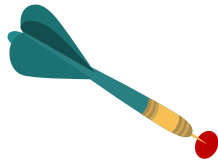


## **Part 2 – Sanitation Solutions**

### **2.7 Introduction to Faecal Sludge Management**

**Inclusive urban sanitation – Capacity development for consultants**



- **Identify the main options for:**  
faecal sludge collection and  
transport, and available treatment  
options

## Faecal sludge collection and transport

- Faecal sludge collection & transport technologies
- Linkage with solid waste management
- Enabling environment for emptying services

## Faecal sludge treatment

- Introduction to faecal sludge treatment technologies
- Co-treatment of faecal sludge with sewage
- The circular economy: reuse and recovery
- Faecal sludge treatment activity



# Faecal sludge collection



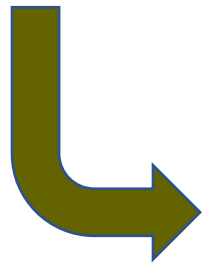
Manual collection



Manually operated  
mechanical collection



Mechanical collection



Serious public health hazard  
Cheaper than safer services  
Therefore, must work with manual emptiers when  
trying to improve the situation.



# Faecal sludge collection



Manual collection



Manually operated  
mechanical collection



Mechanical collection

Example: Gulper.

Limited and often supplemented by simpler scoops and shovels.

More work needed to improve.

Making latrines easier and more hygienic to empty is desirable.

# Faecal sludge collection



Manual collection



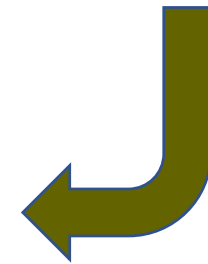
Manually operated  
mechanical collection



Mechanical collection

Example: Vacutug

Have limitations: limited volumes and slow speed.





Engage with existing informal and manual emptiers. This:

- avoids competition with improved services
- builds on existing knowledge



Gulper in Dar Es Salaam

# Consider a need for transfer stations

Avoid dumping faecal sludge in sewers

## Fixed transfer stations

- Good management required
- May be hard to find sites

## Mobile transfer stations (tanks)

- Good coordination with emptiers required



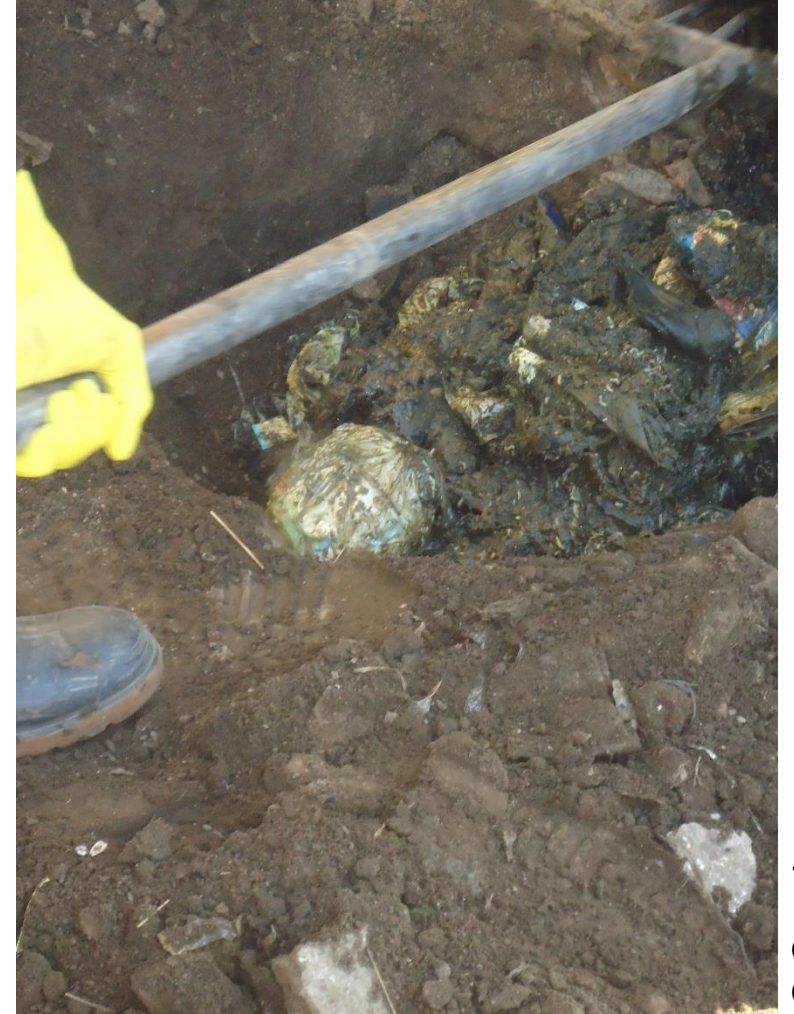
Transfer station in Nairobi



Solid waste complicates and increases the cost of emptying latrine pits.

