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IWWT

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INSTITUTE
FOR WATER
& WASTEWATER
TECHNOLOGY

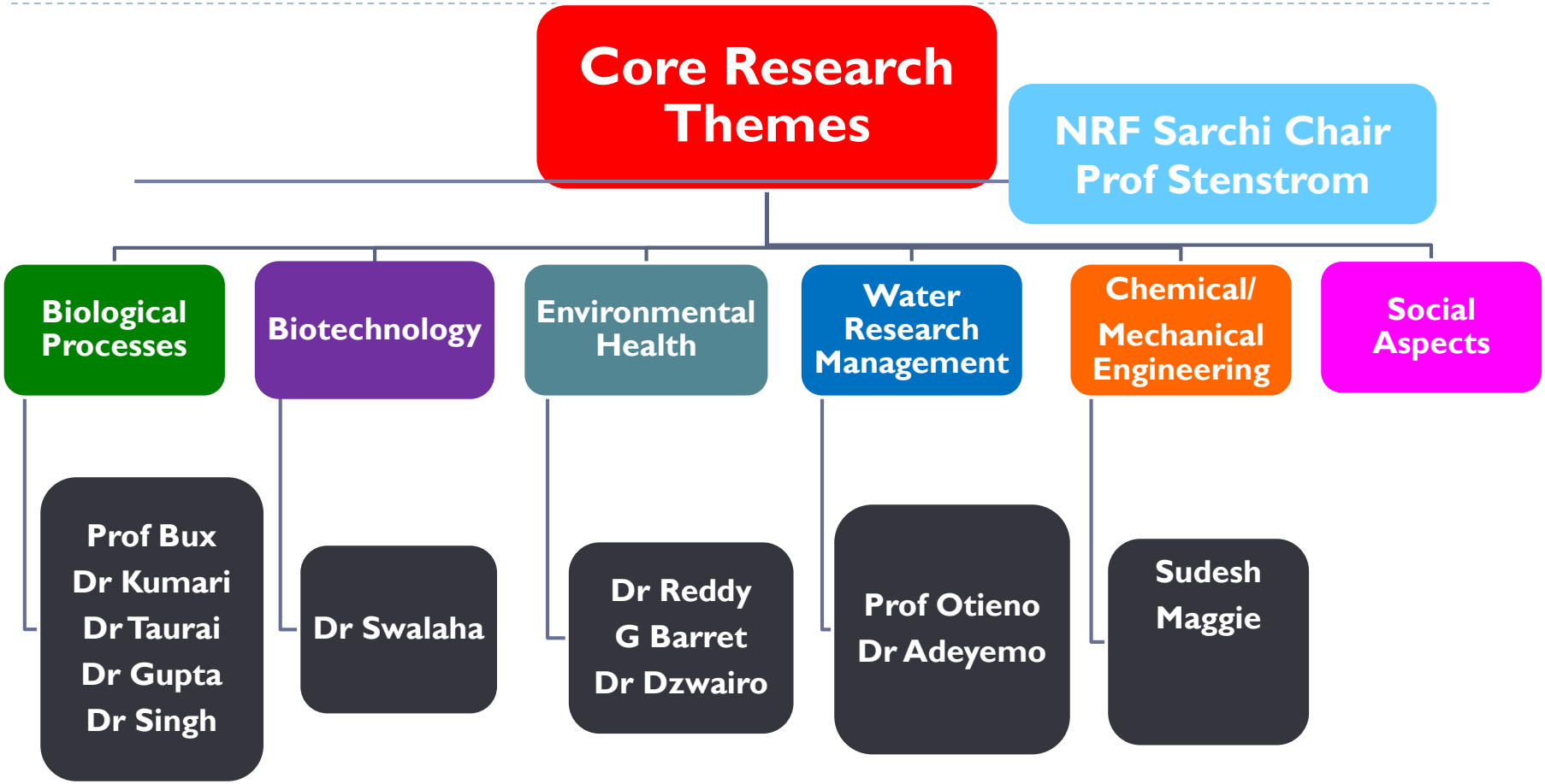
SARChI (South African Research Chair Initiative) in Development and Optimisation of Wastewater Treatment Technology for Developing Economies IWWT/DUT

BACKGROUND

Applied researcher; headed research projects in:

- drinking water, wastewater and excreta, surface waters and integrated water, and wastewater management,
- both in industrialised countries and in developing economies.
- Recently related to drinking water and sanitation management practices in the combined interventions between diarrheal disease and dengue vector control in Asia and Latin America.
- Supervising PhDs, both in Scandinavia and from countries representing developing economies.
- Extensive publication record.
- Advisor for the WHO currently dealing with risk assessment and sanitation safety planning

DUT – Cross-faculty research in water



Institute for Water and Wastewater Technology (Research Areas)

- **Water Treatment**
  - Application of membrane systems for water treatment
  - Developing rainwater harvesting technology
  - Water quality analysis and modelling

- **Wastewater treatment and beneficiation**
  - Microbial database of functional groups in full scale wastewater treatment
  - Wastewater treatment processes and nutrient removal in activated sludge systems
  - Elucidation of filamentous bulking and remedial measures
  - Evaluation of constructed wetlands for wastewater and storm-water treatment
  - Microbial population dynamics in anaerobic processes treating wastewater

