



Decentralized Wastewater Management & Communal Sanitation

A quick and effective tool to provide sustainable
sanitation

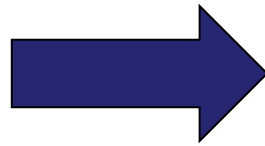


Decentralized Wastewater Management (PART I)

What is decentralized wastewater management?

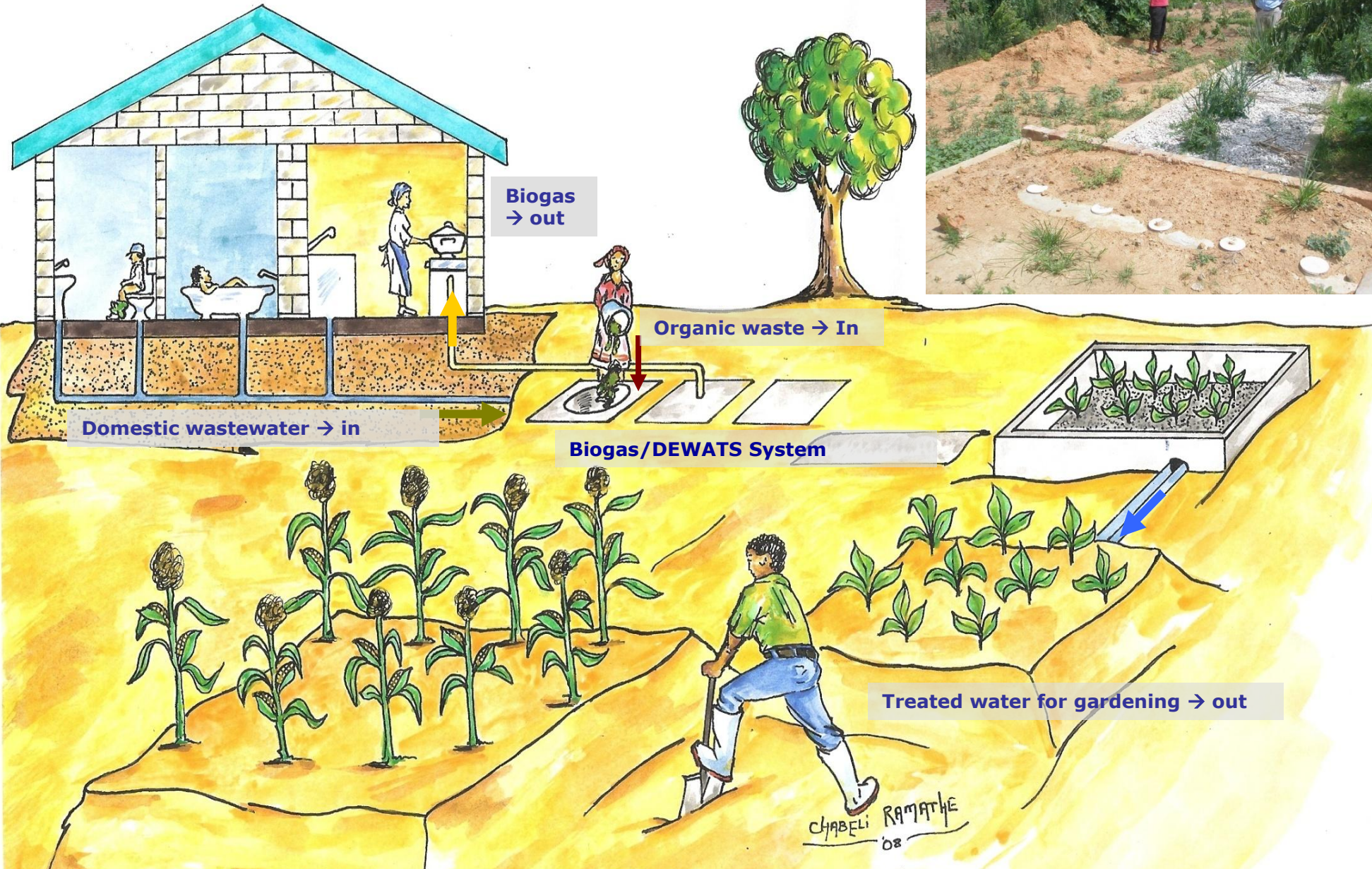
It's to make a change...

