



WIN-SA

WATER INFORMATION NETWORK
- SOUTH AFRICA -

2

**eThekweni's
water
&
sanitation
programme**

Lessons series - issue two

"Making knowledge work for us"

OVERVIEW

PROJECT AIM

To provide an acceptable basic level of water and sanitation to all households in eThekweni municipality's rural and peri-urban communities by 2010 through the supply of urine diversion toilets and 200 litre yard tanks.

PROJECT APPROACH

Programme management

The programme is managed by the construction department of eThekweni municipality, with the education and training component being the responsibility of the education division of eThekweni's water and sanitation department.

Prioritisation of the roll-out

The decision on which areas to supply first is based on an assessment of the risk of outbreak of waterborne disease, by the municipality's health department.

Institutional and social development consultants

Institutional and social development (ISD) consultant are appointed to establish and assist project steering committees in the communities where the rollout is taking place. The ISD consultants are also responsible for training and managing facilitators from the community who educate households about the toilets and water supply. The ISD consultants also assist in identifying opportunities for skills development for emerging contractors.

Local employment

The project aims to stimulate the local economy through using local contractors and assisting local people to become suppliers of materials such as bricks. Through the project steering committee, the needy households in the community are identified for preferential access to employment opportunities through the project.

Funding

The project is funded through the Municipal Infrastructure Grant (MIG). In certain cases additional funds are acquired from the capital budget to install bulk reticulation infrastructure.

Education

The project has a strong emphasis on education, both in terms of the correct use of the urine diversion (UD) toilets and the yard tanks, but also on health issues. Training and educational material has been developed by the municipality for use by the ISD consultants and the facilitators.

Monitoring and evaluation

The Human Science Research Council provides on-going feedback on the impact of the roll-out through a longitudinal study of more than 1000 households who have benefited from the roll-out. The University of KwaZulu-Natal provides scientific evaluation of the functioning of the UD toilets.

In-house Capacity

The project relies predominantly on capacity within the municipality.

The inside of a UD toilet



HOW URINE DIVERSION SANITATION WORKS

Urine diversion (UD) is a form of ecological sanitation, designed to ensure that human waste is dealt with in an environmentally and economically sustainable way. A UD toilet is designed to separate urine and faeces. The system is a dry system and no water is used in its operation. The urine is diverted to a soak away, leaving only faeces to accumulate in the sealed vault below the toilet. The operating principle of UD sanitation is that the faecal matter remains dry and is rendered disease free and safe to handle over time. The toilet design adopted by eThekweni uses a double vault system. Once the first vault is full, the pedestal is moved to cover the second vault and the first vault is sealed until the second vault is full. This

allows for the faecal matter to dry out for at least six months before it is removed. Each time after the toilet is used, sand or ash is used to cover the faeces. This helps in the drying process and also minimises smell.

How the yard tank works

Each household who has paid their once-off connection fee is supplied with a 200-litre plastic yard tank. The tank is positioned on a brick base, near to the house. The tank is filled every night by an electronic bailiff system that automatically cuts off when the tanks are full. The water is free and there is no billing or metering.

eThekwini's Water and Sanitation Programme

The eThekwini municipality is tackling the formidable challenge of providing sanitation and water to its rural and peri-urban communities through the provision of urine diversion toilets and 200 litre yard tanks. This multi-million rand roll-out enters its fourth year in 2006 and provides an opportunity to look at some of the lessons emerging from this programme.

In late 2000 KwaZulu-Natal was hit by a major outbreak of cholera that resulted in the deaths of more than 70 people and infected tens of thousands more. The disease did not spare the city of Durban, nor the outlying villages that had been recently incorporated into the eThekwini municipal boundary.

The city authorities were faced with a massive sanitation and water backlog in the rural and peri-urban areas and this demanded an urgent response to avert another outbreak of this deadly waterborne disease.

The decision was made to provide a basic package of sanitation and water in the form of a urine diversion (UD) toilet and a 200 litre yard tank to all households outside the reach of waterborne sewage and unable to pay for water.

Teddy Gouden, who heads up community education and councillor liaison at the municipality's water and sanitation department, put the backlog of households without adequate sanitation at 140 193 when the roll-out began in 2002. The number of households without access to safe water was 55 432.

