FLUID THOUGHTS

WRC CEO, Dhesigen Naidoo

Water – core to beating Covid-19 and gaining global health security

We are in the throes of an unprecedented global pandemic. Perhaps unexpectedly with a variant of a virus that we collectively contained and managed in the SARS epidemic of 2002-2004.

This new SARS-CoV-2, or Covid-19, has thrown the world into a storm, with no corner on Earth unaffected. Its impact has already been severe on the social, political, economic, security and health fronts. Our anxiety for personal and collective safety has risen to understandably high levels. Our governments are investing in war-like strategies, such as lockdowns and total isolation, to flatten the infections curve and maintain the numbers with levels that our mostly fragile, and under-resourced, health systems can manage.

The world as a whole has trudged through seven months since the acknowledgement of the Covid-19 global pandemic. For some, the curve of infection increases has not yet stemmed sufficiently to mark the end of the wave. At the time of writing we stood at 24 million cases and already had an estimated 817 000 deaths. Dark times!

Water is central to both the containment of infections, as well as the treatment regimen of those who are infected and ill. Regular washing, in particular handwashing, is one of the better lines of defense against the further spread of the virus. Handwashing campaigns have moved to the top of the list of many national interventions. What this has inevitably done, as crises generally do, is put a magnifying glass on the issues of water security and safe sanitation access. And once again, worldwide, but mainly in the Global South, we have been found wanting.

Using the budget prioritisation for emergency measures, water access has become a key objective with tanker services, water harvesting and storage tanks being key short-term measures. Similarly, access to safe sanitation and organising for rapid de-densification of settlements and slums are key interventions in the Covid-19 response plan of governments. This, together with the measures to ensure short-term food security and a measure of economic safety nets, will help us toward being in reasonable shape both as individuals and nations – both through, and especially beyond, this crisis. One of the many risks associated

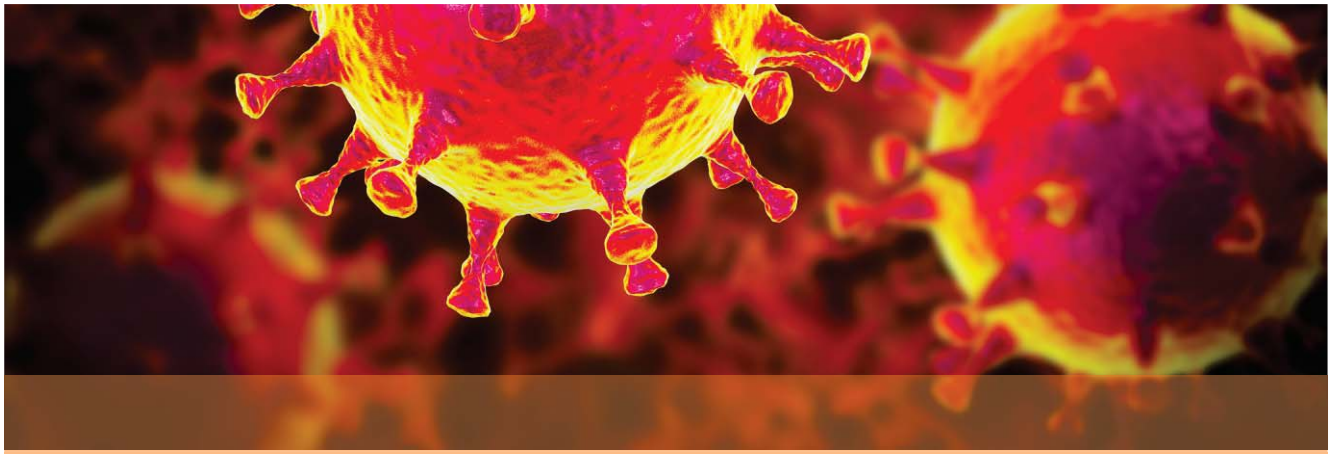
with this pandemic is the slowing of the pace in the achieving of many development targets, including the Sustainable Development Goals. There is a high probability that SDG 6, the goal for water and sanitation, will be further delayed. Depending on the global recovery time from the crisis, this could be for a long time.

