

Progress in Faecal Sludge Dewatering:

Evaluating a conceptual model and predictors of dewatering performance

BJ Ward, Stanley Sam, Eberhard Morgenroth, Linda Strande



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Motivation: Addressing two challenges in parallel

Manage current faecal sludge crisis

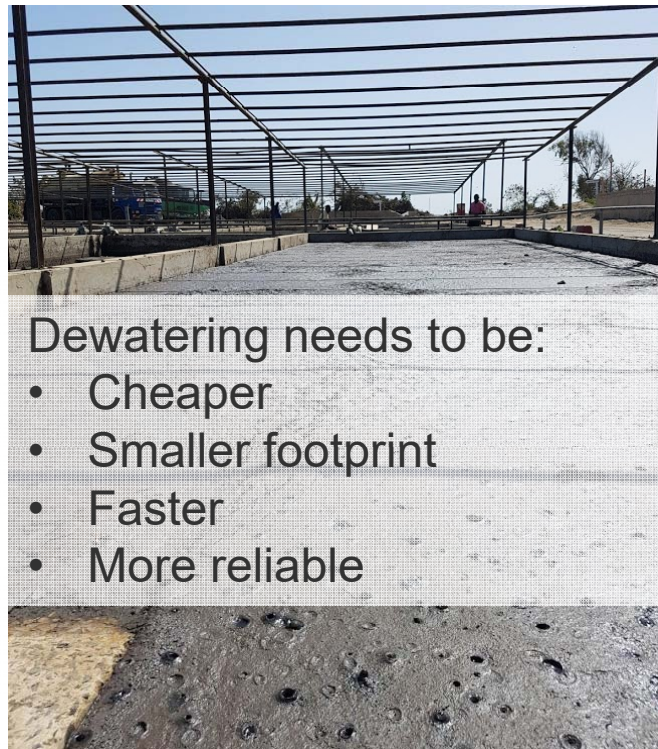


Develop sustainable innovative solutions for future treatment and management



Dewatering: A barrier to achieving faecal sludge management

What's holding us back?



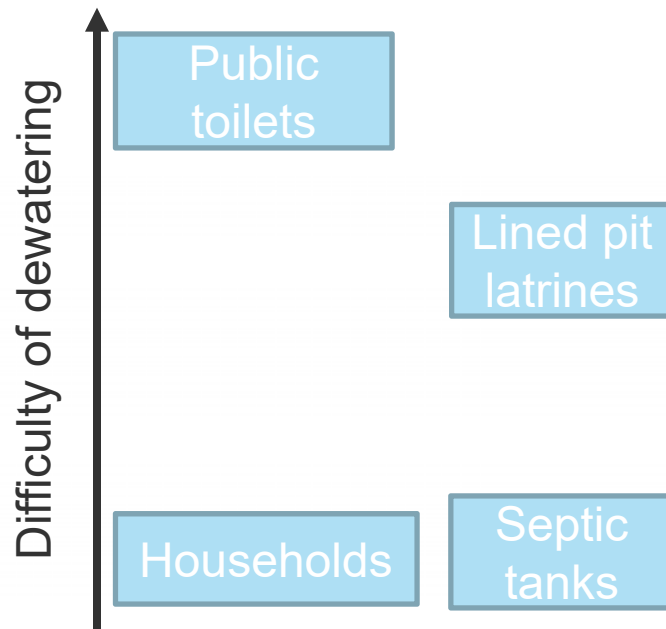
Dewatering needs to be:

- Cheaper
- Smaller footprint
- Faster
- More reliable



Photo: Kevin Taylor

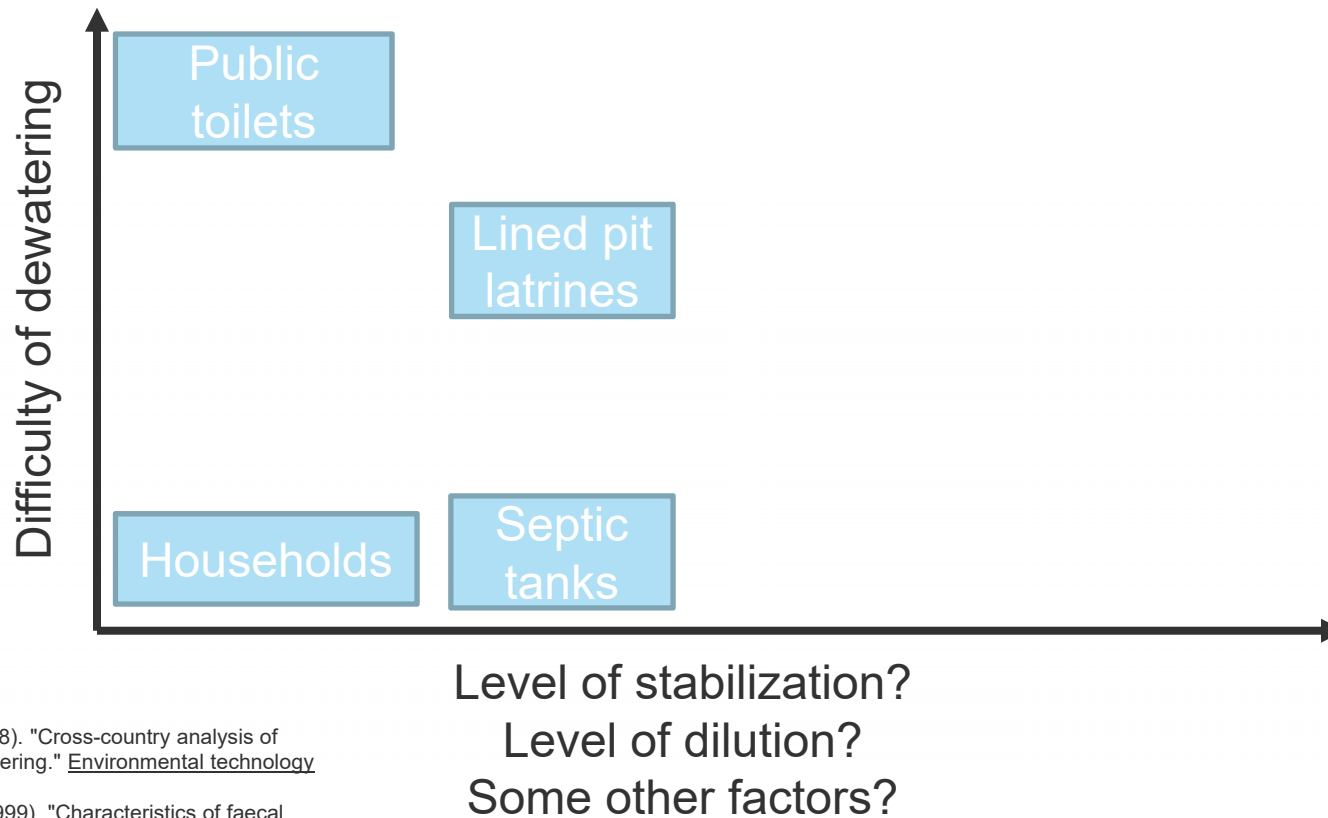
Observations from practitioners and empirical research



Gold, M., et al. (2018). "Cross-country analysis of faecal sludge dewatering." Environmental technology **39**(23): 3077-3087.

Heinss, U., et al. (1999). "Characteristics of faecal sludges and their solids-liquid separation." EAWAG/SANDEC: Janeiro.

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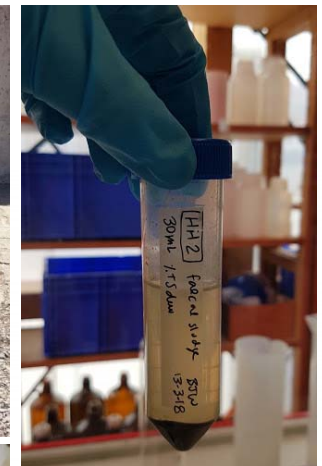
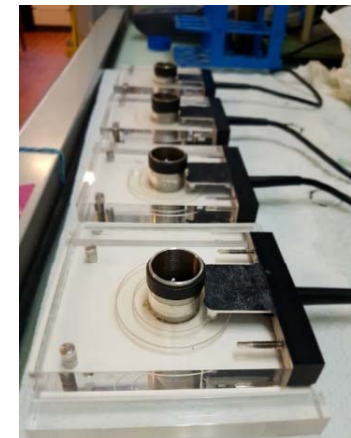
Heinss, U., et al. (1999). "Characteristics of faecal sludges and their solids-liquid separation." *EA Wag/SANDEC: Janeiro*.