The roll-out began with a pilot project in uMzinyathi, a peri-urban area west of Durban central. Here, various designs for sanitation were looked at and the final decision to adopt the UD system was taken.

Gouden explains: "The decision to go with a UD system was taken because of cost considerations plus environmental aspects. It is a sealed unit so you don't impact on the groundwater in anyway," he says.

One of the major cost motivations for choosing UD over ventilated improved pit (VIP) latrines, was the cost of emptying the pits. Gouden points to a recent report that indicates that the municipality will have to spend R70 million to tackle the more than 100 000 pit latrines that need urgent emptying.

"Due to the terrain and inaccessibility of most pit latrines, the cost of emptying one pit latrine is between R600 and

Villages surrounding Inanda Dam





R1 000. So it is totally unsustainable. Even in a municipality as big as Durban, you cannot sustain those kinds of costs.”

Urine diversion technology

UD technology is based on the principal that by keeping urine and faeces separate, the disease-causing pathogens contained in the faecal matter are destroyed over time, through a drying process. The dried faecal matter can be safely removed by the householder at no cost to the municipality.

The toilets are constructed with two vaults or chambers. When the first vault is full, the pedestal is moved over to the second vault, and the first hole is sealed. When the second vault is full, the first vault is emptied and so on.

This means that the faecal matter normally decomposes in the vault for between six months and a year. The urine is diverted into a soakaway. This is done through the design of the pedestal which has two openings. In the front is an opening for urine to be passed in a seated position, behind this is a large opening for faeces. A separate urinal is provided for men to use.

Public education

The roll-out includes a significant public education programme that aims to teach people about breaking the cycle of water-borne disease, but also to introduce the operation and maintenance of the UD system, which requires a change in use from a pit latrine.

The education programme involves five visits to each household in an area where the project is being rolled out. These visits are conducted by project facilitators, who are employed from the local community and trained by an institutional and social development (ISD) consultant. The facilitators use standardised educational material and approaches that have been developed by the municipality to guide each of the visits.

Household visits

Lucky Sibiya, an education officer with the municipality who trains the ISD consultants, describes the series of five visits that each household receives during the project roll-out in their area:

“The aim of the first visit to a household is two-fold. Firstly the intention is to brief the household on the plans to provide sanitation and water. Secondly the visit aims to collect information on the household in order to

assist with planning for the roll-out, such as the number of people in the household, where there are disabled people and whether they will be able to afford the R342.50 connection fee for the water tank.”

The second visit focuses on health and hygiene: “We want first to make the people aware of the health hazards associated with using river water and improper sanitation. We basically want to explain to them how proper sanitation and clean water can break the cycle of disease,” he says.

“The third visit explains how the UD system works and the fourth deals with water, what type of system they will receive, how much it will cost and how it is going to be supplied to them.”

Water is supplied in the form of a 200 litre plastic tank that is filled daily by an electronic bailiff system. The tank supplies a maximum of eight people, as does the toilet.

The last visit deals with operation and maintenance of the toilet. This visit takes place after the toilet has been installed and focuses on how to use the toilet correctly, how to maintain it and how to empty it.

“At this visit the family is given a poster which is stuck inside the door of the toilet. This poster sets out the do’s and don’ts for proper operation of the toilet,” says Sibiya.

Gounden underscores the importance that education is given in the project.

“Once the toilet has been handed over to the households and the project team has moved on, we come in with follow up education. In the completed areas we have

Unimproved pit latrine



done PHAST interventions, (Participatory Health and Sanitation Training), it is very hands-on. We get groups of people together in a workshop situation and get them to talk about their experiences."

In addition the municipality has commissioned street theatre to reinforce the educational message around the correct use of the toilets and breaking the cycle of waterborne disease.

"You need to have on-going education until the correct usage of the toilets becomes entrenched, because the risk is that people will start to regard the new toilets in the same way as the old ones. The cost of the education is however a challenge," Gounden says.

The project is reaching a critical phase in the areas where it was first rolled out as it is now time for many of the toilets to be emptied.

"This will indicate whether people have been using the toilets properly and whether the education has been effective. So we can now start modifying our education, based on our findings," says Gounden.

