



SANITATION REVOLUTION/ GAME CHANGER

**Jay Bhagwan
Water Research Commission**

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South African

Water Research Commission

Supporting sustainable development through research funding, knowledge creation and dissemination









**Sanitation must be made
desirable**

Human Excreta

Faeces and urine

***The major global
environmental
pollutant***

And possibly.....KILLER

Most cities reaching water

limits
integration

(from WRC Project ; K5/2071)

Water Sensitive Settlements (WSS)

1. *'New taps'* (New water resources)

- Water demand management and conservation
- Stormwater / rainwater harvesting
- Treated effluent
- Groundwater
- Desalinated water

2. *'Blue-green infrastructure'* (Water sensitive management)

- Planning & design
- Economic value
- Health impacts
- Ecosystems services
- Social development
- Waterscapes
- Urban rivers
- Urban agriculture

3. *'Adapting to change'* (Building resilience / Governance)

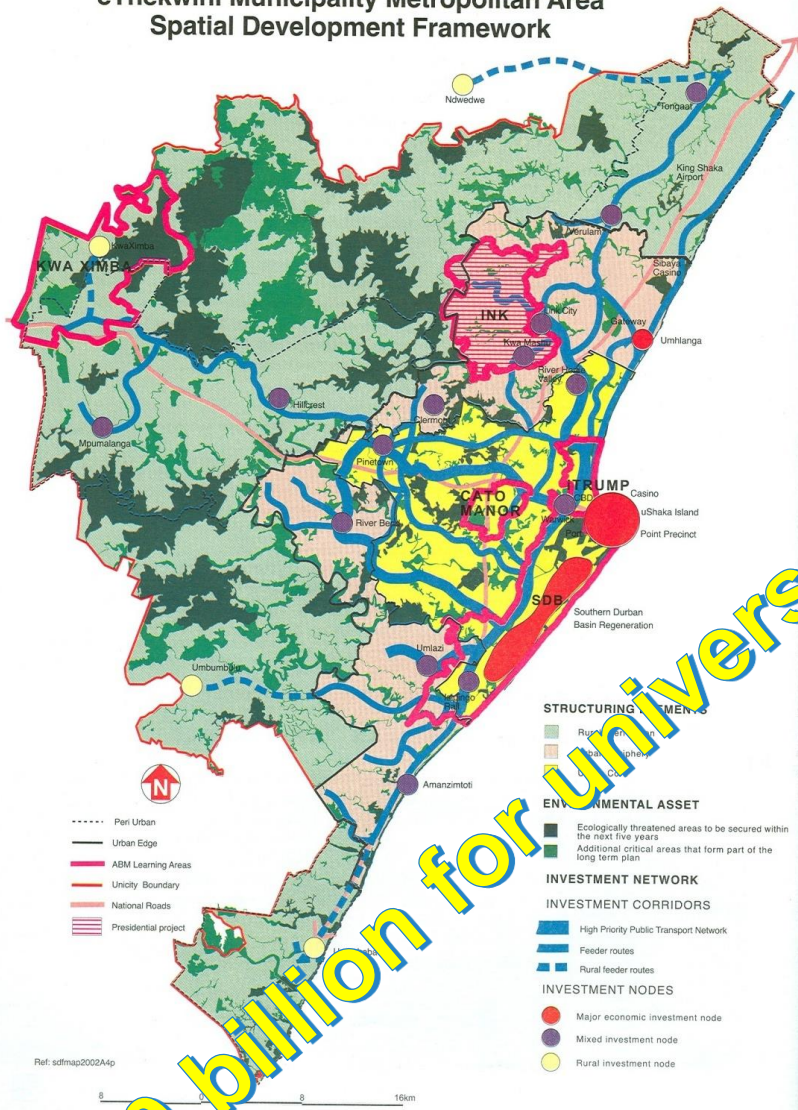
- Resilience
- Strengthening governance
- Learning alliances
- Policy and law
- Communication / Social acceptance
- Management

4. *'Maximising value'* (Maximum value from minimum resource)

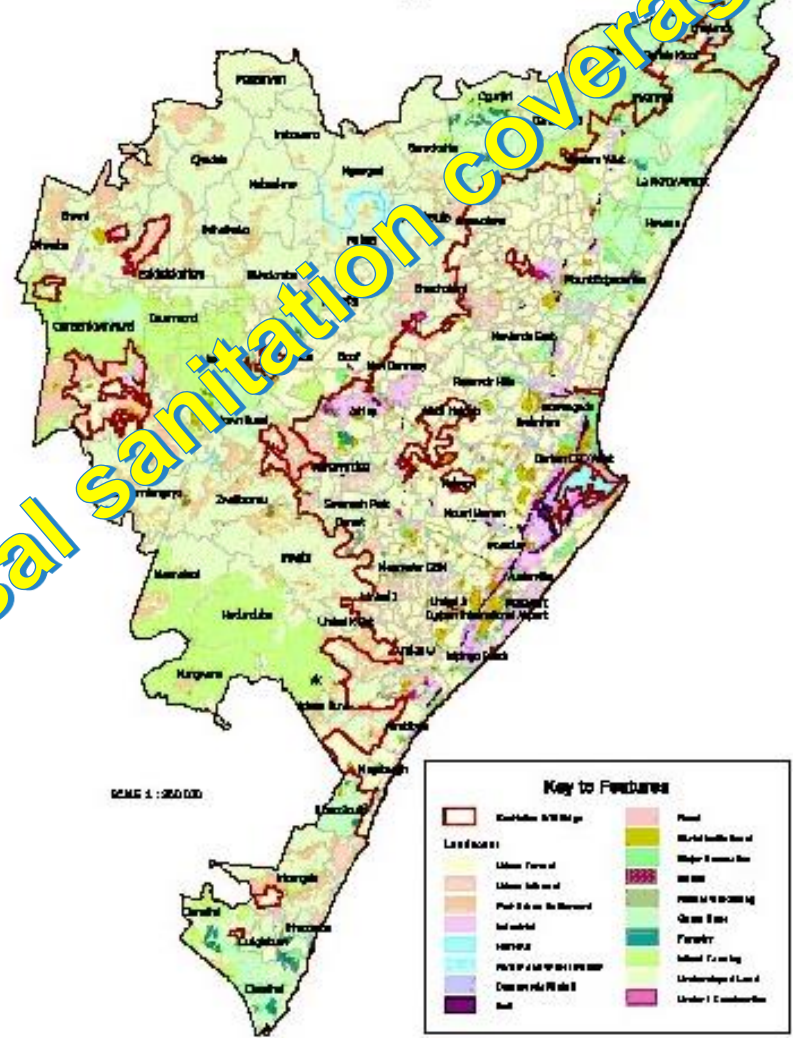
- Source separation
- Centralised vs decentralised
- Towards zero emissions
- Water treatment for purpose
- AMD treatment vs prevention / value recovery
- Integrated treatment
- Resource recovery
- Wastewater biorefineries