Possible approaches:

- User education
- Joint solid waste and faecal sludge collection services
- Avoid solid waste through a water seal, Sato Pan, or similar



Pit latrine sludge

# Appropriate collection and transport

## Manual



+

- High solid content
- Accessibility
- Local job creation

-

- Low amounts
- Higher costs
- Short transport distances

## Mechanical



+

- Large amounts
- Lower costs
- Large transport distances

-

- Low solid content
- Poor accessibility

See [FSM MOOC Module 2.7](#) for more about collection and transport of faecal sludge

# Enabling environment

- Recognise and regulate emptying
- Engage with emptiers when developing regulations
- Set up training in technical and business skills
- Facilitate credit and/or provide small grants
- Support emptiers' associations





# Faecal sludge treatment

# Video: Faecal sludge treatment technologies



Trainer – proceed to next slide and then click on play button to start video.

Extract from Eawag MOOC on Introduction to FSM Week 2

8 mins



This video is in your pen drive









# Cotreatment of sewage and faecal sludge

**Compared with sewage, faecal sludge is usually:**

- more concentrated and variable
- has higher proportion of inorganics and non-degradable solids
- is partially stabilised

Sample 26

Laboratory sample



Chemical parameters (mg/L)

pH	8.3
COD	13,393
CODsol	3,607
TN	3,060
NH <sub>4</sub> -N	1,731
NO <sub>3</sub> -N	10.9
TP	210
PO <sub>4</sub> -P	61

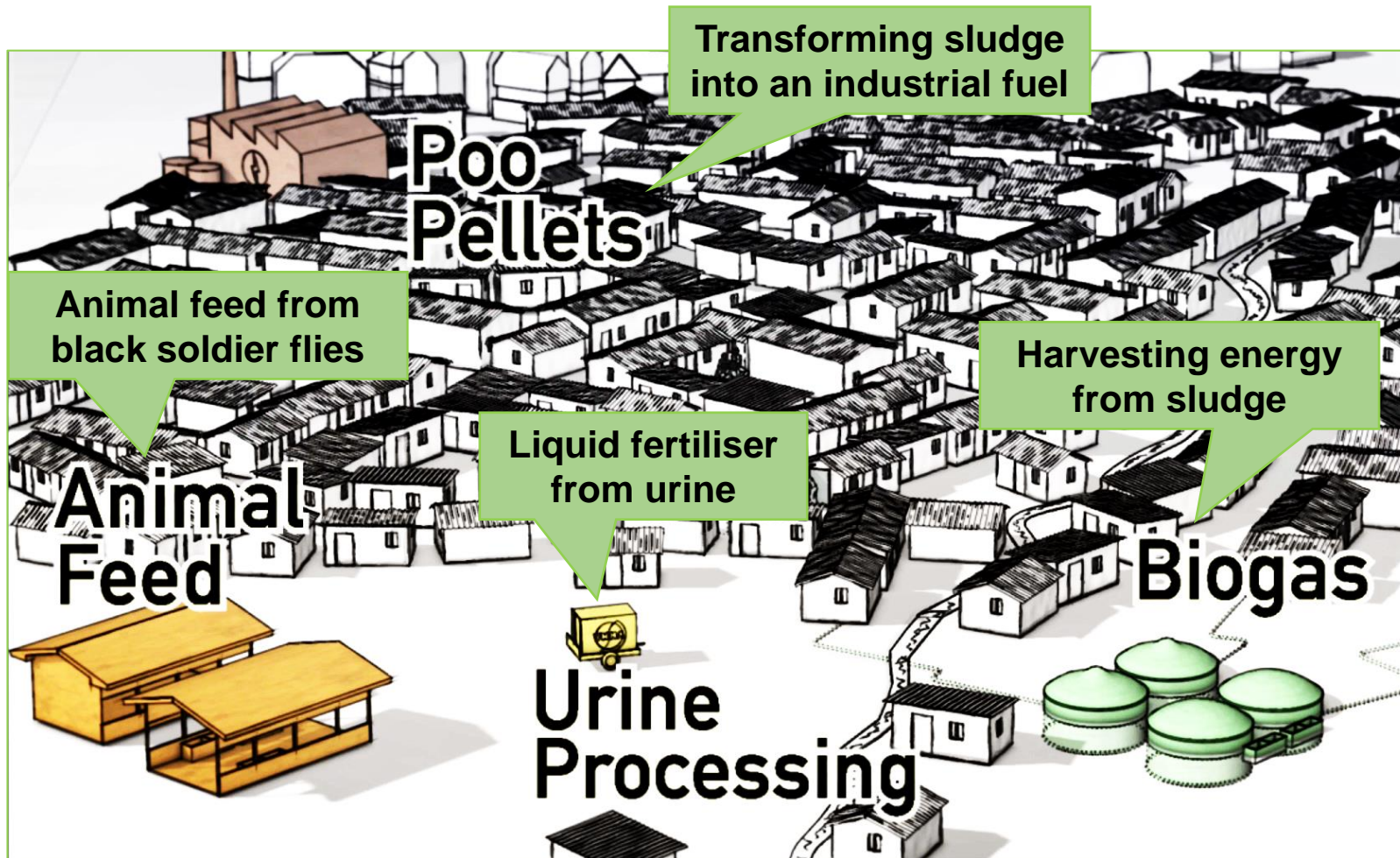
Physical parameters (mg/L)

