

Integrated Fecal Sludge Management (FSM) chains

Assessment, design and setup of fecal sludge management chains in towns and cities in developing countries



Fig.1 On-site sanitation chain

It is estimated that between 2.1 - 2.6 billion people in low- and middle-income countries rely on on-site technologies that produce tons of untreated fecal sludge every day. When septic tanks and pit latrines become full, the sludge that is collected from them is largely discharged without treatment into open drains, irrigation fields, open lands or surface water.

A 5 m³ truck load of FS dumped into the environment is the equivalent of 5,000 people practicing open defecation. Since 2009, Practica supports African municipalities in the design and set-up of full chain on-site sanitation services.

Assessment and planning

In the urban contexts of the global South, **assessment of sanitation** is a key precondition to fecal sludge management planning.

The assessment is based on **relevant modelling** of the urban environment (physical, socio-economic) and sanitation practices to identify priority interventions for towns and cities.

Practica's expertise in this field include the **collection and structuring of baseline data** on excreta and sludge disposal (surveys, market assessment, sludge characterization, etc.).

The statistical and cartographic use of data allows for generating **key indicators, maps, and diagrams** (rate of access, practices, excreta flows, etc.) that the entities in charge of sanitation planning can understand.

Working alongside technical units, **Practica supports the definition of strategic focuses** to orient planning by identifying the technical solutions, and the financial and organizational mechanisms that should be established.

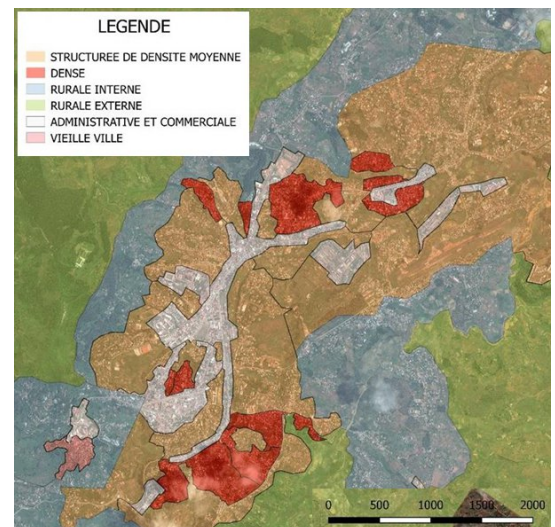


Fig.2 Sanitation zoning of the town of Fianarantsoa (Madagascar, population: 206,000)

"Shit Flow Diagrams"

The shit flow diagram is a tool that represents the main excreta flows along the disposal chain.

Flows are plotted in green when they are considered non-hazardous or controlled and in red when they pose significant health or environmental risks. The size of the arrows of the various flows are proportional to the share of population they involve.

Because it is easy to read, this tool and the associated methodology are in the process of international standardization with the aim of mainstreaming them in sanitation assessments.

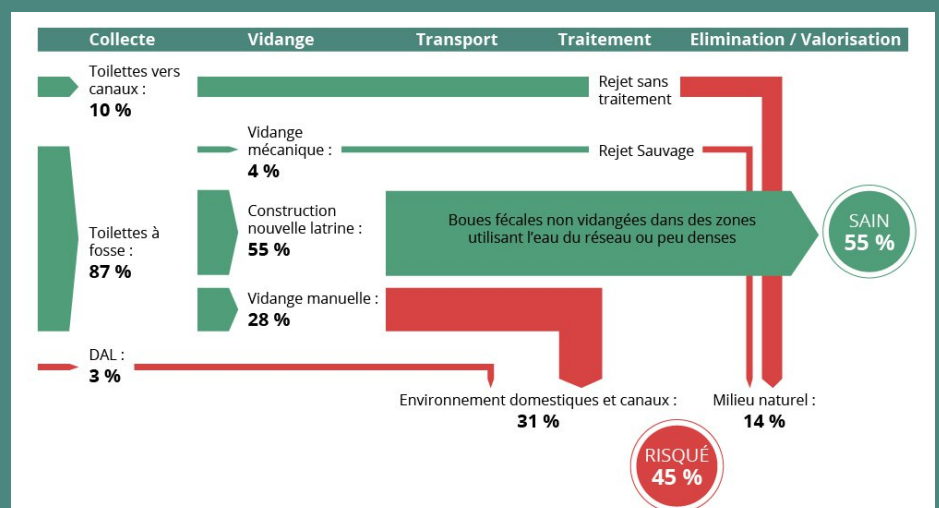


Fig.3 Shit flow diagram for an administrative urban district

Design of full-chain services

The design of on-site sanitation chains is an iterative process that involves multiple factors including: policy and regulatory frameworks, health risks, land tenure issues, funding, available resources, etc.

All these elements are taken into account to define:

- **The technical equipment** to introduce (toilets, sanitation blocks, sludge removal services, transfer sites, recycling units, etc.)
- **The units** to be created or structured to ensure the provision of selected products and services allowing for storing, removing, transporting, and recycling fecal sludge.
- **The mechanisms** to set up to finance, manage, monitor, and control the various links in the sectors (delegation contracts, supervision tools, etc.)
- **The capacity building and sensitization activities** (trainings, technical assistance, promotion) to implement with the various stakeholders.



Fig.4 Design overview of a sludge reuse unit for the town of Maroantsetra (Madagascar) that produces energy and agricultural inputs

Set-up and optimization

Tapping into its diverse pool of managers, engineers, and technicians, Practica proposes operational technical assistance that covers all the activities associated with the setting up of fecal sludge management sectors:

- **Recruitment of private operators** or structuring of municipal services to perform the services
- **Construction of infrastructure:** coordination and control of building works
- **Training** of (private and/or public) actors on the operation, monitoring and control of systems
- **Coaching** of actors at the stages of service start-up and/or optimization (fine-tuning of the sector's operation)

Focused on innovation, Practica supports several action **research pilots** aiming to:

- Develop new approaches and tools
- Lay sound technical and organizational foundations for fine-tuning the operational services
- Initiate new "public-private" partnerships



Fig.5 Training a small emptying service (Benin)



Fig.6 Fecal sludge humification plant in Toamasina (Madagascar) built by Protos and Practica (July 2016)

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