Community participation

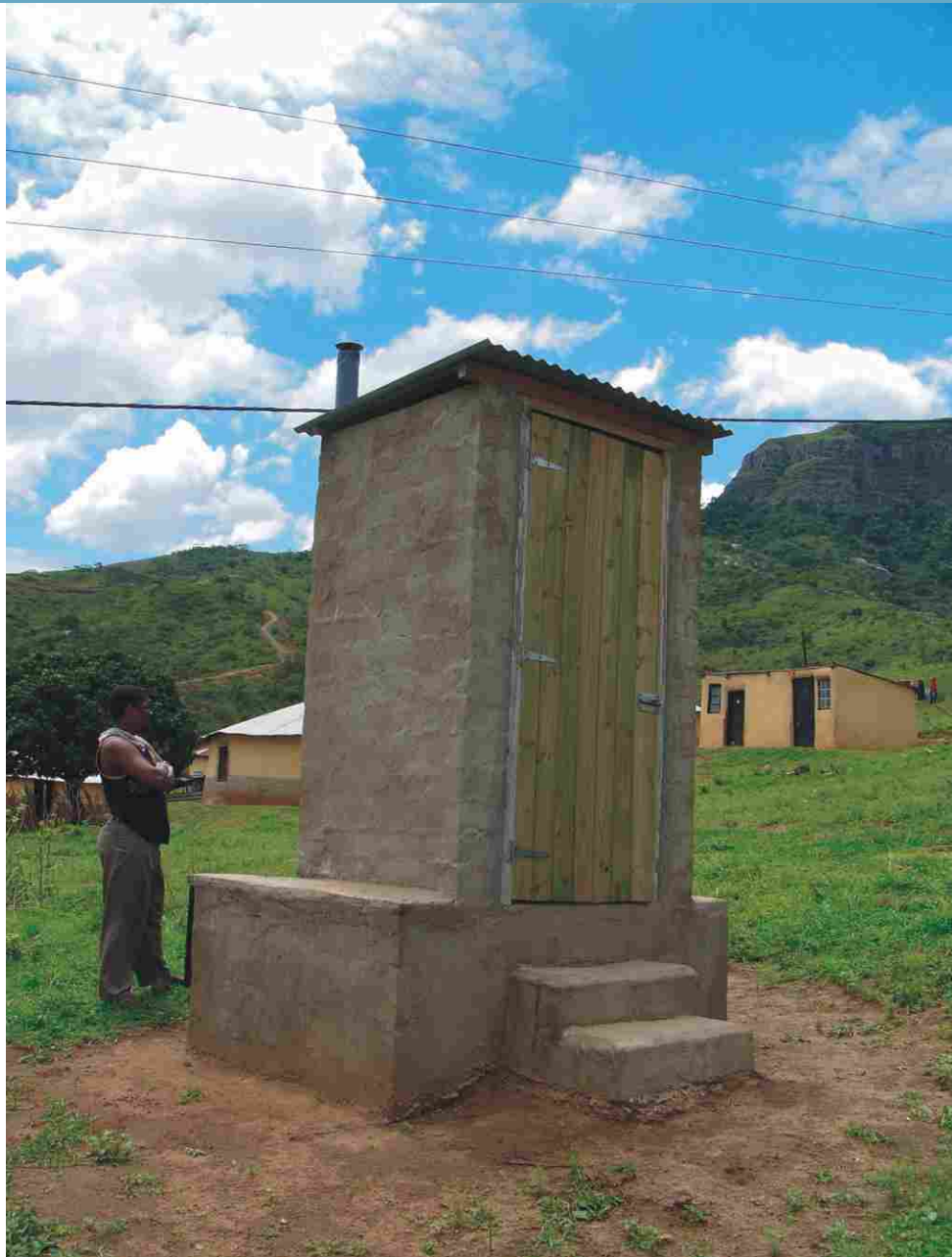
Truman Msomi is one of ten project facilitators for the roll-out in Lower Maphephetheni. Although not far from the city, the area is rural in character and overlooks the picturesque Inanda dam. Msomi visits 10 households per day and describes his role as keeping the community informed about developments on the project.

"At the beginning people were not happy about the new toilets, particularly about the emptying, and said the pits were too shallow. They did not understand the system properly," he says.