TSS	11,237
VSS	5,738
TS	14,977
VS	7,087

Work with an experienced wastewater engineer who also understands faecal sludge

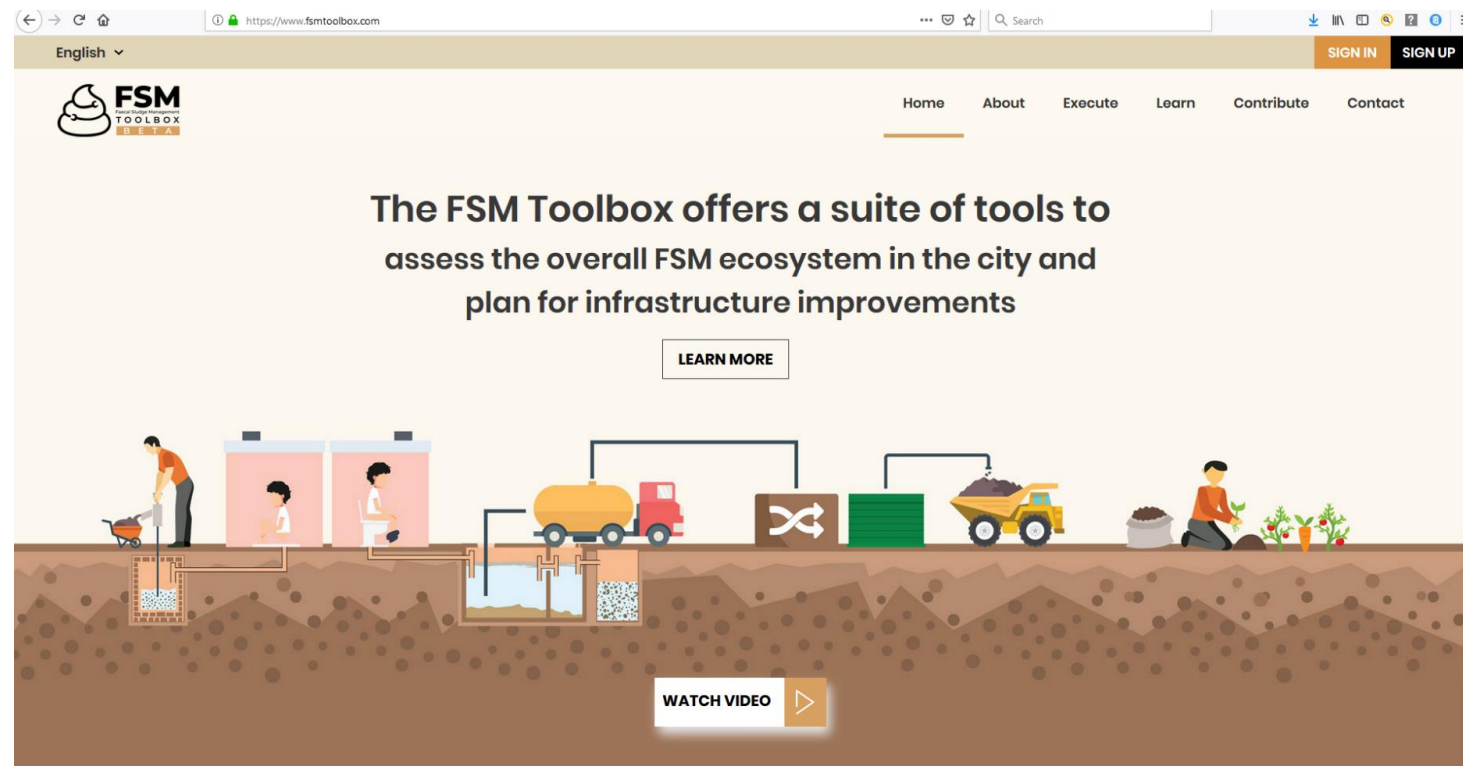
See [FSM MOOC Module 3.6](#) for more about cotreatment of sewage and faecal sludge

