FLUID THOUGHTS

WRC CEO, Dhesigen Naidoo

Women and water poverty

As we celebrate Women's Month in South Africa, we remember that the immense burden associated with not having access to safe water and clean sanitation is by and large firmly on the shoulders of women and the girl child.

It is estimated that in sub-Saharan Africa 75% of water carriers are women and girls. The average of two hours dedicated to fetching water from rivers and wells twice a day effectively robs these women of an economically productive life, and denies girls of the basic right to education and, by extension, the opportunity to escape the poverty trap.

This has the accumulative impact of sub-Saharan Africa losing 40 billion work hours of productivity a year. This is equivalent to the annual work hours of the whole of France. This is the level of production loss for the continent precipitated by insufficient access to water. Can you imagine the knock-on effect of these women achieving those 40 billion hours of productive earning work on their households, their communities and the prosperity prospects of this continent? This scenario while less stark replicates itself all through the developing world. Noble Laureate, Amartya Sen, said that the empowerment of women is not just a gender intervention, it is a development issue.

Especially if we can add the further burdens associated with personal safety for women of all ages risking the journey to river or well in the dark hours. Further, there is the health risks to women and their families associated with consuming water of unknown quality. The disease burdens of rural and peri-urban informal settlements stem firmly from polluted water sources and unhygienic sanitation. This is an untenable situation and one that affects more than 844 million people who do not have access to safe water today. This is more than 10% of the global population. Worse still, some 2.3 billion people do not have access to improved sanitation.

The World Health Organisation (WHO) further claims that, globally, at least 2 billion people use drinking source contaminated with faecal matter. These all illustrate the contribution of water to the overall character of a global feminised poverty scenario. Women and the girl child have, in fact, become very firmly the public face of water poverty.

This Women's Month the Water Research Commission (WRC) and the water and sanitation community of practice have been introduced to a remarkable group of remarkable women. These women – older and younger – are intent in re-writing the script so that the future will look very different.

On 22 August, the WRC and its partners, the Energy and Water Sector Education and Training Authority (EWSETA) and the Department of Water and Sanitation honoured a true Water Empowerment Pioneer who has inspired so many. Her name is Ma Pfarelo Rebecca Ramugondo from Limpopo. Already a Laureate of the Order of the Baobab, Ma Pfarelo, as she prefers to be called, decided that it was up to her and her fellow villagers to clean up their local river in Ha-Makhuvha. Inspired and encouraged by the enthusiasm of the women in her small group she established Tshikofokofo, a river cleanup campaign that is now active in 18 other surrounding villagers.

EWSETA CEO, Errol Gradwell (left) and WRC CEO, Dhesigen Naidoo, with Ma Pfarelo Rebecca Ramugondo, who received an award for her outstanding contribution, commitment and support to communities struggling with water challenges.

What was particularly important was who she addressing at the event. They are young women associated with the Women in Water Empowerment programme running out of the Ministry of Water and Sanitation championed by Minister, Nomvula Mokonyane, and managed by the WRC. These are young women entrepreneurs and students who are already changing lives around them for the better. They are building a network of

women business leaders in the water and sanitation sector that will not only become a force that will lead the transformation of the sector, but also become a resource to empower women to get into the water sector as professional and encourage girls to study toward careers in water and sanitation. What is needed is partnership. Partnership from the private and public sector players to offer incubation opportunities to help develop this vital pillar of our development narrative through greater inclusivity and diversification.

Together we can redefine the future of the girl child in South Africa for a brighter more water secure country. What better time to start than Women's Month 2017.

WATER DIARY

International water
November 13-14
The International Water Association (IWA) Development Congress & Exhibition will be held in Buenos Aires, Argentina. **Visit: http://www.iwa-network.org/news/save-the-date-iwa-water-and-development-congress-exhibition-2017/** for more information.

