

6 CLEAN WATER AND SANITATION



3 GOOD HEALTH AND WELL-BEING



5 GENDER EQUALITY



9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



17 PARTNERSHIPS FOR THE GOALS



SASTEP

South African Sanitation Technology Enterprise Programme

SCHOOLS SANITATION : SAFE PARTNERSHIP



Sanitation Appropriate For Education (SAFE) Initiative



basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

Water Research Commission

18th February 2022

DWS Water and Sanitation Summit

Gallagher Estate, Midrand



WATER RESEARCH COMMISSION



water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA



BILL & MELINDA GATES foundation



science & innovation

Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA

South African Sanitation Technology Enterprise Programme (SASTEP) VISION

VISION STATEMENT

*Upon conclusion of SASTEP, a rejuvenated South African sanitation industry should have emerged that not only creates jobs and contributes to the GDP but also is a global leader in the **application of alternative sanitation technologies that provides everyone in South Africa with access to dignified sanitation that minimizes pollution, enables valorization and promotes health, safety and water security.***



- Jointly funded by WRC, BMGF, and the DSI, SASTEP and supported by DWS.
- Multi-sectoral partnerships linked to sanitation provision choices, how to deal with environmental constraints (like lack of water) and how to use modular systems and configure for different settlements types
- Programme is building the sanitation industry by building the right partnerships in public and private sector as bringing international partnerships to solve the challenges

STATE OF SCHOOLS SANITATION

CHALLENGES



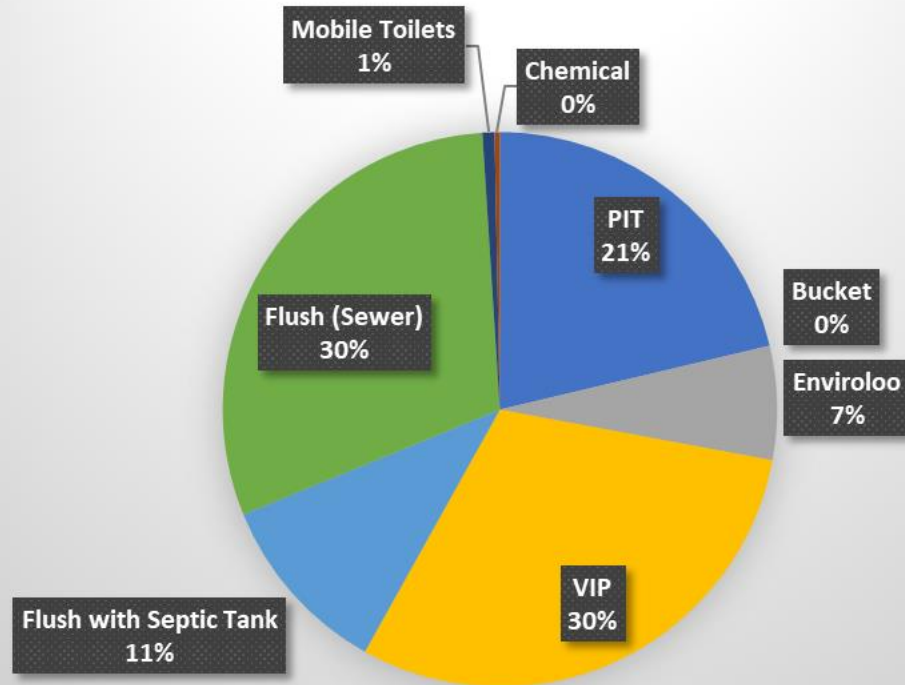
	Number of schools	Pit Latrines ONLY & Unacceptable Sanitation	Undemolished Pit Toilets	Requires Grade R Facilities	Insufficient Toilets
TOTAL	10 661	3 898	3 040	7 274	2 103

Data: DBE 2019

• Key Challenges

- Lack of Operations & Maintenance (O&M) Budget
- Lack of technology options
- Lack of water
- Inability to manage budgets and roles in a co-operative way
- Inability to drive sustainable principles into design and management

TOILET TECHNOLOGY SEGMENTATION



Data: Frost & Sullivan 2019

- According to a market study we conducted (Sample size : 264,401), schools' sanitation can be broken down into the following categories:
 1. Mobile toilets
 2. Chemical
 3. Pit
 4. Bucket
 5. VIP
 6. Flush with septic tank
 7. Flush toilets (waterborne centralized)
- Options 1 to 6 could be replaced in future through next generation sanitation options which build in water efficiency, circularity and transformation of waste into value added products



