How to approach faecal sludge quantification and characterisation on a city-wide scale

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Key Objective (3)

Have a detailed in-depth understanding of the key elements needed to design a sampling campaign for faecal sludge quantification and characterisation on a city-wide scale, including consideration of the local context.

Three main points

1. The difficulty of faecal sludge quantification and characterisation on a city-wide scale.

1. How to produce representative results for faecal sludge quantification and characterisation on a city-wide scale?

2. How to design a sampling plan for faecal sludge quantification and characterisation?

1	Importance + Difficulty
2	How to quantify?
3	How to characterise?
4	Sampling plan development

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The importance of FS quantification is to develop an…

…understanding about…

(1) …the current amount of FS being emptied and transported;

(2) the current demand for FS emptying and transport services;

(3) the future demand for FS emptying and transport services,

to better…

(4) …plan and design appropriate FS treatment facilities;

(5) operate and maintain existing FS treatment facilities;

(6) estimate markets of FS endproducts for resource, recovery.

Faecal sludge quantification is difficult…

…because…

(1) …often no or little data to estimate quantities exist;

(2) emptying and transportation services are often informal or illegal;

(3) of the prevelance of a wide range of onsite sanitation technologies;

…in addition to…

…the influence of…

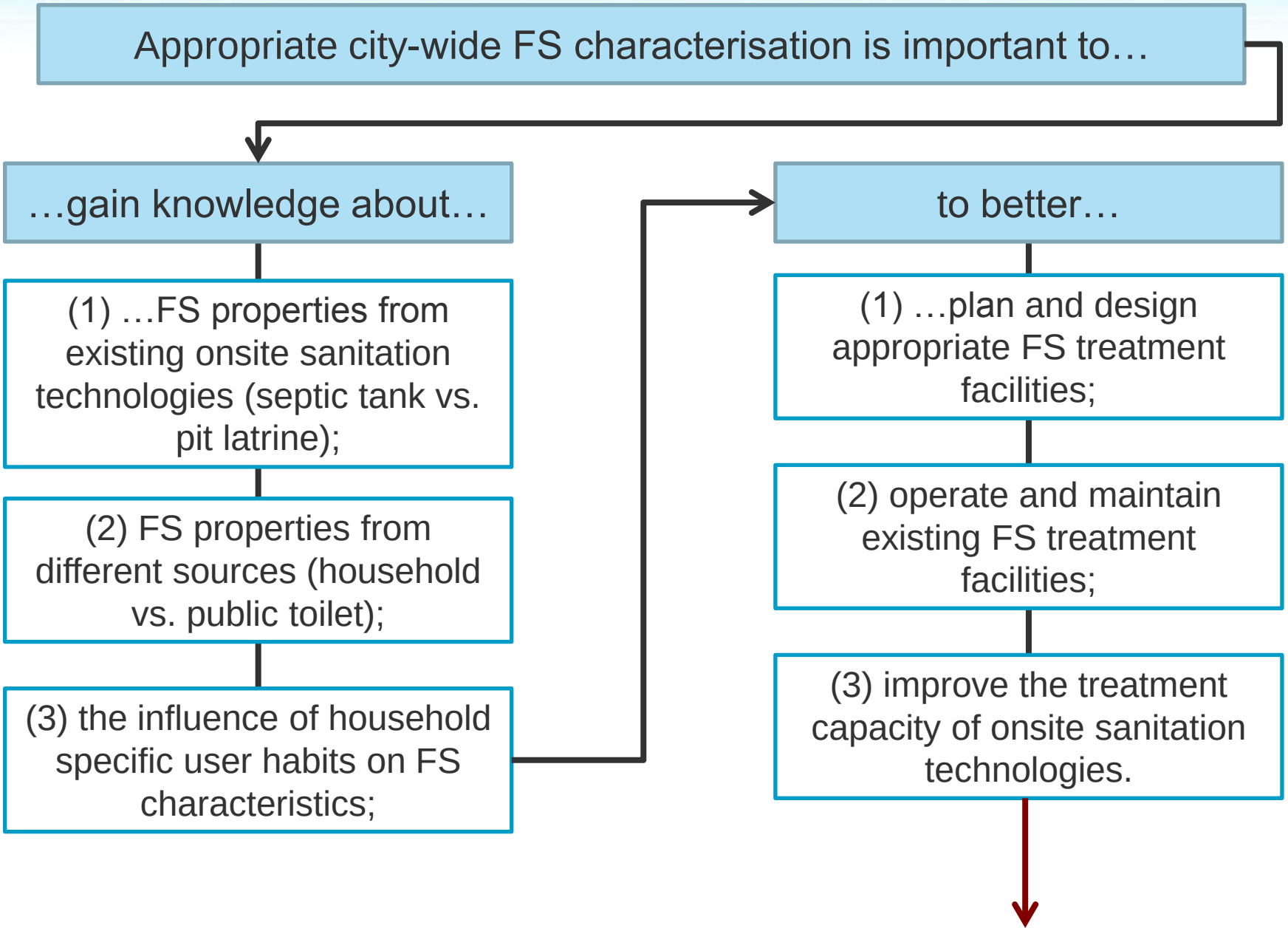
(4) …FS accumulation rates (septic tank vs. pit latrine);

