

# Håkan Jönsson Farewell Symposium

25 October 2017

## Urine Diversion in Durban

*has it exceeded the original vision?*

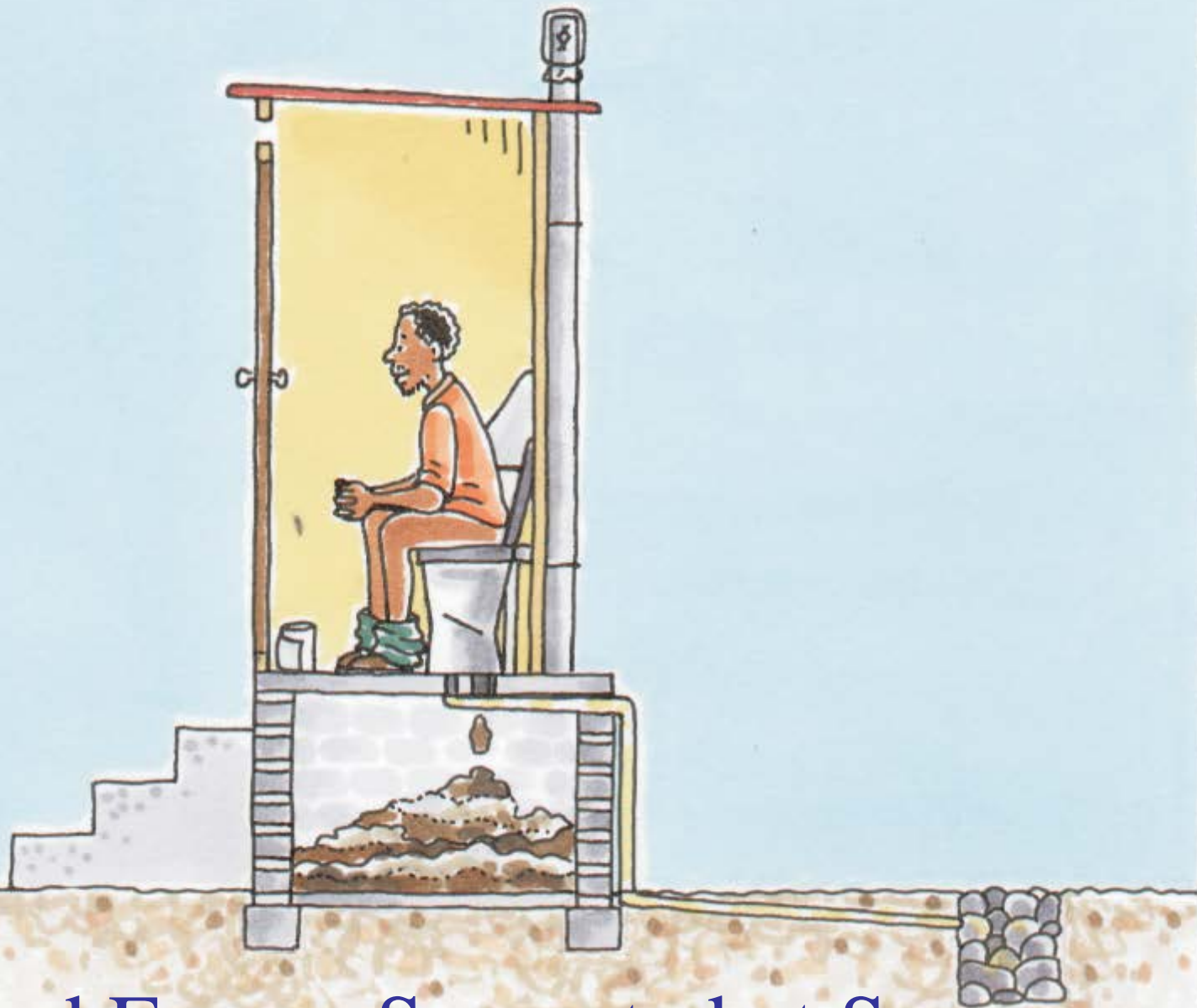
*Chris Buckley*

*Pollution Research Group  
University of KwaZulu-Natal*



# Durban Background

- 2000 Cholera outbreak
- Full-scale roll-out of free water, sanitation and hygiene education to unserved
- 60,000 full VIP toilets
  - how to empty?
- Urine diversion toilets (80,000)



