects, of whom about 60% are from historically disadvantaged backgrounds. It is to be noted that science councils are increasing their efforts to build new research capacity through WRC projects, as indicated below. For example, the CSIR is supporting a relatively large number of students (31), of whom about 50% are from historically disadvantaged backgrounds. Another key observation is the increased number of students supported by consultancy firms via WRC projects.

Organisation	Number of historically disadvantaged students	Total number of students
BKS	2	2
C Swartz	5	5
Coaltech 2002	1	1
Council for Geoscience	1	1
CSIR	14	31
Digby Wells and Associates	2	4
DSS	1	1
Durban Institute of Technology	6	6
Emanti Management (Pty) Ltd	2	2
Envi-Sabi Scientific	1	1
ERWAT	1	1
Golder Associates Africa (Pty) Ltd	5	9
Hlathi Development Consultants	1	1
Human Sciences Research Council	1	1
Independent Economic Researchers	1	1
Institute of Natural Resources	7	10
Mvula Trust	1	1
Nelson Mandela Metropolitan University	9	17
Ninham Shand (Pty) Ltd	1	1
Cape Peninsula University of Technology	4	4
PD Naidoo & Associates	1	1

Organisation	Number of historically disadvantaged students	Total number of students
Phillip Pybus	1	1
Pulles, Howard and de Lange	11	15
Rand Water	1	1
Rhodes University	12	23
TBR Project	1	1
Tshwane University of Technology	12	14
Umgeni Water	2	2
University of Cape Town	13	25
University of Free State	17	30
University of Fort Hare	12	12
University of Johannesburg	4	4
University of KwaZulu-Natal	47	88
University of the North	4	6
University of Pretoria	10	24
University of Stellenbosch	10	48
University of the Western Cape	17	28
University of the Witwatersrand	10	18
University of Venda	20	21
University of Zululand	2	2
Zakhe Training College	1	1
	274	465

Even a relatively small-sized firm such as C Swartz is involved in supporting 5 students, all of whom are from historically disadvantaged backgrounds.

This is a result of the WRC building strong networks among universities, science councils, and other research institutions through mechanisms such as solicited research projects and consortia-based projects. The WRC is committed to building the research capacity of technical universities (previously known as technikons) and historically disadvantaged higher education institutions. Examples are the University of Fort Hare, supporting 12 students (all from historically disadvantaged backgrounds) and the University of the Western Cape, supporting 28 students of whom about 80% are from historically disadvantaged backgrounds.

In addition to its contribution to the number of students, the WRC has been involved in a number of capacity building-related activities at national level. A number of activities were undertaken during National Water Week (March 2005), examples being participation in the *Women in Water Award*, of which the WRC is a founding member, and the *SA Youth Water Prize*.

The WRC has contributed towards national initiatives aimed at building capacity in the water sector. A number of staff members are active and serve as members of the executive committee of FETWater (Framework for Education and Training in Water).

Another key capacity-building initiative was the dissemination of a careers booklet titled *Water@Work-A Career Guide*. The Minister of Water Affairs and Forestry launched the booklet in the Eastern Cape during July 2004. During the year more than 25 000 copies were distributed, reaching schools in remote rural communities. The launch of the booklet included a national competition, with a number of winning schools being awarded visits to waterworks. Feedback regarding both the booklet and the visits to the waterworks was highly positive.

Building capacity through learning networks was actively pursued by the WRC during the year under review. In addition to more than 30 workshops addressing different angles of water and water research, the WRC was involved in a number of other networking activities. The WRC continues its leading role in building strong learning networks in South Africa as mirrored by its contributions to the development of the Water Information Network (WIN). WIN aims to strengthen the capacity of water services at local government level.

Capacity-building activities have been widened to provide support for African and global initiatives aimed at building capacity in Africa, examples being the WRC's role in *Streams of Knowledge*, a network of capacity-building organisations focused on water and sanitation, with most members being from various part of Africa, including two institutions from South Africa (Mvula Trust and NSCWI), and the NEPAD initiative aimed at building water-related centres of excellence in Africa.

INVESTING IN THE CREATION OF WATER CENTRED KNOWLEDGE - THE WRC S RESEARCH PORTFOLIO AND KEY STRATEGIC AREAS (KSAS)

Investing in the creation and sharing of knowledge

During 2004/05 the WRC, based on the assessment of its research portfolio during the previous year when there was wide-ranging consultation with many of its stakeholders concerning the scope of its operations and its strategic direction, continued to invest in the creation of knowledge via four main key strategic areas (KSAs). These areas include **Water Resource Management, Water-Linked Ecosystems, Water Use and Waste Management,** and **Water Utilisation in Agriculture**. In general, the portfolio as planned for the year under review was well received by the various stakeholders. The KSA-based structure, with its four water-centred KSAs (as mentioned above), supported by the knowledge-centred KSA, continued to form the core operating framework for WRC-funded R&D, was further consolidated during the year and became accepted generally.

The WRC funds invested in the creation of new water-centred knowledge during 2004/05 followed a similar pattern of fund distribution among various types of research providers as in previous years, with higher education institutions being the major recipients.

During the year under review, the WRC supported a total of 454 research projects, of which about 78% (356 projects) were active projects (ongoing and new) and about 22% (98 projects) were finalised. The active projects comprised 274 ongoing projects and 82 newly initiated projects that commenced during 2004/05. The various mechanisms of funding include both non-solicited projects, accommodating projects within the broad research strategy of each KSA, and solicited projects, where research projects are developed in accordance with clear terms of reference, aimed at solving specific problems. The WRC supported 41 solicited projects, which translates to about 12% of active projects. While 19 solicited projects were ongoing, 22 newly solicited projects commenced during the year under review.

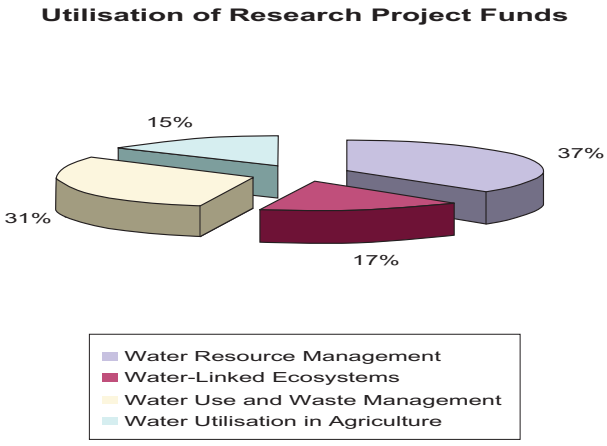
In comparison with the previous year, the year under review shows a 12% decrease in the number of projects, i.e. 454 projects in 2004/05 vs. 517 in the previous year. The number of active projects was reduced by about 10% (from 395 in the previous year to 356 projects during the year under review). The trend of reduction in the total number of projects is a result of a drive to improve management of research projects, with emphasis being placed on prompt finalisation of projects, as also reflected in the high numbers of projects finalised both during the previous year (122 projects) and during the year under review (98 projects). While there is a clear trend of a reduction in the total number of projects, there is also a trend towards an increase in the number of new projects, which was up by about 52% (54 new projects commenced during 2003/04 and 82 during 2004/05). The finalisation of 220 projects and initiation of 136 new projects during the past two years illustrates a strong emphasis on renewal of the research portfolio. By using the mechanism of solicited research, the WRC has effectively managed the relevance of the research portfolio and provided leadership with regard to the creation of new water-centred knowledge. During the year the WRC increased the number of solicited projects from the 6% of active projects in 2003/04 to about 12% of active projects in 2004/05. The increase in the number of solicited projects also contributed to the overall reduction in active (ongoing and new) projects during the year under review, as solicited projects are often large multi-year, multi-provider (consortia-based) projects, often with annual budgets in excess of R1m. per annum.

Number of projects and their distribution (finalised, ongoing and new)

Financial year	2004/05	2003/04
Total No. of projects	454	517
No. of active projects	356	395
No. of finalised projects	98	122
No. of active solicited projects	41	24

Utilisation of funds by the various KSAs

The percentage utilisation of research project funds (based on amounts actually paid out) by the KSAs during 2004/05 was as follows:



About 54.5% was invested in projects that focused on water resources (including water-linked ecosystems) and about 45.5% in projects that focused on water utilisation (including effluent treatment and management, as well as agriculture).

Distribution of research project funds among KSAs - planned vs. utilised (cash paid out) funds

KSA	Planned % allocation of funds (including unpaid committed funds from previous years)	Planned % allocation of funds (not including unpaid committed funds)	% of fund utilised for research projects
Water Resource Management	32	30	37.5
Water-Linked Ecosystems	13	15	17
Water Use and Waste Management	39	34	30.5
Water Utilisation in Agriculture	16	19	15

Although the actual utilisation of funds by the KSAs did not correspond to the planned allocation, the deviations were less than 10%. As shown above, unpaid committed funds from previous years affected the planned allocation. Unpaid committed funds resulted either from amounts being withheld from research providers because of delayed delivery or from amounts still to be credited to research providers upon finalisation of projects.

While, based on cash paid out, the overall investment in research projects (knowledge creation) was R53.7m., investment in the total support of knowledge creation, sharing and dissemination amounted to R62.5m. Both the investments in research projects and in research support, expressed as a percentage of total expenditure, were close to the set budgeted ratios. The ratio addressing funding of the creation of new knowledge (research projects only) is very similar to that of the previous year, with a slight (2%) increase. The decrease in the ratio for research support is due to savings in publication costs and the more effective management of the WRC's patent portfolio that resulted in an additional saving of about R0.33m.

Business efficiency indicators (budgeted and cash paid out)

	04/05 (budgeted*)	04/05 (cash paid out)	03/04 (cash paid out)
Research projects funding as % of total expenditure**	61%	62%	60.0%
Research support (research projects and support and technology transfer) as % of total expenditure	75%	72%	75.2%

* *Not including transfer of unutilised research funds*

** *Expenditure does not include provisions for bad debts and leave, and for the write-off of bad debts*

The research portfolio - Key strategic areas

WATER RESOURCE MANAGEMENT

Scope

The strategic focus for research in this KSA continued to be guided by the principles and objectives of the National Water Act (NWA) of 1998. The primary principle of the Act is that water resources should be managed to achieve optimum long-term social and economic benefits for all; this implies maintaining an optimum balance between protection of the environment and efficient utilisation. This KSA supports the implementation of the NWA by developing tools and technologies for water resource assessment, guidelines and decision-support systems to support decision makers in achieving equitable and

efficient allocation of water resources among competing needs. The research places emphasis on multidisciplinary approaches that provide decision makers and planners with appropriate tools that enable them to take cognizance of social, environmental and economic factors in the planning of water resource development. During 2004/05 the research focus shifted from supporting policy-making to providing guidance for policy implementation and development of policy instruments. The challenge for research in this KSA is to provide the necessary information systems, guidelines, decision-support systems, prediction tools and technologies/methodologies that support protection of water resources and equitable allocation of water to meet the needs of the environment, social and economic development. The NWA places emphasis on stakeholder participation in water resource management; this requires effective participatory tools and approaches that can support multi-stakeholder participation in water resource management at catchment level. The potential negative impact of global climate change on water resource management is also being addressed through research within this KSA.

During 2004/05 the research portfolio included new initiatives and current projects addressing the scope described above. Overall, about R19.35m. was invested (paid out) in 168 projects. Of these, 28 projects were initiated during the year under review while 113 were ongoing. Of the 141 active projects (new and ongoing) about 9% (12) were solicited. During the year under review 27 projects were finalised and 30 reports published.

Thrusts and programmes

The research portfolio (including new initiatives and ongoing projects) has been grouped into strategic thrusts and programmes that directly address the above-mentioned scope and are summarised as follows:

WATER RESOURCE ASSESSMENT

This thrust focused on developing a scientific understanding of the hydrological cycle (and inter-linkages) in order to promote a systematic assessment and variability of the quantity and quality of water available for development in South Africa. It included the following programmes:

- Groundwater occurrence in fractured-rock aquifers
- Catchment hydrology
- Understanding and predicting hydro-climatic variability
- Development of appropriate techniques for evaporation monitoring
- Water quality assessment studies and information systems
- Real-time mapping of daily rainfall over South Africa

INTEGRATED WATER RESOURCE DEVELOPMENT

Research in this thrust focused on providing information to support integrated water resource development. Integration of social, economic and environmental considerations is crucial for sustainable water resource development and management. These aspects are reflected in the outcomes of research within this thrust. The integration of groundwater into the planning process was facilitated through providing better information to planners about the linkages between groundwater and surface water and attributes of this resource was highlighted. The following programmes were focused on:

- Integrated catchment management
- Low flows and streamflow reduction activities
- Urban water resource management

MANAGEMENT OF NATURAL AND HUMAN-INDUCED IMPACTS

Research in this thrust focused on developing appropriate quantitative understanding, tools and strategies for managing the impacts of climate variability and change as well as human interventions on the hydrological cycle and related water resources, with the aim of supporting the development of policy responses, at regional, national or catchment scale, to existing and emerging problems. This included development of systems (e.g. river flow and inundation forecast models, drought impact monitoring systems) for managing floods, droughts and pollution. It also included developing the ability to recognise and address, in an integrated way, human-induced impacts on inter-related components of the hydrological cycle, e.g. river systems and underlying aquifers over a range of relevant space and time scales. Research also supported the generation of information and understanding in order to improve water quality management, with reference to point sources as well as diffuse sources, and addressing chemical, microbial, and biological pollution impacts on

surface water and groundwater. The following programmes were focused on:

- Predicting the impact of global climate change
- Groundwater protection
- Protection and management of surface water quality
- Human-induced impacts
- Integrated flood and drought management

POLICY DEVELOPMENT AND INSTITUTIONAL ARRANGEMENTS FOR WATER RESOURCE MANAGEMENT

This thrust focused on instruments supporting effective water resource management, ranging from support for the development of appropriate policies and their implementation, to research concerning the establishment of governing bodies and institutional arrangements (at catchment, national and transboundary levels). The thrust supported research on tools and methodologies for decision-support for Integrated Water Resource Management (IWRM) and aims to provide strategic support for new policy development and improve the understanding regarding the effective functioning of institutional structures for implementing IWRM. Programmes included:

- Decision-support for IWRM at catchment and Water Management Agencies (WMA) level
- Water policy development and strategic policy support
- Institutional arrangements and processes for IWRM at catchment, WMA and national level
- Transboundary water resource management
- Governance, law and regulation
- Institutional development and collaboration in the Eastern Cape

WATER-LINKED ECOSYSTEMS

Scope

Research undertaken within this KSA during 2004/05 continued to address the conservation of aquatic ecosystems in order to provide the knowledge for their sustainable functioning in support of the National Water Resource Strategy (NWRS) focus on resource protection, the national commitment to international conventions and the ongoing provision of goods and services that ecosystems deliver. No major changes in strategic direction were implemented during the year under review.

