

FLUID THOUGHTS

Sustainable social housing as a theatre for change



WRC CEO, Dhesigen Naidoo

South Africa is struggling. This is true for much of the world, but this is where we live. We have a seemingly perfect storm of another economic dip tempered with deep social upheaval and an increasing ecological deficit as we continue, on the one hand, to depend on coal for our meagre energy supply and have to deal with new pollution threats like microplastics and pharmaceutical waste on the other. Its tight! And globally we have seen an exponential increase in natural disasters – bushfires in Australia, tornadoes in the US, continued drought conditions, tempered by destructive flooding events in South Africa.

At the same time, on the other side of this paradox, we have the highest levels of research derived scientific knowledge and the largest number of knowledge-based solutions and innovations in history. The problem that this community of practice has is the meagre spaces available to pilot, demonstrate and upscale these new solutions and practices that will radically and positively change our fortunes with respect to water, energy, food and health security. All of this at a lower carbon budget.

Using the water domain as an example, we know the benefit of a constellation of local and global partnerships in such promising domains like Water Sensitive Design, Recycling and Reuse platforms and New Sanitation. These include global heavyweights like the Gates Foundation, the Toilet Board Coalition with major multinational partnerships.

In the energy and wastewater domains rapid movements in the REEEP (Renewables IPP) and global movements in more accessible renewables are now reaching a rapid downward gradient in costs. Add to this the improvements in more traditional energy options being optimised for both higher efficiencies and low emissions.

Waste beneficiation has made great strides that has resulted both in waste minimisation and real entrepreneurial opportunities that have emanated for very viable business development and jobs creation.

While many innovations and smart solutions have been tested beyond the laboratory, out in the field, we have not seen the potential symphonious harmony and resource efficiency that would emanate from a composite demonstration site. That opportunity lies in the planned Social Housing projects in the

Department of Human Settlements 2020 plan, especially those designed with mixed-development ambitions. This would lay out the blueprint for the Resilient Cities of the future.

What this requires is a design that organises significant water supply from the new 'taps' of rain and stormwater harvesting, infrastructure for scaled water reuse and recycling, quality enhancement through natural wetland preservation and where useful artificial wetland construction – we would greatly increase the water security levels in the settlement. Add to this better energy efficiency and alternative power generation through solar, wind, biomass and other options together with a now considerably lower energy demand from the water infrastructure – energy security becomes an enhanced possibility.

