

User perceptions of urine diversion dehydration toilets: Experiences from a cross-sectional study in eThekweni Municipality

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ABSTRACT

The current environmental challenges that most middle- and low-income countries have been experiencing has led to new environmentally sustainable and economically viable sanitation solutions, such as waterless systems with source separation of human waste. We conducted a cross-sectional study in eThekweni municipality to explore the post-implementation challenges of urine diversion dehydration toilets (UDDTs) after a decade of installation and the adaptive processes necessary to increase the sustained use of the toilets. A structured questionnaire was administered to 17 499 households in 65 rural and peri-urban areas of eThekweni using mobile phone technology. Results report low levels of satisfaction with the facilities as well as an association between perceived smell in the toilets and malfunctioning of the pedestal, and low use of UDDTs when a pit latrine is present in the dwelling perimeter. Conclusions relate to the importance of educational and promotional activities that stress the economic return derived from reusing urine and excreta in agricultural activities.

Keywords: Sanitation, urine diversion toilets, user satisfaction, South Africa

INTRODUCTION

Over recent years concerns have been raised within the global scientific community about the environmental challenges and shortfalls that our planet is experiencing. The Rio de Janeiro Earth Summit of 1992 first introduced to the policy agenda the alarming issues of climatic change, environmental degradation and natural resource scarcity (Langergraber and Muellegger, 2005; Redclift, 2005). The global environmental crisis has aggravated, among others, the distribution and availability of water, in particular in low- and middle-income countries. Approximately 1.2 billion people live in areas characterised by water scarcity and a further 1.6 billion live in conditions of water stress, with subsequent impacts on the achievement of environmental sustainability and eradication of extreme hunger (UN-Water, 2006). Population growth and rapid urbanisation further exacerbate this trend by undermining governments' ability to provide basic services and ensure food security (Austin and Van Vuuren, 2001). The impacts of inadequate water and lack of sanitation on human lives translate into environmental and health challenges which further fuel the vicious circle of poverty (Langergraber and Muellegger, 2005).

South Africa, with other Sub-Saharan countries, is classified as a water-stressed country, with a yearly per capita availability of between 1 100 and 1 700 m³ of freshwater (UNEP, 1999). Scientists have estimated that by 2050 South Africa will experience a progressive decrease of (economically usable) freshwater resources, which will force the country to develop adaptive mechanisms for water conservation and wastewater management (Austin and Van Vuuren, 2004). With the

realisation that conventional centralised wastewater treatments, using drinking water to flush toilets, are environmentally unsustainable and present financial and environmental costs for governments (Esrey, 2000), alternative waste management options are to be sought. These are based on a novel characterisation of environmental pollution, moving from disposal of sewage to the reuse of urine and faeces, and are based on a re-conceptualisation of sanitation, from the 'drop-flush-forget' model to protection of the environment at source (Drangert, 1998; Austin and Van Vuuren, 2004) by means of 'drop and reuse' models. It is estimated that each year an average adult produces 500 l of urine and 50 l of faeces, from which sources of nutrients, in particular, nitrogen (N), potassium (K) and phosphorus (P), can be recovered in quantities which are approximately equal to the amount of food ingested (Drangert, 1998).

Ecological economists argue that growth which uses natural resource capital and throws this away as waste is no longer sustainable, and has reached its optimal scale. The ecologist's credo, by which economies can develop without growing, implies a revolutionary change in people's mindsets and perceptions towards their waste (Daly and Farley, 2004). In an era where we are encouraged to think about reusing our waste, through recycling of material and recovering of nutrients, it is essential to understand the socio-technical implications for new forms of waste management.

This contribution presents and discusses results from one of the biggest cross-sectional post-implementation studies of urine diversion dehydration toilets (UDDTs) in Southern Africa. The assessment of users' acceptance of the service and the status of the toilets themselves is extremely important in view of the recent involvement of eThekweni Municipality in the research and development of new waste management practices, such as the collection of urine for struvite production and the reuse of nutrients in agriculture.

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