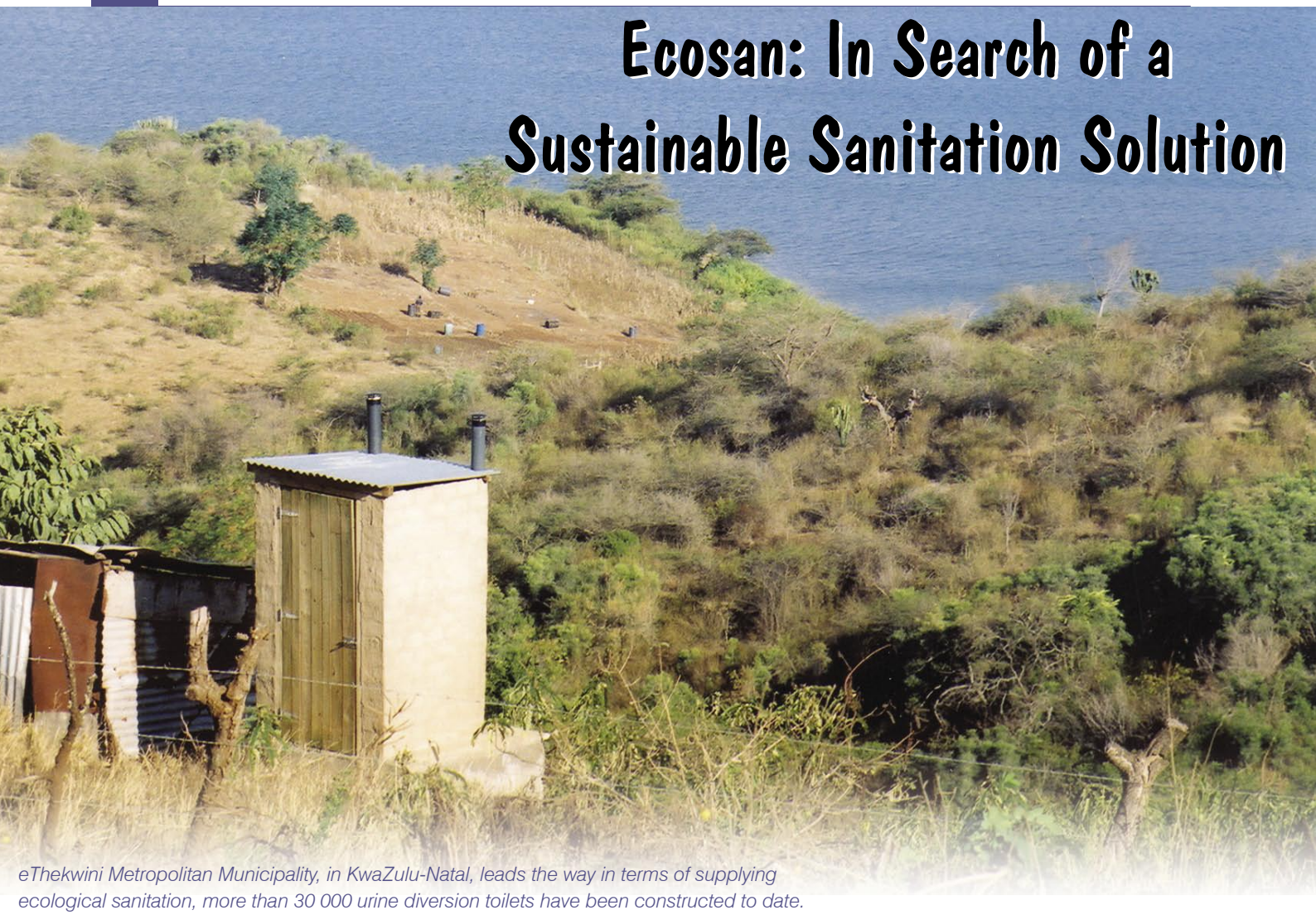
Ecosan: In Search of a Sustainable Sanitation Solution



eThekwini Metropolitan Municipality, in KwaZulu-Natal, leads the way in terms of supplying ecological sanitation, more than 30 000 urine diversion toilets have been constructed to date.