- ✓ **By protecting people's and environmental health**
- ✓ **By recycling of natural resources**

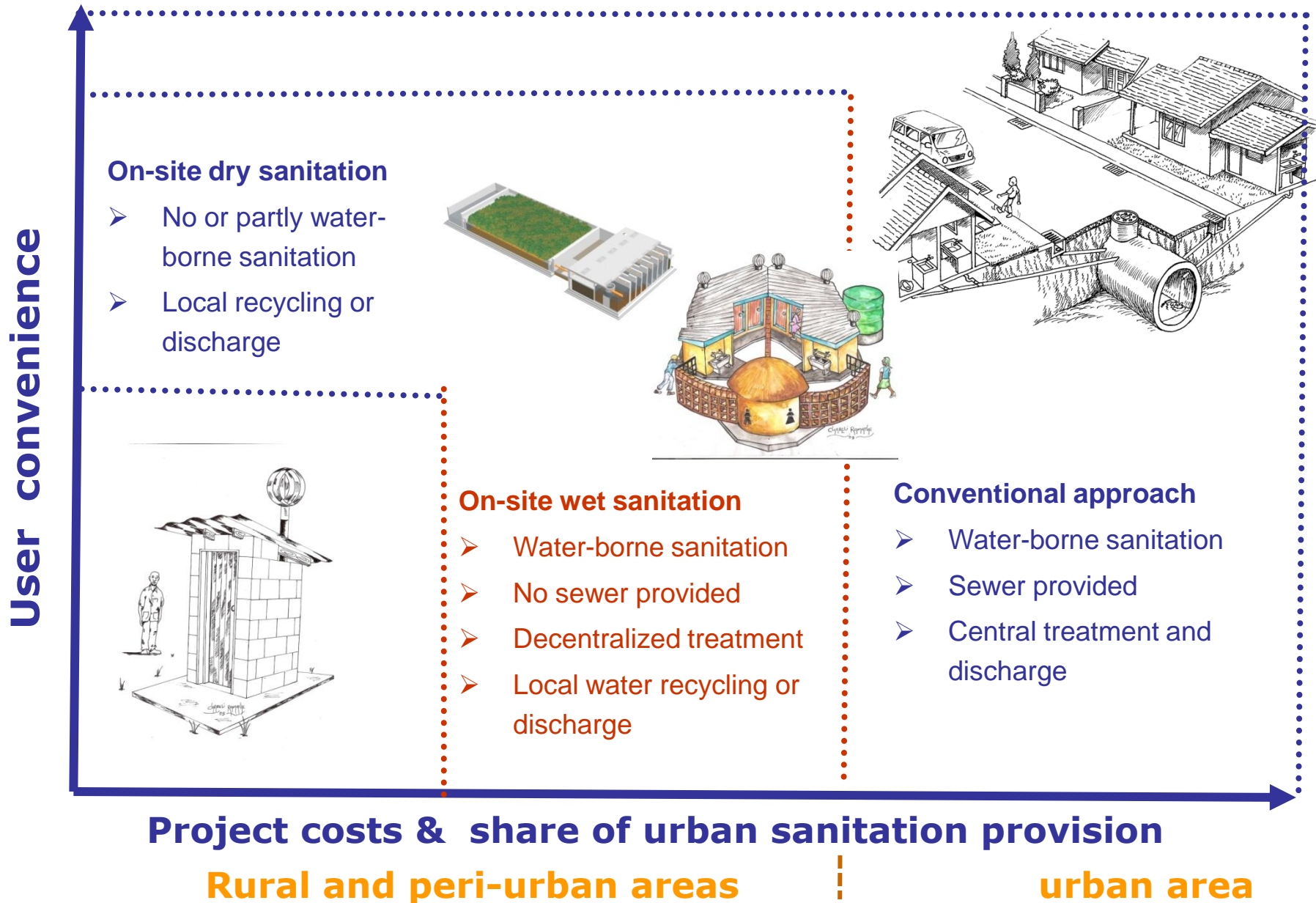


- 1. Safe collection of wastewater and human faeces**
- 2. On- and off-site treatment to required quality**
- 3. Safe disposal or re-use for agriculture and energy generation**
- 4. Sustainable management of step 1 - 3**