Because the project has recently come to this area, no-one has yet had practical experience of emptying the vaults. "At least now people are no longer using the bush," he adds.

Nok'thula Cele, a member of the project steering committee (PSC) for Lower Maphephetheni, echoes Msomi. She says that people are happy with the toilets, it is just a question of emptying it that is causing a problem. She believes that people will come around to the idea of doing this.

"They are not happy about it, except for those who understand how to use the toilet properly," she says.



Urine diversion toilet

The municipality is establishing a system of local contractors who will clear the toilets for people who do not want to do it themselves. The cost is estimated to be between R50 and R100. In addition each household is given a rake and gloves to do the clearing.

Cele also refers to cultural taboos that have made the provision of only one toilet in certain households a problem.

"The rule for building toilets was that only houses that have more than 8 people can have two toilets. But now we saw that this is difficult because in other houses there is Makhoti (daughter-in-law) and Makhoti can't use the same toilet as her in-laws. As we are AmaZulu we are ruled by our traditional rules."

Economic opportunities

Despite reservations about the clearing of the toilets, Cele says the project has been very well received in her area.



Truman Msomi, community facilitator in Lower Maphetheni, next to a 200 litre yard tank

Steve Jonker, project manager on the Lower Maphetheni project, points out that all the bricks for the toilets and to support the water tanks are manufactured in the area. Local people have been trained to manufacture bricks that conform to the correct specifications and the project buys bricks from them.

“By doing this we are saving on transport costs as well as providing economic opportunities which could last a long time after the project has been completed, so it's a win-win situation,” says Jonker.

Jacques Rust, senior divisional engineer at eThekweni's construction department, is in charge of the many project teams rolling out the programme.

“We have provided skills training through the Department of Labour for 600 contractors and provided short term work for 30 000 people,” Rust says.

“Community members get training and skills through the project, and us who are on the committee, we get experience of how to manage a job. These are skills that we as the community have gained. We now have plumbers and welders in the community. Before, we didn't have those skills. Before the roll-out we used to get water from the river and the dam. It was very unhygienic, so we are very proud of this project.”

Both Msomi and Cele work closely with Nokuthula Dube, the ISD consultant for the Lower Maphetheni project. With the strong emphasis on community participation and creating economic opportunities, the ISD consultant plays a pivotal roll in the success of a particular project, through setting up the PSC, training and overseeing the team that conducts the fieldwork and educational visits, as well as engaging with the local ward councillor and tribal authority.

In addition, the ISD consultant assists in the recruitment of local labour, and in conducting an audit of the availability of skills in each project area. Based on the skills gaps identified, local people are trained in bricklaying, plumbing and welding through Department of Labour assisted training.

“The local people are trained and then there is creation of jobs for them. They won't always have to work as unskilled labour, but as semi-skilled or skilled labour. We also look at the employment of the emerging contractors. If they are not trained we have to look at the gaps so that they can be competent local emerging contractors,” says Dube.

Emerging contractors

The construction work is done by emerging contractors using local skills and labour, under the guidance of engineers and project managers employed by eThekweni's construction department. The emphasis on empowering local people is evident in numerous aspects of the project.

Free Water

By late 2005 the project had rolled out 13 000 water tanks and 35 000 UD toilet systems. The roll-out of water has also seen the construction of 30 reservoirs and the laying of over 1 500 km of mains pipelines.

Rust says part of the reason for the lower number of water connections is the R342.50 connection fee that has to be paid by households before they are given a yard tank. This is despite a policy to provide employment on the project to enable poor households to afford the connection fee.

“We believe that it is far more cost effective if we supply all houses with water. The cost of going back later to connect a house is much more expensive. First you have to send a team to locate the house, then you have to do the installation.”

Project steering committee members, Ignatia Gwala, (left) S'tembele Gwala and Nok'thula Cele (right) at the Lower Maphetheni site camp





Work being done by a local contractor to water mains pipes at the Lower Maphephetheni site camp

This has seen Rust send a motivation to the council to waiver the connection fee to ensure that each household is connected. He believes that the connection fee will be waived in January 2006.