In this flurry of emergency responses, it is important to note that we also have the opportunity to do the opposite. We can, in fact, accelerate our efforts toward the SDGs in the medium term, and be firmly on the pathway to sustainable development and a lower carbon economy in the long term. This is the moment when, in many countries in the world, unsafe water and poor sanitation are key Covid risk factors on the one hand, and core to the containment and recovery strategy on the other. The UN system, with UN Water as the anchor, has launched the Global Acceleration Framework and the Decade of Action to nudge world leaders to achieve SDG 6 in its entirety by 2030.

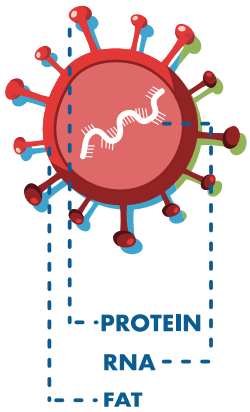
The timing is opportune as water and sanitation matters are enjoying political attention in the public sector and huge focus in the private sector. This must be the right time to engage in catalytic actions to leapfrog the current system constraints to universal access to safe water and sanitation with concomitant, smarter, eco-friendly waste and wastewater treatment. This should be complemented by the industrialisation of the beneficiation of waste and wastewater to produce fertilizers, energy, high-value chemicals, lipids and proteins. These actions will prove transformative – economically, socially and environmentally.

To make this a reality, there are some critical success factors. Firstly, we have to heighten our efforts to translate the accumulated scientific and technological knowledge in this domain to tangible products and services for immediate use on the ground. There will have to be substantive support to product and business development and an overhaul of our archaic regulatory rules and operating procedures.

Secondly, we need new economic models to effect large-scale implementation and sustainable operations and maintenance. Thirdly, we need to bolster our partnerships between science and society, governments and business, local and international. Covid-19 has introduced a ray of hope for new global solidarity. Coronavirus has emphasised that we are unarguably friends in need, let us become friends in deed!



Information resources on water and Covid-19



The following Covid-19 and water related resources are available:

- Water Research Commission http://www.wrc.org.za/corona-virus/
- International Water Association https://iwa-network.org/news/information-resources-on-water-and-covid-19/
- Global Water Research Coalition http://www.globalwaterresearchcoalition.net/
- World Health Organisation https://www.who.int/water_sanitation_health/news-events/wash-and-covid-19/en/
- Water Supply and Sanitation Collaborative Council https://www.wsscc.org/2020/03/31/covid-19-transmission-and-sanitation-and-hygiene-services/

NEWS

Construction to start on Eastern Cape pipeline

Construction of the Tsomo Ngqamakhwe bulk water pipeline in the Eastern Cape was set to commence in August, reported the Department of Water and Sanitation (DWS).

The pipeline is one of the water projects to be undertaken by the department this financial year and it is set to improve water supply to Ngqamakhwe, Butterworth and surrounding areas. Project designs have been completed and the project engineer is on site while awaiting the Department of Labour to satisfy itself with all the necessary requirements needed before the commencement of any construction work.

"Upon completion of the work by the Department of Labour, the project site will be established. The department is satisfied with the preparatory work done so far, and it is confident that the ball will get rolling as soon as all the consultative work has been completed," it said in a statement.

Phase 1 of the project which consists of the construction of a pump station, reservoirs and a pipeline from Tsomo Water Treatment Works to Ngqamakhwe is expected to cost approximately R481 million.

Phase 2 consists of the construction of a bulk water pipeline from Ngqamakhwe to a reservoir and the last phase will be the construction of another bulk water pipeline from the command reservoir to a water treatment works in Butterworth.

"The DWS is steadfast in constructing water infrastructure that will meet the needs of communities and ensure adequate water supply for generations to come," it said.

Source: DWS

Final decision on raw water tariff increases awaited

The final decision on raw water tariff increases will be taken by the Minister of the Human Settlements, Water and Sanitation once all inputs have been considered.

This is according to a statement by the Department of Water and Sanitation (DWS).