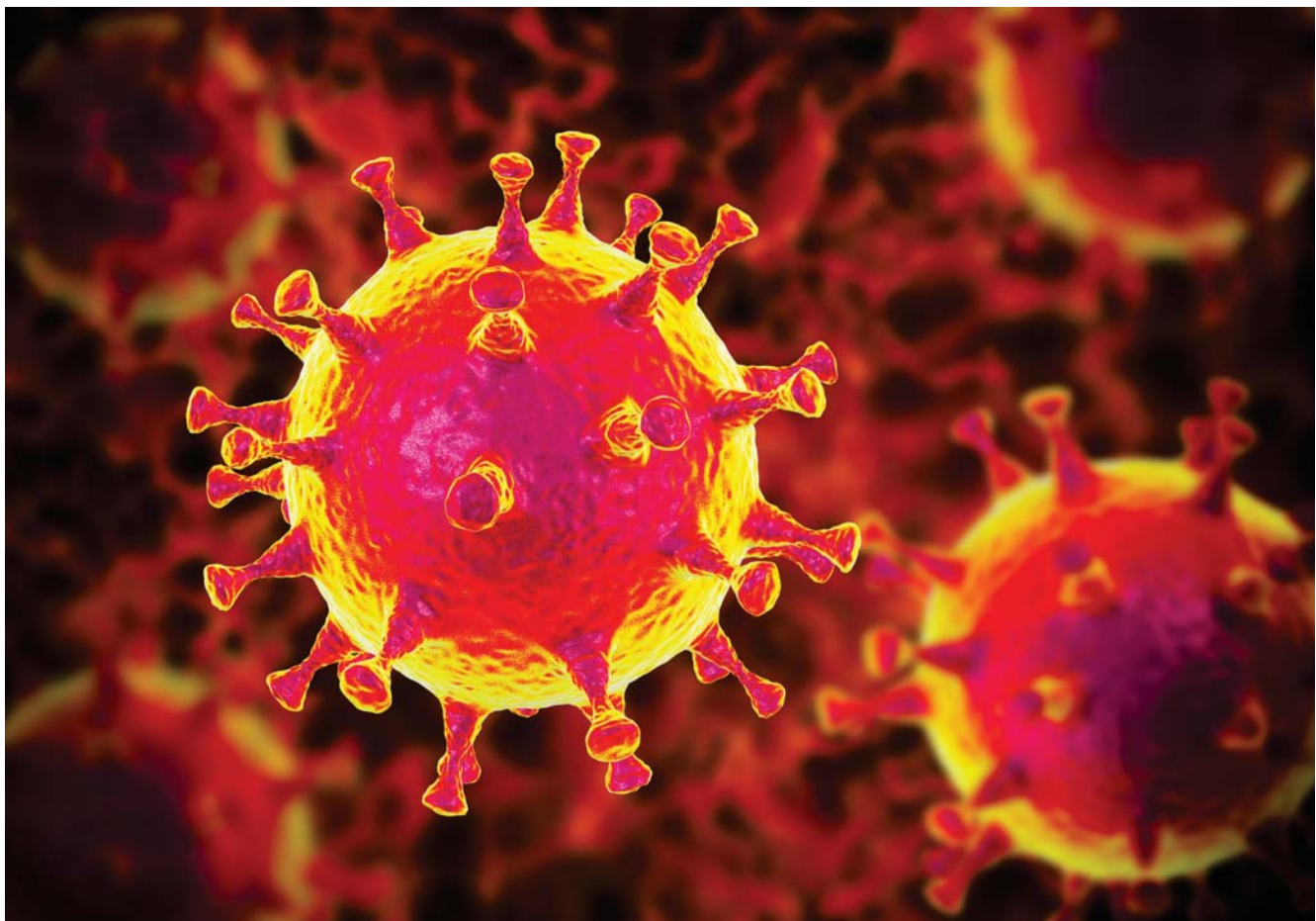
If we add to this mix smart and innovative urban gardening techniques, including vertical farming, we have an improvement in food and nutritional security. This water-energy-food nexus enhancement has the added boon of significantly reducing greenhouse gas emissions and lowering our carbon budget.

Smarter waste beneficiation and innovative waste management will reduce settlements' carbon footprint, and the whole environment will be both ecologically enhanced and aesthetically pleasing. It will become a great place to live and work.

If we have two or three or four of these new settlements developed in this way it will set the path for town-wide developments and lay the foundation for Africa to be the first continent to develop truly resilient and sustainable mega-cities. Then our mantra from WSSD 2002 – People, Planet Prosperity – will be truly realised.

CORONAVIRUS DISEASE (COVID-19)

Water Quality, Sanitation and Hygiene Management in light of Coronavirus Disease (COVID-19)



What we know

Coronavirus disease (COVID-19) which has been declared a pandemic by the World Health Organisation (WHO) is caused by the SARS-CoV-2 that was isolated in Wuhan, China in January 2020. SARS-CoV-2 belongs to the family of zoonotic Coronavirus (meaning they are transmitted between animals and people). The virus has not been previously identified in humans and, as a result, humans do not have immunity to the virus.

Individuals and people at high risk

For individuals at high risk (people > 60 years and those with underlying medical conditions (heart ailments, HIV/AIDS, diabetes, respiratory conditions) infection can result in the

development of severe pneumonia and can ultimately lead to death. At the time of writing there was no known vaccine or medication that can treat the disease.