Rust estimates the cost per unit at about R4 500 for the toilets. However this varies on the density of dwellings within the project boundary, the area's topography, the existing transportation infrastructure and the distance from supply sources to the project area.

"To date R145 million has been spent on the construction of the toilets, with a total spend of R320 million when you include the roll-out of water, as well as the education programme."

He believes that one of the strengths of the project is that it has been done using in-house capacity, in conjunction with emerging local contractors. This allows for on-going improvement of design, both in terms of construction issues as well as the supporting programmes.

"We have rolled out this project using in-house expertise. We realise that in the smaller district municipalities there is a need to use external consultants, but it is essential to keep a core group of expertise in the municipality. Otherwise once the consultants leave, what happens then?"

Monitoring and Evaluation

A roll-out of a project of this scale offers several opportunities for learning, both in terms of improving the technology as well as the support programmes. In order to ensure that the project responds to any short-comings and capitalises on the learning opportunities, eThekweni has commissioned the Human Science Research Council (HSRC) as well as the Pollution Research Group of the University of KwaZulu-Natal (UKZN) to conduct studies into different aspects of the roll-out.

Locally manufactured bricks ready for sale to the project





HSRC

The HSRC is conducting an on-going independent evaluation of the roll-out. Looking at a sample of 1160 randomly selected households, the HSRC examines the effectiveness of the education programme, the community acceptance of the water and sanitation, and the maintenance of the systems by householders.

In addition, the researchers check the quality of the construction and the hygienic maintenance of the systems through an observational checklist.

This interactive evaluation has been very useful in the detection of problems with the design of toilets and water tanks. It also identifies gaps within the education programme, as well the needs for additional interventions.

The reports give a clear picture of what the concerns of the recipients are and the level of acceptance of the new system. The study has pointed to the need to close other gaps in the eradication of sanitation related diseases, such as the prevalence of pit latrines in schools.

“There was a high level of satisfaction with the new sanitation system, but not as high as that expressed over the water system. The new sanitation service presented more problems than the water service: families were required to understand the principle on which it worked and that households were responsible for maintenance, which included both repairs and the emptying of the pit,” states a report on the survey of households by the HSRC.

The research showed “overwhelmingly that the potential for exposure to contaminated water had been reduced with the a consequent lowering of risk of cholera.”

The greatest challenge in terms of acceptance of the UD toilets was the clearing of the chamber. Fifty-one percent

of the respondents said they “felt very bad” about emptying the toilets, however only four percent said they would not do it.

“On a simple ranking of the statements that evoked the most satisfaction it can be seen that the concept of building the toilets close to the houses and providing information on them were highly rated,” the report states.

UKZN

Chris Brouckaert and Katherine Foxon at the Pollution Research Group at UKZN are conducting a series of tests on pathogens in buried faecal matter from the UD toilets at a test site at the university.

They have set up a series of concrete containers containing material from the UD toilets, as well as controls without faecal matter. These provide data on leachate, migration of pathogens in plants and other data. The effectiveness of the faecal matter as fertilizer is immediately apparent in the growth of the plants and results show that the plants are safe for human consumption.

Although eThekweni is not advocating the use of the composted faecal matter as a soil conditioner at this stage, Chris Brouckaert argues in favour of ecological sanitation.

“Traditional waterborne sewage is an incredibly wasteful system, not only in terms of potable water, but also the loss of phosphorus put into the water system and flushed into the sea.”