Civil Engineering - Environmental Science - Planning - (Construction) Economics - Biological / Molecular Science - Chemistry
Political Science - Geohydrology - Health Science - Sociology - Chemical Engineering - Public Administration - Anthropology

eThekweni Municipality Metropolitan Area Spatial Development Framework



Sanitation Waterborne Edge



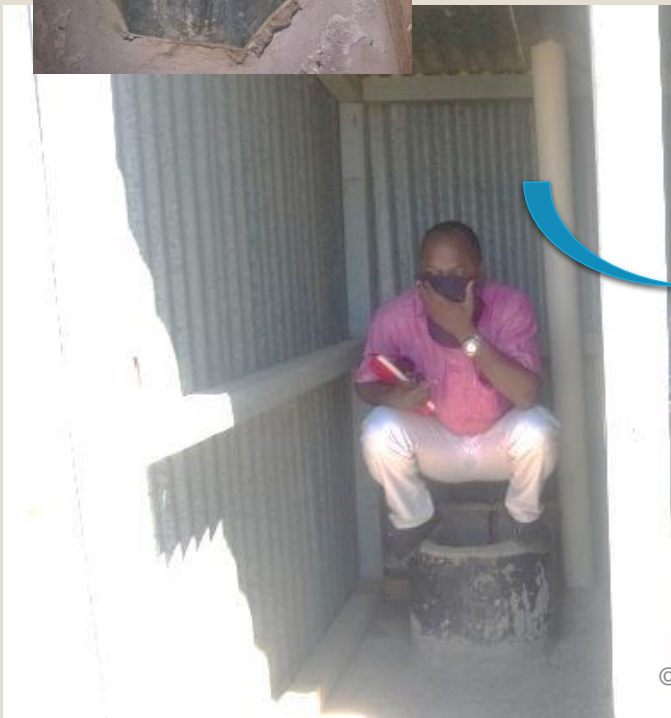
R20 billion for universal sanitation coverage

Problem or opportunity ??????

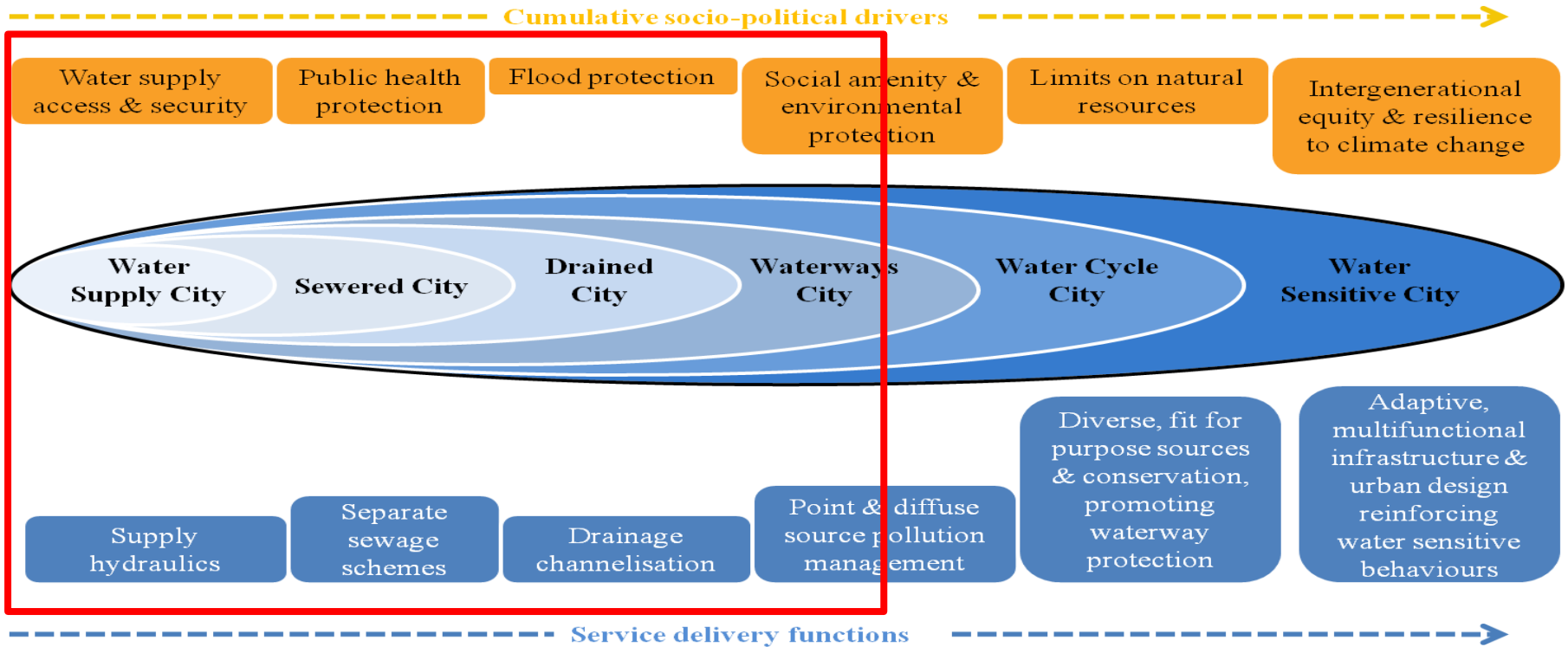
- The world is running out of its traditional sources of energy, potable water and plant nutrients
 - **Water resources are declining**
 - Energy costs are rising
 - The climate change issue
 - Current sanitation technologies are not sustainable
 - Society is conditioned into viewing a flush toilet and centralised sewerage treatment works as the preferred options
 - Storm water is seen as a nuisance rather than a resource