Water-Linked ecosystems are defined as in-stream (fully aquatic), riparian (dependent on water stored in the riverbanks and linked to the river) and water table-dependent (dependent on a water table, but not on surface water). This KSA continued to focus on the protection and sustainable utilisation of the aquatic environment and biota (in-stream, riparian and groundwater). This included the research needs around the international conventions on environmental management (e.g. biodiversity) as well as human needs from the aquatic environment (e.g. sustainable management for equitable ecosystem resource utilisation, recreation and ecotourism).

During 2004/05 the research portfolio included new initiatives and current projects addressing the scope described above. Overall, about R8.77m. was invested (paid out) in 56 projects. Of these, 9 projects were initiated during the year under review while 30 were ongoing. Of the active ongoing and new projects (39 projects) about 15% (6) were solicited projects. During the year 17 projects were finalised and 12 reports published.

Thrusts and programmes

The research portfolio (including new initiatives and ongoing projects) has been grouped into strategic thrusts and programmes that directly addressed the above-mentioned scope and are summarised as follows:

ECOSYSTEM PROCESSES

This thrust included research addressing the biophysical processes, form and function of ecosystems. The aim was to generate knowledge to inform policy and management. Programmes included:

- Estuarine processes
- Riverine processes
- Wetland processes
- Groundwater-dependent ecosystems

ECOSYSTEM MANAGEMENT AND UTILISATION

This thrust included research which specifically addressed the management of ecosystems for sustainable utilisation.

Central to this was the need to manage the social and economic requirements of society from ecosystems and the implementation of policy and legislation. The following programmes were addressed:

- Ecological Reserve
- Estuary management
- Ecosystem health
- Environmental water quality
- EDCs

ECOSYSTEM REHABILITATION

This thrust addressed the rehabilitation of the aquatic environment (including both the abiotic and the biotic components) which has been degraded through anthropogenic activities with the view to restoring process, form and function. This was done in terms of both relevant international conventions and national legislation, and sought to restore bio-diversity where possible. Capacity was built to implement the research findings. This thrust included research addressing the processes and functioning of ecosystems, dealing more specifically with the biophysical processes and form of ecosystems as well as the rehabilitation of these in ecosystems. Knowledge generated by research within this thrust is to be used to increase the national capability to sustainably manage ecosystems and the impact of people on it. Programmes included:

- Wetland rehabilitation
- River rehabilitation
- Influence of instream-constructed barriers

WATER USE AND WASTE MANAGEMENT

Scope

This KSA focused mainly on the domestic, industrial and mining water sectors. It aimed to proactively and effectively lead and support the advancement of technology, science, management and policies relevant to water supply, waste and effluent management, for these sectors. This KSA also supported studies on institutional and management issues, with special emphasis on the efficient functioning of water service institutions and their viability. Research on infrastructure for both water supply and sanitation was included. A further focus was on water supply and treatment technology serving the domestic (urban, rural, large and small systems) as well as the industrial/commercial and mining sectors of our economy. This KSA also focused on waste and effluent as well as reuse technologies that can support the municipal, mining and industrial sectors and improve management in these sectors with the aim of improving productivity and supporting economic growth, while minimising negative effects on human and environmental health.

During 2004/05 the KSA continued its activities in the light of the results of strategic needs analysis and stakeholder engagement. Feedback from these exercises has ratified the KSA direction and contributed many valuable inputs in strengthening the portfolio. A new dedicated and focused thrust addressing issues regarding sanitation and hygiene was introduced and the scope of the thrust **Wastewater Treatment and Technology** was broadened to include stormwater and sewerage research. These two subjects are strongly related to wastewater management and are best integrated and incorporated into this thrust. These changes contributed to strengthening the portfolio of the KSA and provided the KSA with greater relevance and focus.

During 2004/05 the research portfolio included new initiatives and current projects addressing the scope described above. Overall, about R17.37m. was invested (paid out) in 181 projects. Of these, 38 projects were initiated during the year under review while 99 were ongoing. Of the active ongoing and new projects (137) about 7% (10) were solicited projects. During the year under review 44 projects were finalised and 40 reports published.

Thrusts and programmes

The research portfolio (including new initiatives and ongoing projects) has been grouped into strategic thrusts and programmes that directly addressed the above-mentioned scope and are summarised as follows:

WATER SERVICES -
INSTITUTIONAL AND MANAGEMENT ISSUES

The efficient functioning of water service institutions and their viability is key to sustaining water services in rural and urban areas. The focus of this thrust was to address strategic research aspects related to policy issues, institutional reform, regulation, infrastructure management, water-

related competencies and capacity required for the strengthening of water institutions (water service providers, water service authorities, water boards, national departments) in providing sustainable water services. The following programmes were addressed:

- Cost-recovery in water services
- Institutional and management issues - Water services
- Innovative management arrangements - Rural water supply

WATER SUPPLY AND TREATMENT TECHNOLOGY

The provision and supply of affordable and reliable water of quality and quantity for drinking (domestic) and economic (industrial/commercial and mining) activities were addressed. New and ongoing projects were grouped into programmes which are summarised as follows:

- Drinking water treatment technology
- Water treatment for rural communities
- Drinking water quality
- Water distribution and distribution systems

WASTEWATER AND EFFLUENT TREATMENT AND REUSE TECHNOLOGY

The ongoing provision of sanitation services and expansion of industrial development, both of which are national developmental priorities, continually increase the need to better manage and treat the resultant wastewater and effluent flows, mitigated as far as possible by reduction-at-source measures, so that the effluent produced not only meets discharge requirements but can also be considered to be a resource. Research in this thrust has aimed at developing technologies and systems that optimise the wastewater and waste management chain in the municipal (domestic), mining and industrial sectors, including also the institutional and infrastructural arrangements operative in these sectors.

The following programmes were addressed:

- Biological sewage treatment processes
- Sludge characterisation, treatment, utilisation and disposal
- Treatment and recovery of organics from agro-industrial processing
- Treatment and recovery of inorganics (including sulphate, metals) in industrial and mining effluents
- Training in wastewater treatment plant operation
- Biotechnological co-treatment of industrial/mining effluents with sewage wastewaters
- Sewerage reticulation
- Stormwater management

INDUSTRIAL AND MINE-WATER MANAGEMENT

This thrust addressed the usage of water in the mining and industrial sectors which produces high concentrations of wastes and effluents. Some mining activities produce wastes that act as non-point sources of water quality degradation and acid mine drainage. The following programmes were addressed:

- Quantification of water use and waste production
- Regulatory mechanisms to improve industrial and mine-water management
- Minimising the impact of waste on the water environment
- Minimising waste production
- Improved ability to predict and quantify effects

SANITATION, HEALTH AND HYGIENE EDUCATION

This thrust addressed research required to assist the national government to achieve its goal of clearing the sanitation service backlog by 2010. It also provides the research that is essential to support planning for basic sanitation service delivery beyond 2010. The focus is on low-cost and affordable sanitation technologies. The following programmes were addressed:

- Health and hygiene education
- Peri-urban sanitation research
- Knowledge/information management and advocacy
- Institutional and management aspects of sanitation service delivery
- Social development aspects

WATER UTILISATION IN AGRICULTURE

Scope

The strategic focus in this KSA has been on increasing the efficient use of water for the production of food, fibre, fuel-wood and timber; ensuring sustainable water resource use; reducing poverty and increasing wealth of people dependent on water-based agriculture. The needs and requirements of present and future generations of subsistence, emergent and commercial farmers continued to be addressed through the creation and application of water-efficient production technologies, models and information systems within the following interrelated subsectors of agriculture, namely:

- Irrigated agriculture
- Dryland agriculture
- Woodlands and forestry
- Grasslands and livestock watering
- Aquaculture

The challenge for applied research and knowledge dissemination has been to provide solutions to practical problems which are experienced in the process of utilisation, development and protection of water resources, thereby contributing to productivity growth in agriculture.

During 2004/05 the research portfolio included new initiatives and current projects addressing the scope described above. Overall, about R7.9m. was invested (paid out) in 49 projects. Of these, 7 projects were initiated during the year under review while 32 were ongoing. Of the active ongoing and new projects (39) about 33% (13) were solicited projects. During the year under review 10 projects were finalised and 6 reports published.

Thrusts and programmes

The research portfolio (including new initiatives and ongoing projects) has been grouped into strategic thrusts and programmes that directly address the above-mentioned scope and are summarised as follows:

WATER UTILISATION FOR FOOD AND FIBRE PRODUCTION

The direction and driving force for research activities and outputs were determined by the strategic focus to improve the knowledge of the processes of production of field, horticultural and industrial crops. Programmes included:

- Water-efficient production methods in relation to soils, crops and technology in rain-fed and irrigated agriculture
- Fitness-for-use of water for crop production, livestock watering and aquaculture

WATER UTILISATION FOR FUEL-WOOD AND TIMBER PRODUCTION

Research activities and outputs were determined by the strategic focus to improve the knowledge of the processes of production of trees in woodlands, plantation forestry and trees planted in combination with food and forage crops.

The following programme was addressed:

- Water-efficient production methods and systems in agro-forestry, woodlands and forestry plantations

WATER UTILISATION FOR POVERTY REDUCTION AND WEALTH CREATION IN AGRICULTURE

The strategic focus was aimed at improving the knowledge of the management processes undertaken by people who are using water. The research portfolio included the following programmes:

- Sustainable water-based agricultural activities in rural communities
- Integrated water management for profitable farming systems

RESOURCE PROTECTION AND RECLAMATION IN AGRICULTURE

Improving the knowledge of the natural processes and man-induced impacts of resource use was the focus of this thrust. This thrust included the following programmes:

- Sustainable water resource use on irrigation schemes and within river catchments
- Impact assessment and environmental management of agricultural production

Leveraging income for the creation, sharing and dissemination of water-centred knowledge

During recent years the WRC has placed emphasis on leveraging levy income by striving to obtain funds for support of water research from sources other than the levy. This drive has been highly successful. The WRC income originating from sources other than the levy has increased by an amount of about R1.8m. from about R2.5m. in 2003/04 to R4.26m. during 2004/05. This is an increase of roughly 72% over the previous year. It is also 15% higher than the budgeted figure of R3.69m. Additional income due to interest received amounted to R5.25m. which resulted in a total figure of R9.5m. for other income. Leveraged income included funds allocated to a number of KSAs for direct support to research projects and funds provided for knowledge sharing and dissemination (e.g. WIN). Leveraged income was obtained from both local and international sources, where the main source of income was due to support by various government departments for specific research and other knowledge-sharing projects.

Income indicators

* Leveraged income includes all other income with the exception of interest received

Indicator	Budget	04/05 Year-end (actual received)
Levies as percentage of total income	92%	89%
Other sources of income as percentage of total income	8%	11%
Leveraged income as a percentage of other income *	48%	45%

ENHANCING KNOWLEDGE DISSEMINATION AND PUBLIC UNDERSTANDING OF WATER-CENTRED KNOWLEDGE

The WRC organised an Open Day which took place in Grahamstown on 22 July 2004, with the support of Rhodes University. The Open Day included the launch of the careers booklet *Water@Work - A Career Guide by* the Minister of Water Affairs and Forestry, with Board Members of the WRC also participating in this event. The Open Day catered for learners from the Eastern Cape as well as researchers, decision makers, representatives of provincial and local government and other professionals. Feedback received indicated that high-school learners who attended the Open Day found the interaction with university students and researchers highly beneficial.

Public understanding of water research

The following are examples of popular articles (published in *The Water Wheel* and other journals) on issues related to research supported by the WRC:

- Climate Change – There is no Need for Concern
- Climate Change – A Cause for Concern. Is Climate Change Really of No Concern?
- A Call for a More Holistic Vision
- Women and Water: How is Gender Policy Working on the Ground?
- Clouds on Tap
- Bring Water to the People: An Interview with Hydrogeologist, Tholeka Mafanya
- Flow and Transport Characteristics of Groundwater in Karoo Formations

In addition, five popular articles were published on research outputs related to membranes, water losses, wastewater treatment, shallow sewers and sludge guidelines. A series of articles with the title 'Irrigation Talk' was published in *The Water Wheel* and brief summaries of recently published WRC reports were published in the magazine *Agri*.