The DWS recently held consultations with various waters users in the country as per the requirements of the NWA's legislative process on the proposed raw water use charges for the 2021/22 financial year. In terms of the National Water Act of 1998, the department is required to establish an annual raw water pricing strategy after consulting widely with different water users that include mines, industries, agriculture, energy and domestic users. Consultations were done through virtual meetings, physical meetings and emails. In terms of the capital unit charge, tariffs will be set to ensure that the debt is fully paid by the end-user within a reasonable time period (not longer than the life of the asset), after considering affordability and future augmentation of the scheme. It is also envisaged that the debt will not overlap unreasonably to another project thus causing financial strain on that project.

The capital unit charges may be phased in during the construction period and interest will generally not be capitalized after completion of the construction. The proposed raw water charges for water resource infrastructure in domestic and industrial use envisage an annual increase limited to PPI (April 1,2%) plus 10% up until the target for development charge is achieved on Government Water Systems. Tariff increases range from 0% to 11,2% in agriculture irrigation charges; the depreciation charge will be capped at 1.5c per cubic metres at PPI (April 1,2 %). Operation and maintenance cost increases will be limited to 50% a year.

Source: DWS

Environmental scientists call for increased protection for threatened SA freshwater fish

Cape Town – A recent Foundational Biodiversity Information Programme (FBIP)-funded endeavour has turned the tables on the conservation status of a freshwater stream fish, the Maloti minnow, thought to be extinct.

Ezemvelo KZN Wildlife freshwater ecologist, Skhumbuzo Kubheka, presented his finding to a recent Symposium of Contemporary Conservation Practise to a wild round of applause. Scientifically known as ***Pseudobarbus quathlambae***, the Maloti minnow was last collected 80 years ago when original collections were made in the upper uMkhomazana River in KwaZulu-Natal in 1938.

Minnows form part of the Cyprinidae family, and are the largest and most diverse fish family – they feed largely on freshwater invertebrates and vegetation, thus contributing to the maintenance of ecosystem structure and related provision of ecosystem services to humans downstream.

The Maloti minnow prefers small streams with a water depth of about 0.5 m, and slow to moderate flowing water, with boulders and cobbles as the dominant substratum.

Kubheka said that between the time of the original collections in 1938 and the early 1960s scientists had documented 'extermination' of minnow populations due to predation by trout and habitat destruction. By 1966 scientists had all but concluded that the Maloti minnow was extinct.

According to Kubheka, the impending 'extinction' caused doubt and consternation in freshwater science circles whereby some thought that the 'original' Maloti minnow were brought from Lesotho. But one scientist, Dr Paul Skelton, a freshwater fish expert, maintained that the uMkhomazana River was the 'type locality' of ***P. quathlambae***. It followed that on the 26 April 2017 ***P. quathlambae*** was 'rediscovered' by Kubheka and three colleagues (Nkanyiso Ntuli, Snazo Gqola, and Nozipho Mkhabela) at the adjacent Mzimkhulu River System – a first record for this river system. The discovery was made during a survey to map the distribution and determine the status of trout in the province.

Follow-up surveys have revealed the species in four other locations, but they are confined to a small area, which Kubheka says is 'scary' and highlights a conservation concern. According to Kubheka the Mzimkhulu River find also lends weight to the theory that ***P. quathlambae*** was once widespread in and around the Drakensberg Mountains.

Khubeka said the threat to the Maloti minnow created obligations and responsibilities on all parties, especially the conservation authorities responsible for the area, to ensure the long-term survival of the species in South Africa. "It will be sad if we do not do much to protect what we thought we've lost," he said.

Source: FBIP

South Africa's National Climate Change Adaptation Strategy approved

South Africa's National Climate Change Adaptation Strategy (NCCAS) has been approved. The Strategy supports the country's ability to meet its obligations in terms of the Paris Agreement on Climate Change.

"This Strategy defines the country's vulnerabilities, plans to reduce those vulnerabilities and leverage opportunities, outlines the required resources for such action, whilst demonstrating progress on climate change adaptation," said the Minister of Environment, Forestry and Fisheries, Barbara Creecy.