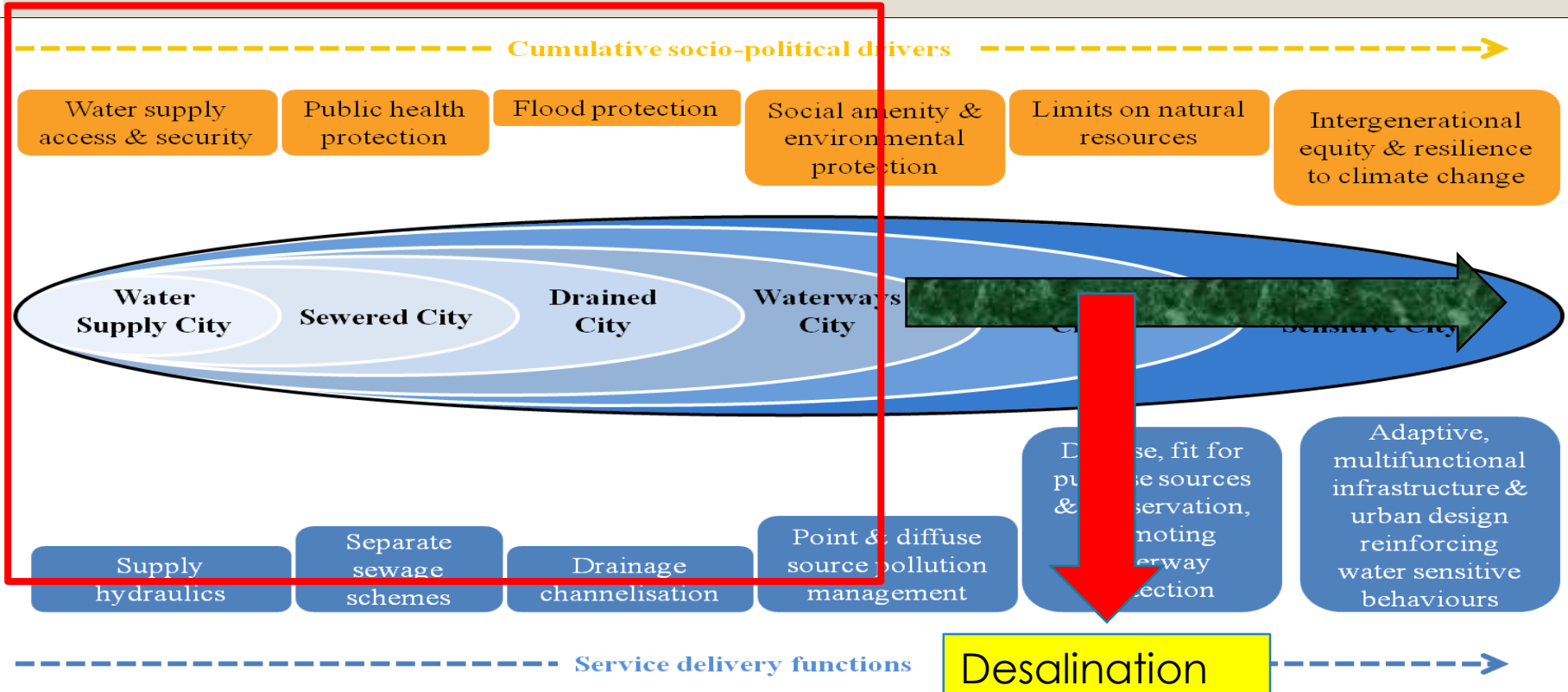


Water Management Transition States



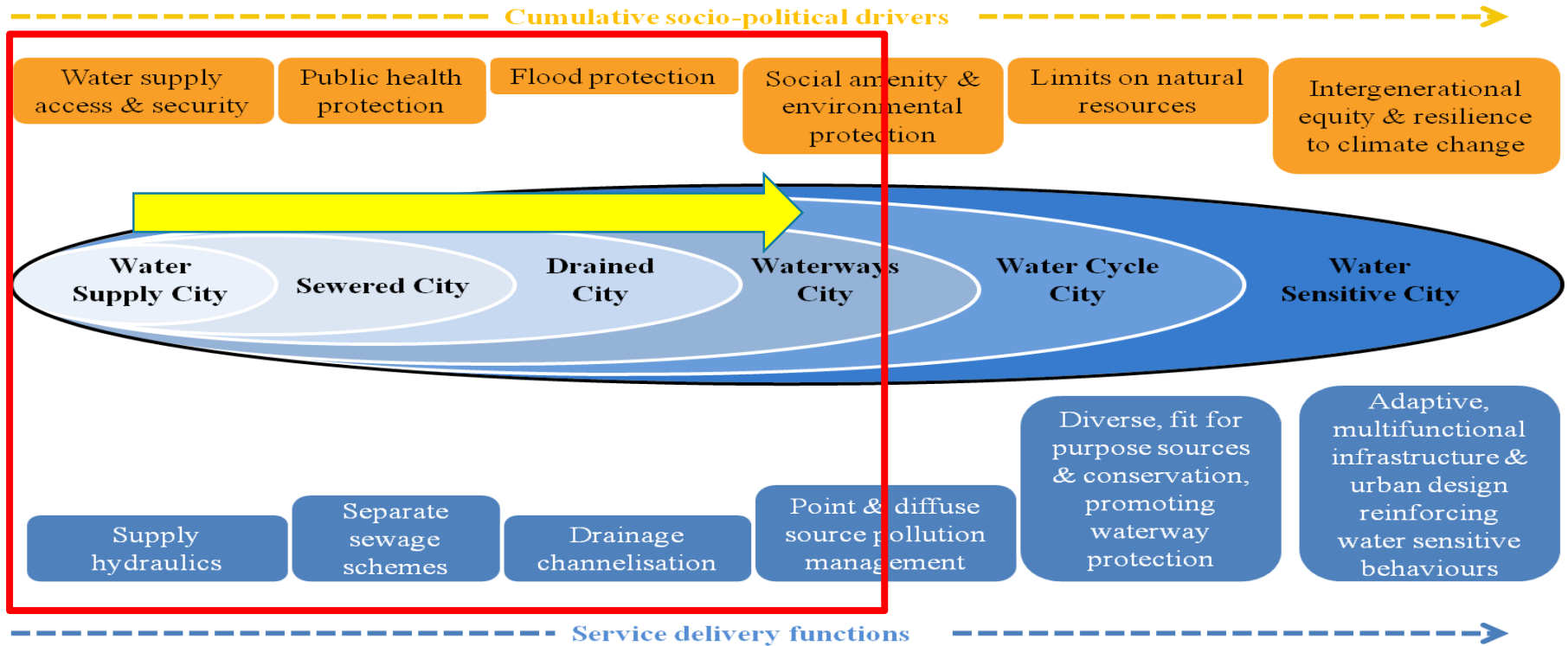
Brown et al., 2007 ISBN: 978-0-9804298-2-4.

Water Management Transition in Developed Countries