The WRC staff and research providers featured in the media (radio, TV and newspapers and trade and technical journals). The following are a few examples:

- Printed media – articles addressing the WRC appeared throughout the year in various newspapers and professional journals including *The Herald, Cape Times, Die Burger, Engineering News, Water, Sewage and Effluent, Pretoria News and The Citizen*
- Radio interviews – examples include an interview on the transfer of the solar still technology to Local Government on SAFM (September 2004) and an interview on the WRC research in the Okhombe Catchment on Radio Today (9 January 2005)
- Television – an interview regarding the *Water@Work - A Career Guide (Morning Live,* August 2004) and an item on the transfer of BioSURE™ technology to the East Rand Water Care Company (ERWAT) presented on the programme, *50/50.*

MAKING KNOWLEDGE APPLICATION A REALITY — COMMERCIALISATION

During 2004/05, the WRC licensed out 60% of its registered patents. An example of a recent achievement is the licensing of the BioSURE™ process (Rhodes University) to ERWAT. A number of licensing agreements have been reviewed and some are being re-negotiated. During January 2005 a new licensing agreement addressing the Petro™ process was signed. In addition to the above, the WRC has discussed its new IP policy and benefit-sharing policy with many of its research providers with the aim of clarifying its contractual requirements for future research projects and improving the level of understanding/knowledge regarding the protection of IP within the water research community. The WRC has also played an active part in the activities of the South African Research and Innovation Association (SARIMA).

A significant achievement is the transfer of solar still technology to the Kannaland Municipality in the Western Cape Province. The WRC research into cost-effective solar distillation technology has resulted in the successful pilot plant being formally handed over to the local authority and community for management and operation. Another development is in the area of application of software models. A draft agreement has been drawn up to license software developed as part of WRC research projects. Negotiations still have to take place with project leaders who are currently using programmes such as SAPWAT, BEWAB, SWAMP, Irricost, RiskMan and WAS.

SHARING WATER-CENTRED KNOWLEDGE

During the year under review the WRC finalised 98 research projects and published 88 research reports which were distributed widely within the water sector.

The launch of the previous year's *Knowledge Review* (2003/04) took place at the WRC (November, 2004) and as in the previous year, it proved to be a very productive event where researchers and other water sector professionals shared knowledge across disciplines and built new or strengthened existing networks.

The WRC organised many workshops (about 30) aimed at knowledge-sharing, and has also held several discussion forums. Many of these workshops addressed wide areas of interest, often cutting across a number of KSAs.
The following are a few examples of such technology transfer and knowledge-sharing workshops and discussion forums:

- Groundwater-dependent ecosystems
- Gender mainstreaming
- Sustainability and commercialisation of water resource models
- Urban river management
- Public policy management in the water sector
- Current knowledge on the environmental water requirements of non-perennial rivers
- Presentations and discussion with the Parliamentary Portfolio Committee on Water Affairs and Forsetry
- Freshwater biodiversity planning- the future direction of biodiversity conservation in inland waters for South Africa (in cooperation with DWAF and the CSIR)
- Dynamics of building a better society (University of the Western Cape)
- Water services strategy
- Mine-water and water treatment research strategy
- Water harvesting and sustainable agriculture
- The up-scaling of water harvesting from homestead food gardens to communal croplands (in co-operation with the ARC)

Lecturing and training and other academically related activities undertaken by WRC staff members

Staff members of the WRC are involved in lecturing, acting as external advisors for graduate students and serving as external examiners for Masters and Ph.D theses. The following are examples of staff involvement in training and lecturing

- Lecturing at the International Course on Groundwater Development in Hard Rock Areas, Göteborg, Sweden
- Lecturing at the Refresher International Course on Groundwater Development in Hard Rock Areas, Pretoria
- Training provided on Environmental Flows at World Bank training workshop for the Bank's task managers in Washington, DC

Distinguished scientific achievements

A staff member was singled out for the excellence of his achievements by the South African research community. Dr Backeberg was elected to present the FR Tomlinson

Commemorative Lecture, the title of which was: Research management of water economics in agriculture - An open agenda. Dr Backeberg was also awarded a gold medal for his contribution to the Agricultural Economics Association of South Africa (AEASA) on 17 June 2004 at the University of Pretoria.

Exhibitions

The WRC has exhibited at many conferences and meetings that have taken place in South Africa and elsewhere on the African continent. The WRC developed and applied a 'knowledge café' concept, allowing dynamic interactions between staff of the WRC and water sector professionals during the recent WISA Conference (Cape Town, May 2004). The WRC also initiated (as indicated under the Key Performance Area (KPA) addressing Customer/Stakeholder Relationships) a South African water sector exhibition during the Global WASH Forum in Dakar, Senegal (December 2004).

Other examples include:

- Sasol TechnoX School Science Festival (August 2004)
- SASAqS Conference (July 2004)
- WARSH Fair-(Harare, Zimbabwe, September 2004)
- SALGA Conference-(Cape Town, September 2004)
- The launch of the State of the Environment Report - City of Johannesburg - Dept of Development, Planning, Transport and Environment (June 2004).

Technical/scientific leadership - presentation of papers at conferences and publication of scientific articles and books

Staff members of the WRC have presented a number of papers at local and international conferences. A number of examples are given here:

- Keynote address focused on the WRC's role as a dynamic water-centred knowledge hub (WISA, May 2005)
- Presentations on knowledge management at the WARSH Fair (Harare, September 2004)
- Two books were published through the year. These were aimed at making research findings accessible to people involved or interested in the management of the resource. One of these, a book entitled *Environmental Water Quality*, explores the balance between water resource protection and water resource use, with a particular focus on water quality. The other is entitled *Our Changing Rivers*, and covers the role of fluvial geomorphology in the sustainable management of water.

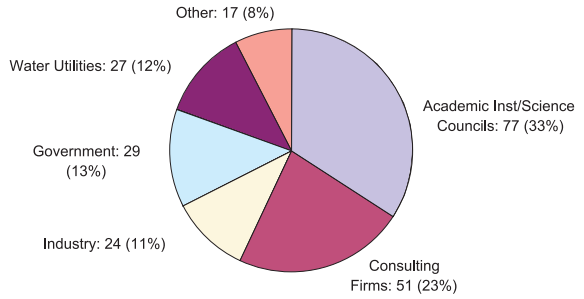
PERFORMANCE

A survey was undertaken with the aim of determining how stakeholders view and rate the performance of the WRC. Special emphasis was placed on the WRC's vision, mission and key strategic objectives. The survey included 10 statements about the WRC that were rated by the participants on a scale of 1 to 5, where 5 was the highest rating (strong agreement). A total of 225 responses were received. The average overall rating was above 4 (out of 5) and the majority of stakeholders agreed that the WRC is relevant and is true to its mission and vision. The publications produced by the WRC were found to be highly applicable. The survey also indicated that some of the respondents would like the WRC to further strengthen its role in support of the water sector in the areas of capacity building and the application of its research outputs.

Ten statements about the WRC

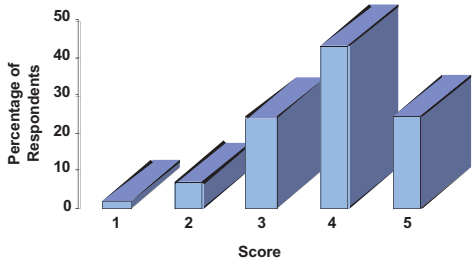
1. I am familiar with the business of the WRC.
2. I perceive the WRC to function as a dynamic, strategic hub for water-centred knowledge.
3. I view the WRC as a reliable, objective, honest broker regarding water-related matters.
4. The WRC leads water research in South Africa in an approriate manner.
5. I consider the WRC to be a global leader, as reflected in the international standing of South African water research and researchers.
6. The WRC research portfolio is relevant and appropriate to the needs of South Africa.
7. I find the WRC publications to be useful, relevant and applicable.
8. My organisation implements WRC findings for decision support in improving technology and/or processes.
9. Training and development of human resources for the water sector is a positive outcome of WRC leadership and support.
10. WRC staff members are skilled and competent in their respective areas.

Affiliations of respondents

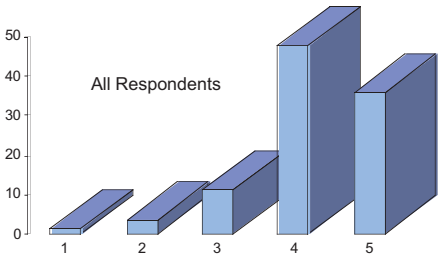


I find WRC publications to be useful, relevant and applicable

Frequency distribution of scores – all statements, all respondents



Frequency distribution of scores – Statement 7, all respondents



Citations

Citations referring to the WRC and its activities are used as an indication of public appreciation. The following are a number of such citations:

- Opening address by Mike Muller, Director-General: Department of Water Affairs and Forestry, on behalf of Minister Sonjica at the WISA Conference, ICC, Cape Town (3 May 2004): 'The **Water Research Commission**, funded by water users, is one of the most important producers of high-level technically trained people. Through their projects, they have produced at least 750 post-graduates in water-related fields, a third of whom are Black, over the past ten years.'…. 'By making research grants conditional on training post-graduates, and particularly Black post-graduates, the **WRC** makes a major contribution to high-level skills development in the water sector, even before we count the great value of research itself.'

- Keynote address- Minister Sonjica - WRC Open Day and Launch of *Water@ Work – A Career Guide,* Rhodes University, Grahamstown (22 July 2004): 'I would like to note with great appreciation this strategic contribution by the **Water Research Commission** to the country's human resource development especially in the area of scarce skills, that according to the different surveys that have been conducted, we suffer dearly.' …'**The Water Research Commission**, true to its mission of being South Africa's hub for water-centred knowledge, is also taking a serious step to respond to this capacity gap. This initiative is one facet of the Commission's commitment to bridge chasms by embarking on capacity-building drives. The initiative to launch 'careers in water' will surely unlock the potential of especially young South Africans as well as create a conducive environment for them to develop into distinguished (water) scientists.'

- Minutes of the Parliamentary Monitoring Group- Water Affairs and Forestry Portfolio Committee, Parliament, Cape Town (5 October 2004): '**The Water Research Commission** presented its Annual Report and stressed that the lack of new scientists would pose problems for water research in the future if nothing was done. The Commission handed a copy of its Annual Report to a representative for the Office of the Minister. Minister Sonjica's representative said that the Minister was very pleased with the good work that the Commission was doing, but it needed to do more to transform the research into actual programmes that would help the thousands of South Africans who still needed clean water.'

- Letter of appreciation - Dr Alan Boyd, DEAT (13 December 2004): 'I would also like to pay tribute to you and your team for all that you are doing to lay the framework for the wise use of our water resources, in their many and varied forms. You are really playing a central role, and that is not always easy'.

- Letter from Prof Roland Schulze: School of Bioresources Engineering and Environmental Hydrology, University of KwaZulu-Natal (17 December 2004): 'I wish to thank you and the **WRC** for the continued support that our School, and projects which I have been involved in, have received again in the past year, and in my personal case, for the past (nearly) 30 years. It is this sustained support that enables researchers to produce outputs and outcomes which make for better decisions in water-related issues.'

ORGANISATIONAL GOALS AND OBJECTIVES (KEY PERFORMANCE AREAS)

During 2004/05, the WRC re-assessed its key performance areas (KPAs) and indicators with the aim of developing indicators that provide quantitative measures to assess performance against set targets. The new KPAs presented below, therefore, include new key performance indicators (KPIs) that reflect both the strategy of the WRC and provide quantitative measures to gauge its successful operation. The following are summaries of key issues addressed in each of the performance areas, as reviewed and re-addressed during this financial year. Achievements against the newly established KPIs for 2004/05 are presented here.

Customer/stakeholder relationships

The objective of this KPA was to enhance the standing of the WRC locally, in Africa and globally, and to receive feedback with regard to the WRC's position with special reference to its relevance and effectiveness. This overarching goal has been translated into a number of indicators as follows:

- **Internal Affairs** (activities of the WRC focused on South Africa). These include:
  - o Local initiatives (initiatives of key importance to the water, SandT and other related national sectors where the WRC plays a significant role)
  - o Public appreciation (this includes feedback regarding the role and relevance of the WRC)
- **External Affairs** (activities of the WRC focused outside South Africa). These include:
  - o African leadership (key strategic activities in Africa in which the WRC is playing a significant role)
  - o International player (activities such as global partnerships, participation in global projects, etc.)

GOAL/OBJECTIVES	INDICATORS	EXCELLENCE TARGET	PERFORMANCE
Leadership in local affairs • National initiatives • Public appreciation	National initiatives of key importance to the water, S&T and other related national sectors where the WRC plays a significant role	Eight national initiatives	Met and exceeded by 40% (11 initiatives)
	Feedback regarding the relevance of the WRC to South Africa	Survey score of 80%	Exceeded (the average rating was above 80%)
		Five citations	Met
Leadership in external affairs • Regional (Africa) • Global	African leadership (key strategic activities in Africa in which the WRC is playing a significant role)	Four Africa initiatives	Exceeded (9 initiatives)
	International player (activities such as global partnerships, participation in global projects, etc.)	Eight global initiatives	Exceeded (10 initiatives)

Financial perspectives

The objective of this KPA was to improve the financial practices, management and performance of the WRC. This is translated into a number of quantitative indicators addressing growth and sustainability and effective management of funds as presented below. The two main sub-objectives are the improvement of financial performance and the enhancement of financial management.

