

A sanitation game changer for Africa and the world

By [Jay Bhagwan](#)

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Millions of South Africans are among the four billion-plus people that are without decent and sustainable sanitation in the world. And our horror stories are well documented, including the shocking cases of school pupils that have died in pit latrines. Many more countries in the world have faced similar cases and clearly this is a pressing human rights issue.



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The toilet-wastewater-energy-pollution and health nexus is an emerging issue in the developed and developing world. The provision of safe, hygienic and appropriate sanitation solutions is a priority development in the world. Developed nations have followed a linear design approach to meet their sanitation needs with conventional waterborne systems implemented and continuously improved to meet more stringent control and pollution regulations in order to minimise the overloading of the natural environment. Developing countries on the other hand continue to struggle to implement such systems, due to a myriad of factors associated with financing, affordability and thus resulted in a heavy reliance on on-site systems.

New sanitation paradigm needed

On-site systems pose a different set of technical challenges related to their management which is often overlooked in the developing world. While significant strides have been made in conventional treatment processes towards meeting effluent discharge standards, these all come at a significant cost and energy requirement. Further, climate variability and water security put on added pressure on resources available for flushing and transporting human wastes. A new sanitation paradigm which challenges current thinking and reflects on technology disruption is thus urgently needed. That is, technology which can safely treat human excreta and matches user preferences without the need for sewers, and minimal reliance for external water, energy and one which has potential for beneficiation of waste streams.

Through innovation and smart chain supply, universal access can be achieved sustainably and linked to water security and business opportunities. The opportunity opens up for leapfrogging these solutions in growing urban cities of the developing world, as well as the water-starved developed world, reducing water consumption, carbon footprint and eliminating pollutant pathways. Thus, there is an urgent need to develop the next generation of off-grid, innovative and novel technological options for sanitation that takes into account available water and energy resources, user preferences, variable user population, and are able to contribute to revenue generation through beneficiation of waste products or reduce operational and maintenance costs.

Such an intervention can contribute to around 30% savings in water supplied, 60% saving on capital, elimination of sewers and resource-intensive traditional wastewater treatment systems, reduction or elimination of pollution pathways, etc. The further benefit offered by non-sewered sanitating (NSS) is the potential for a sustainable new sanitation circular economy which offers opportunities for job creation and social upliftment, as well as industrialisation, localisation and a new services industry.



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Effects of climate variability

Water stress and constraint is a growing challenge and concern for many countries in the world. We have already witnessed and realised the effects of climate variability, extreme events and rapid population growth which has made many cities vulnerable – Cape Town, California, Chennai, Bangalore to name a few experiences that have lived through the mercies of nature. It has also shown that our engineering and solutions are not adequate, and we require radical and disruptive solutions to 'future-proof our water security'.

NSS offers this opportunity, to disrupt the FLUSH practice through which the potential release and contribution of nearly 30-60% of water can be made to the resource, and thereby improve both water and sanitation security. The additional benefits relate to closing a pollution pathway which so seriously affects the environment and public health, extension of capacity of existing infrastructure and possibly a reduction in need for new and larger infrastructure.



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New opportunities for a sanitation economy

Non-sewered sanitation also offers the elements for a circular economy which sees human waste as a resource, which allows a whole ecosystem of beneficiation to be derived from processing, by-products and servicing models which support self-sustaining businesses. It will have a catalytic effect of stimulating and developing a series and variety of logistics and supply chain models which brings greater convenience to the user/customer. This resource approach opens these new opportunities for a sanitation economy.

Concerted and coordinated global effort is required to grow and stimulate a new range of non-sewered/off-grid sanitation

solutions, which can treat and manage human faeces and urine. The focus should be placed on the following actions:

- Bring attention of the current challenge and the raising opportunities at global level;
- Disseminate practical, replicable and / or up-scalable solutions for the management and institutional models for NSS systems;
- Provide a platform to share and exchange scientific advancement and knowledge needs for innovation, technology development, techniques and implementation mechanisms;
- Improve the scientific background and tools for their use, application and decision-making;
- Apply the scientific and practical knowledge to advocate for policy reform to ensure long-term sustainability of infrastructure investment; and
- Stimulate the development of new and innovative non-sewered sanitation technologies.

The next-generation toilet technologies are on their way and are shifting away from the current 'flush-and-dispose' and 'drop-and-store' models. It is envisaged that the new generation of technologies will be point-of-use or beneficiation generation systems which aim to eliminate human waste at source. New systems will incorporate in it the water sensitive design planning and thinking. It aims to be smart, working off-the-grid and treating human wastes at source, eliminating pathogens, and possibly generating products of beneficial value. The next generation toilets could also be coupled with the latest developments in online monitoring and sensing.

Knowledge sharing

The non-sewered sanitation specialist group (NSS SG) of the International Water association (IWA) was officially launched in Tokyo last year during the 2018 IWA World Water Congress. Its mission is to bring together experts, scientists and practitioners in the field of faecal sludge management and non-sewered sanitation to generate, collate and disseminate worldwide the knowledge in this field. This is a very important event for the South African sector, as it will provide direct access to international knowledge, innovation and developments in the area of NSS and faecal sludge management.

The first IWA Non-Sewered Sanitation (NSS) specialist group conference is being hosted in Pretoria, South Africa in partnership with the Water Research Commission, EnviroSan Africa and the University of Pretoria. The event responds to the challenges and needs of the millions of South Africans and the billions of people globally requiring sanitation. The aim of the conference is to provide stimulus for research and innovation for NSS and off-grid sanitation solutions including faecal sludge management, build the technical and scientific base for NSS and to contribute to scientific knowledge and good practice learnings. More than 400 participants from around the globe and some of the leading institutes engaged in this field of activity will arrive at our shores and will focus on new and innovative sanitation, with the aim of establishing a new community of practice which includes innovators, industrialists, scientists, entrepreneurs, policy-makers and municipal officials.

ABOUT THE AUTHOR

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