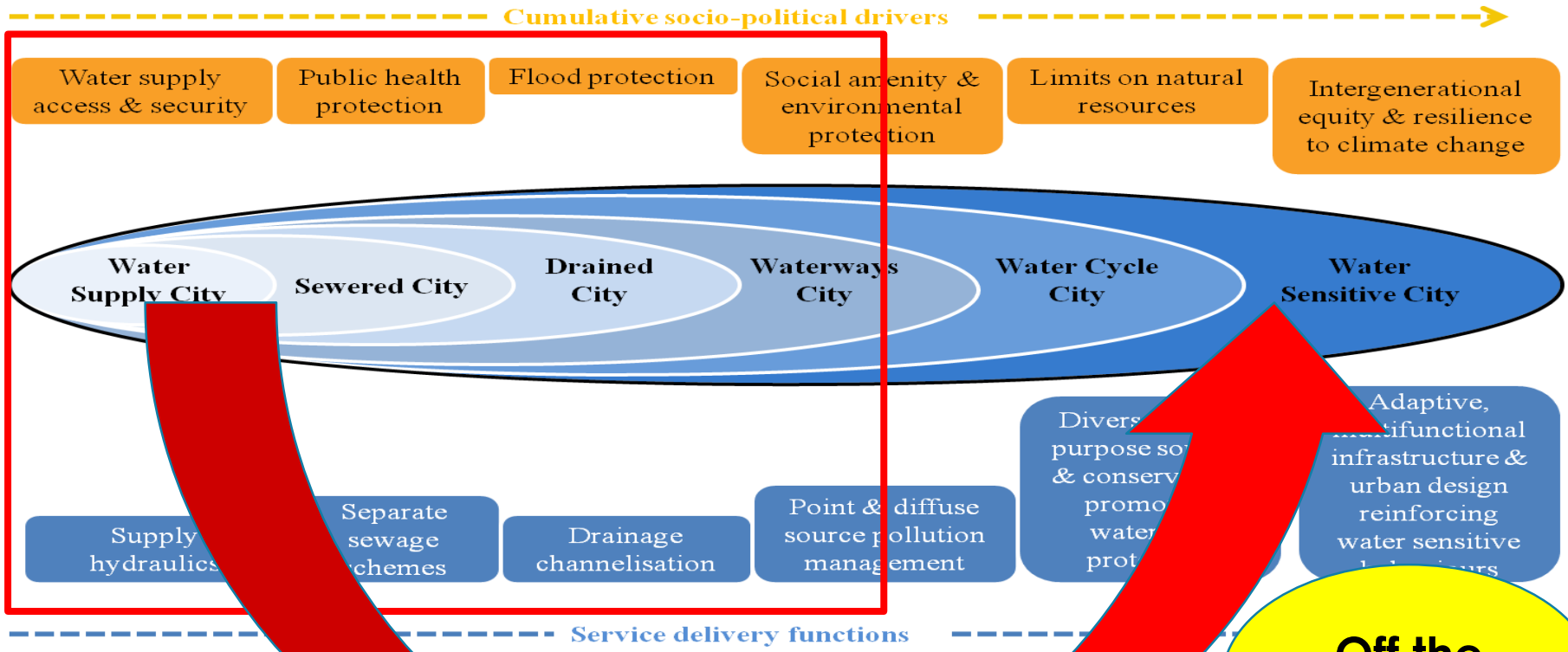
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Water Management in the Developing World



Brown et al., 2007 ISBN: 978-0-9804298-2-4.

