

## Rori Mpete: Thinking outside the box – retrofitting water saving in conventional waterborne sanitation systems

### OVERVIEW

Climate change will have drastic impacts on South Africa's economy and society and the need to adapt is urgent. As the country embarks on a just transition to a low-carbon, climate-resilient and environmentally-sustainable economy, an opportunity exists to develop domestic small, green businesses. This case study forms part of a broader initiative on small business development in South Africa's climate change space. It presents the journey and experience of Rori Mpete, a South African entrepreneur active in the water and sanitation sector.

### FROM IT TO INNOVATION IN THE SANITATION SECTOR

Rori Mpete is the Chief Executive Officer and founding partner of Loo Afrique. He studied Information Technology (IT) at the University of Johannesburg. After graduation, he worked as a junior lecturer. He later joined a telecommunication company which had projects in various African countries. He took the opportunity to work in some of these countries and this gave him a different perspective about the need to promote improved access to services such as sanitation. Most countries across the continent indeed have sanitation challenges.

From the telecommunication company, he moved to a water and sanitation company that had interests in bio-technology applications in the health sector. This also exposed him to the sanitation sector in South Africa, which enhanced his motivation to start a company in the sector.

### FROM TNM INNOVATION TO LOO AFRIQUE

TnM Innovations was founded by Rori and a colleague. The idea of forming the company was conceived in 2012. This entry point was motivated after observing the increasing water shortages in the country.

One particular incident of note was when they visited the home of one of their grandmothers. The water basin in the toilet was not working and they thought of washing their hands in the cistern since the water that goes into it is clean. This gave them an idea of re-positioning the lid of the cistern upside-down, so that it acts as a basin. With the water outlet positioned up, this allowed the washing of hands while the waste water goes into the cistern, thus encouraging grey water usage in everyday living.

After some deliberation they sketched a prototype that could be retrofitted to waterborne toilet systems suitable in different settings, including households, schools and other public spaces. That is how the company was formed, with its initial operations undertaken in a garage.

In 2018, TnM Innovations was transformed into a new company called Loo Afrique (Pty) Ltd, to reflect Rori's now sole ownership as well the definite continental ambition of the business. The focus still remains the same: research and development (R&D) in the water and sanitation sector, specialising in water efficiency.

The company aims to improve sanitation in the country and the rest of the continent by

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providing appropriate sanitation solutions, through re-engineering and retrofitting current infrastructure. Its strategy employs various ways to contribute to the development of the sanitation sector.

Loo Afrique took a decision to align with the Sustainable Development Goal 6 that targets water and sanitation, and at the same time integrate youth empowerment and sustainable growth.

From TnM Innovations to Loo Afrique, their value propositions are remarkable:

- A 100% black youth-owned entity, of which a 30% share ownership is reserved for women in the future;
- All the products are locally manufactured and proudly South African;
- The solutions create a measurable impact in the community through job creation in manufacturing and plumbing opportunities;
- The solutions are easily scalable, safe and sustainable; and
- The solutions offer community education and awareness on water efficiency.

The company provides a range of services that includes:

- Manufacturing water efficiency products, grey water products, water optimisation, and rain water harvesting solutions;
- Facility maintenance, such as plumbing services, mobile toilets, and desludging services;
- R&D focused on water-efficient products and onsite sanitation solutions; and
- Campaign management targeting user behaviour and promoting grey water education in the communities.

## THE TECHNOLOGY

The R&D process has to design and produce products that are user-friendly and easy to install. The process should not be complicated (it must be a DIY). The products also have to be affordable to the majority of people on the continent. This led to the focus on the user interface components of the toilet system, which comprise three parts, namely the cap, the cistern, and the seat.

Most of the technological design and prototypes are based on the observation made at the grandmother's house – that reversing the cistern cap

## HARNESSING ADAPTATION CO-BENEFITS WITH APPROPRIATE SANITATION SYSTEMS

The lack of adequate access to sanitation services is associated with health challenges and impacts on human dignity, with significant negative impacts on socio-economic development.

This challenge is evident the world over, and South Africa is no exception. While there has been notable efforts to enhance access to sanitation services, huge backlogs remain, and inefficient waterborne sanitation systems are proving to be inappropriate in water scarce settings.