# The circular economy: recovery and reuse



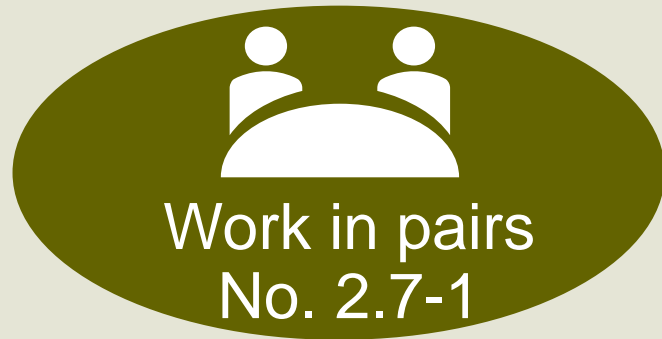
- Technologies exist for waste-to-resource processing
- New markets for private sector service providers
- Revenues can offset treatment costs
- Resource recovery becomes an integral part of the circular economy

- More information at [www.fsmttoolbox.com](https://www.fsmttoolbox.com)
- Comprehensive knowledge platform for FSM
- Assessment and Planning and technical decision support tools

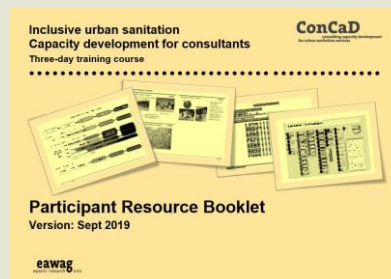




# Faecal sludge treatment exercise



15 mins



In pairs, read the treatment technology sheets posted around the room.

For each treatment technology, discuss and identify the

- Treatment objectives
- Treatment products
- Pathogen inactivation mechanisms
- Level of technology development

Fill in the table in your Participants Resource Booklet (See Activity 2.4-1, page 29).

# References and resources

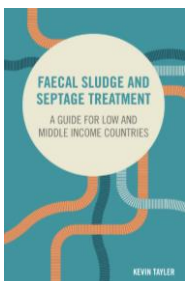


**FSM Toolbox** 2019 The FSM Toolbox combines existing tools to enable an structured assessment of the enabling ecosystem (enabling environment), followed by planning.



**Faecal Sludge Management: Systems Approach for Implementation and Operation** 2014, Eawag. This first book on FSM includes the current state of knowledge of this rapidly evolving field, and presents an integrated approach that includes technology, management and planning. [www.sandec.ch/fsm-book](http://www.sandec.ch/fsm-book)

**Faecal Sludge Management: Highlights and Exercises** 2019, Eawag. This exercise book is meant to be used in teaching, training and workshops dealing with all aspects of FSM [www.sandec.ch/fsm-book](http://www.sandec.ch/fsm-book)



**Faecal Sludge and Septage Treatment:** A guide for low- and middle-income countries, 2018, Tayler, K. Rugby, UK, Practical Action Publishing