Decentralized wastewater management at household level



Urban sanitation provision



Urban sanitation provision in most Tanzanian towns

Main polluter for open water resources

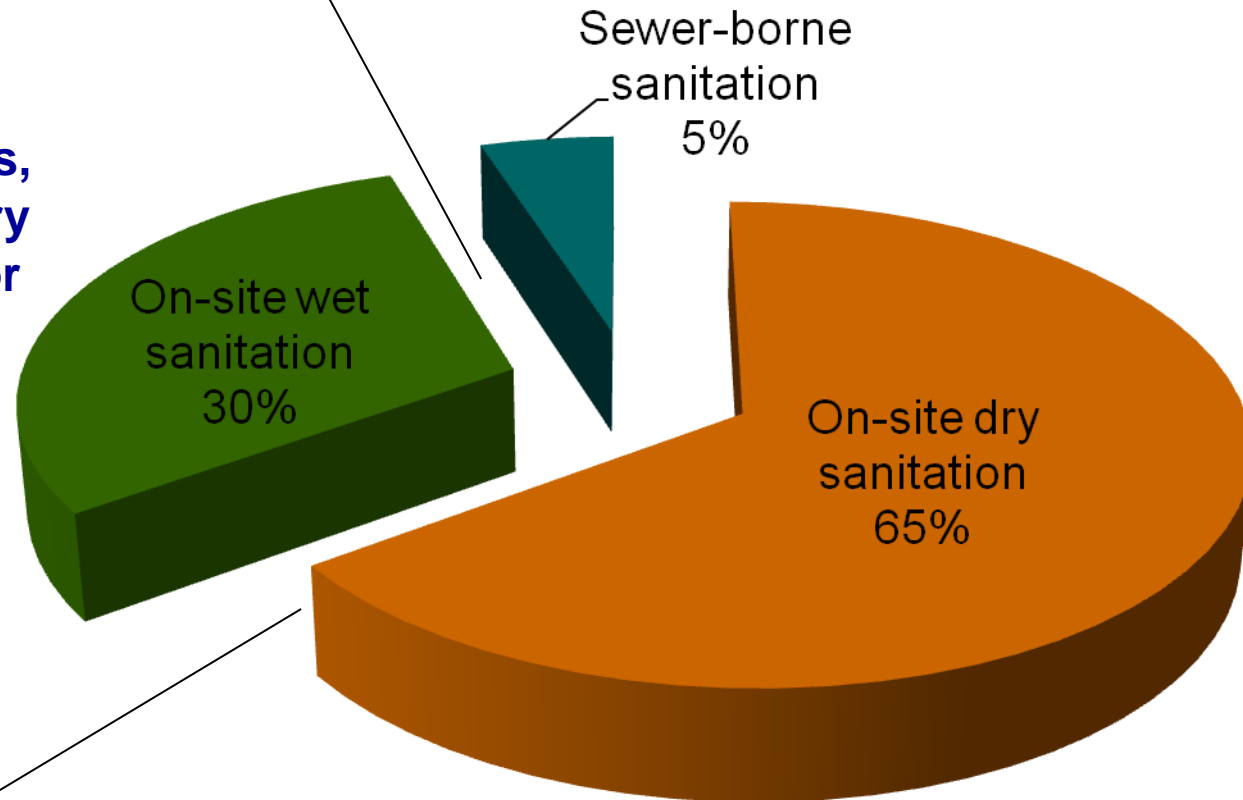
Upgraded houses, real estates, hotels, institutions, industry
Septic tanks and soak-away or direct disposal into rivers and sea, high risk for water resources and public health
Inefficient maintenance and emptying, standards but no law enforcement

**Solution: law enforcement
advanced technologies
and capacity building**

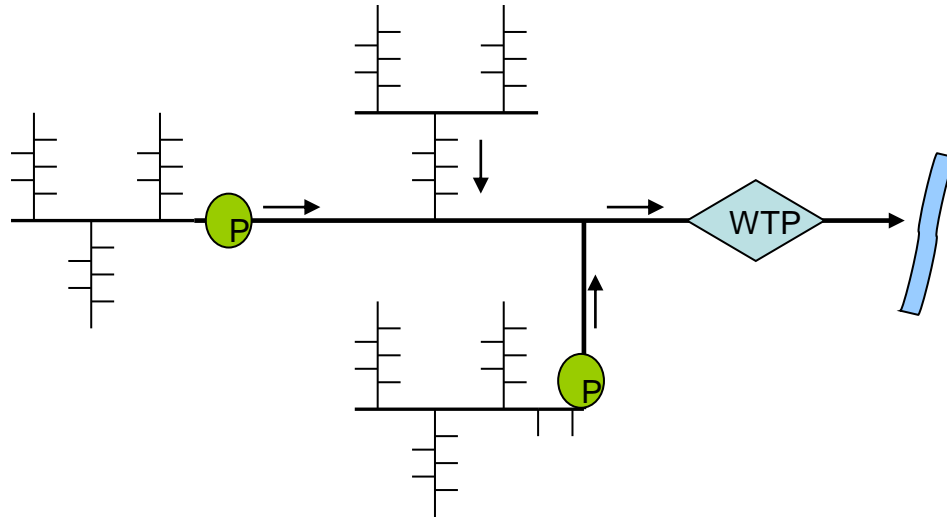
Main polluter for ground water

Mainly pit latrine, risk of ground/drinking water pollution and public health, inefficient maintenance/emptying management