These overarching objectives have been translated into a number of indicators as follows:

- Financial performance
  - o Income growth (income growth is measured as meeting the budgetary target of R3.6 m.)
  - o Research ratio (measured as research funding and support as percentage of total income)
  - o Cashflow management (measured against availability of cash for effective operation)

- Financial management
  - o High quality budget planning and reporting (measured as the percentage deviation between actual and budget at year-end)
  - o Audit results (measured as a percentage of previous year's internal audit queries fully addressed and a clean vs. qualified audit)
  - o Efficiency of recoveries (measured as the percentage of projects older than 3 years fully finalised)
  - o Roll-over of research funds (measured as the deviation from the budgetary figure for roll-over of research project funds)

GOALS/OBJECTIVES	INDICATORS	EXCELLENCE TARGET	PERFORMANCE
Improved financial performance	Income growth (income growth is measured as meeting the budgetary target of R3.6m.)	Meet budget target in full	Exceeded by 15% (actual income was R4.25m.; in addition, R2.5m. has already been secured for the next financial year)
	Research ratio (measured as research funding and support as percentage of total income)	75% (revised budget)	Revised budgeted figure met
	Cashflow management (measured against availability of cash for effective operation)	R30m	Met
Effective financial management	High quality budget planning and reporting (measured as the percentage deviation between actual and budget at year-end)	10%	Met. Exceeded with regard to running and HR costs
	Audit results (measured as a percentage of previous year's internal audit queries fully addressed and a clean vs. qualified audit)	65%	Met
	Efficiency of recoveries (measured as the percentage of projects older than 3 years fully finalised)	100%	Not fully met, achieved 91% i.e., exceeding the target set for very good performance
	Roll-over of research funds (measured as the deviation from the budgetary figure for roll-over of research project funds)	20%	Not met. The target set was met or even exceeded by two of the KSAs while setbacks for the other areas resulted in a major deviation of about 40%.

Learning and innovation

This KPA aimed to improve commercialisation of IP and the WRC's contribution towards the water-centred knowledge base in South Africa, including capacity building, as well as to enhance the WRC's activities and positioning through knowledge-sharing and leadership. The issues of building the knowledge base (capacity building) and the application, transfer, sharing and dissemination of water-centred knowledge are of great importance to the relevance of the organisation. The above aims are translated into three indicators with set targets for various levels of performance. The measures applied are:

- Improved commercialisation of IP (measured as the percentage of the total number of patents licensed out)
- Improvement of the WRC's contribution towards the water-centred knowledge base in South Africa including capacity building (number of students supported by the WRC research portfolio as well as the percentage of the total made up of historically disadvantaged students)
- Enhancing the WRC activities and positioning through knowledge-sharing and leadership (measured against the number of Open Days and workshops organised by the WRC).

GOALS/OBJECTIVES	INDICATORS	EXCELLENCE TARGET	PERFORMANCE
Improved commercialisation of IP	The percentage of the total number of patents licensed out	60%	Exceeded, 65%
Improved contribution towards capacity building (knowledge base)	Number of students supported by the WRC research portfolio as the total made up of historically disadvantaged students	400 students, 60% of whom are historically disadvantaged (HD)	Exceeded (465 students of whom 60% HD)
Knowledge sharing and scientific leadership	The number of Open Days and workshops organised by the WRC	Two Open Days and 20 workshops	Met. Additional activities, lecturing, awards, keynote addresses

The objective of this KPA was to improve and strengthen the WRC with regard to:

- Functional excellence
- Management excellence
- Performance management

The WRC places strong emphasis on improving its internal processes in order to improve the efficiency and effectiveness of the organisation and its core business process of research funding. The above objectives were translated into the following key indicators and measures:

- **Functional excellence** includes the improvement of the fund management process with regard to its time-frame (measured for the current year as the time gap between receiving a final report to the time of its publication) and the development of an appropriate fund management system (measured against the level of completion of the development of the system). Other indicators address:
  - o The ability of the organisation to assess its impact (at project level), which is tied to the development and utilisation of an impact tool (performance is measured against level of application of the tool)
  - o The improvement of internal communication and administrative support via an Intranet (this is measured against stages of development; the performance measure set for 2004/05 is the percentage of organisational policies populating the Intranet)
- **Management excellence** addresses improved organisational management tools, i.e. operational policies, and the level of the organisation's compliance with governing legislation (measured against a number of new and revised policies and the extent of compliance as reported by internal and external audits)
- **Performance management** ties to improving the application of performance management practices in the organisation (this is measured against the level of application, viewed as the percentage of staff having appropriate KPAs/KPIs)

The objective of this KPA was to improve and strengthen the WRC with regard to:

- Functional excellence
- Management excellence
- Performance management

The WRC places strong emphasis on improving its internal processes in order to improve the efficiency and effectiveness of the organisation and its core business process of research funding. The above objectives were translated into the following key indicators and measures:

- **Functional excellence** includes the improvement of the fund management process with regard to its time-frame (measured for the current year as the time gap between receiving a final report to the time of its publication) and the development of an appropriate fund management system (measured against the level of completion of the development of the system). Other indicators address:
  - o The ability of the organisation to assess its impact (at project level), which is tied to the development and utilisation of an impact tool (performance is measured against level of application of the tool)
  - o The improvement of internal communication and administrative support via an Intranet (this is measured against stages of development; the performance measure set for 2004/05 is the percentage of organisational policies populating the Intranet)

- **Management excellence** addresses improved organisational management tools, i.e. operational policies, and the level of the organisation's compliance with governing legislation (measured against number of new and revised policies and the extent of compliance as reported by internal and external audits)

- **Performance management** ties to improving the application of performance management practices in the organisation (this is measured against the level of application, viewed as the percentage of staff having appropriate KPAs/KPIs)

Internal processes

GOALS/OBJECTIVES	INDICATORS	EXCELLENCE TARGET	PERFORMANCE
Functional excellence	Improvement of the fund management process (time-frame) – minimising the time gap between receiving a final report to the time of its publication	80% of projects within 3 months	Not met. While extensive efforts were made to clear the backlog, resulting in the finalisation of 98 projects, the overall time gap was not sufficiently reduced
	An appropriate fund management system - level of completion of the development of the system	Business analysis completed and 50% of system developed	Met with regard to business analysis; not met with regard to system development at 30% (met the target for very good performance)
	The development and utilisation of an impact tool - level of application of the tool	Applied to 50% of the projects to be finalised	Did not meet excellent target; met very good performance target, i.e. tool being piloted and revised
	Improvement of internal communication - the percentage of organisational policies populating the Intranet	Intranet populated with all policies	Met
Management excellence	Operational policies – number of new and revised policies	Five policies (new and revised)	Exceeded (6 policies)
	Organisation's compliance - extent of compliance as reported by internal and external audits	80% compliance	Met (100% compliance to PFMA, 100% compliance to EE plan, need to improve compliance regarding IT)
Performance management	Development and use of KPAs	100% of staff have KPAs signed and used for evaluation	Met

Organisational transformation

The objectives of this KPA included:
- The enhancement of effective leadership and culture
- Improved levels of staff competence
- Accelerated equity and redress

These objectives translated into a number of measures:

- The enhancement of effective leadership and culture was measured against the percentage deviation or the gap between current reality and the vision, as assessed by the organisational effectiveness and cultural survey (OECS)
- Improved levels of staff competence as measured against level of completion of the organisation's skills development plan
- Accelerated equity and redress-indicators relate to the meeting of the organisation's employment equity plan and level of procurement from Black Economic Empowerment (BEE) suppliers

GOALS/OBJECTIVES	INDICATORS	EXCELLENCE TARGET	PERFORMANCE
Effective leadership and culture	The gap between vision and current reality (culture survey)	25% deviation	Met
Improved competence levels	Completion of a skills development plan	100% completion of plan	Met
Accelerated equity and redress	Meeting targets of EE plan measured against percentage of new appointments	90% of new appointments EE	Exceeded (100%)
	Improved ratio of BEE suppliers	80% of supplier BEE	Not met. Met the target set for good performance, i.e. 62% of suppliers being BEE

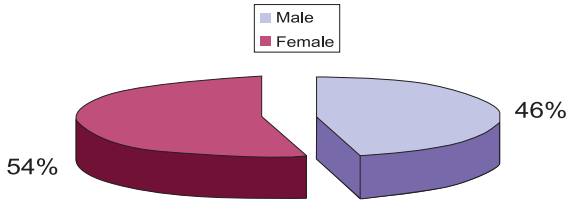
HUMAN RESOURCES

During 2004/05 the WRC's organisational structure (see organogram) underwent few but significant changes. Two new positions (PR/Communication Coordinator and Business Development Manager) evolved because of the respective employees within the company taking on additional responsibilities and growing their current jobs into these new positions. The other significant changes in the organisational structure were the recruitment of an additional research manager to support the KSA, **Water-Linked Ecosystems**. The KSA, **Water Resource Management** added an additional group coordinator to its support staff.

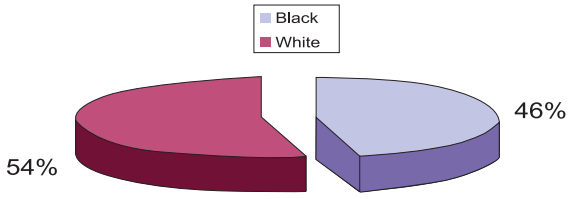
The current structure, in making allowance for core and direct support functions, provides for 49 permanent staff members and 3 employees on contract. Evaluation and grading of WRC jobs are based on the Public Service (Equate) System. During the year changes in IT and PR/Communications functions necessitated the re-evaluation of the 2 new jobs mentioned above.

In terms of composition by race, there was little change in the number of Black staff during the past year. Female staff members still represent the majority, with staff comprising 54% females and 46% male employees. At Senior Management level the proportion of Black members increased by 5% from the previous year to 55% of all Senior Management members by the end of 2004/05.

Staff composition by gender



Staff composition by Race



Improved Levels of Staff Competence

While each staff member has a target for their individual development as part of their KPAs/ KPIs, the WRC aims to build on the above by fully implementing a skills development plan by the end of the next financial year. The plan was completed for all employees during the year under review (2004/05).

Accelerated Equity and Redress

Meeting employment equity plan targets

The report against the employment equity plan indicates that the WRC has met (or even exceeded) the set employment equity targets for 2005, as well as the target set in this KPA for excellent performance. During 2004/05 the WRC appointed a number of new employees, all of whom had been found to be highly appropriate for assuming duty against the relevant vacancies. The vacancies resulted from movement of staff within the organisational structure and the provision made for some measure of succession planning. Two new research managers were appointed (one due to assume duty early in 2005/06), both of whom are Black males. The WRC also appointed two Black females, one to support organisational IT and the other as a receptionist. A Black male was also appointed in the position of financial officer and a White female to the position addressing public understanding of science.

Procurement

The target set for excellent performance is for 80% of suppliers (non-research) to fall into the BEE category. The WRC has set measures by which all preferred suppliers are assessed with regard to their BEE status and the rule is that all purchases are to be from BEE suppliers unless an appropriate motivation is provided.

During the current financial year the WRC focused on developing and implementing a new performance assessment tool at organisational and strategic areas levels. The development of this tool coincides with the establishment of clear quantitative strategic measures and targets catering for three levels of performance (excellent, very good and good) for each indicator as set against its key performance areas.

WRC support for staff education and training

Investment in excellence and effective leadership culture

The performance-based change strategy adopted during 2003/04 continued into 2004/5. This strategy placed special emphasis on enhancing performance of employees both as individuals and as individuals within the team (WRC) context. In 2004/05 this commitment to enhancing performance started off with an Organisational Culture and Effectiveness Survey (OCES), which complemented the Investment in Excellence courses held in 2003/04. The objective of this survey was to identify those behavioural and attitudinal styles that inhibit the WRC and its employees from attaining their goals.

The results of the OCES were analysed for various strategic and functional groupings within the organisation, indicating a mixture of cultures, with a significant difference between the culture of the support groups and the KSAs. Furthermore, the gap between current reality and the vision of the organisation (for an effective organisational culture), was assessed. The target set for excellent performance regarding the above was for the gap not to exceed 25%. This target, on average, has been met.

These results were communicated to all staff of the WRC and a plan was set in place to help the organisation move forward in achieving its goal of a constructive culture.

Personal development plans (PDPs)

The WRC developed PDPs for all staff members. The aim of the PDPs takes into account the development needs of the individual employee from a personal as well as an organisational perspective and integrates the needs of the

employee with the business objectives of the organisation. The PDP also provided a business-focused framework on which the WRC's Skills Plan was developed.

Training courses

Participation in courses on Financial Management, PC software, Project Management, Business Excellence and Skills Development was also supported. In addition, 4 staff members (8%) continued to be engaged in studies, supported by the WRC, for an array of degrees and diplomas.

Formal studies	No. of individuals	Status
Store Keeping and Stock Control	1	Ongoing
Masters in Public Policy	1	Ongoing
Diploma in Public Relations	1	Ongoing
Office Admin	1	Ongoing

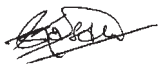
LOOKING AHEAD

The year under review has been a year of building appropriate internal and external feedback loops. It has also been a year for internal re-thinking of core strategy. Based on this feedback, which was mostly reassuring, the WRC aims to further build on the strong foundation laid during recent years while a number of strategic interventions are planned for the next financial year. A key challenge facing the WRC is the pending amendment of the Water Research Act. This requires an all-embracing effort in further building the organisation's profile, its relevance and effectiveness. While visiting its long-term strategy, the WRC has employed a scenario planning tool (based on a methodology developed by Ms CJ Ilbery) and the outcome of this strategic exercise has called for further strengthening of the WRC's contributions to the benefit of all South Africans, while assessing the possible role that the WRC can play in Africa through building an African water-centred knowledge hub that will be supporting the spirit of NEPAD and other government initiatives. During 2004/05 the core leadership of the WRC developed various scenarios addressing the long-term future of the organisation. The strategic direction resolved from these scenarios calls for strengthening the WRC's activities in South Africa, while building stronger relationships with the African continent. During 2005/06 the WRC will further investigate and study the feasibility of the WRC serving as the African water-centred knowledge hub.

BOARD APPROVAL

The annual financial statements of the WRC and wholly-owned company for the year ended 31 March 2005, which appear on pages 52 to 72 of this report, were approved by the WRC Board at its meeting held on 26 May 2005. The Board is of the opinion that the WRC is financially sound and operates as a going concern.