Water Management in the Developing World



LEAPFROG

in et al., 2007 ISBN

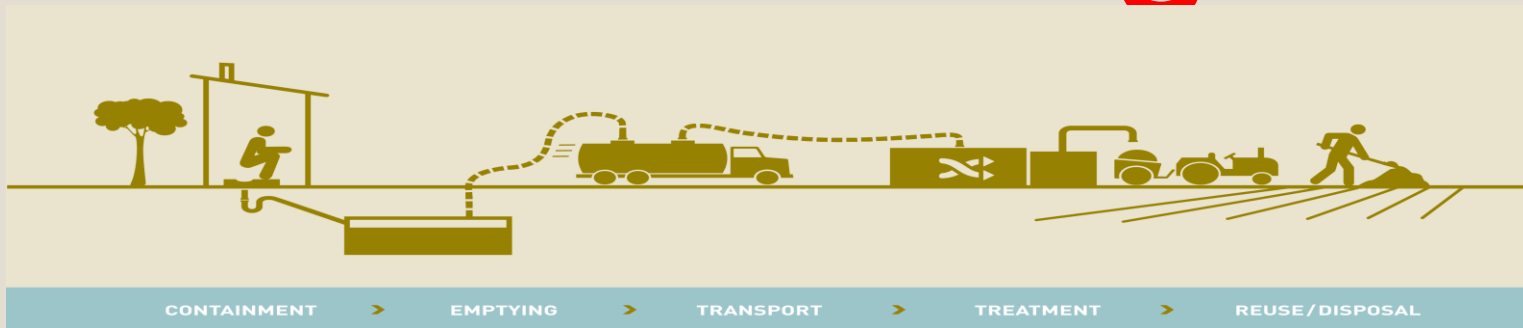
Off the grid

Current issues...

- Current approaches very civil engineering orientated
- Project management compromises community and household based approaches
- Sustainability not a concern :
 - When the pit is full then what?
- No planning ahead and for O&M
 - O&M costs neglected in budget
- LITTLE INSTITUTIONAL SUPPORT
- Competency and capacity
- Lack of ownership and accountability, no behavior change