Solution: advanced technologies and public education, by-laws

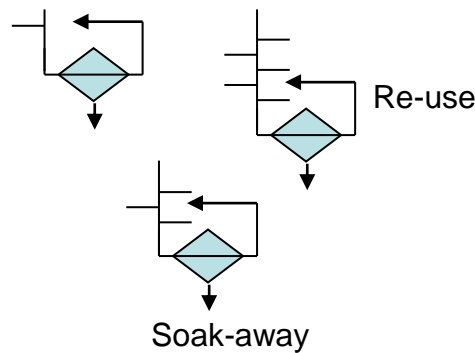


Centralized and decentralized approaches

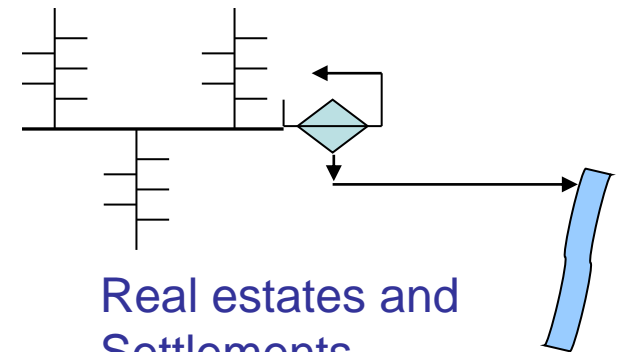


Centralized system
with river discharge

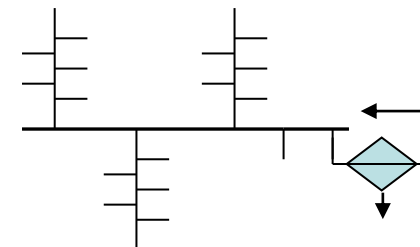
Single House and institutions



Decentralized system
with re-use, soak-away
and river discharge



Real estates and
Settlements



Decentralized wastewater management

Advantages - Decentralization

- ✦ An quick and effective tool to close sanitation gaps and mobilize local resources
- ✦ Simplification and reduction of sewer systems
- ✦ Re-use of the treated wastewater in agriculture and food garden
- ✦ Mobilization of local construction & operation capacities → job creation
- ✦ Utilization of biogas for cooking and heating
- ✦ Low running cost and low cost of the project life cycle

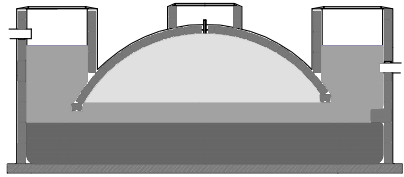
Disadvantages - Decentralization

- ✦ Operation and maintenance on decentralized level needs to be established and supervised
- ✦ Land requirement

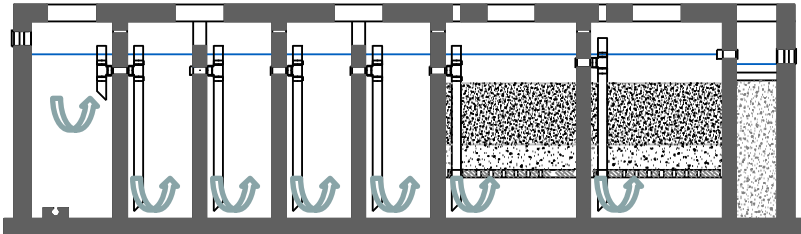
Compare investment and running cost of a decentralized and centralized approach

...and then decide for your project

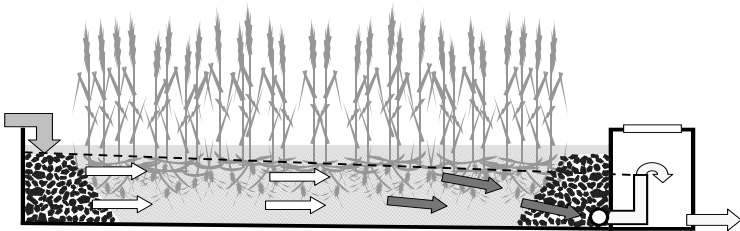
DEWATS – decentralized wastewater treatment solutions promoted by BORDA Partner Network



Biogas settler (pre-WWT or intermediate settler for Solid-free Sewer, underground construction)



Anaerobic baffled reactor – ABR (core- WWT part)



Planted gravel filter (post -WWT part)



DEWATS for a single household



Application: 6 – 10 people

Input: domestic wastewater and optional kitchen waste

Biogas output: 10 – 20 l /d / cap. according to input

Disposal of effluent: irrigation &soak-away

Land required: 6 - 12 m²

Building material: brick and blocks, ferro-cement,
pre-fab fiberglass

Investment cost: approx. 2,000 USD

Running cost: approx. 25 USD per year
(service contract)

Pay back period: 3 – 4 years (saving emptying and
energy cost)

DEWATS for institutions



Application: 10 - 300 people

Input: domestic wastewater

Biogas output: 5 l /d / cap. according to input

Disposal of effluent: irrigation &soak-away

Building material: brick and blocks, concrete,
ferro-cement, pre-fab fiberglass

Example: 120 users

Land required: 80 m²

Investment cost: approx. 9,500 USD

Running cost: approx. 150 USD per year
(service contract)

DEWATS for real estates



Application: 50 - 1000 people

Input: domestic wastewater

Biogas output: 10 l/d / cap. according to input

Disposal of effluent: irrigation & water courses

Building material: brick and blocks, concrete

Example: 1,000 people connected

Land required: 750 m²

Investment cost: approx. 105,000 USD

Running cost: approx. 900 USD per year

Financing of decentralized wastewater management

- Multi-stakeholder funding and mobilization of local resources for investment and operation (builder, beneficiaries, service provider and public sector)
- Enforcement of laws for disposal of wastewater will force builders and developer to invest into wastewater treatment infrastructure and operation and wastewater discharge fine stimulates polluter to invest (institutions, hotels, hospitals, industry, real estates)
- In-come generation (biogas for cooking, water for irrigation, job creation for small local construction companies and service provider) stimulates to invest into infrastructure and services

Frame condition for sustainable sanitation

Legal frame condition

- Technical standards and guidelines
- Comprehensive city wide sanitation planning
- Enforcement of laws for disposal of human waste and wastewater
- Financial stimulation

Capacities building

- Decision making authorities in strategic planning, project approval and law enforcement
- Private consulting and construction firms and NGO's for implementation and service provision
- Capacity building and research institutions

Advanced technologies

- Low-maintenance treatment systems performing according standards
- Built by resources locally available
- Generating of benefit like biogas, irrigation water and soil improver



Communal Sanitation (PART II)

What is communal sanitation?