**DO YOU KNOW
MICHAEL?**



RESEARCH & INNOVATION CAN CHANGE SCHOOLS SANITATION TRAJECTORY



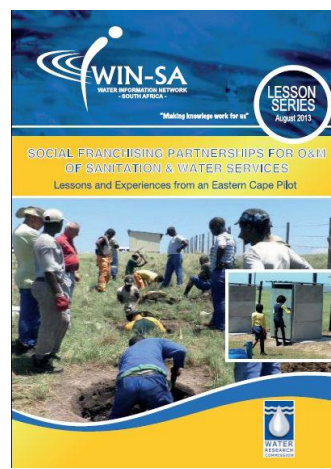
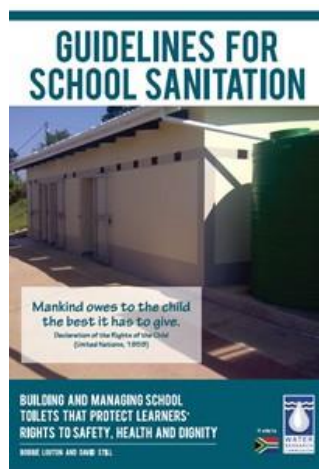
SCHOOLS SANITATION : MODELS TO USE FOR O&M

• *School Sanitation Guidelines*

- Piloted in 8 different schools under the jurisdiction of the KwaZulu-Natal Education Department.
- In each school, the following were assigned: A Health & Safety Officer who was the school cleaner, a Health & Safety Manager who served as a staff member, and the principal who oversees all aspects of the school life.
- Training was provided for the Health & Safety
- Consumables were budgeted monthly
- A cleaning protocol was established

• *Social Franchising model for schools O&M*

- A model to enhance quality of service and create economies of scale
- For the pilot, Amanz'abuntu Services set up a subsidiary, Impilo Yabantu ("Water for People" in Xhosa) Services, to facilitate the training of local franchisors in the Butterworth Education District, Eastern Cape.
- The trainee franchisors were supplied with basic cleaning equipment, a light delivery vehicle demarcated with the Impilo Yabantu logo and a digital camera to visually assess the effect of maintenance services on school toilets.
- Through the pilot, around 400 schools in the Butterworth District benefitted from the franchise operations. The DoE has requested that the programme be extended to a further 3 districts housing 1,000 schools.



SCHOOLS SANITATION : WATER SAVING AND HYGIENE

- Provision of sanitation and hand hygiene products - COVID -19 – hygiene support
- V-cistern and Loo Cap developed under WRC WADER Technology Accelerator
- Rolled out sanitation and wash stations in 5 schools under SASTEP during COVID-19
- Tested greywater to flush and clean water to wash hands after use of toilet
- Tested Rapid Wash – portable hand wash station to improve hygiene where water is not readily available
 - E.g., Blitz Wash - a 25-liter sanitizer station
- Tested and evaluated for efficiency, hygiene improvement and savings with innovator
- The grassroots innovator has sales in SADC but not in South Africa from public sector. Sales with private sector in SA.
- We should support local innovators with viable products