POOR HAVE NO SANITATION MARKET

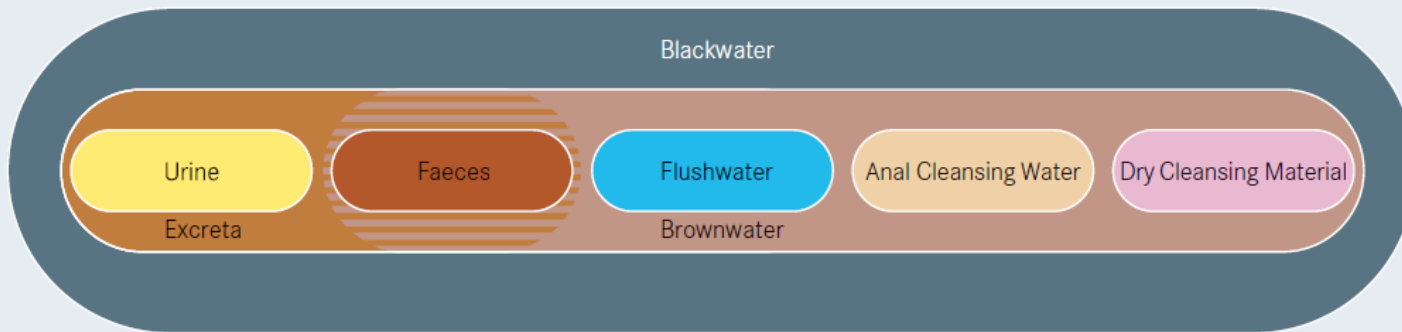
Game Changers



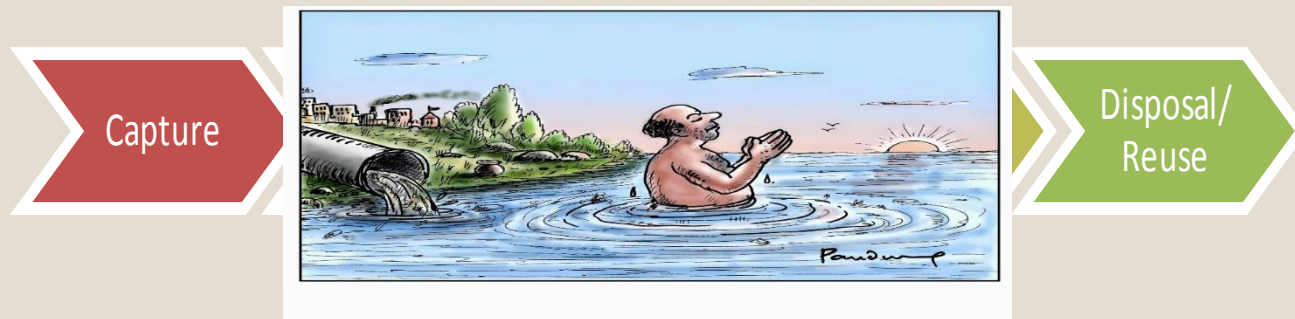
Sanitation Value Chain



Game Changer



Sanitation Value Chain



Game Changing

Is about working
Towards

A

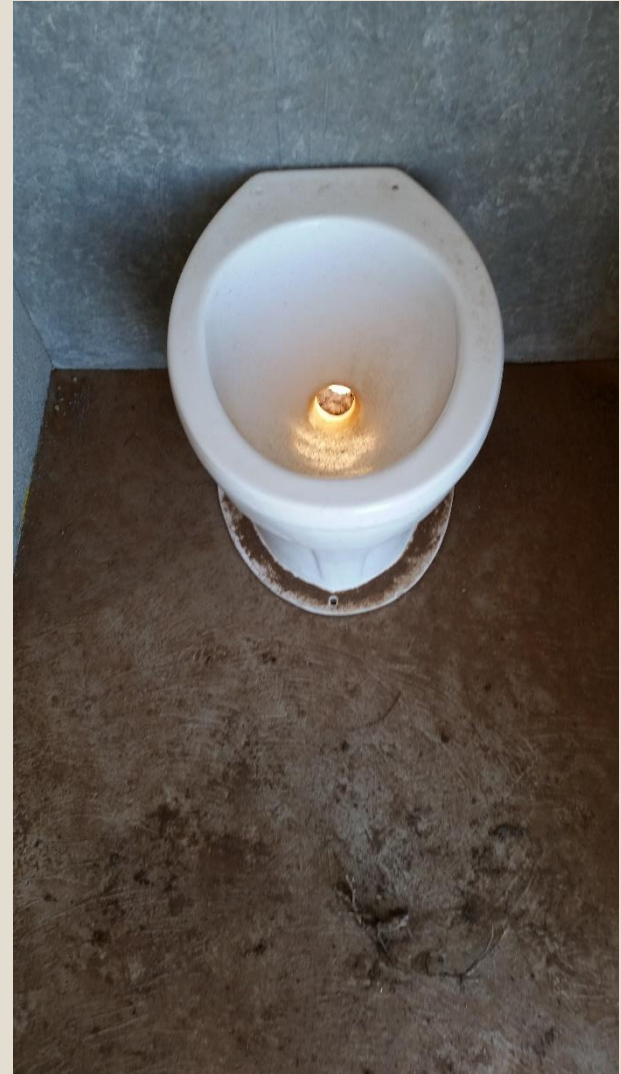
World free of

**FAECAL
SLUDGES**



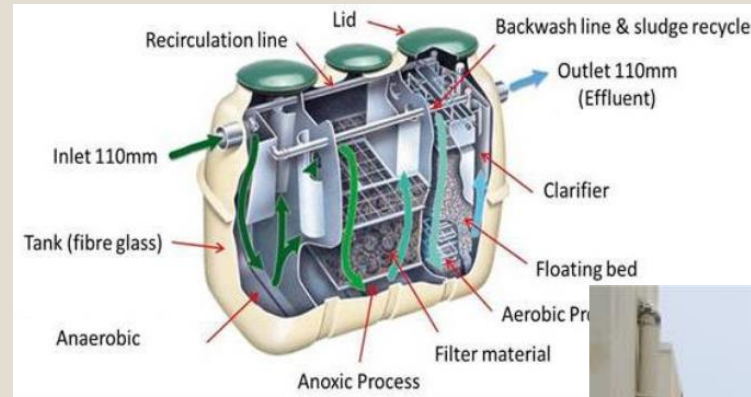
Is this possible ?

- **NO**
 - If we continue to do the same
- **YES**
 - If we change our paradigm –
 - There is no more wastewater and sewerage
 - Biological treatment is not the default
 - Faecal sludge is seen as a resource – energy, soil remediator, nutrient etc.
 - Technologies that treat at source
 - No sludges produced
 - Large levels of beneficiation
 - Same user convenience
 - Water saving and environmentally safe.