BJ Ward February 2019

Methods: sampling and characterization in Dakar, Senegal



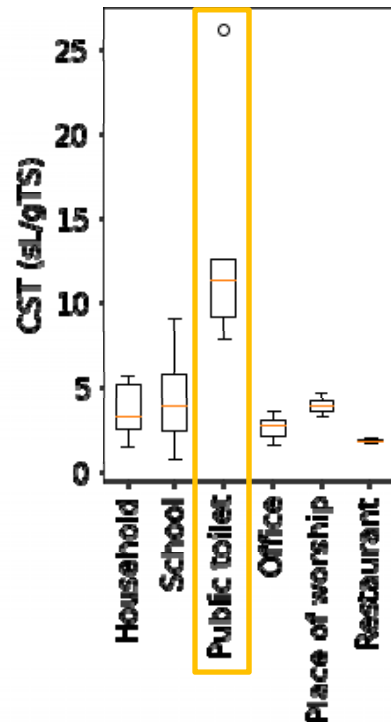
BJ Ward February 2019



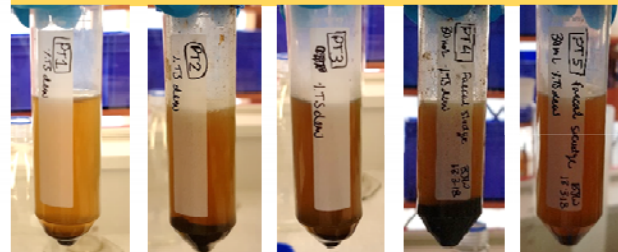
Results: Dewatering time and turbidity

Dewatering time and turbidity related to source

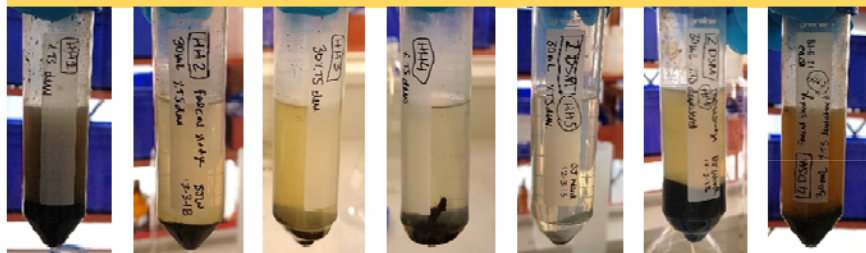
- Public toilet faecal sludge slowest to dewater, most turbid