These statements are signed on behalf of the WRC Board by



Prof HC Kasan • WRC Board Chairperson

Dr R Kfir • WRC Chief Executive Officer

the visible difference

CONSOLIDATED FINANCIAL STATEMENTS

FOR THE YEAR ENDED 31 MARCH 2005

Contents	Page

Report of the Auditor-General

AUDITOR-GENERAL

REPORT OF THE AUDITOR-GENERAL TO PARLIAMENT ON THE FINANCIAL STATEMENTS OF THE WATER RESEARCH COMMISSION FOR THE YEAR ENDED 31 MARCH 2005

1. AUDIT ASSIGNMENT

The financial statements as set out on pages 52 to 72, for the year ended 31 March 2005, have been audited in terms of section 188 of the Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996), read with sections 4 and 20 of the Public Audit Act, 2004 (Act No. 25 of 2004). These financial statements, the maintenance of effective control measures and compliance with relevant laws and regulations are the responsibility of the accounting authority. My responsibility is to express an opinion on these financial statements, based on the audit.

2. NATURE AND SCOPE

The audit was conducted in accordance with Statements of South African Auditing Standards. Those standards require that I plan and perform the audit to obtain reasonable assurance that the financial statements are free of material misstatement.

An audit includes:

- examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements,
- assessing the accounting principles used and significant estimates made by management, and
- evaluating the overall financial statement presentation.

Furthermore, an audit includes an examination, on a test basis, of evidence supporting compliance in all material respects with the relevant laws and regulations which came to my attention and are applicable to financial matters.

The audit was completed in accordance with Auditor-General Directive No. 1 of 2005.

I believe that the audit provides a reasonable basis for my opinion.

3. AUDIT OPINION

In my opinion, the financial statements fairly present, in all material respects, the financial position of Water Research Commission at 31 March 2005 and the results of its operations and cash flows for the year then ended, in accordance with Generally Accepted Accounting Practice.

4. APPRECIATION

The assistance rendered by the staff of Water Research Commission during the audit is sincerely appreciated.

N Manik for Auditor-General
Pretoria • 31 July 2005

FINANCIAL STATEMENTS

Balance Sheet

Water Research Commission and Wholly Owned Company
Balance Sheet as at 31 March 2005

	NOTES	Water Research Commission 2005 R	Water Research Commission 2004 R	Consolidated 2005 R	Consolidated 2004 R
ASSETS					
Non-current assets		43,161,562	39,479,114	40,428,324	37,307,443
Property, plant and equipment	2	1,509,705	1,034,559	8,051,508	7,576,365
Interest in subsidiary	3	9,841,994	9,318,227	-	-
Other investments	4	31,809,863	29,126,328	31,809,863	29,126,328
Intangible asset	5	-	-	566,953	604,750
Current assets		108,712,679	97,769,067	108,977,155	98,201,532
Trade and other receivables	6	45,878,809	35,999,707	45,926,345	36,080,161
Cash and cash equivalents	17	62,833,870	61,769,360	63,050,810	62,121,371
Total assets		151,874,241	137,248,181	149,405,479	135,508,975
EQUITY AND LIABILITIES					
Capital and reserves					
Accumulated fund		112,824,469	95,797,807	110,051,427	93,819,749
Non-current liabilities		17,420,275	16,359,614	17,420,275	16,359,614
Provisions	7	2,084,285	1,516,030	2,084,285	1,516,030
Benefit plans	8,20	15,335,990	14,843,584	15,335,990	14,843,584
Current liabilities					
Trade and other payables	9	21,629,497	25,090,760	21,933,777	25,329,612
Total equity and liabilities		151,874,241	137,248,181	149,405,479	135,508,975

FINANCIAL STATEMENTS

Income Statement

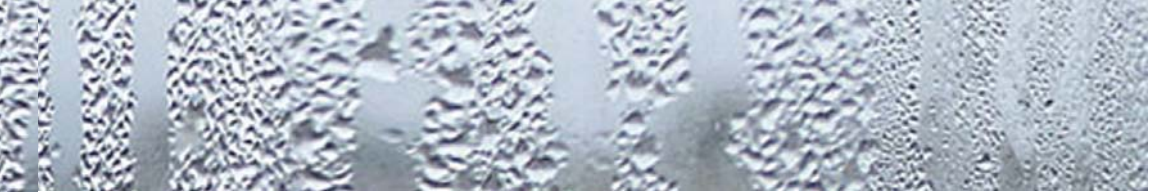
Water Research Commission and Wholly Owned Company
Income Statement for the year ended 31 March 2005

		Water Research Commission		Consolidated	
	NOTES	2005	2004	2005	2004
		R	R	R	R
INCOME		90,179,786	90,395,444	88,938,907	88,720,068
Water research levies		77,852,766	80,561,878	77,852,766	80,561,878
Income on investment	10	4,949,304	4,346,251	3,655,817	3,083,330
Other interest		299,986	907,264	300,220	908,281
Valuation of investments		2,650,755	1,207,978	2,650,755	1,207,978
Profit/(Loss) on sale of fixed assets		(4,314)	4,738	(4,314)	4,738
Provision for project creditors		(182,321)	874,471	(182,321)	874,471
Project creditors written off		148,121	-	148,121	-
Other income		4,465,489	2,492,864	4,517,863	2,079,392
EXPENDITURE		73,153,124	81,712,629	72,707,228	81,271,482
Administrative services		3,881,496	3,853,033	3,937,302	3,593,814
Amortisation of intangibles		-	-	37,797	37,797
Audit fees - external		142,858	172,148	150,832	185,393
Audit fees - internal		338,656	243,852	338,656	243,852
Depreciation of property, plant and equipment		225,187	428,355	225,187	432,334
Directors' emoluments	11	1,454,651	1,342,621	1,454,651	1,342,621
Municipal services and security		-	-	408,169	428,839
Provision for bad debts		934,597	1,122,946	934,597	1,122,946
Bad debts		1,094,355	-	1,094,355	-
Rental and maintenance		1,838,677	1,671,381	843,953	957,674
Research projects and support	1.3, 6, 12	42,844,279	51,298,825	42,844,279	51,298,825
Staff expenditure	13	15,815,590	16,500,761	15,854,672	16,548,680
Technology transfer	14	4,582,778	5,078,707	4,582,778	5,078,707
Net income for the year		17,026,662	8,682,815	16,231,678	7,448,586

FINANCIAL STATEMENTS
Statement of Changes in Equity

Water Research Commission and Wholly Owned Company
Statement of Changes in Equity for the year ended 31 March 2005

	Water Research Commission ACCUMULATED FUND R	Consolidated ACCUMULATED FUND R
Balance at 1 April 2003	87,114,992	86,371,163
Net income for the year	8,682,815	7,448,586
Balance at 31 March 2004	95,797,807	93,819,749
Net income for the year	17,026,662	16,231,678
Balance at 31 March 2005	112,824,469	110,051,427



FINANCIAL STATEMENTS

Cash Flow Statement

Water Research Commission and Wholly Owned Company
Cash Flow Statement for the year ended 31 March 2005

	NOTES	Water Research Commission 2005 R	Water Research Commission 2004 R	Consolidated 2005 R	Consolidated 2004 R
Net cash flow from operating activities		2,325,703	14,446,839	1,666,863	14,237,531
Cash receipts		72,404,953	86,370,585	72,490,244	87,008,267
Cash payments		(75,328,539)	(77,177,261)	(74,779,417)	(76,762,347)
Net cash generated by/(outflow from) operating activities	16	(2,923,586)	9,193,324	(2,289,174)	10,245,920
Interest received		5,249,289	5,253,515	3,956,037	3,991,611
Net cash (outflow)/inflow from investing activities		(1,261,194)	(434,162)	(737,424)	(283,117)
Purchase of fixed assets		(721,528)	(117,838)	(721,528)	(145,597)
Proceeds from sale of fixed assets		16,881	16,257	16,883	16,257
(Increase)/decrease in investments		(32,780)	(153,777)	(32,780)	(153,777)
Increase in investment in subsidiary		(523,767)	(178,804)	-	-
Net increase in cash and cash equivalents		1,064,509	14,012,677	929,439	13,954,414
Cash and cash equivalents at the beginning of the year		61,769,360	47,756,683	62,121,371	48,166,957
Cash and cash equivalents at the end of the year	17	62,833,869	61,769,360	63,050,810	62,121,371

FINANCIAL STATEMENTS
Notes

Water Research Commission and Wholly Owned Company
Notes to the Financial Statement for the year ended 31 March 2005

1. Accounting policies

The financial statements are prepared in accordance with Generally Accepted Accounting Practice on the historical cost basis and incorporate the following principal accounting policies which are consistent with those applied in the previous year, unless otherwise stated.

1.1 Property, plant and equipment

Land and buildings are not depreciated. Depreciation on office equipment (20%), office furniture (10%), photo and computer equipment (33.33%) is calculated annually on the straight-line method at the rates indicated. Motor vehicles are depreciated on a pro rata basis calculated on the basis of kilometres travelled annually as a portion of the expected useful life of the vehicles. The rates are appropriate to reduce each asset to its estimated residual value over the period of its useful life. Computer software that is in the process of being developed is carried at capitalized cost. Depreciation of developed computer software, commences when the software is ready for intended use.

1.2 Capital assets purchased by organizations with research grants are written off in the year purchased. These remain assets of the Water Research Commission until the project for which they were acquired has been concluded and the Water Research Commission has decided on the disposal thereof.

1.3 Research projects and research support services

Payments made by the Water Research Commission are accounted for as advances. In cases where audited statements are not received on time, the payments are accounted for as expenditure. It is the policy of the Water Research Commission that its management may allow overspending on a project budget in a given year, only if acceptable reasons are given, provided the total contract amount is not exceeded. The total amounts paid in respect of research during the year under review are therefore reflected as advances(refer to note 6) and expenditure(refer to note 12).

1.4 Investments

1.4.1 Investments in subsidiaries are recognized at cost less accumulated impairment losses.

1.4.2 The Water Research Commission classifies its investments in equity securities into the category of available-for-sale.The classification is dependent on the purpose for which the investments were acquired. Purchases and sales of investments are recognised on the trade date, which is the date that the Water Research Commission commits to purchase or sell the asset. Cost of purchase includes transaction costs. Available-for-sale investments are subsequently carried at fair value. Realised and unrealised gains and losses arising from changes in the fair value are included in the income statement in the period in which they arise.

1.5 Intangible assets

No value is attributed to internally developed patents. Costs incurred on patents, whether purchased or created by the Water Research Commission, are charged to the income statement during the period in which they are incurred.

FINANCIAL STATEMENTS
Notes

Water Research Commission and Wholly Owned Company
Notes to the Financial Statement for the year ended 31 March 2005

1.6 Consolidation principles

The consolidated financial statements incorporate the financial statements of the Water Research Commission and its wholly owned subsidiary. The results of the subsidiary are included from the effective date of acquisition. Goodwill, being the excess of the cost of acquisition over the fair value of the net assets of the acquired subsidiary at the date of acquisition, is amortized on a straight-line basis over the period of expected benefit. Inter-group transactions and balances are eliminated on consolidation.

1.7 Post employment pension benefit costs

The Water Research Commission operates two defined benefit plans, the assets of which are generally held in separate trustee-administered funds. The pension and provident fund plans are generally funded by payments from employees and the Water Research Commission , taking into account the recommendations of independent qualified actuaries. For defined benefit plans the defined benefit obligation, the related current service cost, and where applicable, past service cost are determined by using the projected unit credit method.Actuarial gains or losses are recognized immediately in the income statement.

1.8 Post employment medical aid benefit costs

The Water Research Commission operates a defined medical aid benefit plan. No plan assets are held to fund the benefit plan. For defined benefit plans the defined benefit obligation, the related current service cost, and where applicable, past service cost are determined by using the projected unit credit method. Vested service costs and actuarial gains or losses are recognized immediately in the income statement.

1.9 Revenue

The Department of Water Affairs and Forestry, Rand Water and Umgeni Water Boards collect levy income. The rate of the levy is approved by the Minister of Water Affairs and Forestry on an annual basis. Revenue recognition of levy income represents amounts received and receivable from the Department of Water Affairs and Forestry, Rand Water and Umgeni Water Boards.

1.10 Financial instruments

Financial instruments carried on the balance sheet include cash and bank balance, investments, receivables, payables and liabilities. These instruments are carried at their estimated fair values. The particular recognition methods adopted are disclosed in the individual policy statements associated with each item.

1.11 Cash flows

For the purpose of the cash flow statement, cash includes cash on hand and deposits held on call with Corporation for Public Deposits and bank balances.

1.12 Foreign currencies

Transactions in currencies other than South African rands are recorded at the rates prevailing on the date of the transactions. At each balance sheet date, monetary assets and liabilities that are denominated in foreign currencies are translated at rates prevailing on the balance sheet. Income and expense items are translated at spot rate. Exchange differences arising on monetary assets and monetary liabilities, are set off against each other.