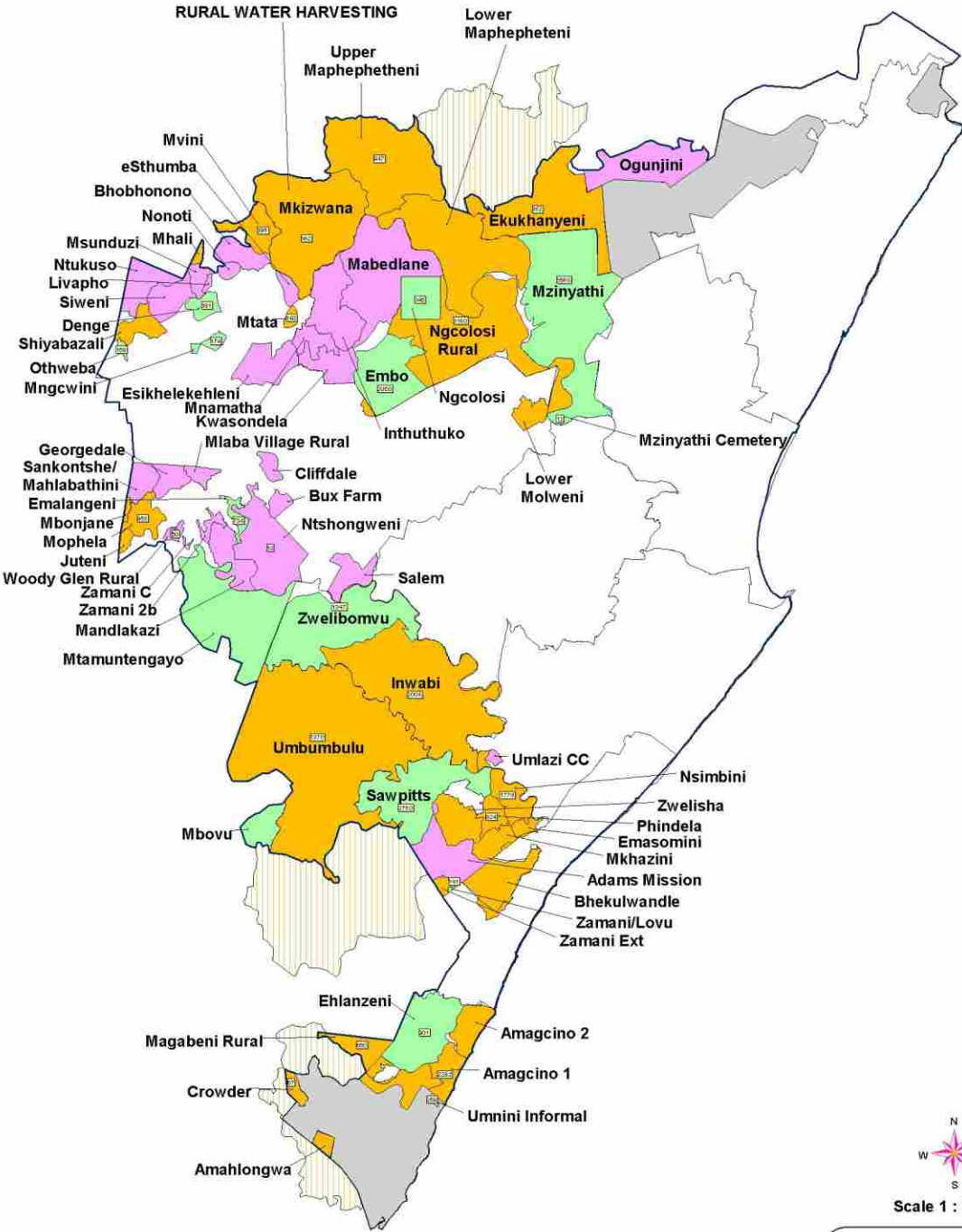
Brouckaert argues that we need a shift in attitude and understanding: “Human waste is a resource with residual value, yet psychologically, legally and socially it is regarded as hazardous waste.”

Pawpaw trees growing at the UKZN experimental site. The large trees have been grown with faecal material from UD toilets



ETHEKWINI WATER SERVICES

RURAL WATER & SANITATION PROJECTS



Scale 1 : 150 000

KEY

- Undeveloped Rural Areas
- Completed Projects
- Future Projects
- Present Projects
- Cross Boundary Projects

AS AT 20 OCTOBER 2005

Numbers of completed units change monthly



LOOKING AT THE LESSONS

1 Get feedback, communicate and respond to problems

In order to benefit from the practical experiences of work being done on the ground, a good feedback system needs to be in place. eThekweni municipality has done this through:

- Commissioning an independent research organisation, the Human Science Research Council to perform an on-going evaluation of all aspects of the project and its acceptance
- Utilising the scientific research capacity of the University of KwaZulu-Natal to investigate the implications of the roll-out of a new technology in order to improve its function
- The establishment of project steering committees in the local communities and the use of local facilitators, working closely with the construction division, allows for effective on-the-ground communication between the community and the project implementing agency