To date, the disease has been confirmed in over 100 countries, including South Africa. Based on known infectious disease epidemiology models, it is expected that the number of cases will continue to rise, peak and then subsequently plateau off.

The South African National Institute of Communicable Diseases (NICD) continues to provide up to date status/changes of COVID-19 transmission in the country.

How the virus is transmitted

The virus is thought to spread mainly from person to person: between people who are in close contact with one another through respiratory droplets produced when an infected person coughs or sneezes.

It may be possible that a person can get COVID-19 by touching a surface or object that has the virus on it and then touching their own mouth, nose or eyes. This is not thought to be the main way the virus is spread.

Know the signs and symptoms

COVID-19 presents as a respiratory illness with symptoms very similar to influenza disease such as:

- Fever
- Cough
- Shortness of breath

Seek medical advice if you develop symptoms or have been in close contact with someone known to have COVID-19.

Keeping drinking water safe

South Africans get their drinking water from a variety of sources, the two main sources being surface water and groundwater. Safe water sources include tap water and well managed boreholes and wells while unsafe water sources include rivers, and unmanaged wells and boreholes. Viruses, such as rotavirus, norovirus, polio virus and hepatitis A are known to persist and be transmitted through untreated water but, **to date, there has been no evidence that COVID-19 can be transmitted**

through treated drinking water or through groundwater. Thus, its persistence in water still remains to be verified.

Being a virus that is susceptible to environmental conditions, COVID-19 should be very fragile and will easily die off when in unfavourable conditions (commonly used disinfectants, such as chlorine as well as to high heat, low or high pH and sunlight).

For South Africans who have access to tap water

It is therefore reasonable to assume, based on limited research available, that South Africans with access to tap water from a well-managed drinking water distribution system are highly unlikely to contract COVID-19 from their drinking water. A well-managed drinking water distribution system should ideally use filtration and disinfection, and should have a free residual chlorine (0.2 and 0.5 mg/L) throughout the distribution system to ensure effective inactivation of the virus.

For South Africans who do not have access to piped water

For South Africans who use alternative sources of water, such as springs, streams, boreholes, rainwater etc. and/or also store water in their homes for a period of time, the same rules with regard to household water treatment at point-of-use and safe storage apply.

As a general rule, safe disinfectants in the form of bleach, hypochlorite or chlorine should be used to disinfect the water before use.





COVID-19 should be inactivated through:

- Correct application of boiling (meaning, rolling boiling water for 2-3 minutes)
- Irradiation (solar and UV) disinfection
- Sedimentation and filtration techniques

It must be noted that, although drinking water in itself might not lead to the transmission and spread of COVID-19, collection of water from community stand pipes, shared boreholes, or from tankers, and other related activities bringing healthy individuals in close proximity to those infected might aid human-to-human transmission.

Wastewater and the Use of Sanitation Services

Unlike treated drinking water and groundwater, COVID-19 is likely to be present in wastewater where active infections are present. Furthermore, based on observations, COVID-19 may be transmitted through the faecal-oral route. It should be noted though that, at the time of writing, there were no reports of faecal-oral transmission of the COVID-19 virus or transmission via wastewater systems with or without wastewater treatment. Approximately, 2% to 10% of persons with COVID-19 disease present with diarrhoea at the early stages of infection rather than a fever. Molecular analysis in 2 studies has shown that the virus can survive in wastewater, faeces and urine for at least 14 days at 4°C and approximately 2 days at a higher temperature of 20°C.

The indirect and direct reclamation of wastewater effluent for reuse is increasingly being recognised as one of the sustainable

measures to augment water supply in South Africa, in light of climate change and increasing drought conditions. Current wastewater reuse practices in South Africa include greywater harvesting and use, treated wastewater reuse for irrigation as well as treatment of wastewater effluent for drinking purposes in areas like Beaufort West where the water supply is a blend consisting of approximately 20% reused water. Given knowledge of the virus structure and the die off rates of other coronaviruses when exposed to different inactivation methods, it can be assumed that treated wastewater, even if from a COVID-19 infected area, will still be safe for reuse if treated to the required quality with currently used water reuse technologies and systems.