FINANCIAL STATEMENTS
Notes

Water Research Commission and Wholly Owned Company
Notes to the Financial Statement for the year ended 31 March 2005

		Water Research Commission		Consolidated	
		2005 R	2004 R	2005 R	2004 R
2.	**Property, plant and equipment**				
2.1	**Fixed property**				
	CARRYING VALUE: End of year	-	-	6,541,804	6,541,804
	- Cost	-	-	615,855	615,855
	- Improvements	-	-	5,925,949	5,925,949
	Fixed property consists of Erf 706 Rietfontein, Pretoria, Gauteng. The directors value the property at R 6,500,000				
2.2	**Motor vehicles**				
	CARRYING VALUE: Beginning of year	36,942	40,446	36,942	40,446
	- Cost	68,975	68,975	68,975	68,975
	- Accumulated depreciation	(32,033)	(28,529)	(32,033)	(28,529)
	MOVEMENTS during year	(3,293)	(3,504)	(3,293)	(3,504)
	- Disposals	-	-	-	-
	- Depreciation	(3,293)	(3,504)	(3,293)	(3,504)
	CARRYING VALUE: End of year	33,649	36,942	33,649	36,942
	- Cost	68,975	68,975	68,975	68,975
	- Accumulated depreciation	(35,326)	(32,033)	(35,326)	(32,033)
2.3	**Office furniture**				
	CARRYING VALUE: Beginning of year	866,632	936,735	866,633	939,661
	- Cost	1,265,250	1,204,820	1,319,438	1,259,008
	- Accumulated depreciation	(398,618)	(268,085)	(452,805)	(319,347)
	MOVEMENTS during year	(89,862)	(70,103)	(89,862)	(73,028)
	- Acquisitions	35,237	60,430	35,237	60,430
	- Disposals	(20,540)	-	(20,540)	-
	- Depreciation	(104,559)	(130,533)	(104,559)	(133,458)
	CARRYING VALUE: End of year	776,770	866,632	776,770	866,633
	- Cost	1,198,371	1,265,250	1,198,371	1,319,438
	- Accumulated depreciation	(421,601)	(398,618)	(421,601)	(452,805)

FINANCIAL STATEMENTS

Notes

Water Research Commission and Wholly Owned Company
Notes to the Financial Statement for the year ended 31 March 2005

		Water Research Commission		Consolidated	
		2005 R	2004 R	2005 R	2004 R
2.4	**Office equipment**				
	CARRYING VALUE: Beginning of year	69,737	163,157	69,738	164,212
	- Cost	923,737	908,196	1,529,178	1,513,637
	- Accumulated depreciation	(854,000)	(745,039)	(1,459,440)	(1,349,425)
	MOVEMENTS during year	312,540	(93,420)	312,540	(94,474)
	- Acquisitions	372,638	15,541	372,638	15,541
	- Disposals	(654)	-	(654)	-
	- Depreciation	(59,444)	(108,961)	(59,444)	(110,015)
	CARRYING VALUE: End of year	382,277	69,737	382,277	69,738
	- Cost	1,282,244	923,737	1,282,244	1,529,178
	- Accumulated depreciation	(899,967)	(854,000)	(899,967)	(1,459,440)
2.5	**Computers**				
	CARRYING VALUE: Beginning of year	61,248	216,256	61,248	216,256
	- Cost	414,854	1,249,735	414,854	1,249,735
	- Accumulated depreciation	(353,606)	(1,033,479)	(353,606)	(1,033,479)
	MOVEMENTS during year	52,181	(155,007)	52,181	(155,007)
	- Acquisitions	110,073	41,867	110,073	41,867
	- Disposals	-	(11,517)	-	(11,517)
	- Depreciation	(57,892)	(185,357)	(57,892)	(185,357)
	CARRYING VALUE: End of year	113,429	61,248	113,429	61,248
	- Cost	524,927	414,854	524,927	414,854
	- Accumulated depreciation	(411,498)	(353,606)	(411,498)	(353,606)
2.6	**Computer software**	-	-	-	-
	CARRYING VALUE: Beginning of year	-	-	-	-
	- Accumulated depreciation	-		-	-
	MOVEMENTS during year	203,580	-	203,580	-
	Acquisitions	203,580	-	203,580	-
	Disposals	-	-	-	-
	Depreciation	-	-	-	-
	CARRYING VALUE: End of year	203,580	-	203,580	-
	Cost	203,580	-	203,580	-
	Accumulated depreciation	-	-	-	-
	Total property, plant and equipment	1,509,705	1,034,559	8,051,508	7,576,365

FINANCIAL STATEMENTS
Notes

Water Research Commission and Wholly Owned Company
Notes to the Financial Statement for the year ended 31 March 2005

		Water Research Commission		Consolidated	
		2005	2004	2005	2004
		R	R	R	R
3.	**Interest in subsidiary**				
3.1	Shares at cost	755,939	755,939	-	-
	Loan to subsidiary	9,086,055	8,562,288	-	-
		9,841,994	9,318,227	-	-

3.2 The following information relates to the Water Research Commission's interest in its subsidiary: Erf 706 Rietfontein (Proprietary) Limited is incorporated in South Africa. The total issued ordinary share capital of the company is held by the Water Research Commission and amounts to R1.

4.	**Other investments - unlisted**				
	Old Mutual	25,588,822	23,620,962	25,588,822	23,620,962
	Momentum Wealth and NIB	6,221,041	5,505,366	6,221,041	5,505,366
		31,809,863	29,126,328	31,809,863	29,126,328

National Treasury has granted exemption from investing surplus cash with the Corporation for Public Deposits in terms of Treasury regulation 31.3.3. National Treasury has also confirmed that the above investments are in compliance with Treasury regulation 31.3.5.

5.	**Intangible asset**				
5.1	**Goodwill**				
	Opening carrying amount	-	-	604,750	642,547
	Amortised for the year	-	-	37,797	37,797
	Closing carrying amount	-	-	566,953	604,750
	Gross carrying amount	-	-	755,939	755,939
	Accumulated amortisation	-	-	(188,986)	(151,189)
6.	**Trade and other receivables**				
	Water research levies	28,812,746	32,003,287	28,812,746	32,003,287
	Project advances(notes 1.3 and 12)	28,700,541	14,621,773	28,700,541	14,621,773
	Personal computer loans	4,338	4,072	4,338	4,072
	Other	244,971	319,766	292,507	400,220
		57,762,596	46,948,898	57,810,132	47,029,352
	Provision for doubtful debts	(11,883,787)	(10,949,191)	(11,883,787)	(10,949,191)
	Total receivables	45,878,809	35,999,707	45,926,345	36,080,161

FINANCIAL STATEMENTS
Notes

Water Research Commission and Wholly Owned Company
Notes to the Financial Statement for the year ended 31 March 2005

7. Provisions

7.1 Provisions were made for the following:

	Water Research Commission			Consolidated		
	Balance at beginning of year	New provisions	Balance at end of year	Balance at beginning year	New provisions	Balance at end of year
2005						
Leave pay	1,516,030	568,255	2,084,285	1,516,030	568,255	2,084,285
	1,516,030	568,255	2,084,285	1,516,030	568,255	2,084,285
2004						
Leave pay	1,100,120	415,910	1,516,030	1,100,120	415,910	1,516,030
	1,100,120	415,910	1,516,030	1,100,120	415,910	1,516,030

The leave pay provision represents the potential liability in respect of leave outstanding.

Water Research Commission and Wholly Owned Company
Notes to the Financial Statements for the year ended 31 March 2005

8. Benefit plans

Pension and provident schemes

The Water Research Commission has made provision for pension and provident schemes covering substantially all employees. All eligible employees are members of the defined benefit schemes administered by ABSA Bank Ltd. The assets of these schemes are held in administered trust funds separately from the Water Research Commission's assets. Scheme assets primarily consist of investments in m Cubed Investments Life Limited. The funds are governed by the Pension Funds Act of 1956.

The defined benefit schemes administered by the Water Research Commission are valued actuarially at an interval of not more than three years using the projected unit credit method. The scheme was last actuarially valued on 31 March 2005. At that time all were certified by the reporting actuary as being in a sound financial position, subject to the continuation of their current contribution rates. In arriving at his conclusion, the actuary took into account the following assumptions at balance sheet date (expressed as weighted averages):

	Pension fund	Provident fund
General inflation rate	4.1%	4.1%
Valuation rate	7.9%	7.9%
Expected investment return	7.6%	7.6%
Salary inflation	5.1%	5.1%

Any deficits advised by the actuaries are funded either immediately or through increased contributions to ensure the ongoing soundness of the schemes. Contributions are fully expensed during the year in which they are funded.

FINANCIAL STATEMENTS
Notes

Water Research Commission and Wholly Owned Company
Notes to the Financial Statements for the year ended 31 March 2005

Medical aid scheme

The Water Research Commission has made provision for a medical aid benefit scheme covering both active and retired employees. All eligible employees are members of the defined benefit scheme. The funds are governed by the Medical Schemes Act, 1998 (Act No. 131 of 1998).

The defined benefit schemes administered are valued actuarially at an interval of not more than three years using the projected unit credit method. No plan assets are held by the Water Research Commission to fund the obligation. The scheme was last actuarially valued on 31 March 2005. At that time the reporting actuary certified that the vested liability for continuation members will fluctuate depending on the mortality rate of current continuation members and the rate of new retirements over the next few years. The active member liability will be affected by whether the actual withdrawals match those expected and the rate of medical aid inflation. In arriving at his conclusion, the actuary took into account the following assumptions at balance sheet date (expressed as weighted averages):

	2005	**2004**
Investment returns	9.5%	12.5%
Medical aid inflation rate	7.5%	10.5%
Withdrawal rates	Medium	Medium
Percentage married on retirement	90.0%	90.0%
Retirement age	65	65
Early retirement age	55	55

FINANCIAL STATEMENTS
Notes

Water Research Commission and Wholly Owned Company
Notes to the financial statements for the year ended 31 March 2005

	Water Research Commission		Consolidated	
	2005	2004	2005	2004
	R	R	R	R
8. Benefit plans (continued)				
Pension fund benefit plan				
Present value of plan obligation	24,678,000	20,229,000	24,678,000	20,229,000
Fair value placed on assets	(24,250,000)	(19,026,000)	(24,250,000)	(19,026,000)
	428,000	1,203,000	428,000	1,203,000
Obligation at beginning of the year	1,203,000	-	1,203,000	-
Expensed in the income statement	(775,000)	1,203,000	(775,000)	1,203,000
Prior years service costs	-	3,865,000	-	3,865,000
Current service costs	1,589,000	1,428,000	1,589,000	1,428,000
Interest costs	1,821,000	1,673,000	1,821,000	1,673,000
Expected return on assets	(1,809,000)	(1,289,000)	(1,809,000)	(1,289,000)
Actuarial gains	(611,000)	(3,373,000)	(611,000)	(3,373,000)
Contributions to the fund	(1,765,000)	(1,101,000)	(1,765,000)	(1,101,000)
	428,000	1,203,000	428,000	1,203,000
Provident fund benefit plan				
Present value of plan obligation	5,941,000	5,415,000	5,941,000	5,415,000
Fair value placed on assets	(5,941,000)	(5,415,000)	(5,941,000)	(5,415,000)
	-	-	-	-
Obligation at beginning of the year	-	-	-	-
Expensed in the income statement	48,000	20,000	48,000	20,000
Prior years service costs	(2,216,000)	(1,305,000)	(2,216,000)	(1,305,000)
Current service costs	35,000	35,000	35,000	35,000
Interest costs	487,000	471,000	487,000	471,000
Expected return on assets	(694,000)	(548,000)	(694,000)	(548,000)
Actuarial gains	(547,000)	(849,000)	(547,000)	(849,000)
Unrecognised asset	2,983,000	2,216,000	2,983,000	2,216,000
Contributions to the fund	(48,000)	(20,000)	(48,000)	(20,000)
	-	-	-	-

FINANCIAL STATEMENTS
Notes

Water Research Commission and Wholly Owned Company
Notes to the financial statements for the year ended 31 March 2005

	Water Research Commission		Consolidated	
	2005	2004	2005	2004
	R	R	R	R
Medical aid scheme				
Present value of plan obligation	14,907,990	13,640,584	14,907,990	13,640,584
Fair value placed on assets	-	-	-	-
	14,907,990	13,640,584	14,907,990	13,640,584
Obligation at beginning of the year	13,640,584	12,500,000	13,640,584	12,500,000
Expensed in the income statement	2,079,860	1,751,029	2,079,860	1,751,029
Contributions to the fund	(676,830)	(610,445)	(676,830)	(610,445)
Actuarial gains	(135,624)	-	(135,624)	-
	14,907,990	13,640,584	14,907,990	13,640,584
Benefit plans				
Pension fund benefit plan	428,000	1,203,000	428,000	1,203,000
Provident fund benefit plan	-	-	-	-
Medical aid scheme	14,907,990	13,640,584	14,907,990	13,640,584
	15,335,990	14,843,584	15,335,990	14,843,584

FINANCIAL STATEMENTS
Notes

Water Research Commission and Wholly Owned Company
Notes to the financial statements for the year ended 31 March 2005

		Water Research Commission		Consolidated	
		2005	2004	2005	2004
		R	R	R	R
9.	**Trade and other payables**				
	Amounts due to Research Contractors	14,466,720	18,188,834	14,466,720	18,188,834
	Other	2,542,589	2,392,852	2,944,013	2,740,628
	Outstanding cheques	114,450	98,669	114,450	98,669
	Value-added tax	4,505,738	4,393,000	4,408,594	4,284,076
	PAYE outstanding	-	17,405	-	17,405
	Total payables	21,629,497	25,090,760	21,933,777	25,329,612
10.	**Income on investments**				
	Interest on loan to subsidiary	1,293,487	1,262,921	-	-
	Interest on other investments	228,912	341,396	228,912	341,396
	Interest on deposits and cash investments	3,426,905	2,741,934	3,426,905	2,741,934
		4,949,304	4,346,251	3,655,817	3,083,330
11.	**Disclosure of emoluments of all Board Members (Directors) in terms of section 28 of Treasury Regulations**				
11.1	**Total Director Emoluments**				
	Fees for services as Director	31,500	54,000	31,500	54,000
	Basic salary	1,145,032	1,080,003	1,145,032	1,080,003
	Bonuses and performance payments	97,115	58,461	97,115	58,461
	Travel allowances	181,004	150,157	181,004	150,157
		1,454,651	1,342,621	1,454,651	1,342,621

FINANCIAL STATEMENTS
Notes

Water Research Commission and Wholly Owned Company
Notes to the financial statements for the year ended 31 March 2005