The NCCAS outlines a set of objectives, interventions and outcomes to enable the country to give expression to its commitment to the Paris Agreement. Developed in consultation with all relevant stakeholders and approved by Cabinet, it aims to reduce the vulnerability of society, the economy and the environment to the effects of climate change. It gives effect to the National Development Plan's vision of creating a low-carbon, climate resilient economy and a just society.

"Adaptation to climate change presents South Africa with an opportunity to transform the health of the economy and build resilience, thus strengthening the social and spatial fabric, and enables the country to remain globally competitive," said Creecy.

It will ensure that food production is not threatened, infrastructure is resilient and enable continued sustainable economic development.

"This Strategy is an important step forward for South Africa. We now have a common reference point for climate change adaptation efforts in South Africa in the short to medium-term, providing guidance across all levels of government, sectors, and stakeholders affected by climate variability and change," said the Minister.

The ten-year plan, coordinated by the Department of Environment, Forestry and Fisheries, will be reviewed every five years.

GLOBAL

Report unpacks water as reason for migration

A new report from the United Nations University Institute for Water, Environment and Health unpacks relationships between water and global migration.

Global migration has been increasing since the 1990s. As millions of people are exposed to multiple water crises, daily needs related to water quality, lack of provisioning, excess or shortage of water become vital for survival as well for livelihood support. In turn, the crisis can transform into conflict and act as a trigger for migration, both voluntary and forced, depending on the conditions.

The report, Water and Migration: A Global Overview, aims to start unpacking relationships between water and migration. The data used in this Report are collected from available public sources and reviewed in the context of water and climate.

A three-dimensional (3D) framework is outlined for water-related migration assessment. The framework may be useful to aggerate water-related causes and consequences of migration and interpret them in various socioecological, socioeconomic, and sociopolitical settings.

A case study approach is adopted to illustrate the various applications of the framework to dynamics of migration in various geographic and hydrological scenarios. The case studies reflect on well-known examples of environmental and water degradation, but with a focus on displacement /migration and socioeconomic challenges that apply.

The relevance of proxy measures such as the Global Conflict Risk Index, which helps quantify water and migration interconnections, is discussed in relation to geographic, political, environmental, and economic parameters.

To access the report,
Visit: www.shorturl.at/svAZ0

Lack of water remains a problem for millions of school children globally

The most basic defence against Covid-19, namely handwashing, remains out of reach for millions of students and their teachers.

This is according to figures released by the World Health Organisation and Unicef in August.

Around 43% of schools globally have nowhere for their pupils to wash their hands with soap and water. In sub-Saharan Africa, where a million Covid-19 cases have now been reported and thousands have lost their lives, this figure rises to nearly threequarters of schools (74%) that lack soap and water for handwashing.

Jean-Bosco Twizeyimana is a student at Group Scholaire Kibungo in Bugesera in Eastern Rwanda. The school has a basic water harvesting system, but it's not enough to meet the needs of all the pupils. "There's no water to wash hands after using the toilet, so we don't wash them before coming out of class. At home, we don't wash our hands, the problem is we don't have the water."

As Covid-19 spread around the world, schools closed to prevent the spread of the virus. Whilst many pupils have had access to some level of digital learning, a whole generation of children in developing countries risk being left further behind. The poverty gap may continue to widen between children who are able to continue to access education and those who cannot.

WaterAid is calling for governments to make hygiene, water and toilets in schools a top priority now and for post-Covid-19 and to make funding available to get proper handwashing facilities in all schools. "Too many schools are still built with no clean water or toilets which means they cannot provide a safe or good quality education," the organisation said in a statement. "Donors and development agencies must commit to stopping this dangerous practice so that pupils do not have to worry everyday about where they will get a drink or go to the toilet."

The schools data can be found here, https://washdata.org/data

Alaska getting wetter is bad news for global climate

Alaska is getting wetter. A new study spells out what that means for the permafrost that underlies about 85% of the US state, and the consequences for Earth's global climate.

The study, published in Nature Publishing Group journal, ***Climate and Atmospheric Science***, is the first to compare how rainfall is affecting permafrost thaw across time, space and variety of ecosystems. It shows that increased summer rainfall is degrading permafrost across the state.