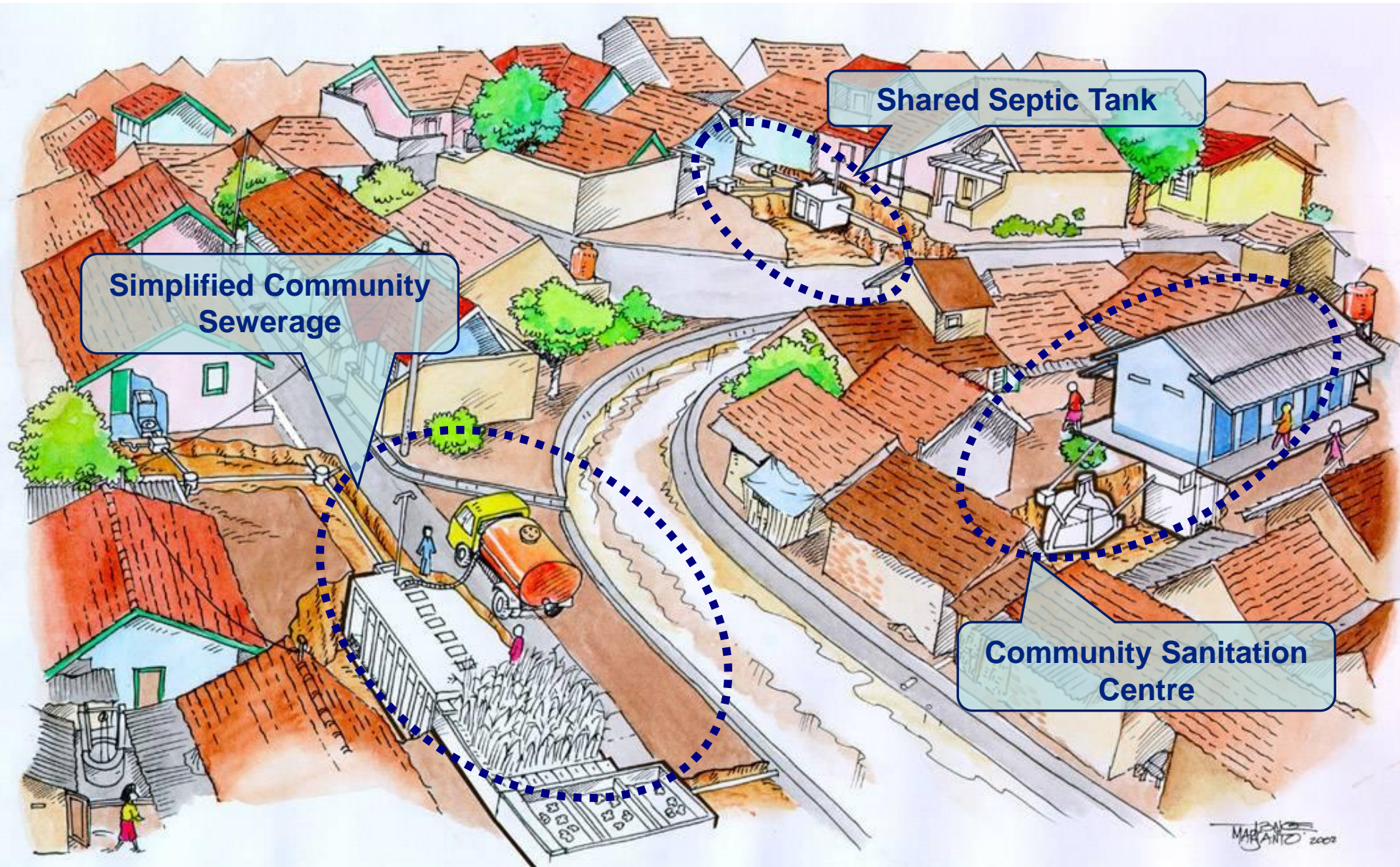
Adequate and affordable sanitation service shared by the users

A rapid response to provide water and sanitation to:

- ✓ High densely populated and un-served residential areas
- ✓ Informal settlements
- ✓ Public sanitation centres for markets and bus stations
- ✓ School sanitation