During her budget speech earlier this year Minister of Water Affairs & Forestry Buyelwa Sonjica alluded to the fact that 16 million South Africans still do not have access to safe, hygienic sanitation. In its quest to eliminate this backlog, the government has started to explore a number of alternative options, one being ecological sanitation (ecosan).

It is not news that the pathogens and parasites found in excreta are widely responsible for a variety of illnesses in rural and peri-urban areas, including cholera and diarrhoea. The majority of pathogens can be found in human faeces. Therefore, the main risk lies in the contamination of the environment by faeces spread near places where people and animals live and next or into drinking water sources.

The most basic type of 'improved' sanitation applied in South Africa is the ventilated improved pit (VIP) latrine. While it has brought safe sanitation to thousands of households, it is not always practical. Many areas have high water tables, or difficult terrain, making the construction of VIPs impractical. And what happens to these toilets once they are full?

Ecosan is not so much a technology than a sanitation philosophy. It can be viewed as a three-step process: containment, sanitation and recycling of human excreta. This can include soil-based composting toilets in shallow reinforced pits, dry urine diversion toilets with storage vaults, urine diversion mini-flush toilets and even high-tech vacuum systems.

The ecosan approach to sanitation promotes a cycle or 'closed' system (as opposed to the linear nature of water-borne sanitation). Human excreta are treated as a resource, processed (usually dried and/or composted) until they are completely free of disease organisms. The nutrients contained in the excreta are then recycled by using them as fertilizer in agriculture. This does not only save water but reduces pollution. By not introducing them into the water cycle,

contamination of surface and groundwater can be avoided.

The most widely adopted ecosan solution in South Africa is the urine diversion toilet. Waste is deposited in a chamber and dry material (usually sand or ash) is added after each use to deodorise decomposing faeces while controlling moisture and facilitating biological breakdown (composting).

Urine is diverted through a specially adapted pedestal. In this country most of the urine is led to a soakaway pit, but it can be tapped and used as a fertilizer in home gardens. This is because in urine three major plant nutrients can be found, namely nitrogen, phosphorus and potassium.

ECOSAN IN SOUTH AFRICA

More than 40 000 ecosan toilets have been constructed in South Africa to date. By far the majority of these can be found in the eThekwini municipal area, outside Durban, in KwaZulu-Natal, where double-vault urine diversion toilets are being built as part of the metro's efforts to provide peri-urban citizens with basic sanitation. At last count 30 000 of these urine-diversion toilets had been constructed in the area at a rate of 1 000 a month.

In the Northern Cape, non-governmental organisation Mvula Trust and others have been assisting the provincial government and the Department of Water Affairs & Forestry with the conversion or replacement of bucket toilets in poor and remote small towns. Here about 15 000 urine-diversion toilets have been constructed. Pilot studies are also underway in Khayelitsha, in the Cape Town, and townships in Ekurhuleni, Gauteng, to test the suitability of ecosan toilets in these areas. In addition ecosan toilets can be found at Buffalo City and Umtata, in the Eastern Cape, and Taung, in North West.

THE QUEST FOR ACCEPTANCE

As with any new technology, introducing the ecosan concept to South African users has not been easy. Most people aspire to have a flush toilet, and any other option is considered second best. What makes this sanitation method even more challenging is that in ecosan, success depends on proper operation and management, and thus depends on user participation to a far greater extent than conventional sanitation systems.

So despite convincing environmental and economic reasons to support this approach acceptance of the technology as a whole has been rather limited, as illustrated by a recent study undertaken by Gertrude Matsebe and Louiza Duncker of the Programme for Sustainable Human Settlements at CSIR Boutek. They undertook research of the social perceptions of users of urine diversion sanitation systems in Taung in the North West, Mpushini in KwaZulu-Natal, and Barkley West and Augrabies in the Northern Cape.

DID YOU KNOW?