Increasingly, water-efficient toilet systems are being promoted to enhance access to sanitation services, as well as providing climate change adaptation co-benefits. This is envisaged to enhance people's health and environmental integrity, while at the same time creating business opportunities along the sanitation value chain.

can allow people to wash their hands, while that same water fills the cistern (thus improving on hygiene) and at the same time equally flushing with grey water.

The key highlights are three products, namely the Pee Basin, the Loo Cap, and the Evo-Flush3.0 (see Table 1 on page 4 for product description).

The main driving force is the substantial water savings that can be realised using these products. The Loo Cap saves 0.8 to 1.2 litres per flush, the Pee Basin saves 0.5 to 1 litre, while the Evo-Flush 3.0 saves over three litres. This makes the technology ideal for toilet facilities at public places such as schools. This technology is simple but relevant in the South African setting.

As shown in Figure 1 on page 3, the most common type of toilet in the country is the waterborne (flush) toilet system connected to sewerage (in 2016 more than 10 million households were using a waterborne system), and this is likely to grow. With conventional waterborne systems, close to half of a household's water consumption is used to flush the toilet, hence water saving innovations like Loo Afrique's solutions will bring much-needed huge water savings and is one of the low hanging fruits in driving substantial water conservation and demand management in the country.

The retrofitting of existing sanitation systems furthermore creates huge capital savings on "new grey water infrastructure".

Loo Afrique intends to use locally available raw materials to manufacture its products.

It is also considering joining the circular economy and using recycled material (plastic). The use of recycled plastic comes with a manufacturing limitation on product colour. The recycled material only allows the toilet system to come out in a black colour, thus creating a big stigma challenge, as society is generally used to a white toilet interface. However, it seems Rori and his team are determined to combat this “minor” hurdle of colour.

While there are various sanitation products on the South African sanitation market, Loo Afrique’s products have a competitive edge. Its design is unique and no one is producing similar units in the country. Even though some companies import similar products from countries such as China, the potential threat of competition remains minimal. In addition, Rori has extensive knowledge and networks in the sector, which are fast-tracking the marketing of the company.

Most of the support towards innovation tends to be characterised by a linear approach that demands experience and a proven track record to access it. This scenario limits innovation and takes away the frontrunner advantage for early career innovators as they struggle to meet such criteria. For instance, Rori (Loo Afrique) stills struggles to acquire moulds and

lacks the capacity to manufacture, besides having developed the prototypes some years back.

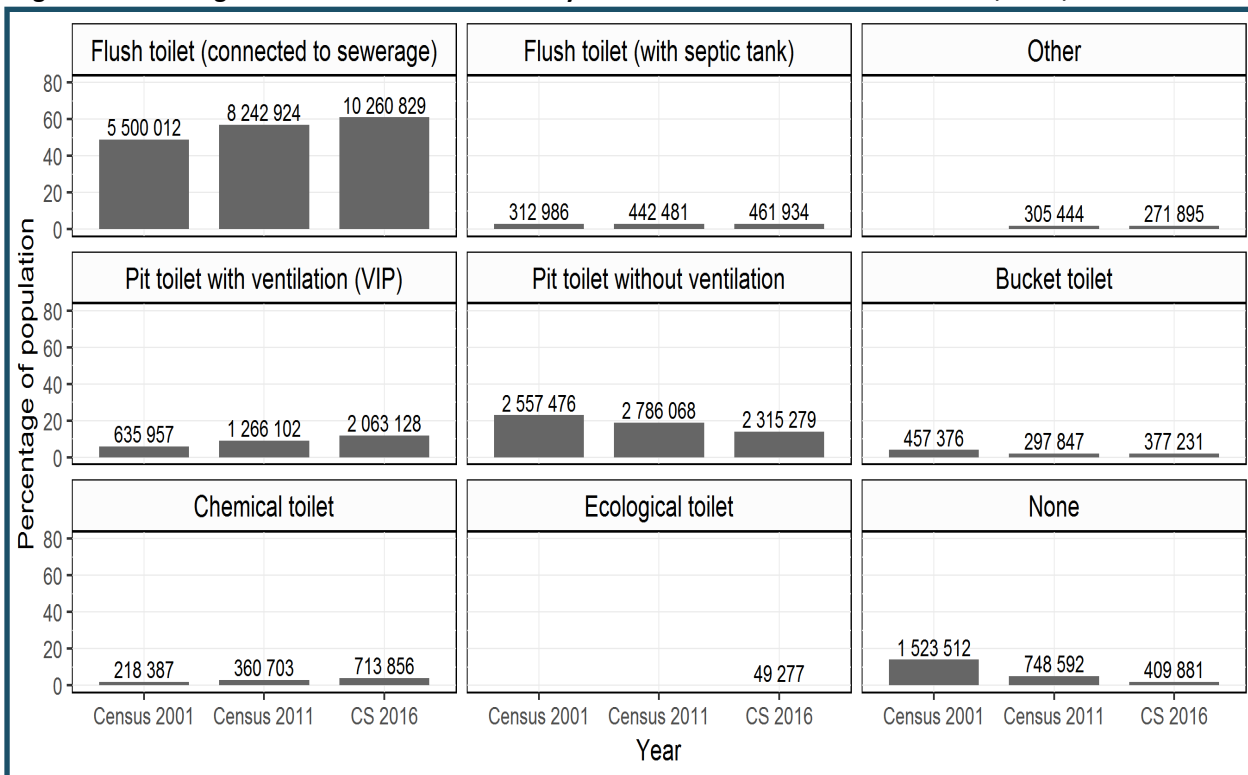
Given this scenario, Loo Afrique has opted for an outsourcing model which involves relying on an existing manufacturing firm for the production process on their behalf. This market traction solution has relatively lower penetration costs of entry. In the longer run, Loo Afrique aims to set up its own manufacturing facility in Tshwane and manufacture its own products, thus creating more sustainable jobs. Rori goes on to say:

“To have our products manufactured by an existing manufacturer won’t create the much-needed impact in terms of job creation and sustainable business. However, if Loo Afrique manufactures its new innovative products in the market using their own facility or factory, this will have immediate positive economic impacts in the lives of many young South Africans in Tshwane.”

### THE JOURNEY

Loo Afrique (formerly TnM Innovations) has participated in various business development-related pitching and competitions in the country and on the continent. A highlight was participating in the UN-Water and UNESCO World Water Day in Durban in 2017, at which the company had the opportunity to showcase its products to then-President Jacob Zuma.

**Figure 1: Percentage and number of households by toilet facilities in South Africa in 2001, 2011, and 2016**



Source: Mudombi (2018). *Forward-Looking Approach to Next Generation Sanitation and Industrial Development in South Africa. Trade & Industrial Policy Strategies.*

**Table 1: Product description**

Product	Description	Benefits
<b>Loo Cap</b>	<ul style="list-style-type: none"> <li>◆ A hand wash basin cap for an existing cistern</li> <li>◆ Comes with a fitted hand wash tap and main water supply connection</li> <li>◆ Lid type: basin shaped closing lid</li> <li>◆ Hand washing tap</li> <li>◆ Downward flushing handle</li> </ul>	<ul style="list-style-type: none"> <li>◆ Uses existing main water supply into the cistern</li> <li>◆ Encourages hand washing</li> <li>◆ Automatic hand-washing basin</li> <li>◆ Grey water from the basin fill the 6 litre cistern</li> <li>◆ Saves 800ml to 1.2 litre of water that could have been used in the process</li> </ul>
<b>Pee Basin</b>	<ul style="list-style-type: none"> <li>◆ An upright standing pee urinal toilet system, with a hand washing basin</li> <li>◆ Grey water flushing system</li> <li>◆ Uses existing plumbing infrastructure</li> <li>◆ Hand washing tap</li> <li>◆ Touch/sensor automatic flushing</li> </ul>	<ul style="list-style-type: none"> <li>◆ Fitted on an existing structure</li> <li>◆ Uses grey water to flush</li> <li>◆ Saves 500ml to 1 litre of water</li> <li>◆ Automatic hand washing basin</li> <li>◆ Grey water from basin flushes the urinal</li> <li>◆ Promotes hygiene</li> </ul>
<b>Evo-Flush3.0</b>	<ul style="list-style-type: none"> <li>◆ A three litre flushing toilet system, with a hand washing basin</li> <li>◆ Grey water flushing system</li> <li>◆ Uses existing plumbing infrastructure</li> <li>◆ Hand washing tap</li> </ul>	<ul style="list-style-type: none"> <li>◆ Complete new toilet structure</li> <li>◆ Uses grey water to flush</li> <li>◆ Saves over three litres of fresh water as compared to current market products</li> <li>◆ Promotes hygiene</li> </ul>

The company also participated at the Water Research Commission (WRC) Symposium in 2017 and, along the journey, have received various endorsements:

- Loo Afrique won first prize at the 2018/19 Gauteng Accelerator Township Economy (GATE) Awards from the Innovations Hub
- Won first prize at the 2018 City of Tshwane Green Pitch Award (Sustainability & Innovation)
- Publications and features:
  - The 2017 Sowetan Top 100 Youth Business in South Africa
  - 2018 Vukuzenzele Youth Entrepreneurship in Water & Sanitation
- Won the 2017 Yaa-Youth in Agriculture Awards Best Innovative Enterprise of the Year
- Was a pre-selected technology partner for the Women in Water initiative
- Was a finalist in the 2018 SA Premier Business Awards
- Was a finalist in the 2018/19 Imagine H2O International Exhibition
- Endorsed by Esther Mahlangu, through the K'saselihle Cooperative Projects
- Endorsed by the Nelson Mandela Foundation

In 2017, the company received support from the Nelson Mandela Foundation to retrofit the sanitation systems in 100 schools. However, challenges in accessing funding as an entrepreneur have constrained Loo Afrique's ability to carry out the project.

Indeed, despite outstanding awards and wide-ranging recognition of the novelty and potential, the endorsements have not yet translated into tangible support and benefits, apart from the WRC which assisted with product development.

Loo Afrique is now looking forward to engaging in the Water Technologies Demonstration (WADER) programme to help kickstart commercialisation. More broadly, Rori is focusing on creating and strengthening networks with important roleplayers, such as the WRC, the WADER programme and the South African Bureau of Standards (SABS).

### CHALLENGES AND BARRIERS

Since its formation, the company has gone through some challenges (both from a business and private life angle) as well as achieving some milestones, which shows its endurance and resilience.

**The Loo Cap**



**The Pee Basin**



Source: Loo Afrique (Pty) Ltd

The main challenge relates to the lack of resources to sustain the business as well as being able to meet personal needs (so as not to have to rely on personal savings).

According to Rori, there is a lack of sustainable finance in the sector. This unfortunately contributed to the collapse of TnM Innovations. This journey, however, has come with important lessons, which will help guide future engagements.

More importantly, the lack of support to start commercialising its products has been the main hurdle. While there is demand for the products, the unavailability of final products ready for the market remains the biggest challenge.

Loo Afrique is yet to commence manufacturing, and this prevents engaging with customers on potential sales. For an emerging small business, the process of setting up a manufacturing facility is expensive, even for acquiring moulds. The manufacturing industry in South Africa is generally dominated by large, white-owned companies producing plastic and ceramic ware.

Government's policies are not considered to be very supportive by entrepreneurs, particularly in linking research, innovation and business development. What is portrayed in the media as available business support is not what one gets when visiting the offices. In addition, the requirements under the Public Finance Management Act of 1999, which regulates public procurement, is a hindrance to innovators and entrepreneurs, as such requirements are well beyond their means. Moreover, government procurement is very risk averse, which does not favour innovative entrepreneurs.

Rori has positively engaged with various government departments, among others, including:

- Department of Water and Sanitation
- Various departments for the cities of Tshwane and Johannesburg (Department of Development and Infrastructure, Department of Strategic Interest Groups Development, Department of Utility Management)
- Department of Public Works
- Office of the Mayor – City of Tshwane
- Office of The Mayor – City of Johannesburg

Though the engagements have been positive, the actual support has been limited. In terms of future prospects, Loo Afrique will continue to exploit opportunities in the water and sanitation sector. This includes expanding its market in South Africa as well as across the continent. This will be driven by a change in the business model, through strengthening the connection between the project ideas and market readiness. Product diversification is also important going forward. In addition to new innovation, Loo Afrique is working on adding basic sanitation products to its range.

### MAKING CONTACT

Rori is charting his path to success to open doors for fellow scientists, researchers and entrepreneurs who, like him, have the passion at heart to support South Africa's just transition to a low-carbon, climate-resilient and environmentally-sustainable economy and society. To help him grow his innovations and revolutionise Africa's water and sanitation space, get in touch with Rori at:

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This case study forms part of a broader initiative by TIPS with support and funding from the Government of Flanders. It is complemented by a main report, *Small Business Development in the Climate Change Adaptation Space in South Africa*, which summarises the research findings on the topic, as well as five other case studies on South African-based entrepreneurs active in the adaptation space. These are available on the TIPS website at [www.tips.org.za](http://www.tips.org.za).