Urine and Faeces Separated at Source  
**NB: NOT RECYCLED**

# Urine Diversion Closet



# Bill Gates



# Regional 2-week course in Kimberley on *Ecological Sanitation* (15 Jan 2005)

THIRD INTERNATIONAL ECOLOGICAL SANITATION CONFERENCE



- 5 days of discussions and field trips
- 81 presentations



# Those were the days, my friend ... 2005



**Third International Conference on Ecological Sanitation**

**The provision of sustainable sanitation services  
to peri-urban and rural communities in the  
eThekwini (Durban) municipality**

**Neil Macleod**

**(CEO eThekwini Water and Sanitation)**



# The Research Agenda

- The impact of UD toilet waste and urine on the environment, including crops grown in the waste material
- The use of grey water for urban agriculture
- Analysis of the drying process of the faecal matter in the UD toilet vaults
- The impact of UD toilets on community health, particularly in areas where no proper sanitation service existed previously

# STUDY AIM

- To evaluate the health outcomes of dry sanitation, water provision and hygiene programmes in the peri-urban areas of eThekweni Municipality.



# Episodes of Diarrhoea & Vomiting Averted

Total episodes of diarrhoea reduced

Episodes averted X Households X People / household

= .51 X 56377 X 5.4

**= 155 262 episodes of diarrhoea averted**

Episodes of diarrhoea reduced in < 5 year olds

Episodes averted / children < 5 years

= 1.3 X 30 000

**= 39 000 episodes of diarrhoea averted**

- eThekweni Municipality – Water and Sanitation Unit;
- World Health Organisation (Geneva)
- Swedish Institute of Infectious Disease (Sweden)