		Water Research Commission		Consolidated	
		2005	2004	2005	2004
		R	R	R	R
11.2	**Executive directors**				
	Dr R Kfir - Chief Executive Officer	725,197	677,327	725,197	677,327
	- Salary	582,932	538,862	582,932	538,862
	- Bonuses and performance payments	62,261	58,461	62,261	58,461
	- Travel allowances	80,004	80,004	80,004	80,004
	Mr A Rampershad - Chief Financial Officer	553,615	477,216	553,615	477,216
	- Salary	417,761	407,063	417,761	407,063
	- Bonuses and performance payments	34,854	-	34,854	-
	- Travel allowances	101,000	70,153	101,000	70,153
11.3	**Non - Executive directors**	175,839	188,078	175,839	188,078
	Prof HC Kasan - Chairperson				
	-Salary	144,339	134,078	144,339	134,078
	Mr RJC Nay				
	- Fees for services	15,000	12,000	15,000	12,000
	Ms. MM Matsabu				
	- Fees for services	12,000	16,500	12,000	16,500
	Prof. CG Palmer				
	- Fees for services	4,500	18,000	4,500	18,000
	Mr MG Rall				
	- Fees for services	-	7,500	-	7,500

FINANCIAL STATEMENTS
Notes

Water Research Commission and Wholly Owned Company
Notes to the financial statements for the year ended 31 March 2005

		Water Research Commission		Consolidated	
		2005	2004	2005	2004
		R	R	R	R
12.	**Research projects and support**				
	Subsistence and travel	1,841,749	1,861,767	1,841,749	1,861,767
	Research projects(note 1.3 and 6)	36,770,935	44,561,923	36,770,935	44,561,923
	Research consultancies	4,231,595	4,875,135	4,231,595	4,875,135
		42,844,279	51,298,825	42,844,279	51,298,825
13.	**Staff expenditure**				
	Human resources	14,754,929	13,741,267	14,794,011	13,789,186
	Leave pay provision	568,255	415,910	568,255	415,910
	Pension benefit costs valuation	(775,000)	1,203,000	(775,000)	1,203,000
	Medical benefit costs valuation	1,267,406	1,140,584	1,267,406	1,140,584
		15,815,590	16,500,761	15,854,672	16,548,680
14.	**Technology transfer**				
	Publications	3,822,684	3,929,305	3,822,684	3,929,305
	Conferences	532,402	695,099	532,402	695,099
	Maintenance of patents	227,692	454,303	227,692	454,303
		4,582,778	5,078,707	4,582,778	5,078,707
15.	**Taxation**				
	No provision was made for normal tax as the Water Research Commission is exempted from income tax in terms of Section 10(1)(cA)(I) of the Income Tax Act.				

Water Research Commission and Wholly Owned Company
Notes to the financial statements for the year ended 31 March 2005

		Water Research Commission		Consolidated	
		2005	2004	2005	2004
		R	R	R	R
16.	**Reconciliation of net income with cash generated from operating activities**				
	Net income	17,026,662	8,682,815	16,231,678	7,448,586
	Adjustments for:				
	Profit on the sale of fixed asset	4,314	(4,738)	4,314	(4,738)
	Depreciation	225,187	428,355	225,187	432,334
	Amortization of intangibles	-	-	37,797	37,797
	Provisions	568,255	415,910	568,255	415,910
	Benefit plans	492,406	2,343,584	492,407	2,343,584
	Valuation of investments	(2,650,755)	(1,207,978)	(2,650,755)	(1,207,978)
	Interest received	(5,249,290)	(5,253,515)	(3,956,037)	(3,991,611)
	Net income before changes in working capital	10,416,779	5,404,433	10,952,847	5,473,884
	Changes in working capital	(13,340,365)	3,788,891	(13,242,020)	4,772,036
	Decrease/(increase) in debtors	(9,879,102)	2,441,372	(9,846,184)	3,210,520
	(Decrease)/increase in creditors	(3,461,263)	1,347,519	(3,395,835)	1,561,516
	Net cash generated/(utilised) by activities	(2,923,586)	9,193,324	(2,289,174)	10,245,920

FINANCIAL STATEMENTS
Notes

Water Research Commission and Wholly Owned Company
Notes to the financial statements for the year ended 31 March 2005

		Water Research Commission		Consolidated	
		2005	2004	2005	2004
		R	R	R	R
17.	**Cash and cash equivalents**				
	Cash and bank balances	26,998,487	29,360,084	27,215,427	29,712,095
	Amounts immediately recoverable	35,835,383	32,409,276	35,835,383	32,409,276
		62,833,870	61,769,360	63,050,810	62,121,371

18. Financial instruments

18.1 Credit risk

Accounts receivable

Accounts and other receivables are presented net of an allowance for doubtful debts, estimated based on prior experience and the current environment. The credit risk with respect to accounts receivable in respect of water levies is limited due to their dispersion across different geographical areas in South Africa. Amounts reflected as advances to research organisations represent payments in respect of research in progress and constitute a very low level of risk.

Cash and bank

The credit risk in respect of cash resources is limited as the counter party is a high quality credit institution with a sound reputation.

18.2 Fair values

The carrying amounts of cash and short-term deposits, accounts receivables, accounts payable and short-term liabilities approximates their fair values due to the short-term maturities of these assets and liabilities.

18.3 Investment risk management

Old Mutual, Momentum Wealth and NIB manage the investments of the Commission and have a sound reputation. The investment strategy is to maximise long-term capital growth and return on the investment portfolio while maintaining a low level of risk within the portfolio.

Water Research Commission and Wholly Owned Company
Notes to the financial statements for the year ended 31 March 2005

18.4 Price risk

Due to the nature and extent of the Commission's investments, the Commission is not unduly exposed to price risks as investments are in unit trusts, cash and deposits which are classified into the category of available-for-sale.

18.5 Interest rate risk

Due to the nature and extent of the Commission's investments, the Commission is not unduly exposed to interest rate risks as at least 80% of the investments are held in unit trusts.

18.6 Other risks

Cash flow and liquidity risks of the Commission are minimal as the investments in units trusts are available within 3 working days. The Commission does not have any foreign accounts receivables, foreign accounts payable or derivative market instruments.

19. Related party transaction

19.1 Controlled entity

Erf 706 Rietfontein (Pty) Ltd is wholly owned by the Water Research Commission.

Transaction type	2005	2004
	R	R
Interest received by WRC	(1,293,487)	(1,262,922)
Rent paid by WRC	913,248	879,648
Municipal expenses paid by WRC	181,495	196,903
Administration fees received by WRC	202,000	282,006

Related party transactions are eliminated on consolidation.

19.2 Directors

No transactions other than directors emoluments disclosed in note 11 were entered into with directors during the year.

Water Research Commission and Wholly Owned Company
Notes to the financial statements for the year ended 31 March 2005

20. SUBSEQUENT EVENTS

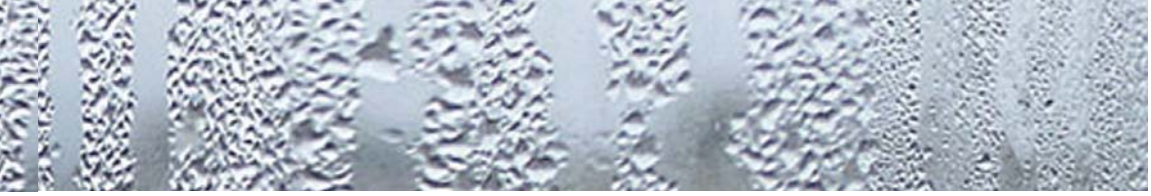
As at 1 April 2005 both the pension fund and provident fund converted from a defined benefit funding method to a defined contribution funding method. The liability, as at 1 April 2005, due to this conversion, was R 4,3 million. The liability includes the shortfall in the pension fund, the cost to put all members on an equal footing based on the actuarial assumptions and an additional 15% of actuarial value as approved by the employer. The 1 April 2005 liability was calculated using the assumptions as per the last valuation, which will differ from the assumptions used for the IAS 19, as IAS 19 prescribes different assumptions.

21. RESTATEMENT OF COMPARATIVE FIGURES

During 2005 the Water Research Commission restated certain items from the 2004 financial statements in order to ensure a higher standard of adherence to GAAP and IFRS. The following were reclassified in the financial statements of 2004:

- Trade and other receivables (Vat debtors and vat creditors now disclosed as a net amount)
- Trade and other payables (Vat debtors and vat creditors now disclosed as a net amount)
- Directors emoluments (More comprehensive note disclosure of directors emoluments per director)
- Other income (Administration fees received and paid now disclosed as a net amount)

The adjustments had no effect on the opening balance of accumulated funds.



the visible difference

ERF SEWE-NUL-SES RIETFONTEIN (Pty) Ltd

FOR THE YEAR ENDED 31 MARCH 2005

Contents	Page

Report of the Auditor-General

AUDITOR-GENERAL

REPORT OF THE AUDITOR-GENERAL TO PARLIAMENT ON THE FINANCIAL STATEMENTS OF ERF-SEWE-NUL-SES RIETFONTEIN (Pty) Ltd FOR THE YEAR ENDED 31 MARCH 2005

1. AUDIT ASSIGNMENT

The financial statements as set out on pages 76 to 86, for the year ended 31 March 2005, have been audited in terms of section 188 of the Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996), read with sections 4 and 20 of the Public Audit Act, 2004 (Act No. 25 of 2004) and section 300 of the Companies Act, 1973 (Act No. 61 of 1973). These financial statements, the maintenance of effective control measures and compliance with relevant laws and regulations are the responsibility of the accounting authority. My responsibility is to express an opinion on these financial statements, based on the audit.

2. NATURE AND SCOPE

The audit was conducted in accordance with Statements of South African Auditing Standards. Those standards require that I plan and perform the audit to obtain reasonable assurance that the financial statements are free of material misstatement.

An audit includes:

- examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements,
- assessing the accounting principles used and significant estimates made by management, and
- evaluating the overall financial statement presentation.

Furthermore, an audit includes an examination, on a test basis, of evidence supporting compliance in all material respects with the relevant laws and regulations which came to my attention and are applicable to financial matters.

The audit was completed in accordance with Auditor-General Directive No. 1 of 2005.

I believe that the audit provides a reasonable basis for my opinion.

3. AUDIT OPINION

In my opinion, the financial statements fairly present, in all material respects, the financial position of Erf Sewe-Nul-Ses Rietfontein (Pty) Ltd at 31 March 2005 and the results of its operations and cash flows for the year then ended, in accordance with Generally Accepted Accounting Practice and in the manner required by the Company's Act of South Africa, 1973 (Act No. 61 of 1973).

4. APPRECIATION

The assistance rendered by the staff of Erf Sewe-Nul-Ses Rietfontein (Pty) Ltd during the audit is sincerely appreciated.

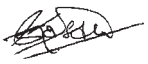
A H Muller for Auditor-General
Pretoria • 27/07/2005

Erf-Sewe-Nul-Ses Rietfontein (Pty) Ltd

DIRECTOR'S REPORT FOR THE YEAR ENDED 31 MARCH 2005

APPROVAL OF FINANCIAL STATEMENTS

The Directors' Report and Financial Statements set out on pages 76 to 86 were approved by the Board of Directors and were signed on its behalf by:



Prof HC Kasan • WRC Board Chairperson

Dr R Kfir • WRC Chief Executive Officer

GENERAL INFORMATION

Directors:
Prof HC Kasan
Dr R Kfir
Dr GC Green

Registered office:
301 Watko Building
491, 18th Avenue
Rietfontein
PRETORIA

Registration number:
1984/003566/07

Main business and purpose: The main business of the company is to own the immovable property known as Erf 706 Rietfontein and in addition and supplementary to the aim of the Water Research Commission (WRC), to place the property at the disposal of the WRC as their main place of business.

DIRECTORS REPORT FOR YEAR ENDED 31 MARCH 2005

GENERAL REVIEW

(a) To review the business and operations of the company for the above accounting period generally, the directors draw attention to the balance sheet, income statement, equity and cash flow statement attached, where the business of the company, the results and state of affairs are clearly reflected.

(b) The Fourth Schedule to the Companies Act, 1973, requires the Directors to report on any material facts or circumstances which occurred between the accounting date and the date of their report. No such material facts or circumstances occurred.

SPECIFIC MATTERS

(a) The main aim of the company is that of owning the immovable property known as Erf 706 Rietfontein, including all permanent improvements, and to use the property for the purpose of promoting the operations of the Water Research Commission.

(b) No shares were allotted or issued by the company for the year ending 31 March 2005.

(c) Improvements to the fixed property totaling R Nil (2004: R 27 759) were made in this financial year and capitalized.

(d) No dividends were paid or declared during the accounting period and we have no recommendation to make in respect of dividends(2004 – RNil).

(e) The Directors and certain members of staff of the Water Research Commission, for whom an administration fee is paid to the Water Research Commission, managed the business of the company. No third person was involved in managing the company.

(f) The names of Directors are shown below. No changes have taken place in the appointments during the accounting period. The company has a secretary.