Service delivery
November 26-29
The Water Research Commission, together with the Water Institute of Southern Africa (WISA) is hosting the Second International Peri Urban conference, to be held at the Century City Conference Centre, in Cape Town. The theme of this conference is 'Shaping development and sustainability in peri-urban environments'. **Visit: www.wisa.org.za**

Young water professionals
December 10-13
The eighth International Young Water Professionals conference will take place in Cape Town under the theme 'Building leaders and making impact'. The conference brings together 450 water, environment and related young professionals from across the globe and showcases how the young water professionals are making impact across the sector as well as offering capacity development and training sessions to further skill our future water leaders to tackle the demands from the water sector. **Visit: http://iwaywpconference.org/**

Water loss
May 7-9 2018
The IWA Water Loss Specialist Group, together with the City of Cape Town, will host the biennial Water Loss Conference and Exhibit at the Century City Conference Centre in Cape Town. The conference will be one of the world's largest water loss conferences and is expected to attract over 500 participants from more than 50 countries. **Visit: https://www.eiseverywhere.com/ehome/251759&internal=1**

Water resource management
June 24-27, 2018
WISA is hosting its biennial conference at the Cape Town International Convention Centre.
Visit: www.wisa2018.org.za

NEWS

South Africa – water can't be saved without change

Following all the rules to save water might be a great way of conserving the precious natural resource, but it won't work if it's done by some of the people some of the time.

A major shift in societal mindsets, behaviour and attitude is the only way to make sure that water saving efforts are effective and sustainable. This is according to Department of Water and Sanitation (DWS) Acting Deputy Director-General for Infrastructure, Leonardo Manus.

Manus was speaking at a roundtable discussion held jointly by DWS, GIBB and Sunlight. The roundtable served as a platform to discuss ways in which water saving and use can be more effective to aid future security efforts, and expand the pool of water resources in the country.

Participants at the roundtable said human behaviour change towards water remains a challenge that contributes to water scarcity in the country. They said that while new technologies are vital to increasing water supply, some social problems cannot be solved with technical solutions.

Manus said stakeholders have to become craftier in the way they see water use and management, as demand is escalating at a rate higher than supply. "Over time, cities have generated unnatural demand for water and, as more people move to the cities."

Along with economic growth, this results in a higher demand for water. "There is a definite need to relook at how we handle our water resources and, most importantly, how we use water."

Source: SAnews.gov.za

Partnerships to boost SA's water security

South Africa has committed to work with all international agencies and governments to ensure water security.

The commitment was made during the 6th International Hydrology Programme (IHP) Africa National Committees meeting in Port Elizabeth, in the Eastern Cape, held earlier this year.

Water and Sanitation Deputy Director-General: Planning and Information, Deborah Mochotlhi, said delegates at the meeting must put their heads together to come up with implementable and effective international mechanisms to manage water security and protect water resources.

"These mechanisms will ensure that all the countries represented here today manage their water resources and also educate all water users about their role. Hydrologists play a critical in the water sector, as they measure the properties of bodies of water, such as water quality and streamflow, and they also analyse data on the environmental impacts of pollution, erosion, drought and other problems," she noted.

Mochotlhi said they are mindful of the global issues in relation to water challenges facing most parts of the world caused by the effects of climate change. South Africa, in particular, is still grappling with and recovering from the devastating drought effects.

"In recent months, the Western Cape province has been severely affected by these natural effects and, subsequently, the province was declared a disaster area due to serious water challenges. The Eastern Cape has also not been spared, with Nelson Mandela Bay, Buffalo City and Mnquma municipalities being hard hit by serious water challenges."

Source: SAnews.gov.za

New weather station opened in Johannesburg

On 14 July, the first weather station in Johannesburg, that is part of the Trans-African Hydro-Meteorological Observatory (TAHMO), was opened in Braamfontein.