As Siberia remains in the headlines for record-setting heatwaves and wildfires, Alaska is experiencing the rainiest five years in its century-long meteorological record. Extreme weather on both ends of the spectrum – hot and dry versus cool and wet – are driven by an aspect of climate change called Arctic amplification. As the earth warms, temperatures in the Arctic rise faster than the global average. While the physical basis of Arctic amplification is well understood, it is less known how it will affect the permafrost that underlies about a quarter of the Northern Hemisphere, including most of Alaska. Permafrost locks about twice the carbon that is currently in the atmosphere into long-term storage, and supports Northern infrastructure such as roads and buildings; so understanding how a changing climate will affect it is crucial for both people living in the Arctic and those in lower latitudes.

"In our research area the winter has lost almost three weeks to summer," says study lead author and Fairbanks resident Thomas A. Douglas, who is a scientist with the US Army Cold Regions Research and Engineering Laboratory. "This, along with more rainstorms, means far more wet precipitation is falling every summer."

Over the course of five years, the research team took 2 750 measurements of how far below the land's surface permafrost had thawed by the end of summer across a wide range of environments near Fairbanks, Alaska. More rainfall led to deeper thaw across all sites. After the wettest summer in 2014, permafrost didn't freeze back to previous levels even after subsequent summers were drier. Wetlands and disturbed sites, like trail crossings and clearings, showed the most thaw.

"This study adds to the growing body of knowledge about how extreme weather – ranging from heat spells to intense summer rains – can disrupt foundational aspects of Arctic ecosystems," says Merritt Turetsky, Director of the University of Colorado Boulder's Institute of Arctic and Alpine Research and a co-author of the study. "These changes are not occurring gradually over decades or lifetimes; we are watching them occur over mere months to years."

Study tracks Covid-19 in wastewater from planes, cruise ships

Testing wastewater systems on long-haul planes and cruise ships could provide crucial information on detecting the presence of the Covid-19 virus in incoming passengers.

A new paper in ***Journal of Travel Medicine*** reported that testing of aircraft and cruise ship wastewater upon arriving at their destination had detected genetic fragments of the Covid-19 virus, SARS-CoV-2, a step forward in using this test as an additional public health management tool. Researchers from The University of Queensland (UQ) and Australia's national science agency CSIRO worked with transport companies to test on-board wastewater from lavatories.

CSIRO Chief Executive, Dr Larry Marshall, said rapidly pinpointing hotspots for Covid-19 will help keep all Australians safe as we start to travel again. "Responding to a pandemic is not just about the race for a vaccine, Australian science is supporting our economic recovery by delivering for partners like Qantas," Marshall said.

"Our relationship with air travel goes back to the 60s, and today our unique coatings already protect aircraft, so it's great to be trusted to keep Australia flying while helping to stay ahead of any potential new outbreaks."

Paper co-author and Professor Jochen Mueller from UQ's Queensland Alliance for Environmental Health Sciences said this tool could help as governments and transport industries develop plans to minimise transmission associated with resuming international travel.

"This could provide additional peace of mind to track and manage infection and play an important role in opening up long-haul flights or cruises resuming," Prof Mueller said.

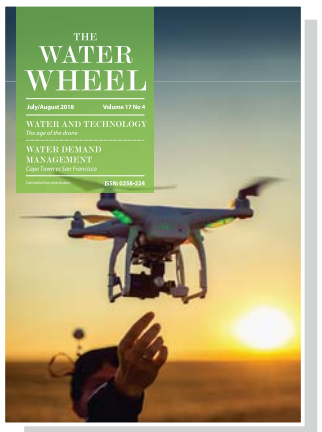
The test provides an early warning of infection, as the virus sheds in the stools of infected passengers even before they show symptoms.

Lead author and CSIRO researcher Warish Ahmed said the virus fragments in the wastewater were unviable, so not infectious. "The study indicates that surveillance of wastewater from large transport vessels with their own sanitation systems has potential as a parallel data source to prioritise clinical testing among disembarking passengers."