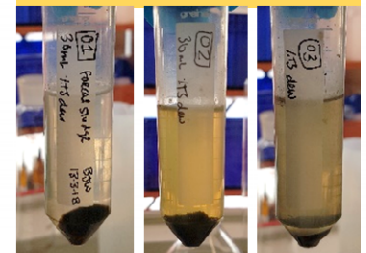
Public Toilets



Households



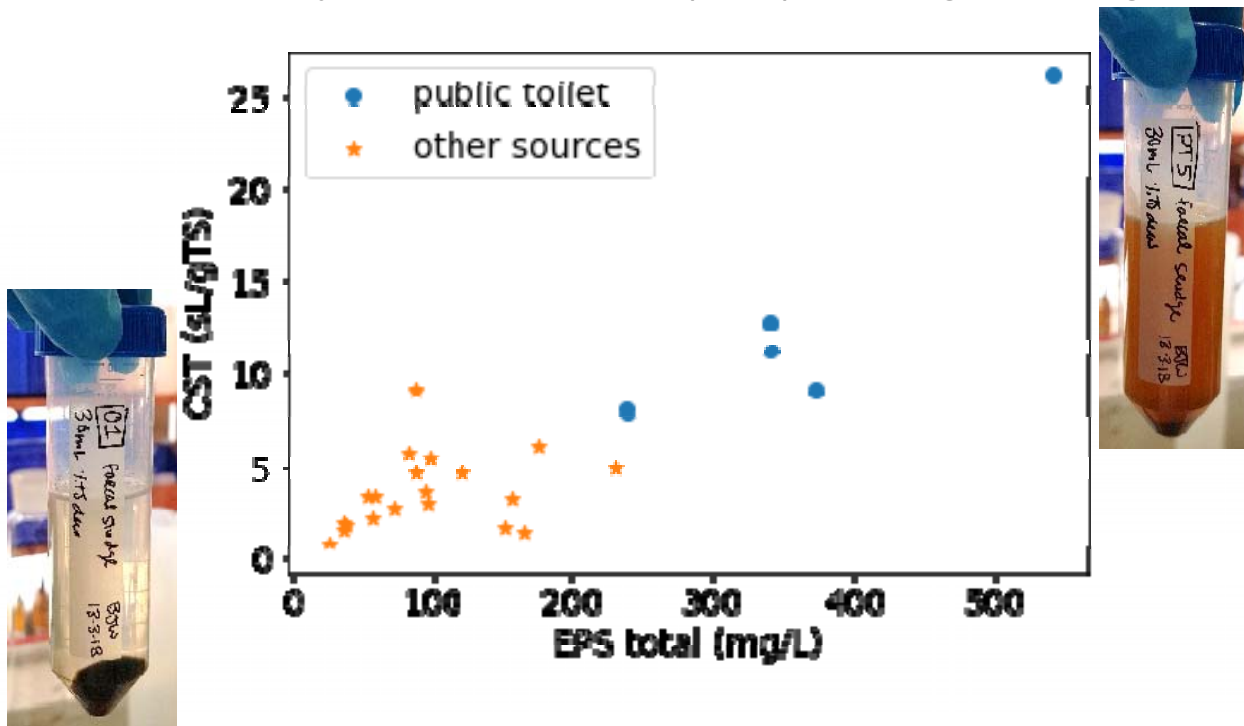
Offices



Ward, B.J., et al. "Evaluating a conceptual model and predictors of faecal sludge dewatering performance in Senegal and Tanzania." *submitted to Water Research*.

Results: Dewatering time and turbidity

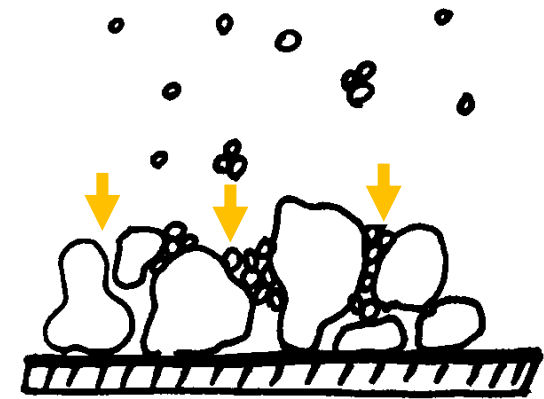
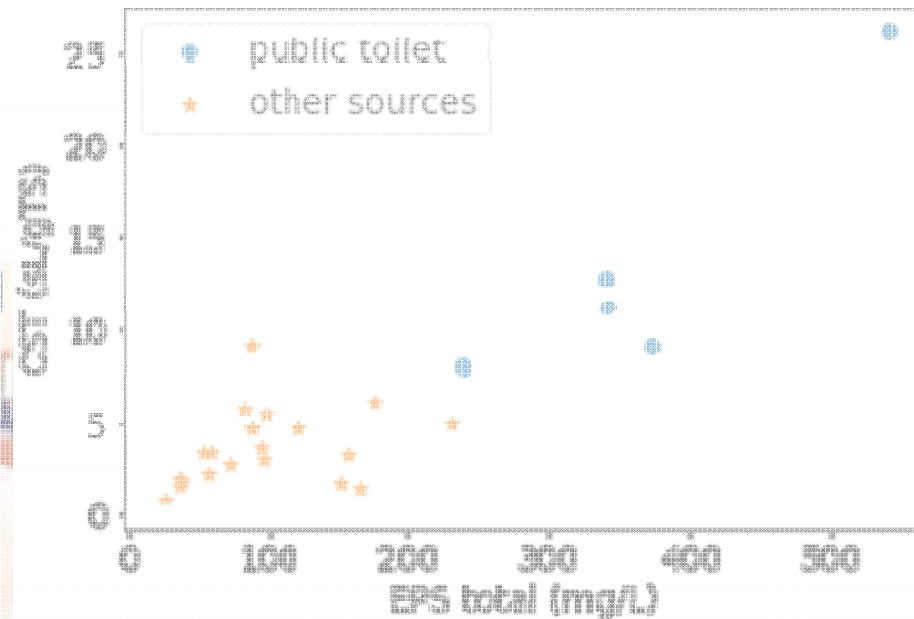
Extractable polymeric substances (EPS) = undegraded organic material that clogs pores