Safe practices at wastewater treatment plants

In the absence of new information and research findings with regards to COVID-19 and wastewater, current occupational health and safety best practices at wastewater treatment and water reuse plants should be implemented.

- Workers should always use personal protective equipment (PPE) and adhere to practices that will minimise or completely prevent their exposure to untreated water as they are the ones most at risk not only of getting COVID-19 but other waterborne diseases
- Personal protective equipment should ideally consist of a mask, goggles, a fluid-resistant apron and gloves
- Workers should perform hand hygiene practices, such as handwashing using soap and water or a hand rub using an

alcohol-based formulation after removing PPE

Once again, the people most at risk will be those working with faecal sludge when emptying pits or fixing sewerage systems and it is critical that they continue to maintain best practice for safely managing faecal waste.

Safe practices in households

The safe confinement of human wastes (faeces and urine) is effective in preventing transmission of viruses and pathogens. Households that have flush toilets connected to a well-designed and maintained public wastewater system or septic tank do not face any additional risk of contracting COVID-19. The same applies for households with access to a well-constructed pit toilet with a ventilation pipe.

Toilets should be flushed with the lid down to prevent droplet splatter and aerosol clouds. An investigation in Hong Kong regarding COVID-19 cases in an apartment building revealed the possibility of virus spread through an improperly sealed pipe, which carried infected faecal matter through the building's ventilation system and into people's bathrooms. So far this is the only study that had reported transmission through a sewerage system.

Best hygiene practice to curb the spread of COVID-2019

Frequent and proper hand hygiene has been identified as one of the key measures in preventing the spread of COVID-19. Not only is proper hand hygiene important in curbing the spread of this particular outbreak, but this practice is also important in preventing the spread of other harmful microorganisms in general.

Hands must be washed, after using the toilet; after disposing of faeces; after changing babies' nappies and disposing of their faeces; before preparing food; before eating; before feeding children; immediately after handling raw food; after contact with contaminated surfaces, e.g. rubbish bins, cleaning cloths; after handling pets and domestic animals; after contact with blood or bodily fluids, e.g. faeces, vomit; before and after dressing wounds or giving care to a sick person; after wiping or blowing your nose. Hands must be washed using soap and clean water.

As South Africa heads into the winter season, a drop in ambient temperature and in humidity levels provides ideal conditions not only for COVID-19 to thrive, but also influenza viruses. The following preventative and good hygiene practices apply:

- avoid contact with others if they have cold- and flu-like symptoms
- clean and disinfect surfaces and floors regularly
- cough and sneeze into your elbow
- avoid touching your face, especially eyes, nose and mouth
- stay home if you are unwell

In the instances where water is not available, an alcohol-based sanitiser product, with an alcohol concentration of at least 60% v/v can be used. If hands are visibly dirty, an alcohol-based rub is likely to be ineffective due to the fact that alcohol does not

penetrate soil very well. If this is not available then alternative such as the following can be used:

- Mild (0.05%) chlorine solutions e.g. unscented bleach
- Methylated spirits
- Antiseptic products

WRC Reports:

- **WRC Report No. TT 460/11:** Provides guidelines for managing water-related microbial diseases specifically looking at health and hygiene awareness
- **WRC Report No. 2134/1/18:** Understanding and addressing the exposure of workers, the public and the environment to pathogens during pit emptying

For more information:

- South Africa Coronavirus update, <http://www.nicd.ac.za/>
- Water Research Commission (WRC) Knowledge Hub (www.wrc.org.za)
- WHO (Water, Sanitation, hygiene and waste management for COVID-19 Technical Brief (3 March 2020) <https://www.who.int/publications-detail/water-sanitation-hygiene-and-waste-management-for-covid-19>
- Global Water Research Coalition (GWRC). COVID-19 Virus Water, Sanitation and Wastewater Management. Fact Sheet (10 March 2020)