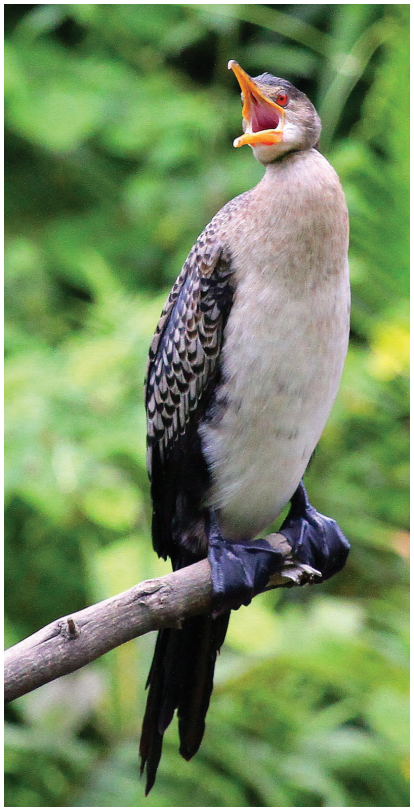
The TAHMO aims to develop a vast network of weather stations across Africa. Current and historic weather data is important for agricultural, climate monitoring, and many hydro-meteorological applications.

A total of 10 stations, sponsored by IBM, will be opened up in the coming few months, mainly at fire stations throughout Johannesburg, supported by the City of Johannesburg. This first station was opened at the Maths Centre, where it will also be used to teach Maths, Science and Technology teachers in South Africa, how to use it in their lessons, to not only improve climate awareness but also practical physics and geography knowledge.

The TAHMO weather stations serve the funders of these stations with data, the national meteorological departments (in this case the South African Weather Service), the research community, and potentially interested parties in improved weather data.

The sales of data for commercial applications will help to sustain the network and add to the roll out. These 10 stations serve as the proof-of-concept for South Africa and the application in African cities. For more information, Email marieke@aqualinks.co.za

South Africa faces a decline of cormorants



South Africa is facing a serious decline in its number of cormorants, according to the Department of Environmental Affairs.

Five species of cormorants are known to breed in South Africa, of which three are marine species and endemic to the Benguela ecosystem of southern Africa. The global population of two species of cormorants, the Cape cormorant (Phalacrocorax Capensis) and the Bank cormorant (Phalacrocorax Neglectus), has dropped by nearly 50% since the 1970s and are now regarded by the International Union for the Conservation of Nature (IUCN) as endangered. The latter two species compete with fisheries for prey, which could be one of the reasons for its decrease in numbers.

The Cape cormorant breeds at 53 localities between the Orange River and the Eastern part of the Eastern Cape. The majority of the decline occurred after the early 1990s off the northwestern coast of South Africa, between the Orange River estuary and Dassen Island. This is thought to have resulted from displacement of the main prey of Cape cormorants (anchovy and sardine) to the southeast coast.

The Bank cormorant breeds at 37 localities in the Northern and Western Cape provines and West of Cape Agulhas. Extinction of the colony at Lambert's Bay and large decreases between Saldanha Bay and Dassen Island coincided with a shift to the southeast of rock lobster, an important prey item in South Africa.

Some of the conservation measures taken include the protection of the birds' breeding habitats from disturbances and the establishment of elevated breeding platforms in colonies, such as Vondeling Island.

Source: DEA

GLOBAL

Mass drownings fuel the Mara River ecosystem

Each year, more than a million wildebeest migrate through Africa's Serengeti Mara Ecosystem. While crossing the Kenyan reach of the Mara River, thousands perish. A new study, published in the Proceedings of the National Academy of Sciences, is the first to reveal how wildebeest drownings impact the ecology of the iconic river.

Amanda Subalusky, a postdoctoral associate at the Cary Institute of Ecosystem Studies, is the paper's lead author. She conducted the work while a graduate student at Yale University. Subalusky explains: "The Mara River intersects one of the largest overland migrations in the world. During peak migration, the wildebeest cross the Mara River multiple times, sometimes resulting in drownings of hundreds or thousands of wildebeest. Our study is the first to quantify these mass drownings and study how they impact river life."

The research team conducted five years of field surveys and analysed a decade of historical reports from the Mara Conservancy to determine the rate and frequency of wildebeest drownings in the Mara River's Kenyan reach. On average, 6 200 wildebeest – representing 1 100 tons of biomass – succumb each year during migration, with mass drownings occurring in 13 of the last 15 years (2001-2015).