“This programme will provide a lot of information for guiding policy. This is what makes the project unique. Other municipalities, I think, roll out projects with a philosophy of deliver, deliver, deliver, without looking too deeply into the issues.” - Teddy Gounden, head of community education and councillor liaison, eThekweni's water and sanitation department

“The design of the toilet has been changed several times as practical experience has shown up design faults. Many of these changes related to the back covers that provide access for clearing the vaults. Initially these had been made of concrete and sealed with cement. They are now made of plastic and fit into metal runners, making opening and closing far easier. In addition, a plastic rain cap has been added to the top of the vent pipe to prevent rain water from entering the chamber through the vent pipe.” - Jacques Rust, senior divisional engineer, eThekweni's construction department

“If there is anything that you can take away, it is the way the project is structured with all the support structures: the education and training component, the studies conducted by the university, the monitoring that is being done by the HSRC and how that collaborative work comes together to allow us to identify problems and address them before they get into a state where it gets out of control. When we identified a problem, we immediately responded, we don't allow these things to fester and simmer.” - Teddy Gounden

2 Maximise the economic empowerment opportunities

In addition to the immediate need for sanitation and water, there is also a pressing need to create economic opportunities in the rural and peri-urban areas of eThekweni. With the budget for the roll-out running into hundreds of millions of rands, the metro has structured the roll-out to create opportunities for local people and ensure that the expenditure contributes to developing the local economy:

- Training and contracting emerging contractors from the communities where the roll-out is taking place creates employment opportunities both during and after the project
- Creating business opportunities for local entrepreneurs, such as assisting with the setup of local brick-making yards, ensures that the project budget is spent within the target community
- Training and employing local people as facilitators and health promoters creates opportunities, particularly for women, young people and the disabled

“We decided to go for local contractors in order to bring economic benefits to the community. We have provided skills training through the department of labour for 600 contractors, and provided short term work for 30 000 people.” - Jacques Rust

“When the local people are trained then there is creation of jobs for them. They won't always work as unskilled labour, but as semi-skilled or skilled labour. We also ensure that at least 50 percent women, 35 percent youth and five percent disabled are employed.” - Nokuthula Dube, ISD consultant, Lower Maphephetheni project

3 Develop an education programme

In order to communicate messages to the recipients of a new technology, a structured education programme, together with educational material was developed by the municipality. In addition to this, a comprehensive training programme was developed for standardised training of ISD consultants and facilitators. An assessment of the success of these training programmes forms part of the on-going HSRC study.

- A five visit education programme is taken to each household to educate about operation and maintenance of the toilets and water tanks, as well as sanitation related health education
- On going Public Health and Sanitation Training interventions and street theatre reinforce the educational messages
- Structured training programmes for the ISD consultants and facilitators ensure that the intended messages are consistently communicated

“It is significant. We are visiting each and every household five times. We realise the importance of user information, that it could basically make or break the project in terms of the acceptance and use of the toilet.” - Teddy Gounden

“A significant portion of the budget is spent on education. The UD system is a new concept and education on the workings and maintenance of the system is essential to ensure its success.” - Jacques Rust

A typical rural homestead showing the UD sanitation and the yard tank



WIN-SA lessons series

The WIN-SA lessons series aims to capture the innovative work of people tackling real service delivery challenges. It also aims to stimulate learning and sharing around these challenges to support creative solutions. To achieve this, the lessons series is supported by ancillary learning opportunities facilitated by WIN-SA to strengthen people-to-people learning. WIN-SA's "Bringing in the harvest" campaign provides the vehicle for this.

To find out more about these and other WIN-SA services go to the WIN-SA portal at www.win-sa.org.za or contact the network directly.

For further information on the eThekweni municipality's sanitation & water project visit www.win-sa.org.za/ud

WIN-SA mission

Our mission is to ensure the body of knowledge in the sector is well managed, readily accessible and applied, leading to improved decision-making and performance, especially of local government.



Contact details

Address: 491 18th Avenue, Rietfontein, Pretoria

Postal Address: Private Bag X03, Gezina, 0031

Tel: (012) 330 9076 **Fax:** (012) 331 2565

E-mail: lessons@win-sa.org.za

Website: www.win-sa.org.za