Options for communal or community based sanitation



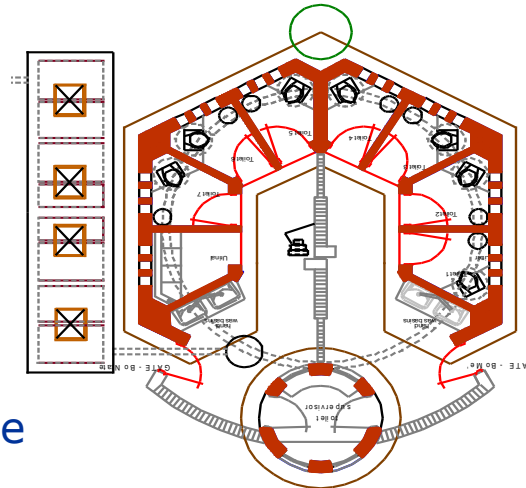
Requirement and standards of communal sanitation facilities

- ✓ Sustainable delivery of sanitation service to all users (women, men, children, old, disabled, pregnant)
- ✓ Sustainable and sufficient water supply
- ✓ Clean and maintained → full time caretaker
- ✓ Provision of privacy and security
- ✓ Affordable → but the user-fee covers O&M cost
- ✓ User participation in planning process → informed choice
- ✓ Sustainable O&M management established → service provider or community organization
- ✓ Eco-friendly → appropriate treatment & disposal of any waste

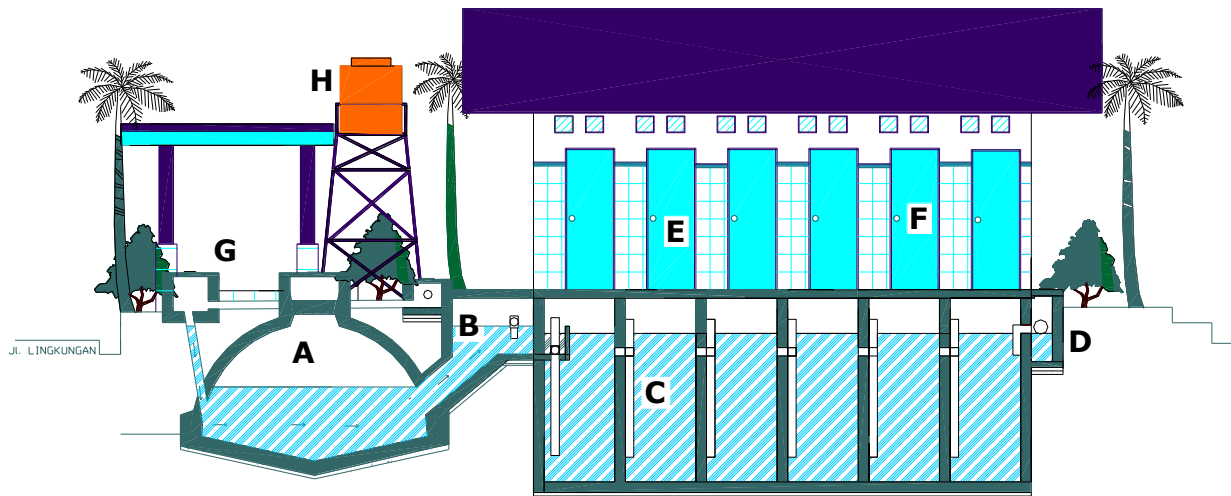
Design example for public sanitation centres

Public sanitation centre facility options:

- Toilets for children's and/or disabled
 - Bathing with warm water
 - Kiosk for water and soaps
 - Laundry and solid waste disposal point
 - Full wastewater treatment
 - No or low flush
-
- ✓ Applicable for public & residential areas
 - ✓ Operated by a CBO or public or private service provider
 - ✓ Capacity for 500 user per day
 - ✓ Investment: 30,000 USD (60 USD per user)
 - ✓ User fee: 5-7 USD per HH per month (9000 Tsh) or 7 – 10 cent per use (150 Tsh)