TOILET FACILITY - Before



TOILET FACILITY - After





**DO YOU KNOW
MICHAEL?**

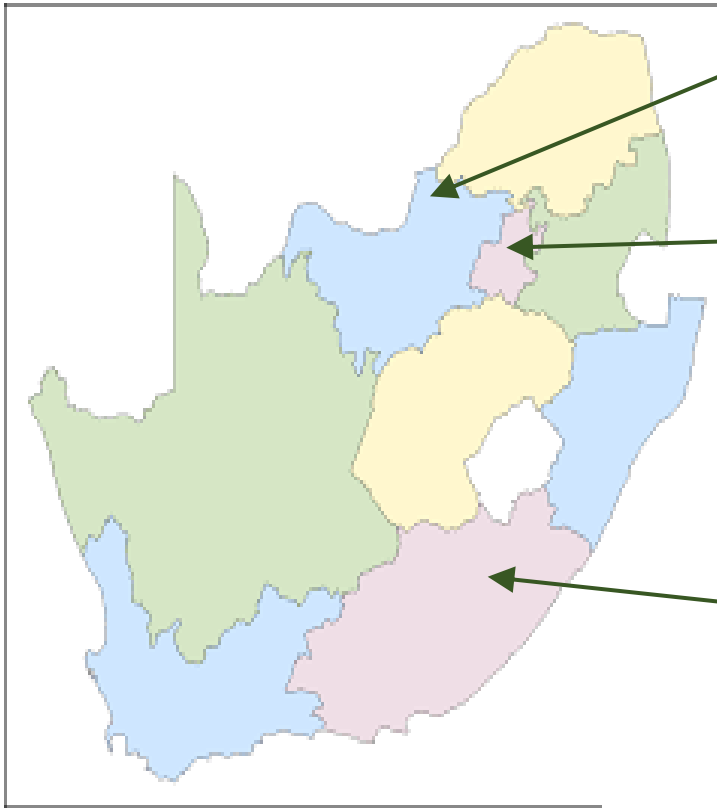


SAFE INITIATIVE : EXTENDED DEMO SUB-PROGRAMME



SCHOOLS SANITATION : PARTNERING WITH SAFE INITIATIVE

- 10 selected with DBE
- Designed an extended SAFE Demonstration sub-programme
- The demos will be harmonised to provide data to DBE on
 - OPEX
 - CAPEX
 - User acceptability
- Sustainable design principles in new technologies:
 - Full recycle toilets
 - Modular ablution facilities
 - Generation of nutrients, energy and water
 - Testing of various treatment technologies
 - Lifecycle cost assessment



NORTHWEST PROVINCE
SCHOOL

- Tirelo School

TECHNOLOGIES

- Clear / Enviroloo system

GAUTENG PROVINCE

- Tsholetsega Primary School
- Olievenhoutbosch Primary School, Tshwane
- Esikhisini Primary School , Tshwane

EASTERN CAPE PROVINCE

SCHOOL

1. Dlungwana Primary School
2. Khanyisani Primary School
3. Celinkungu Primary School
4. Bakerville Primary School
5. Kgaola Primary School
6. Ikaheng Primary School

TECHNOLOGIES

- Clear / Enviroloo system
- EOOS/Eazi-Split
- USF Newgenerator
- Arumloo + DEWdrop
- Calcamite (Ecomite)

SCHOOLS SANITATION: PROGRESS ON EXTENDED DEMO

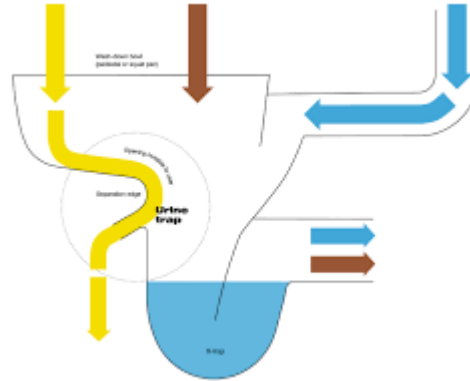


On-going Demo Projects				
	Name of Site	Technology	Commercial Partner	Status
1	Tsholetsega Primary School, Kagiso	Clear recirculation toilet system	Enviro-options	Demo commenced July 2019
2	Tirelo Farm Primary School	Clear recirculation toilet system	Enviro-options	Demo site completed November 2021, awaiting power connection
3	Sobantu Secondary school, KZN	EOOS	Envirosan	Small scale Demo in school. Completed.
Planned Demo Projects				
	Name of Site	Technology	Commercial Partner	Status
1	Khanyisani Primary School, Eastern Cape	Newgenerator	WEC Projects	Demo unit in production, installation expected Mar/Apr 2022
2	Celinkungu Junior School, Eastern Cape	EOOS	Envirosan	Contract phase, site work should commence Feb 2022
3	Maria linden JSS, Eastern Cape	Clear recirculation toilet system	Enviro-options	Demo unit in production, installation expected Mar/Apr 2022
5	Isandlwana Schools, KZN	Clear recirculation toilet system	Enviro-options	Proposal under consideration, if approved will be installed during 2022
6	Dlungwana Senior Primary School	Eco-mite	Calcamite	Proposal under consideration, if approved will be installed during 2022
7	Ikaheng Primary School	Bio-mite	Calcamite	Proposal under consideration, if approved will be installed during 2022

Demos are funded by BMGF ; DSI funds support additional due diligence and SA grassroots innovators



SANITATION INNOVATION : WATER EFFICIENCY AND RESOURCE RECOVERY (PEDESTAL, URINAL AND PROCESSOR)



Diamond Reactor



- Off Grid Nutrient Recovery Unit
- Converts 98 Litres of urine to 1 KG of Biological Fertilizer
- Completely Automated
- Remote Monitoring from cell phone - Smart City
- Batch System process
- Effluent Treatment for reuse for low flush toilets etc.
- Stand Alone or Complete Ablution Block