# PRG test site: Preparation of columns containing soil and buried waste from urine diversion toilets



Construction of concrete columns



Dry waste



Wet waste

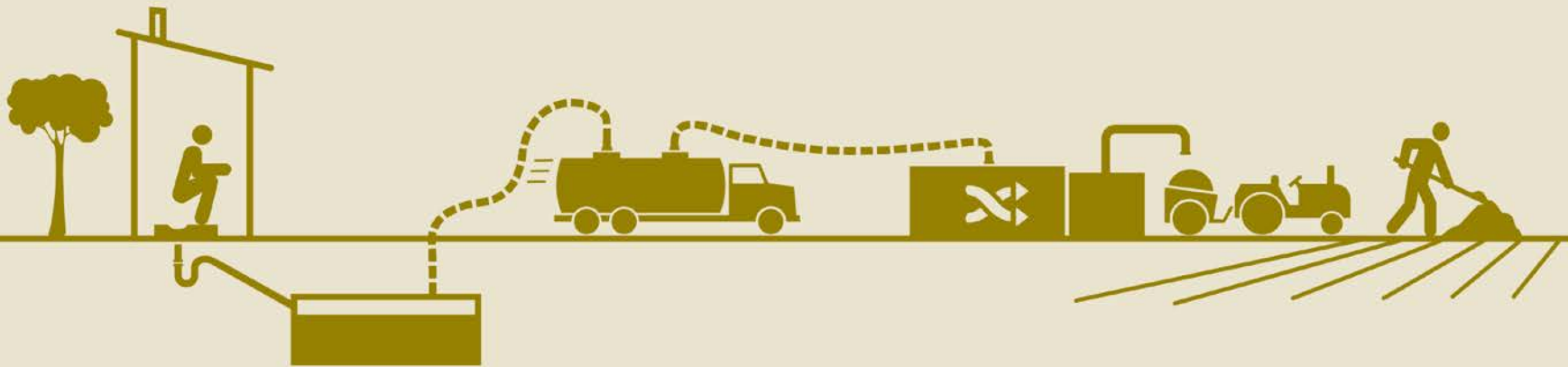


Mixed waste

Filling waste into columns



# Focus on Entire Value Chain



CONTAINMENT



EMPTYING



TRANSPORT



TREATMENT



REUSE/DISPOSAL

# A Practical Demonstration



# Durban Ecosan Course 2008



# Urine Nitrification Reactor

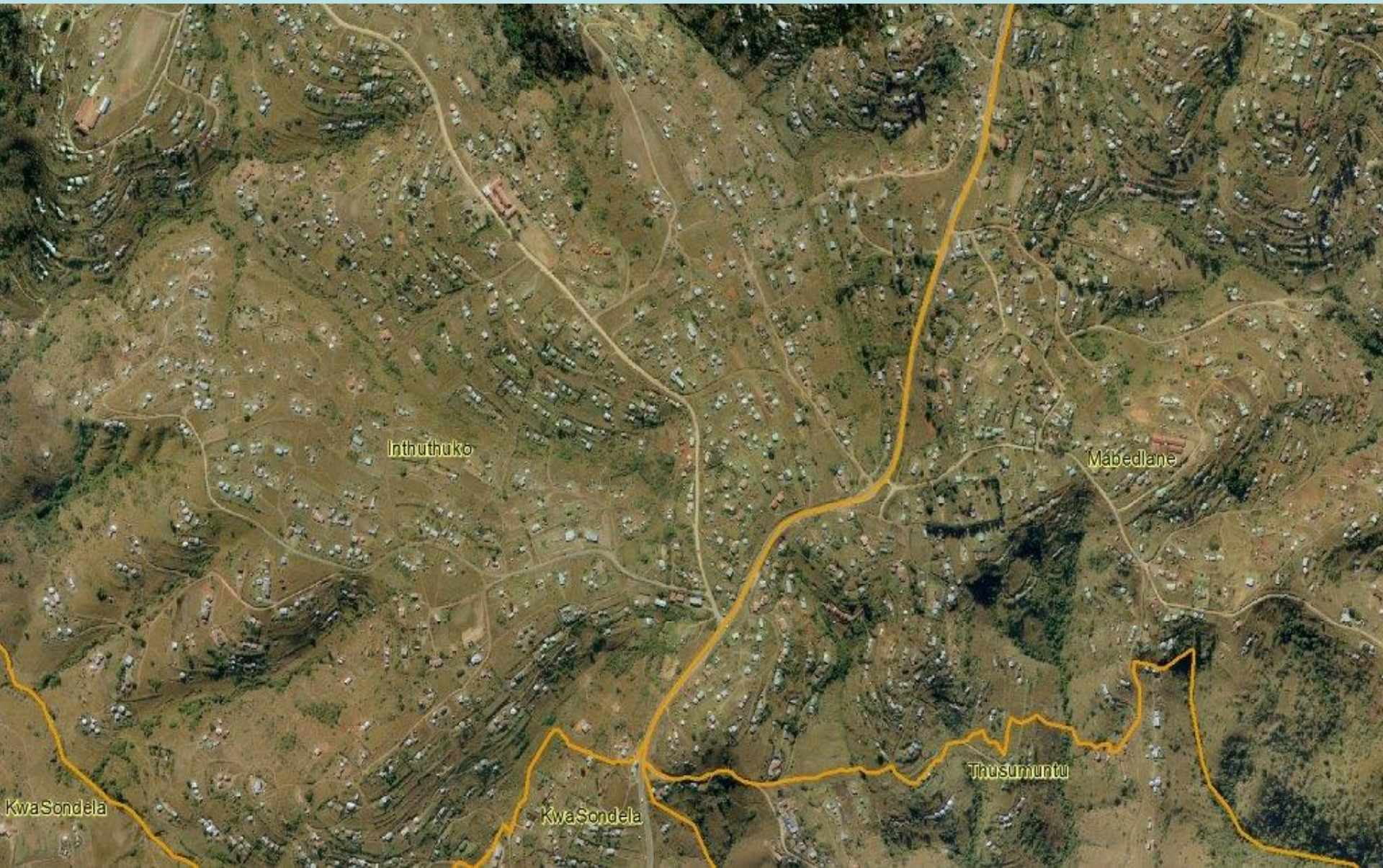




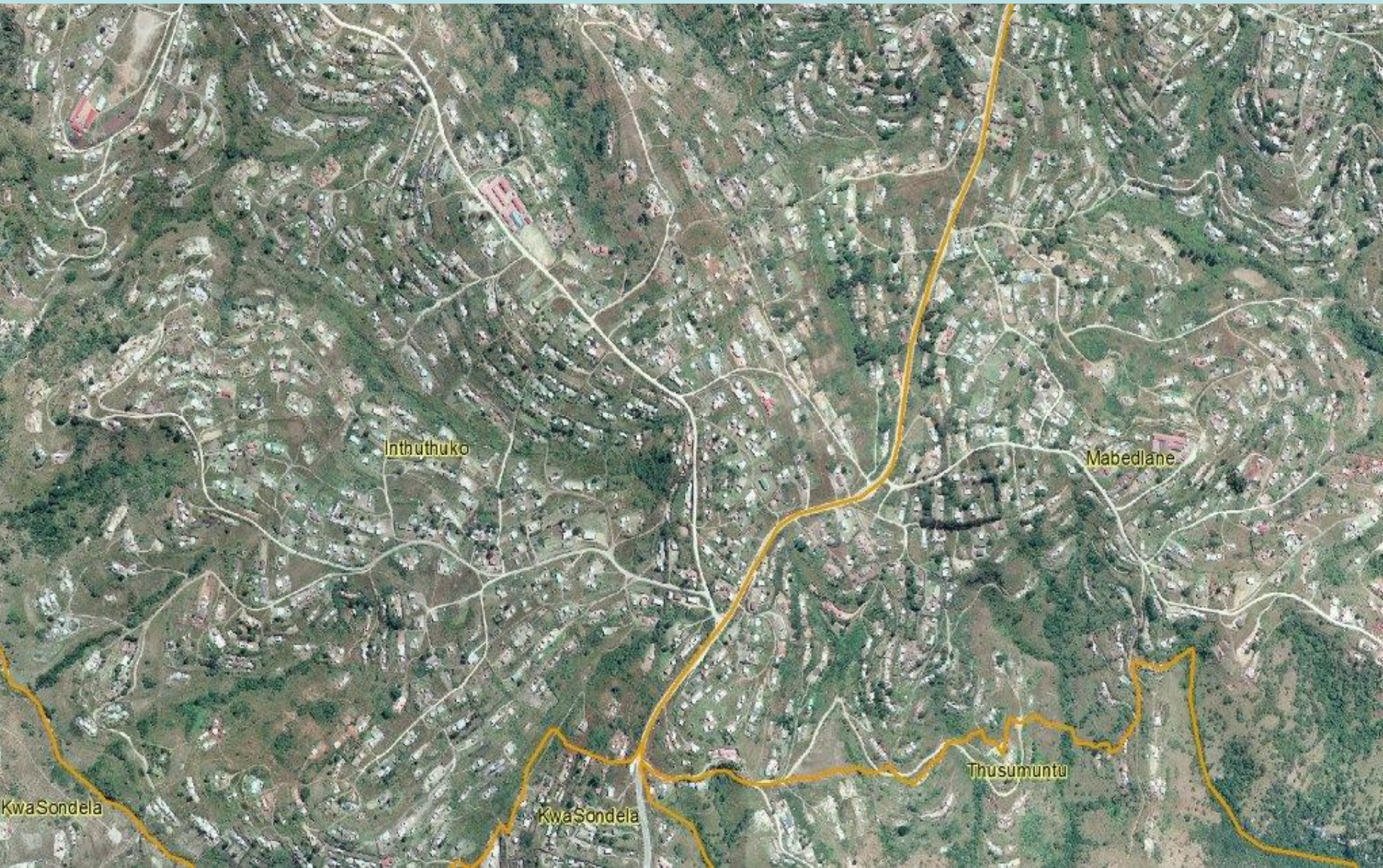
# Reuse Trials of Products



# 2008



# 2013



# 2008



# 2013



# UD Sludge Processing



# Viscous Heater at Isipingo



# New ISO Standard



INVITATION TO ATTEND THE THE FIRST  
ISO INTERNATIONAL WORKSHOP ON  
**COMMUNITY-SCALE RESOURCE-ORIENTED  
SANITATION TREATMENT SYSTEMS**

**Durban 27 to 30 June 2017**



# IWA publication (in progress)

The importance and need for faecal sludge management has been recognised worldwide. One major gap in developing appropriate and adequate faecal sludge treatment and monitoring techniques is the ability to understand faecal sludge characteristics, its quantification and correlation to source population. Faecal sludge characteristics are highly variable, but as standard methods for sampling and analysis do not exist, results are not comparable and hence the actual variability is not yet fully understood.