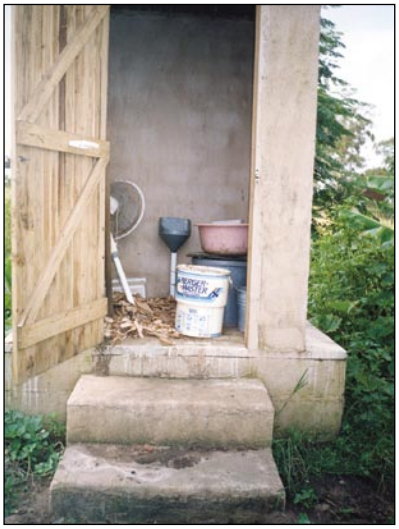
In Third World countries an average 90% of sewage is discharged completely untreated into surface water.

Their study showed that 16% of households with urine diversion toilets did not use them at all or used them for unintended purposes, such as storage areas or animal pens. In other cases the toilets were used only when there were no alternatives (VIPs) available or reserved for use by visitors. Generally, users accepted the urine diversion toilet as a toilet, but not the concept of handling and re-using human excreta.

The issue seems to be a social rather than a technical one. In all except one case (Augrabies) communities were not offered a choice between ecosan and conventional systems. In all three provinces the local authorities took the leading role during the implementation process of the projects. Users were only involved after a decision was taken, just before the construction started.

About 16 million South Africans still do not have access to safe sanitation prompting government to look at alternative technologies such as ecological sanitation. This technology is being piloted in several areas, including Mayfield, on the East Rand.





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The research showed that initially, people liked the toilets because they were properly built compared to pit or VIPs. However, as time passed users' interest in the toilets lessened, mainly because of operation and maintenance issues. Despite the fact that most users were informed about their roles (emptying the vault) the findings showed 86% of them were unwilling to handle their own excreta. Blocked or full toilets were abandoned, with many people converting back to using the old unhygienic toilets.

Alternatives, such as getting local entrepreneurs to do the job, were not explored. It is thought that if such a collection/disposal service were to be introduced, it would address the problem of handling human excreta. The waste could then be sold as compost to farmers in the vicinity, or be used to fertilize municipal gardens.

"There is a general norm among many people to not handle human faeces, therefore, the removal of faeces from the vaults of the urine diversion toilets is perceived as an unacceptable practice as well as unhealthy and unhygienic," the researchers comment. "Unfortunately, ecosan is also perceived by the users as a temporary and alternative sanitation technology, meant only for the poorest of the poor, and therefore substandard to their aspirations for waterborne sanitation."

The importance of good user education was also emphasised. Matsebe & Duncker found that in the North West, for example, users had no knowledge on basic operational information, such as using sand, ash or dry soil after defecating.

THE WAY FORWARD

It is clear that where top-down approaches to sanitation have the potential of being unsustainable, the chances are magnified where ecosan is concerned. As Matsebe & Duncker point out: "Local councils are put under pressure to spend the budget allocated before the end of the financial year. This leads to insufficient time and planning allocated for projects to be undertaken. In this scenario, the software issues (community concerns) are overlooked or engaged at a minimal scale with the main focus on the hardware (infrastructure). Proper planning should be undertaken to ensure that sufficient time is allocated to various tasks of the project, especially the human element."

The main lesson here is that user participation is vital prior, and during, project implementation. While consultation, education and communication are important issues, they form only part of the process of participation.

Sanitation technologies and services should meet the needs and interests of the users, and should be designed so that they complement existing social and cultural practices. A variety of suitable sanitation technologies should be introduced to the users (in the form of, for example, demonstration models) in order for them to make informed decisions on the options available. Users should also be informed about the national strategy and purpose behind a specific sanitation technology in order for them to understand why waterborne sanitation is not an option. Only if these criteria are met will alternative sanitation technologies such as ecosan find acceptance in the market.

Ecosan is not a zero-risk solution, but rather a search for new possibilities. It should not be seen as the solution to South Africa's sanitation problems, but rather as another tool in the fight for better community health and well-being.