• Water Efficiency

- Protocol for testing
- Innovations tested with a 1 to 5 L flush
- Innovation linked to :
 - Pedestal design
 - Cistern design (leaks)
 - Cistern design for greywater use as flush water

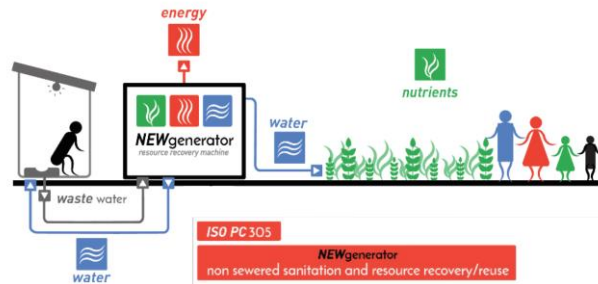
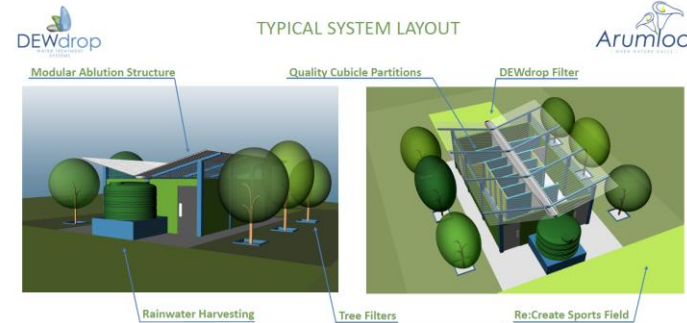
• Resource Recovery

- Innovations designed to
 - Separate urine
 - Recover urine as struvite (modular and mobile)
 - Recover urine as value added product (modular and communal)
 - Biodegradable

- Testing done on final products for sale and use

Demos are funded by BMGF ; DSI funds support additional due diligence and SA grassroots innovators

SANITATION INNOVATION : WATER EFFICIENCY AND RESOURCE RECOVERY (FULL UNIT, BACKEND, PROCESSING)



• Design

- Modular
- Ease of installation
- Non-sewered

• Water Efficiency

- Full recycle – fill once and enjoy the experience of a centralised waterborne system
- Rainwater harvesting

• Resource Recovery

- Water recovered and recycle
- Energy recovery
- Nutrient recovery

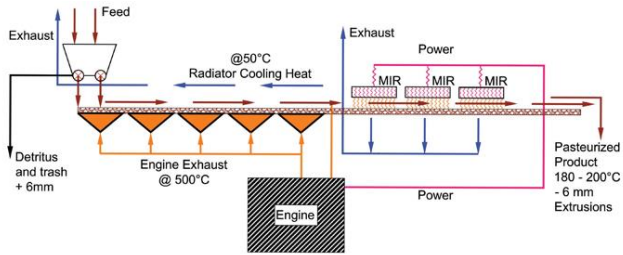
• Standards & Certification

- Building standardization and certification of technologies to ensure quality and performance with Agreement and SABS

Demos are funded by BMGF ; DSI funds support additional due diligence and SA grassroots innovators

SANITATION INNOVATION : SLUDGE PROCESSING

- Testing innovations (centralized and decentralized)
- Removing Pollution via waste conversion
 - Biochar
 - Hydro char
 - Activated carbon
 - Soil conditioner
 - Building materials
 - Fertilizer
 - Animal feed



Demos are funded by BMGF ; DSI funds support additional due diligence and SA grassroots innovators

Take Home Message

- We can provide more innovative, equitable and dignified solutions for our children
- Need cooperation from DBE for increased uptake of next generation sanitation innovations
- Let's not ignore O&M!
 - Current O&M benchmarks suggest children can have excellent sanitation for as little as R4000 a month per school (consumables, energy and janitor (general services) payment
 - Or we can use a social franchising model and consolidate services for economies of scale
 - Or we can build longer term O&M services contracts with supplier
- Let's choose technologies based on lifecycle costs and drive sustainable principles into design and management as part of a greater sustainable development goal for schools' sanitation
- We must disrupt the thinking that if its not waterborne, it can only be PITS and VIP's. Our children deserve better

For more information and queries contact:

Akin Akinsete
SASTEP Programme Manager
Water Research Commission
Email: akina@wrc.org.za
Tel.: 012 761 9366



SASTEP

South African Sanitation Technology
Enterprise Programme

Thank you for your attention