Co-author, Emma Rosi, an aquatic ecologist at the Cary Institute, notes: "To put this in perspective, it's the equivalent of adding ten blue whale carcasses to the moderately-sized Mara River each year. This dramatic subsidy delivers terrestrial nitrogen, phosphorous and carbon to the river's food web. First, fist and scavengers feast on soft tissues, then wildebeest bones slowly release nutrients into the system – feeding algae and influencing the food web on decadal scales."

To reveal the fat of wildebeest carcasses, the researchers modelled in-stream consumption by fish and Nile crocodiles, scavenging by birds, nutrient uptake, and downstream transport. Stable isotope analyses of common fishes, camera monitoring of scavengers, and stable isotope analyses of biofilm on wildebeest bones all informed the fate of wildebeest nutrient inputs.

When wildebeest carcasses were present, they comprised up to 50% of the diet of common fish. The most frequent terrestrial scavengers on carcasses were Marabou storks, white-backed vultures, Rüppell's vultures and hooded vultuers, consuming 6-9% of soft tissue. Biofilms on wildebeest bones had a distinct isotopic signature, and made up to 24% of the diest of three common fish species months after drowning events. Due to low metabolic rates, Nile crocodiles were estimated to eat just 2% of total carcass inputs.

Co-author, David Post, an aquatic ecologist at Yale University commented: "The Mara River is one of the last places on Earth left to study how the drowning of large migratory animals influences aquatic ecosystems. Many migratory herds, such as bison, quagga, and springbok have been driven to extinction or remnant populations."

OPINION

How Africa can prepare against the next El Niño

Governments and other key actors in food security need to prepare against the next El Niño, writes Dr Esther Ngumbi, a postdoctoral researcher at the Department of Entomology and Plant Pathology at Auburn University, Atlanta.

After a long dry spell coupled with drought, the rains have finally arrived in many African countries, including Kenya and South Africa, and the 2017 planting season is underway. But this joy may be short-lived. The United Nations World Meteorological Organisation released an update that projects a 50-60% chance of an El Niño forming in mid- to late 2017.

Depending on the regions and hemisphere, El Niño events can bring either drought or floods. Either way, these conditions trigger food insecurity, increase malnutrition and enhance vulnerability to infectious diseases. But this is not new. The last El Niño event, which occurred in 2015/16, caused the worst drought in decades and failed harvests in parts of Africa, Asia and the Pacific. As a result, millions of citizens across Africa and Asia experienced food insecurity.

Such warnings must be taken seriously and measures need to be taken to ensure that citizens in the countries that may be affected are cushioned. After all, we know that failure to act would lead to dire consequences as seen in the 2015/16 events.

Efforts against 2016 El Niño

Several countries have successfully implement El Niño preparedness plans. Faced with the 2016 event, the state of California, in the United States, prepared in advance and created a thoughtful plan of action that was communicated to citizens across the state. African countries such as Ethiopia, Kenya and Uganda have, in the past, also made efforts to prepare for El Niño related events, even though these were not always successful.

Anticipating the 2016 event, the government of Ethiopia prepared and rolled out plans for its citizens, including allocating almost US$30-million to pre-empt the influence and consequences of the phenomenon in the country. In addition, it communicated to its citizens the anticipated effects and implemented other actions to alleviate the aftermath effects. And in Nairobi and Narok (Kenya), government officials briefed citizens of the upcoming El Niño in public forums and urged citizens to prepare.

Preparing against predicted El Niño

First and foremost, governments and key actors in aiding food security must act and prepare with a sense of urgency. They should come up with detailed, well-thought out preparedness measures and national contingency plans of action.

These include deciding on triggers and a timeline for action, decision points, communication channels as well as the registration of its citizens that may need help. Preparing in advance and setting up concrete national plans will strengthen resilience, safeguard livelihoods and avert disaster.

Preparedness must be backed with interventions that help citizens to make the most of the current rain season before the predicted El Niño strikes.