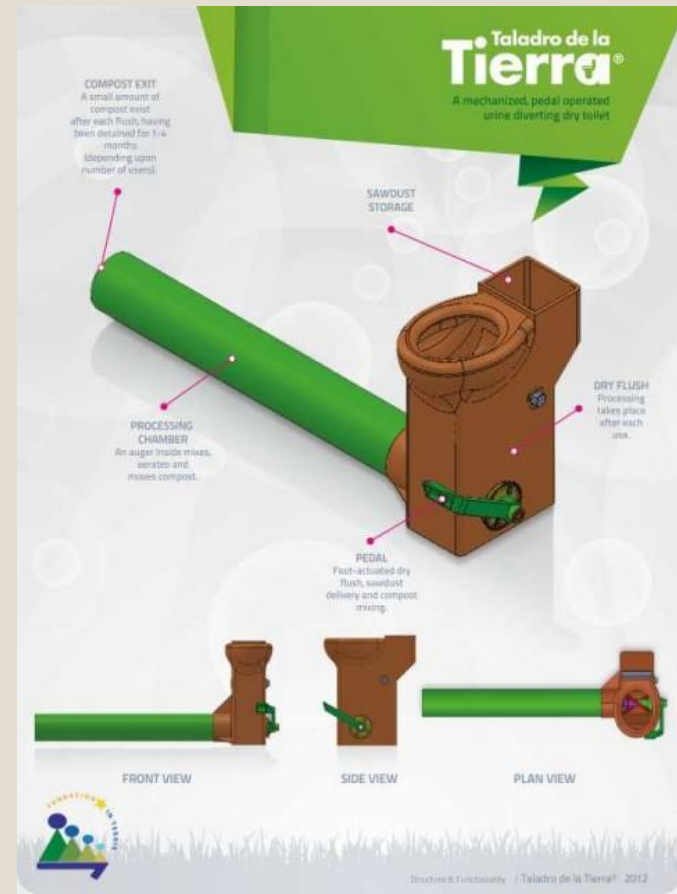


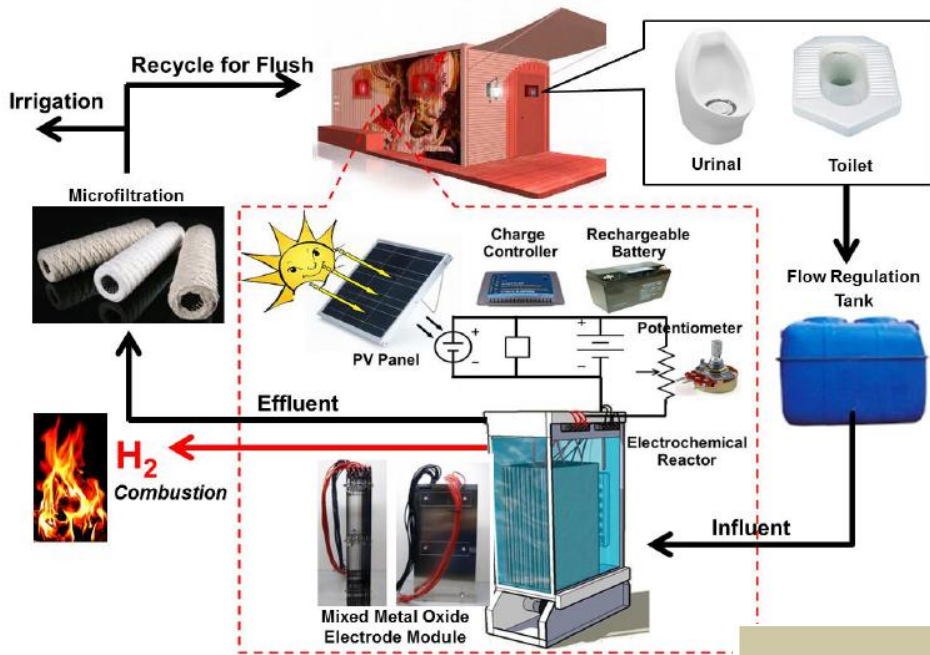
Processes involved

- Drying
- Dehydrating
- Dessicating
- Catalytic
- Chemical
- Pyrolysis
- Carbonisation
- Combustion
- Solar treatment
- Thermal