Design example for public sanitation centres

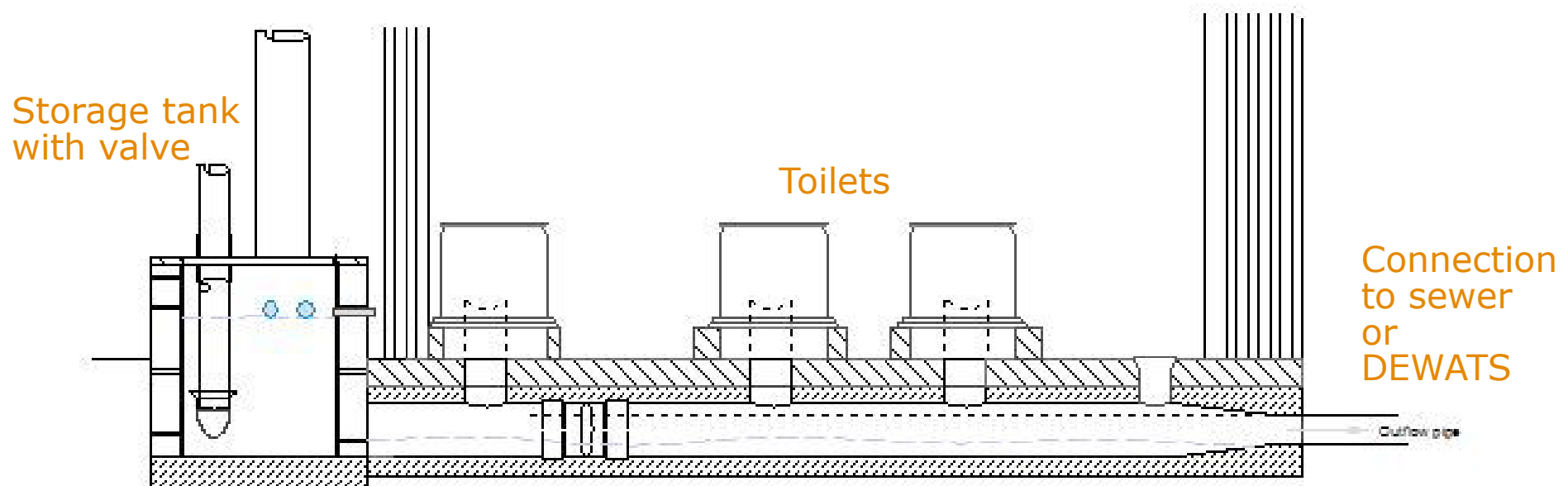


Public sanitation centre facility options:

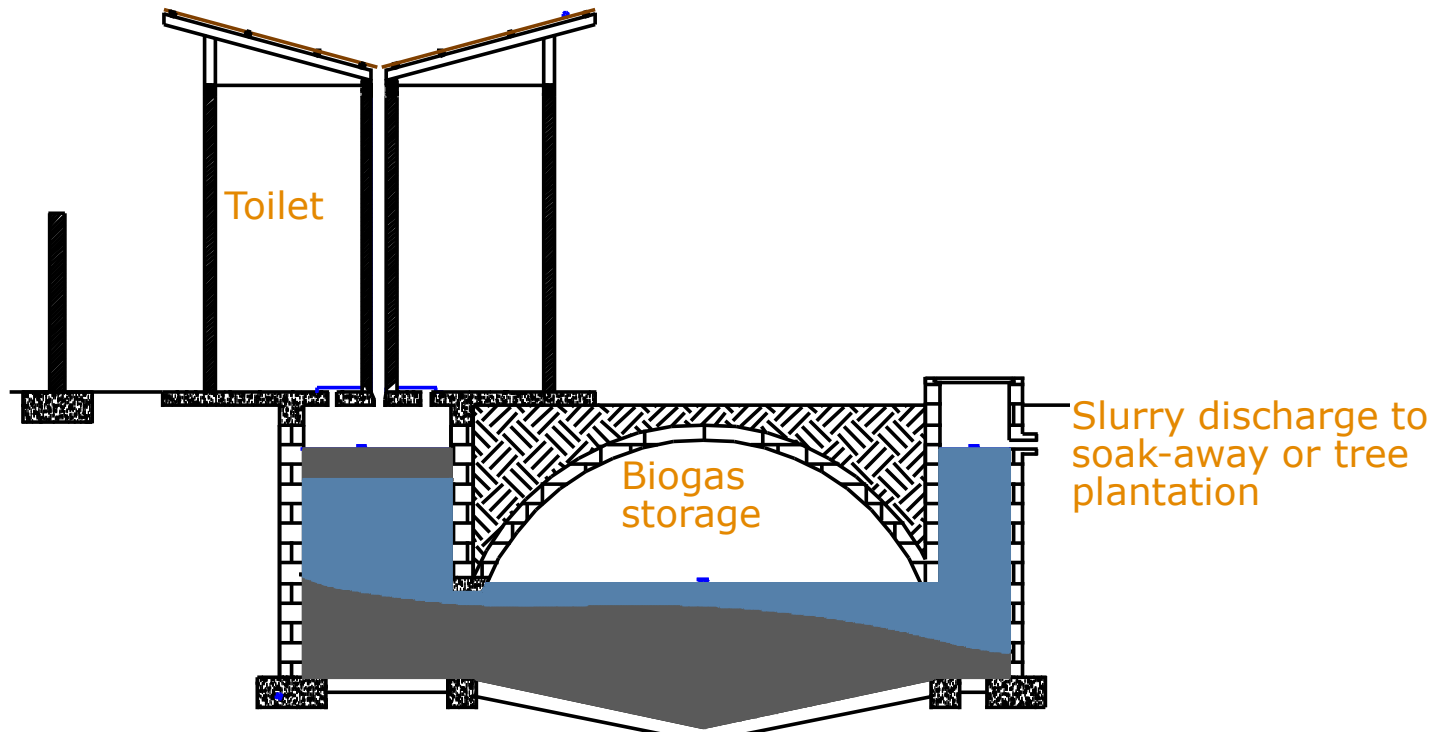
- Pour-flush toilets
- Anaerobic baffled reactor underneath the ablution block
- ✓ Applicable for public & residential areas
- ✓ Operated by a CBO or public or private service provider
- ✓ Capacity for 500 user per day
- ✓ Investment: 40,000 USD (100 USD per user)
- ✓ User fee: 5-7 USD per HH per month (9000 Tsh) or 7 – 10 cent per use (150 Tsh)