These interventions include ensuring that farmers have all the agricultural inputs such as drought tolerant seed varieties, including sorghum, millet and cowpeas that are needed for the planting seasons. Governments, through their agricultural extension officers, must educate farmers on the need to plant these varieties.

All these interventions would allow farmers to increase their crop production and yields while diversifying and adapting their farming practices to make the most out of the current season.

Long-term and communication interventions needed

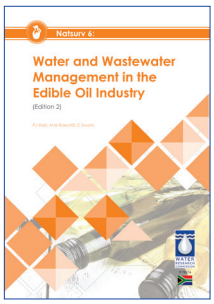
Equally important are long-term interventions. These include investing in irrigation and water-supply facilities as well as rehabilitating water catchment and implementing rainwater harvesting to ensure that countries are able to grow crops during the drought season.

Most importantly, governments should develop strong and reliable communication channels that enhance the dissemination and sharing of information and data about all the available interventions from communities to national and regional levels.

Finally, countries should strive to learn to assess impact in order to know what works best. This would allow countries to keep improving their disaster preparedness coping strategies.

Source: Scidev.net

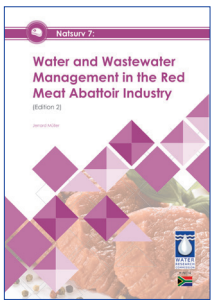
NEW WRC REPORTS



Natsurv 6 – Water and wastewater management in the edible oil industry (Edition 2)

Manufacturing and processing industry consume significant quantities of energy and water. In addition, unwanted liquid, solid and gaseous waste is generated along with the intended products. Novel, more sustainable methods are constantly being sought to reduce qualitative and quantitative industrial pollutant loads and reuse water and waste. This new survey serves to update the content of the original national survey of the edible oil industry, completed in 1989. The report includes information stemming from an audit of the industry from both a local and global perspective.

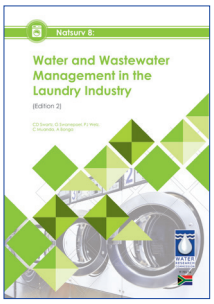
Report No. TT 702/16



Natsurv 7 – Water and wastewater management in the red meat abattoir industry (Edition 2)

Internationally, red meat abattoirs are known to be high volume water consumers. Similarly they are also serious polluters of wastewater. The increasing demand of domestic water consumers, and the limited supply of water in a semi-arid South Africa focuses the attention on high volume industrial consumers to assist in reducing water consumption. During the first survey (published in 1988) there were 25 registered abattoirs throughout South Africa. The deregulation of the South African meat industry in the 1980s brought about the demise of many large abattoirs. The markets opened up and smaller abattoirs proliferated. Management staff of smaller abattoirs are quite often not seriously concerned with water consumption and wastewater quality, as they focus on the quality of meat, which is their core business. Water consumed per slaughter unit (SU) were found to increase inversely to the abattoir slaughter capacity. Average consumption for large abattoirs is 0.91 kl/SU increasing to 2.04 kl/SU for small abattoirs. Wastewater qualities similarly have average chemical oxygen demand (COD) values of 1 217 mg/ℓ for large abattoirs and values as high as 5 025 mg/ℓ in small abattoirs.

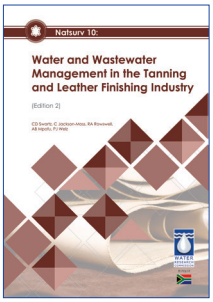
Report No. TT 701/16



Natsurv 8 – Water and wastewater management in the laundry industry (Edition 2)

This Natsurv provides an overview of the laundry industry and its changes since the 1980s. The study critically evaluated and documented the generic laundry process in terms of current practice, best practice and cleaner production. The specific water consumption rate was determined and best practice technology put forward. The local electricity, water and effluent prices and bylaws within which this industry functions were also described and evaluated to judge if the trends and indicators are in line with water conservation demand management and environmental practices.

Report No. TT 703/16



Water and wastewater management in the tanning and leather finishing industry: Natsurv 10 (Edition 2)

The main aims of the revision of this NATSURV were to provide a detailed overview of the tanning and leather finishing industry in South Africa, and its changes since 1980; to determine the water consumption and specific water consumption in the industry; determine wastewater generation and typical pollutant loads; and provide recommendations on best practices for the tanning industry.