To access the paper,
Visit: www.shorturl.at/koEXY

THE WATER WHEEL

SUBSCRIPTION



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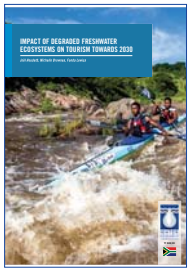
NEW WRC REPORTS

A win-win solution for mine waste cleanup: The remediation of mine contaminated sites, the recovery of metals, prevention of water pollution and job creation
Over 120 km of the Witwatersrand is affected by the legacy of gold mining. Many dumps have been reprocessed and are being reprocessed but the roots of the dumps are left behind causing continuous pollution. The mine dump residue continually drips acidic water into the Witwatersrand catchments impacting on the Vaal- and Crocodile River systems. To stop the continual pollution of the waterways and to improve the health of the people affected by the dump residue, the WIN-WIN team approached the WRC to fund a feasibility study for the clean-up of the dump areas by a women-headed and women-driven team. A leading objective was to create employment and opportunities for entrepreneurship.
WRC Report no. 2845/1/20

The returns on investments in Reserve determinations in the last 20 years
This short scoping project attempted to address the valuation of the investment in RDM Reserve studies in the past 20 years. The Reserve concept followed from a period of extractive use and wide-ranging impacts prior to the 1960s. The National Water Act (No. 36 of 1998) made provision for determining Resource Directed Measures (RDM), which includes the ecological Reserve and the Basic Human Needs Reserve. The Reserve concept sought to achieve a balance between development (water used by, and impacted on, all sectors) and protection (securing water quantity and quality for basic human needs and sustaining the resource base). Since the method development of the Reserve concept, numerous studies of varying costs, in various catchments were completed. A need was identified to review the returns on investment of the different RDM studies.
WRC Report no. 2939/1/20



Impact of degraded freshwater ecosystems on tourism towards 2030
A better understanding of the links between the condition of ecosystems and the sustainability and growth of the tourism sector creates the potential for tourism to unlock incentives for environmental management and restoration that will support tourism and thereby its capacity to drive economic transformation for South Africans.With a specific focus on freshwater ecosystems, the objectives were to:

- Demonstrate the links between natural capital, tourism and global change and the influence such links have on the development potential of the tourism sector and its contribution to generating economic benefits and supporting Small, Medium and Microenterprise (SMME) development
- Generate recommendations regarding policy and further research needs to promote environmental management and ecological restoration through tourism The study also incorporated a capacity development component with youth in the case study areas. These activities sought to raise awareness about nature-tourism linkages as a building block towards empowering youth to recognise sustainable tourism opportunities.

WRC Report no. TT 828/20

Integrated land use and water use in water management areas, with a view on future climate and land use changes
Accurate quantification of the water balance in catchments is fundamentally important in the planning, management and allocation of water resources, especially in arid and semiarid regions. Some components of the water balance, such as evapotranspiration (ET), streamflow and groundwater recharge are directly related to land use. The overall aim of this project was to determine water use from agricultural land, natural ecosystems and urban areas (domestic and industrial water use) using a combination of remote sensing and geographical information system (GIS) products, and provide the information in the format of user-friendly summary sheets and guidelines for integrated land and water use at WMA/provincial/municipal level.
WRC Report no. 2520/1/20

Knowledge exchange to improve implementation of irrigation water measurement/metering at farm and scheme level
Irrigation water measurement is critically important when aiming to improve water-energy-food security. Without wide-scale, accurate measurement, it is not possible to determine how much water is used by the irrigation sector, or to create benchmarks from where water resource management institutions and growers can set targets to become more irrigation efficient and water productive. Whereas the discourse in the past has focused on the advantages and disadvantages of water measurement and metering, the publication of regulations by the Department of Water and Sanitation (DWS) (Government Notice 131 of 17 February 2017 and Government Notice 141 of 23 February 2018) has required the taking of water for irrigation purposes to be measured, recorded and reported, shifting the focus from the "why" to the "how". This triggered an urgency among growers and water user associations (WUAs) to know more about the implementation of water measurement and metering, and the value it will add to water management. It was this project's objective to support the uptake of water measurement and metering in commercial irrigated agriculture and the uptake of the WRC's research in this regard by generating content and stimulating participation that specifically address key questions of commercial irrigators and WUAs.
WRC Report no. TT 826/20

To download a free copy of these reports Visit: www.wrc.org.za.