Toilet flushing with recycled wastewater

- Type of toilets: sitting or squatting
- Manual flushing 2 – 4 times per day
- Flushing with stored grey water from any sources (hand wash basin, bath, kitchen, roof, treated wastewater)
- Amount of flushing water 2.0 - 4.0 l per user

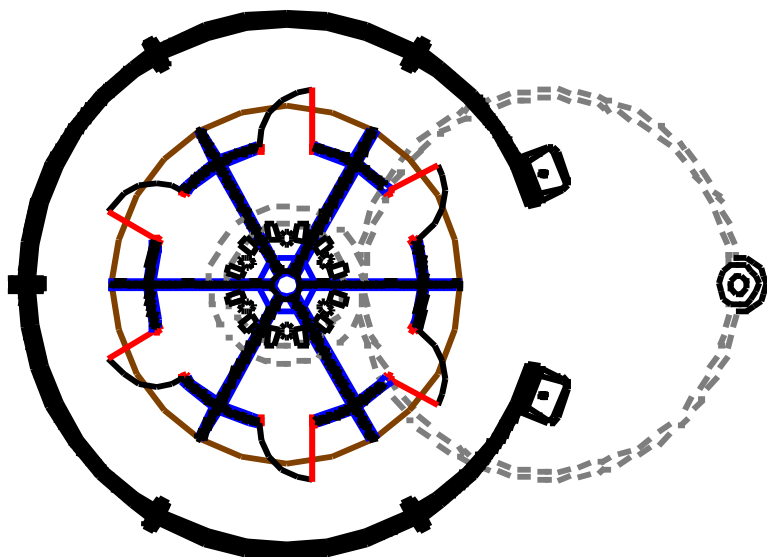


Design example for DEWATS bio-latrine

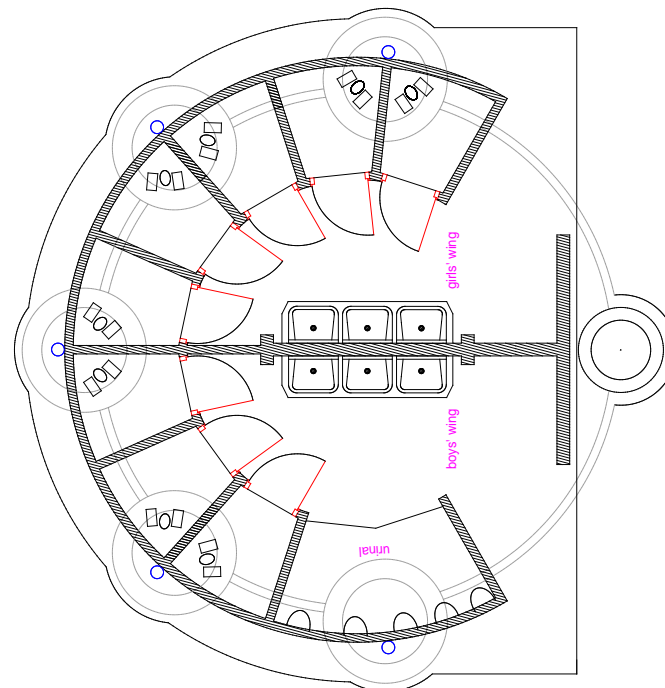


- Dry toilet with business directly into the biogas plant inlet
- Water only required for hand washing
- Ventilation and rain water drainage into the biogas plant through the roof
- Min. of water required in order to ensure liquid/water process condition

Design example for DEWATS bio-latrine



- Design 6 toilet squatting or sitting places
- No. of user up to 180 user
- Investment cost: approx. 5000 USD



- Design up to 10 toilet squatting or sitting places and urinal
- No. of user up to 300 user
- Investment cost: approx. 9500 USD



DEWATS is promoted and implemented by BORDA BNS network

BORDA BNS network Mission's:

Improving the livelihoods of disadvantaged groups and to sustain the functioning of the eco-systems through dissemination of demand oriented Basic Needs Service (BNS) in the field of decentralized sanitation, water- and energy supply and solid waste -and wastewater management

A international network of BORDA cooperation partners focusing on Basic Needs Services (BNS) with more than 150 project implementations per year





DEWATS components of the BORDA Network



Planning & Project management

Capacity building (from authorities down to craftsmen)

Quality management (QMS)

Sanitation mapping & planning (city wide)

Social intervention

Health Impact Assessment

Community based sanitation (let the community decide what they want, able to afford and able to operate (CPA Tools))

Health & Hygiene Education

Technical solutions

Wastewater treatment technology (biogas settler, anaerobic baffled reactors & filter, gravel filter and ponds)

Public sanitation centre (dense populated areas, informal settlements, market places, bus stations, sport and tourist centres)

Sludge treatment systems

Simplified sewer

Energy & water recovery



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„Thinking long-term - Acting Now“