Report No. TT 713/17

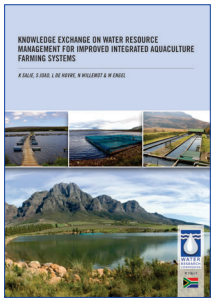
Water resource protection: Research report. A review of the state-of-the-art and research and development needs for South Africa

Water plays a significant role in the economies of the agricultural, business and industrial sectors. Expanding populations, economies and climate change have put pressure on the quality and availability of water resources in South Africa. Water resource protection therefore becomes increasingly important for sustainable supply management. Hence, a review of the state-of-the-art of resource protection in South Africa has been undertaken. Gaps in scientific understanding and implementation regarding water resource protection have been identified through literature review and discussions with stakeholders and experts. Aiming to improve the water resource protection in South Africa, a research strategy has been

developed to tackle the most relevant of the identified gaps.
Report No. 2532/1/17

Water use and crop parameters of pastures for livestock grazing management

Cultivated pastures form the base of feed for many livestock production enterprises in South Africa, comprising more than a sixth of the country's total irrigated land, making it one of South Africa's highest value crops. To ensure sustainable pasture production to produce sufficient pasture to supply the protein demand more efficiently for a growing population, innovations will be required to increase the efficiency of water and nitrogen use in such pasture production systems in the livestock industry. The main objective of this research project was to address the existing challenges in the production of pastures for livestock grazing management and to find answers to the knowledge gaps identified in literature.
Report No. 2173/1/16



Knowledge exchange on water resource management for improved integrated aquaculture farming systems

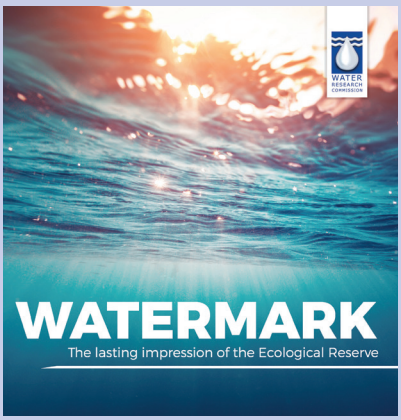
For four years the project team investigated and gathered information on aquaculture-agriculture systems, which are associated with farm/irrigation dams. Limited attention was paid to the adoption of this information and its implementation. The study for this project focused on the process of knowledge exchange to improve existing water resource management principles and practices, as well as creating a better opportunity for sustainability to both aquaculture and agriculture.
Report No. TT 718/18 (main report) and TT 719/17 (training manual for small-scale rainbow trout farmers)

Nanotechnology for the treatment of industrial-scale effluents – particularly the removal or organic contaminants from textile effluents using nano-TiO2

Suitable water quality is essential for life and industrial productivity. The aim of this project was to assess the application of one of the emerging nanotechnologies for water treatment, namely nanofiltration and nanophotocatalytic treatment of the nanofilter retentate.
Report No. 2386/1/16

Principled, pragmatic revitalisation of catchment management forums in South Africa

There are many views on catchment management forums (CMFs). They are seen as places for enthusiastic participation, communities of practice in the making, and crucial to the devolution of water management to local stakeholders. They are also seen as exhausted, toothless, talk shops, unrepresentative, undemocratic, haunts of the privileged, ignored by officials and a waste of time. This research project was designed to accompany the Department of Water and Sanitation revitalisation of catchment management forums, which is taking pace as part of the rollout of catchment management agencies, currently in progress.
Report No. TT 682/16



Watermark – The lasting impression of the Ecological Reserve]
The second, updated version of ***Watermark** – **The lasting impression of the Ecological Reserve*** **Report No. (SP 99/16)** has been published by the WRC. The publication explores the rationale behind the Ecological Reserve and illustrates how it will help to ensure the adequate supply of water in the years to come. The concept of the Reserve encapsulates a three-pronged sustainability approach: social, economic and environmental. Each of these three leg is taken into consideration when decisions are made regarding South Africa's water resources.