Due to the lack of standard methods for sampling and analysis of faecal sludge, standard methods from other fields, such as water, wastewater and soil science are usually applied. However, these methods are not necessarily the most suitable for faecal sludge, and have not been specifically adapted for that purpose. Characteristics of faecal sludge are typically different from these other matrices by orders of magnitude. The methods for faecal sludge sampling are also greatly complicated by the wide range of technologies in each local context, and the heterogeneity within systems. Another gap in existing knowledge is how to quantify faecal sludge on a city-wide scale, or scale relevant for the design of treatment technologies. Moreover, the lack of standardisation complicates the transfer of knowledge and data between different regions and institutions as the results are not comparable. This illustrates the urgent need to establish common methods and procedures for faecal sludge characterisation and quantification.

This book aims to address these challenges and provide a basis towards standardised methods for characterisation and quantification of faecal sludge from onsite sanitation technologies, including sampling techniques and health and safety procedures for faecal sludge handling. It also aims at improved communication between sanitation practitioners, comparative faecal sludge database, and improved confidence in the methods and obtained results. The book will be beneficial for researchers, laboratory technicians, academics, students and sanitation practitioners.



## Methods for Faecal Sludge Analyses

**new**

COMING OUT IN 2018

Edited by



OPEN  
ACCESS  
PUBLICATION

With support from the Bill & Melinda Gates Foundation



www.iwapublishing.com  
ISBN: 9781780409115 (Hardback)

Lead editor

Konstantina Velkushanova • Linda Strande • Mariska Ronteltap  
Thammarat Keattapan • Damir Prdjanovic • Chris Buckley



# Reflections

- Cholera
- Municipality with vision
- Government Subsidy
- Research support – PRG
- Vuna Hypothesis – pay people to use toilet
- Need to develop a policy
- San policy – recognise not just 1 system
- Don't like but use
- No retail sales
- Need ceramic pedestal
- Not a profit but a lower cost
- Emerging concerns – CEC – path, gene transfer
- Aim for reuse, but cautious implementation
- Aha – not all get a free service
- Overtaken by progress – low flush
- Local industry
- Design – away from house

# Urine Diversion in Durban

has it exceeded the original expectations?

# Urine Diversion in Durban

has it exceeded the original expectations?

**Yes !!!**

**It has ....**

# Acknowledgements

- eThekweni Water and Sanitation
  - Neil Macleod
  - Teddy Gounden
  - John Harrison
  - Bill Pfaff
  - Dave Wilson
- WRC
  - Jay Bhagwan
- Partners in Development
  - Dave Still
- EnviroSan
  - Jacques Rust