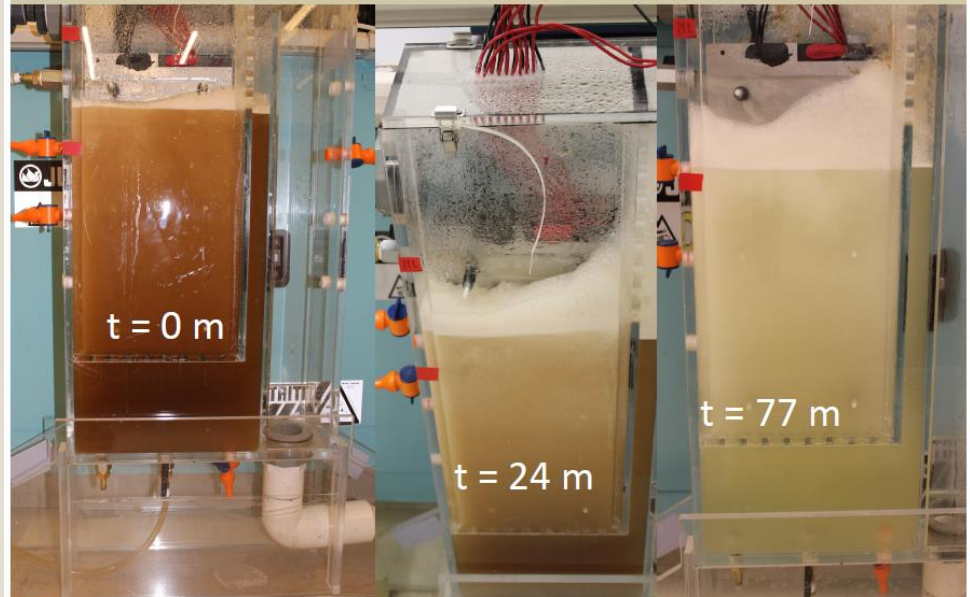


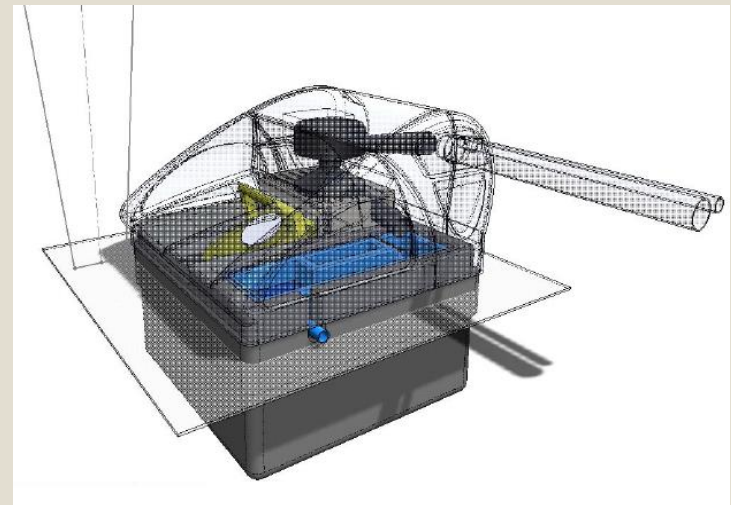
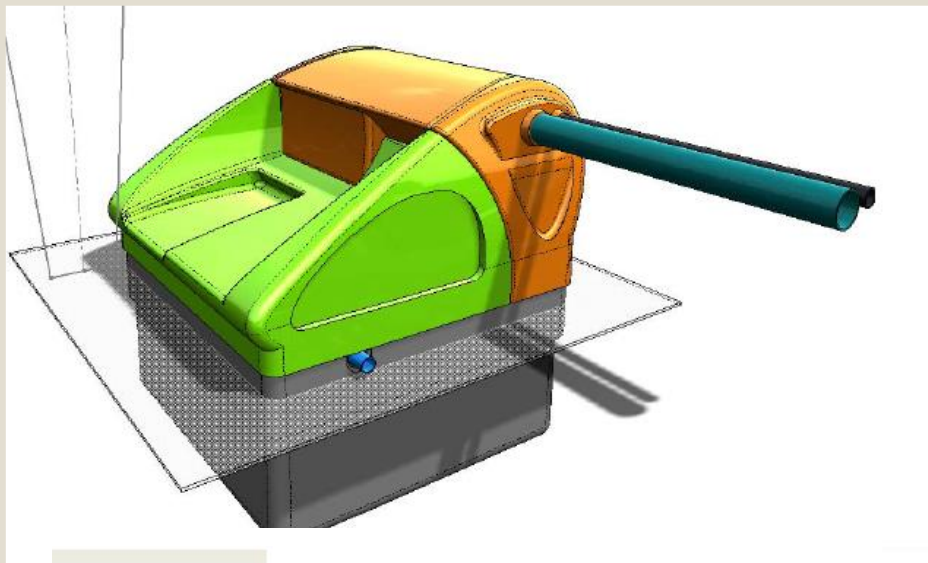
Next generation sanitation solutions



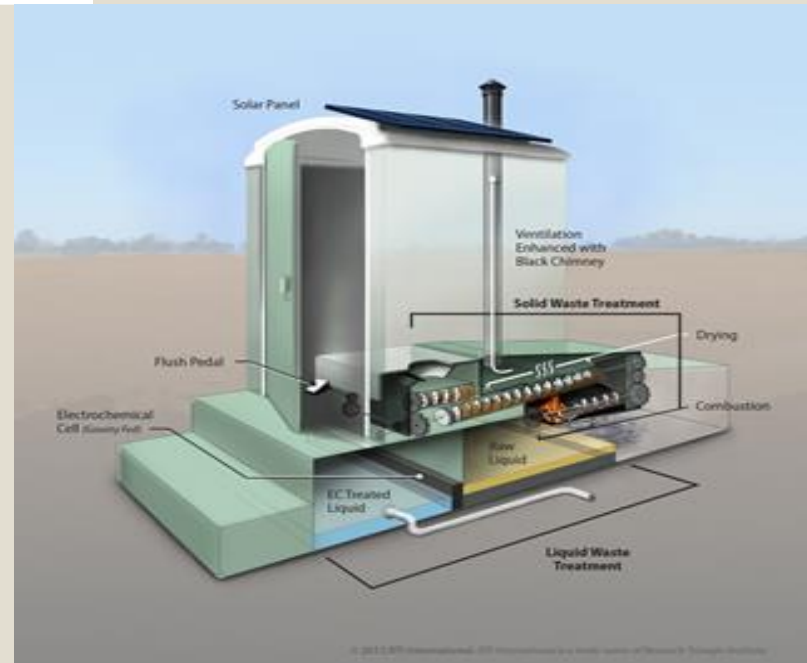
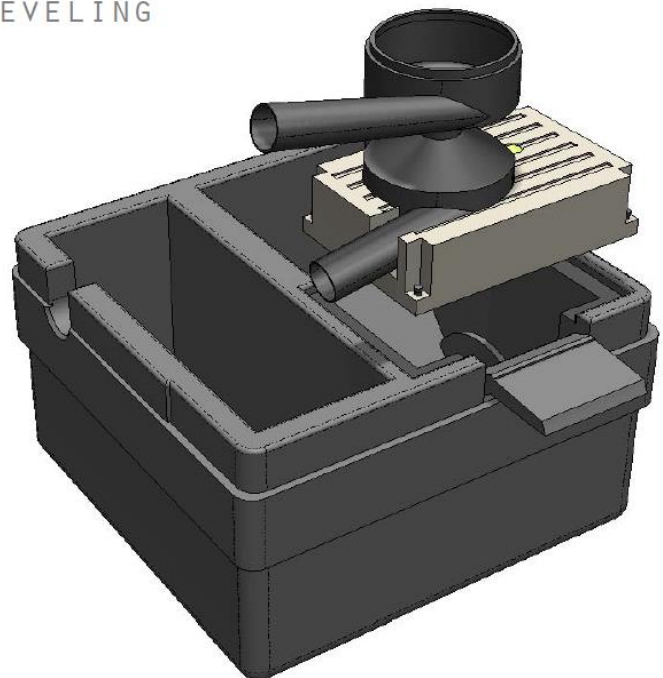


Electrochemical Wastewater Treatment





ZYCLONE
LEVELING



Conclusions

- There is not one optimal solution for all sanitation situations
- The conventional system is not at all bad for urban areas – but much may be improved
- New technologies cannot solve all challenges but quite some
- The socio-cultural aspects are important



So lets start being radically innovative and think of the future.....