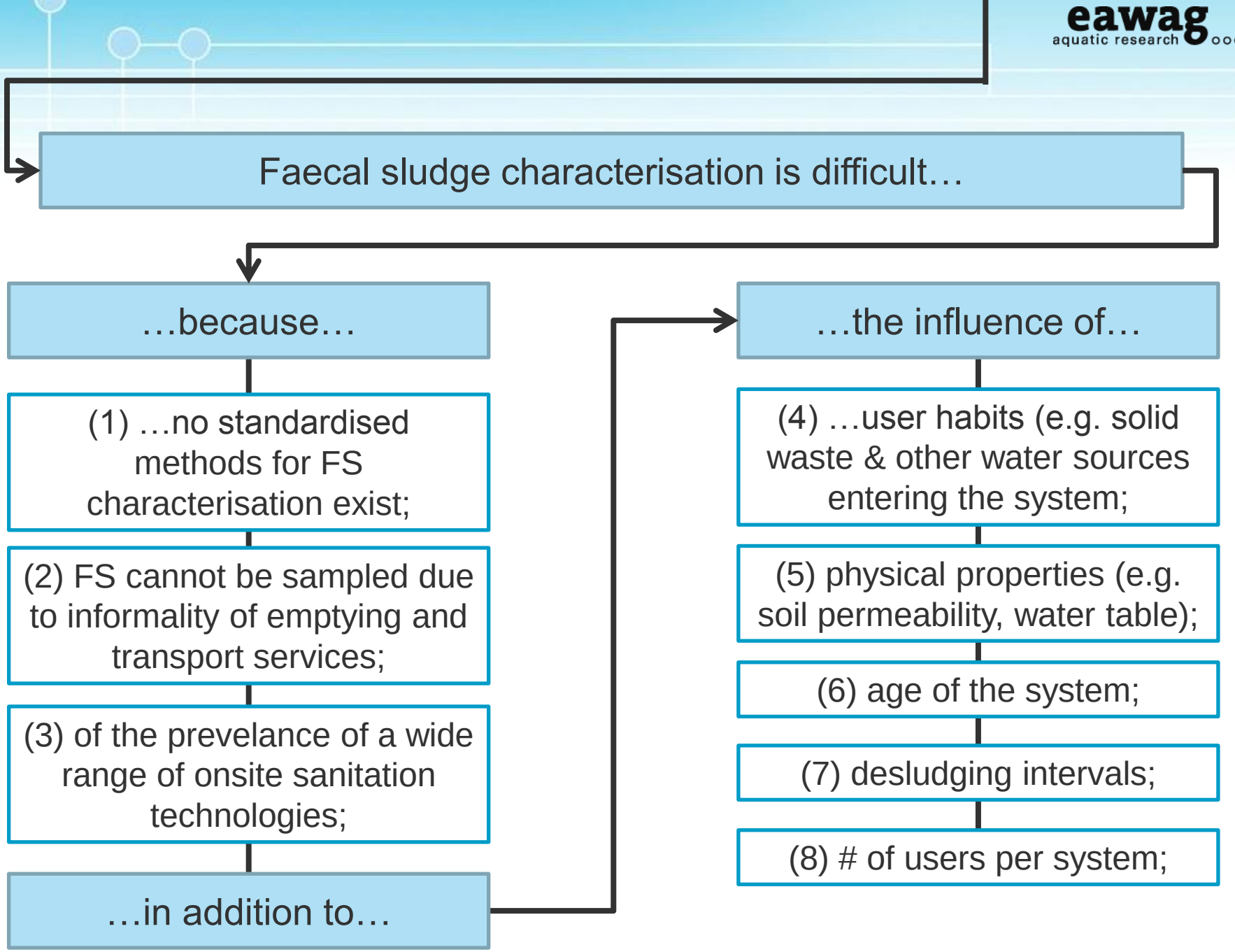
(5) physical properties (e.g. soil permeability, water table);