Prof HC Kasan • Dr R Kfir • Dr GC Green

The company is wholly owned by the Water Research Commission

FINANCIAL STATEMENTS

Balance Sheet

Erf Sewe-Nul-Ses Rietfontein (Pty) Ltd
Balance Sheet as at 31 March 2005

	NOTE	2005 R	2004 R
ASSETS			
Non-current assets		6,541,804	6,541,806
Plant and equipment	4	-	2
Investment property	5	6,541,804	6,541,804
Current assets		361,621	540,586
Trade and other receivables	10.3	144,680	188,575
Cash and cash equivalents	7,10.3	216,941	352,011
Total assets		6,903,425	7,082,392
EQUITY AND LIABILITIES			
Capital and reserves		(2,584,054)	(1,826,869)
Share capital	2	1	1
Accumulated losses		(2,584,055)	(1,826,870)
Non-current liabilities			
Interest-bearing borrowings	3,10.1	9,086,055	8,340,568
Current liabilities		401,424	568,693
Trade and other payables	10.4	401,424	346,973
Current portion of borrowings	3	-	221,720
Total equity and liabilities		6,903,425	7,082,392

FINANCIAL STATEMENTS

Income Statement

Erf Sewe-Nul-Ses Rietfontein (Pty) Ltd
Income statement for the year ended 31 March 2005

	NOTE	2005 R	2004 R
Revenue	8	1,349,116	1,265,052
Interest received		234	1,017
Operating expenses		(813,048)	(1,198,735)
Profit from operations		536,302	67,334
Finance costs		(1,293,487)	(1,263,766)
Loss before taxation		(757,185)	(1,196,432)
Taxation	6	-	-
Loss after taxation		(757,185)	(1,196,432)

FINANCIAL STATEMENTS
Statement of Changes in Equity

Erf Sewe-Nul-Ses Rietfontein (Pty) Ltd
Statement of changes in equity for the year ended 31 March 2005

	Share Capital R	Accumulated Profits R	Total R
Balance at 1 April 2003	1	(630,438)	(630,437)
Net loss for the year	-	(1,196,432)	(1,196,432)
Balance at 31 March 2004	1	(1,826,870)	(1,826,869)
Net loss for the year	-	(757,185)	(757,185)
Balance at 31 March 2005	1	(2,584,055)	(2,584,054)

FINANCIAL STATEMENTS
Cash Flow Statement

Erf Sewe-Nul-Ses Rietfontein (Pty) Ltd
Cash flow statement for the year ended 31 March 2005

	NOTE	2005 R	2004 R
Cash outflow from operating activities:		(658,839)	(284,308)
Operating loss before taxation		(757,185)	(1,196,432)
Adjustment for:			
Depreciation		-	3,979
Investment income		(234)	(1,017)
Finance charges		1,293,487	1,263,766
Operating profit/(loss) before working capital changes		536,068	70,296
Working capital changes		98,346	908,145
Decrease/(Increase) in debtors		43,895	933,779
(Decrease)/Increase in creditors		54,451	(25,634)
Cash generated/ (utilized) by operating activities		634,414	978,441
Interest received		234	1,017
Finance costs		(1,293,487)	(1,263,766)
Cash inflow/(outflow) from investing activities:		2	47,241
Disposals of property and equipment		2	(27,759)
Proceeds from investment		-	75,000
Cash flow from financing activities:			
Increase in long-term borrowings		523,767	178,804
Net (decrease)/increase in cash and cash equivalents		(135,070)	(58,263)
Cash and cash equivalents at beginning of year		352,011	410,274
Cash and cash equivalents at end of year	7	216,941	352,011

FINANCIAL STATEMENTS
Detailed Income Statement

Erf Sewe-Nul-Ses Rietfontein (Pty) Ltd
Detailed income statement for the year ended 31 March 2005

	2005 R	2004 R
Income	1,349,350	1,266,069
Rent received	1,122,840	1,026,970
Municipal expenses recoveries	223,906	228,310
Interest received	234	1,017
Sundry income	2,370	9,772
Expenses	2,106,535	2,462,501
Administration and management fee	207,310	283,851
Advertising	608	-
Auditor's remuneration	7,974	13,245
Bank charges	4,227	4,383
Depreciation		
- Equipment	-	2,925
- Furniture and fittings	-	1,054
Insurance	28,754	37,961
Interest paid	1,293,487	1,263,766
Legal fees	12,125	11,663
Municipal services and levies	277,727	285,884
Regional services council	5,650	916
Rent – meter readings	2,332	1,239
Repairs and maintenance	100,018	362,844
Security	130,442	142,955
Staff expenditure	33,431	47,919
Sundry expenses	500	-
Telephone	1,950	1,896
Loss before taxation	(757,185)	(1,196,432)

FINANCIAL STATEMENTS
Notes to the Financial Statement

Erf Sewe-Nul-Ses Rietfontein (Pty) Ltd
Notes to the financial statements for the year ended 31 March 2005

	2005	2004
	R	R

1. ACCOUNTING POLICIES

1.1 The financial statements have been prepared on the historical cost basis. The following are the principal accounting policies of the Company which are consistent in all material respects with those applied in the previous year, except as otherwise indicated.

1.2 Furniture and equipment
Furniture and fittings and equipment are stated at historical cost less depreciation. Depreciation is provided on the straight line method at the following rates:
- Furniture and fittings @ 10%
- Equipment @ 20%

1.3 Investment Property
Investment property, which is property held to earn rentals and for capital appreciation, is held as a long-term investment and is therefore carried at initial cost.
All improvement costs are capitalized against the investment property. Investment property is not depreciated.

1.4 Revenue
Revenue consists of rental income excluding value added tax

1.5 Financial instruments
Financial instruments carried on the balance sheet include cash and bank balances, investments, receivables, creditors and liabilities. These instruments are carried at their estimated values. The particular recognition methods adopted are fair disclosed in the individual policy statements associated with each item.

1.6 Cash flows
For the purposes of the cash flow statement, cash includes a bank balance.

Erf Sewe-Nul-Ses Rietfontein (Pty) Ltd
Notes to the financial statements for the year ended 31 March 2005

	2005 R	2004 R
2. SHARE CAPITAL		
Authorized		
4 000 Ordinary shares of R1 each	4,000	4,000
Issued		
1 Ordinary share of R1 each	1	1
3. LONG-TERM BORROWINGS		
Water Research Commission		
Total borrowings	9,086,055	8,562,288
Less: Current portion of borrowings	-	221,720
Long term portion of borrowings	9,086,055	8,340,568

The loan is unsecured and repayable over 13 years.
Interest was charged at 15% on the monthly balance.

During the year R 2,600,000 (2004 - R 1,830,000) of the loan was subordinated by the Water Research Commission.

Erf Sewe-Nul-Ses Rietfontein (Pty) Ltd
Notes to the financial statements for the year ended 31 March 2005

	2005 R	2004 R
4. PLANT AND EQUIPMENT		
4.1 Furniture and fittings	-	1
Carrying value: Beginning of year	1	2,926
- Cost	54,188	54,188
- Accumulated depreciation	(54,187)	(51,262)
Disposals	1	-
Depreciation	-	(2,925)
Carrying value: End of year	-	1
- Cost	-	54,188
- Accumulated depreciation	-	(54,187)
4.2 Equipment	-	1
Carrying value: Beginning of year	1	1,055
- Cost	605,441	605,441
- Accumulated depreciation	(605,440)	(604,386)
Disposals	1	-
Depreciation	-	(1,054)
Carrying value: End of year	-	1
- Cost	-	605,441
- Accumulated depreciation	-	(605,440)
Total Plant and Equipment	-	2
5. Investment property		
Erf 706, Rietfontein, Pretoria, Gauteng		
- At cost	615,855	615,855
- Improvements	5,925,949	5,925,949
	6,541,804	6,541,804
The directors' value of the property at - 31 March	6,500,000	6,500,000

Erf Sewe-Nul-Ses Rietfontein (Pty) Ltd
Notes to the financial statements for the year ended 31 March 2005

	2005 **R**	2004 R
6. INCOME TAX		
No provision has been made for taxation as the company has applied for tax exemption. Confirmation of the company's exempt status is pending. Due to the loss incurred, no provision would be required in any event.		
7. CASH AND CASH EQUIVALENTS		
Bank balance	216,941	352,011
8. REVENUE	1,349,116	1,265,052
Rent received	1,122,840	1,026,970
Municipal expense recoveries	223,906	228,310
Sundry income	2,370	9,772

FINANCIAL STATEMENTS
Notes to the Financial Statement

Erf Sewe-Nul-Ses Rietfontein (Pty) Ltd

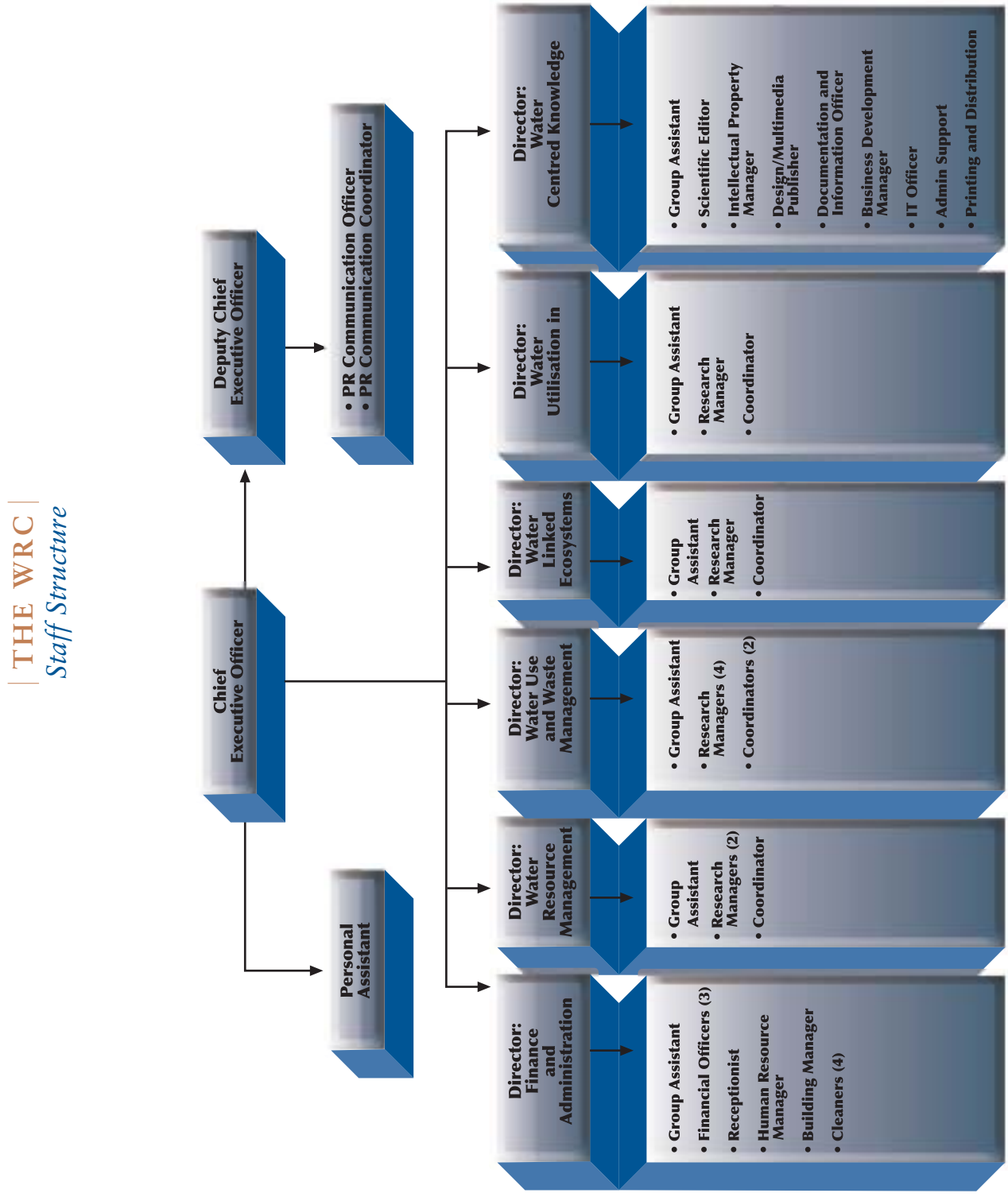
Notes to the financial statements for the year ended 31 March 2005

	2005 R	2004 R
9. PROFIT FROM OPERATIONS		
Profit from operations has been arrived at after charging/(crediting):		
- Interest received	(234)	(1,017)
- Auditors' remuneration	7,974	13,245
- Depreciation		
- Equipment	-	2,925
- Furniture and fittings	-	1,054
- Interest paid	1,293,487	1,263,766
10. FINANCIAL INSTRUMENTS		
10.1 Credit risk		
Financial assets which potentially subject the company to concentrations of credit risk consist principally of cash, short-term deposits and trade receivables. The company's cash equivalents and short-term deposits are placed with high credit quality financial institutions.		
10.2 Fair values		
The carrying amounts of cash and short-term deposits, accounts receivables, accounts payable and short-term liabilities approximated their fair values due to the short-term maturities of these assets and liabilities.		
10.3 Financial assets		
Trade and other receivables	144,680	188,575
- Trade debtors	34,776	66,894
- Deposits	12,760	12,760
- Receiver of revenue : VAT	97,144	108,921
Cash and cash equivalent		
Refer note 7 for cash and cash equivalents	216,941	352,011
10.4 Financial liabilities		
Trade and other payables	401,424	346,973
- Expenses payable	90,765	37,584
- Rental deposits	10,590	9,320
- Receiver of Revenue: Tax payable	300,069	300,069
Long-term borrowings		
Refer note 3 for long-term borrowings	9,086,055	8,340,568

Erf Sewe-Nul-Ses Rietfontein (Pty) Ltd
Notes to the financial statements for the year ended 31 March 2005

	2005	2004
	R	R
11. RELATED PARTY INFORMATION		
11.1 Controlling entity		
The company is wholly owned by the Water Research Commission.		
11.2 Directors		
The directors whose names appear in the attached directors' report each held office as a director of the company during the year ended 31 March 2005.		
11.3 Related party transactions		
Transactions between the company and the Water Research Commission, which are related parties, are disclosed below		
Interest paid	(1,293,487)	(1,262,922)
Rent received	913,248	879,648
Municipal expenses	(181,495)	(196,903)
Administration fees	(202,000)	(282,006)

THE WRC
Staff Structure



Water Research Commission
Private Bag X03
Gezina, Pretoria 0031

Republic of South Africa
Tel: +27 (0)12 330 0340 • Fax: +27(0)12 331 2565
website:www.wrc.org.za • e-mail:wrc@wrc.org.za