SECTOR MOURNS LOSS OF AQUATIC SCIENCE PIONEER

In August, the aquatic science fraternity mourned the death of stalwart environmentalist and researcher, Dr Mark Chutter. He was 84.

Considered a pioneer of aquatic science in South Africa, Dr Chutter leaves behind a stellar career infused with highlights that provided clear direction to the aquatic science sector and contributed tremendously to its advancement in South Africa.

Dr Chutter's first love was studying rivers, and he had a meticulous eye for recognising fine detail in aquatic species. This was undoubtedly aided by his earlier systematic research on dragonflies when he described one species and the nymph stage of several species. Dr Chutter completed his MSc in Zoology in 1960, followed by a PhD in River Ecology in 1967.

He joined the hydrobiologica laboratory at the National Institute of Water Resources at the CSIR in the early sixties. The institute was responsible for some of the first comprehensive river studies in South Africa. Former colleague, Prof Brian Allanson, relates how Dr Chutter developed an interest in the structure and ecology of river invertebrate fauna which was to grow into a major study of the Vaal River system. "This essential study of a river of immense importance to the growth of the Witwatersrand was chosen for his doctoral study at Rhodes University. By this time, Mark and his family lived in Grahamstown and we greatly benefited from his many talents." During his Vaal River studies Dr Chutter identified the previously undescribed livestock pest species, ***Simulium chutteri***, which was named after him.

Certainly the most significant of Dr Chutter's contributions to enumeration of the freshwater invertebrate fauna of South Africa's rivers was his development to a scoring system in which the sensitivity of river fauna could be described numerically. The basic tenants of this system were later developed into the South African Scoring (SASS) system, which today is widely used in the assessment of river health not only in South Africa, but also in other African countries.

Dr Chutter's other contributions were the management of an integrated research project involving 11 scientists and 8 technicians studying the eutrophication of Hartbeespoort Dam, evaluating water chemistry processes and assessing the impact this had on the biota. The aim was to devise a method to control the level of phosphorous entering the dam and develop an accepted standard for water quality.

After retiring from the CSIR, Mark continued consulting and providing expert evaluations of water development projects throughout southern Africa. Rob Palmer, who worked with Dr Chutter as part of AfriDev Consultants (Pty) Ltd, relates the following memory: "My first task at AfriDev was to market the company, and not knowing anything about marketing, I understood this to mean meeting people in their offices and chatting to them over a cup of coffee. One of the first marketing meetings I arranged was with a friend of mine at a large company, and Mark offered to join me. When we arrived, my friend was waiting for us at the entrance, but instead of taking us to her office, she surprised us by escorting us to a lecture hall that was filled with a crowd that was waiting expectantly for our presentation! Mark handled the situation with characteristic calmness, and although we did not get much work out of the company, my respect for Mark ratcheted up several notches. Another memorable incident took place hours before a major tender deadline, after I had stayed up all night in his office trying to find an error in the cost calculations. Mark looked at my spreadsheets and mentally added several pages of numbers while having breakfast, and spotted the error immediately! His aptitude for mental arithmetic was impressive to say the least. I cherish the time I spent with Mark, and remember and respect him for his intellect, reliability and gentle humour."

In 1990, Dr Chutter was awarded the Gold Medal from the Southern African Society of Aquatic Scientists in recognition of his scholarship and profound contribution to the hydrobiology of South Africa.

He is also remembered by Dr Ferdy De Moor: "Mark loved to play squash and tennis, and I remember weekend afternoons playing social tennis with him and other members of the NIWR staff at the CSIR courts. He also enjoyed playing bridge, and this was a daily event over lunch at the CSIR canteen."

"Mark always had a sharp mind for detail and always shared his opinions freely. He was always down to earth and friendly, and was always prepared to listen and discuss problems. He will be missed, but his contributions to water science in South Africa will be remembered and perpetuated through the continued and ever expanding practical use of his work."