(6) age and use of the system;

(7) desludging intervals;

(8) # of users per system.


Appropriate city-wide FS characterisation is important to…
…gain knowledge about…
(1) …FS properties from existing onsite sanitation technologies (septic tank vs. pit latrine);
(2) FS properties from different sources (household vs. public toilet);
(3) the influence of household specific user habits on FS characteristics;
to better…
(1) …plan and design appropriate FS treatment facilities;
(2) operate and maintain existing FS treatment facilities;
(3) improve the treatment capacity of onsite sanitation technologies.


Faecal sludge characterisation is difficult…
…because…
(1) …no standardised methods for FS characterisation exist;
(2) FS cannot be sampled due to informality of emptying and transport services;
(3) of the prevelance of a wide range of onsite sanitation technologies;
…in addition to…
…the influence of…
(4) …user habits (e.g. solid waste & other water sources entering the system;
(5) physical properties (e.g. soil permeability, water table);
(6) age of the system;
(7) desludging intervals;
(8) # of users per system;

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Attempts at FS quantification include:

(1) FS production,

- calculated by: per capita production of excreta,
- sludge accumulation rates in OSS technologies (septic tank vs. pit latrine),
- including population growth projections,

which estimates the future demand for FS emptying, transport and treatment.

(2) FS volumes,

- desludging intervals,
- use of system,
- construction of system
- age of system,
- # of users per system,
- physical properties,

which estimates the current demand for FS emptying, transport and treatment.

(3) FS collection,

- existing legal discharge location,
- cooperation with service providers,
- performing a truck counting study,

which estimates the current collection of FS.

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City-wide FS characterisation includes:

(1) Origin of FS:

- households/multiple households,
- schools, universities,
- institutions/industries,
- restaurants/hotels,
- public toilets,
- type of OSS,

which requires knowledge from quantification study.

(2) Physical data:

- soil permeability,
- water table,
- dry/rainy seasons
- land-use,
- temperature,

which requires availability of spatial data.

(3) Chemical analysis:

- intended treatment for enduse,
- choice of appropriate parameters,
- capacity for laboratory analyses,
- existing laboratory equipment,

which is budget and resource intensive.

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Steps for the development of a sampling plan

#1	Literature research	• Spatial data • City sanitation master plans • Stakeholder mapping
#2	Data compilation	• Population size (day/night time) • OSS technologies in use • Distribution of OSS technologies
#3	Local availability	• Universities (laboratories and resources) • FS emptying and transportation services • FS discharge locations
#4	Detailed planning	• Sample size • Sample distribution • Questionnaires
#5	To keep in mind	• Strategy for FS sampling location • Strategy for QA/QC • Strategy for standard operating procedures

Example of reality

Kampala

Existing discharge location
Strong collaborations

1 Project manager
1 Internship
1 Master student
1 Research assistant

180 samples

3 months preparation
6 months data collection
3 months detailed analyses
3 months detailed write up

Total time for implementation: 18 months

5 slides with Kampala photos (not displayed due to big file size)

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Thanks for the attention!

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