- **Algal Biotechnology**
  - Biodiesel production using micro-algae
  - Bio-prospecting for algae that produce oil and other high value products
  - Evaluating the carbon dioxide sequestration potential of algae from flue gas
  - Application of algae in wastewater treatment

Institute for Water and Wastewater Technology (Research Areas – SARChI addition)

Improving the understanding of microbial action in full-scale biological wastewater treatment facilities with the intention of optimization and trouble shooting

- **The reduction efficiency, of selected chemical parameters (nutrients, heavy metals, selected organic micropollutants, nanoparticles) and pathogens (bacterial, viral (surrogate; bacteriophages) and parasitic).**

- **Establish a framework of risk, costs and benefits for the selected processes and in an effluent perspective.**

Developing and adapting low-cost alternative wastewater treatment technology for rural and peri-urban application

- **Different low-cost technologies for blackwater and greywater with a focus on wetlands, algal ponds and anaerobic processes.**

- **Focus on increased pathogen reduction efficiency (including virus surrogates), particles and reduction efficiency related to nutrients and organic content.**

Institute for Water and Wastewater Technology (Research Areas – SARChI addition)

Catchment and technology based integration of health, well-being and environment

- Effluents and impact of chemicals, microbes and particles.
- Pollution impact, health and environment related to IWRM
- GIS based vulnerability mapping, modelling
- Hazard, Exposure and Vulnerability Assessment

Wastewater treatment and reuse for crop and energy production

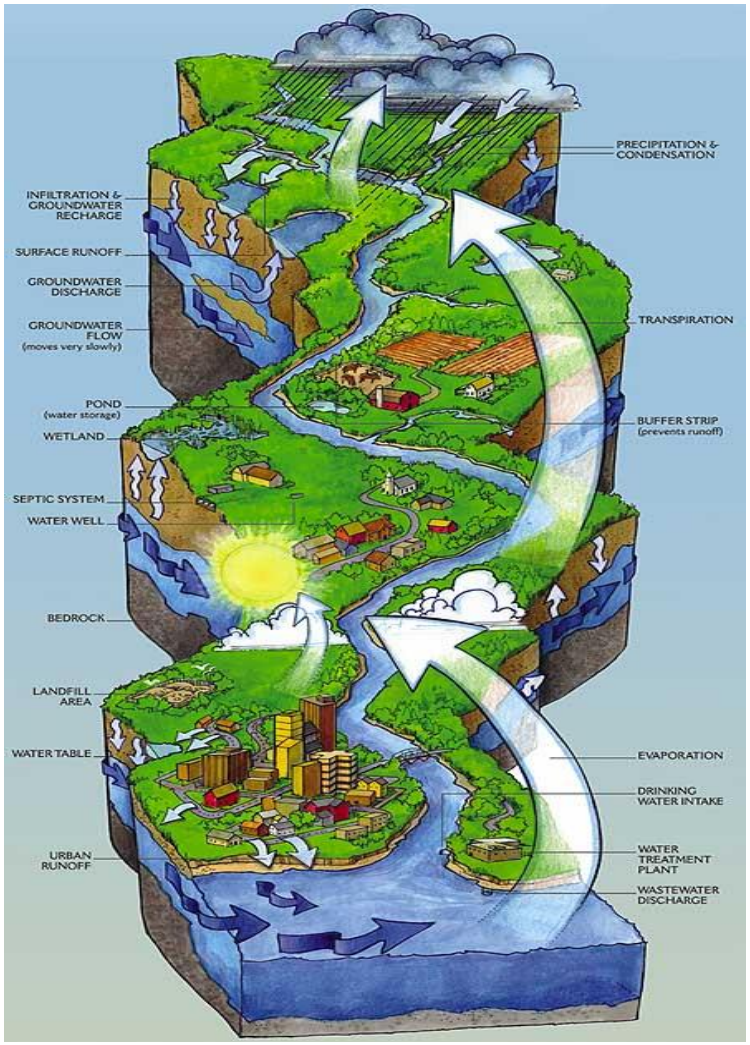
- Risk Assessment and Modelling
- Technology investigations on steps and applications for validation of treatment barriers and application (HACCP evaluation).
- Model site application and overall models

Sanitation Safety Plans

Managing risks in using wastewater, excreta, greywater and contaminated surface water

The dysfunctionality of a sanitation system - fecal contamination

- (A) faecal material contained in pit latrines transported through the groundwater to nearby wells;
- (B) faecal material and wastewater from septic systems in open channels within a given setting enhance the risk of direct exposure of children/others;
- (C) wastewater outlets contaminate streams; food-crops; direct contamination and water for drinking and hygiene purposes;
- (D) may seep into DW pipes during period when water is not distributed (no overpressure), common due to regional water scarcity or lack of electrical power.



DIADEN Overview

Household containers

- Water management practices
  - Collection
  - Transportation
  - Usage
  - storage
- Contaminated drinking water
  - Hygiene
  - sanitation
  - Water management
- Dengue vector production
  - Contaminatedd omestic containers

THANK YOU