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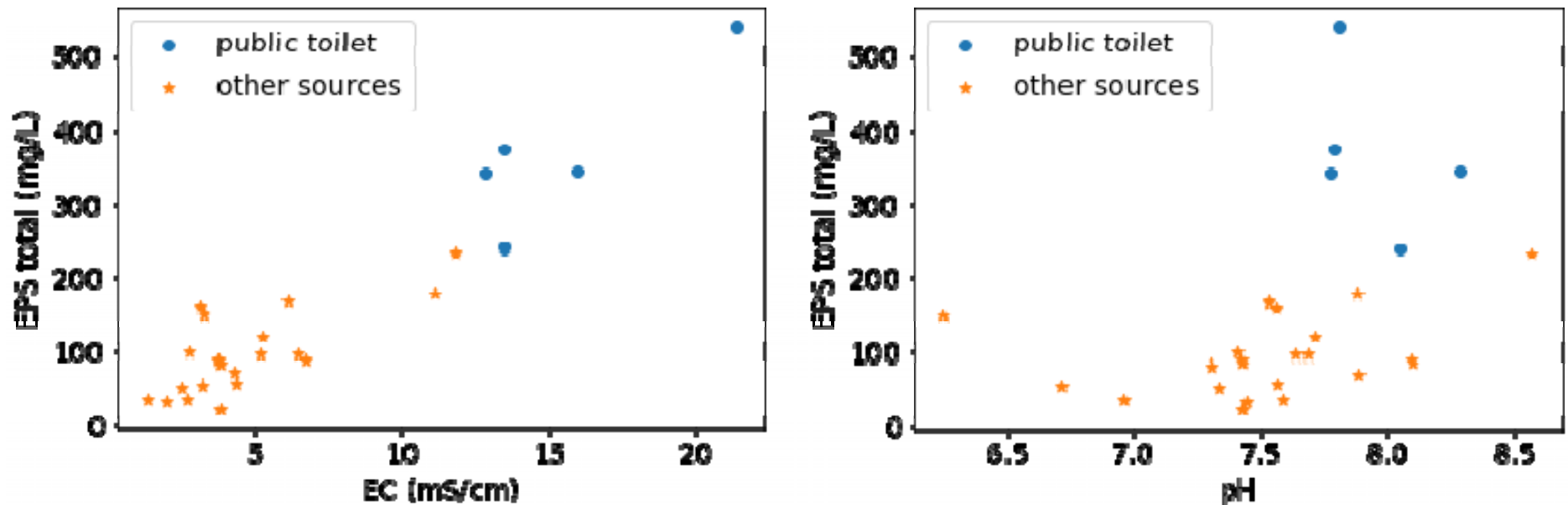
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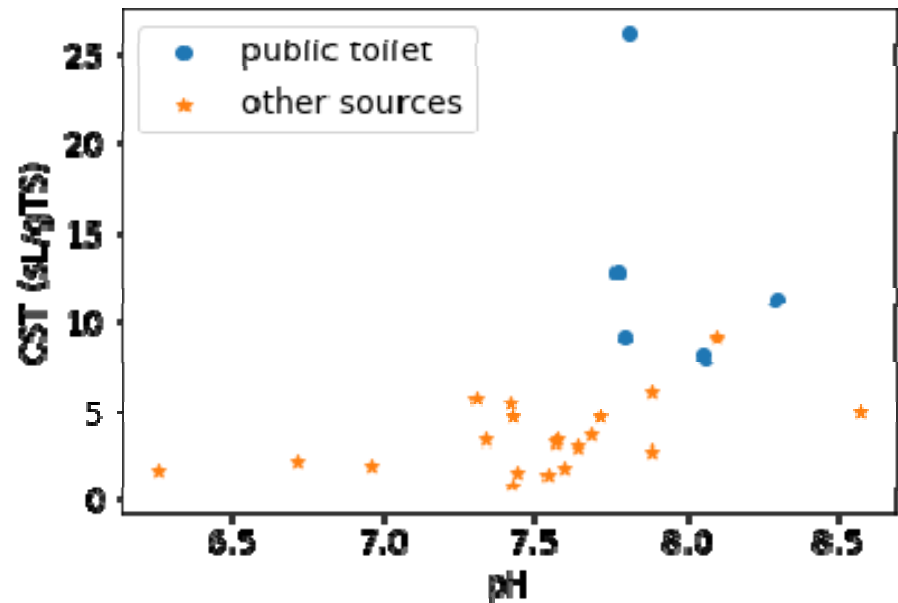
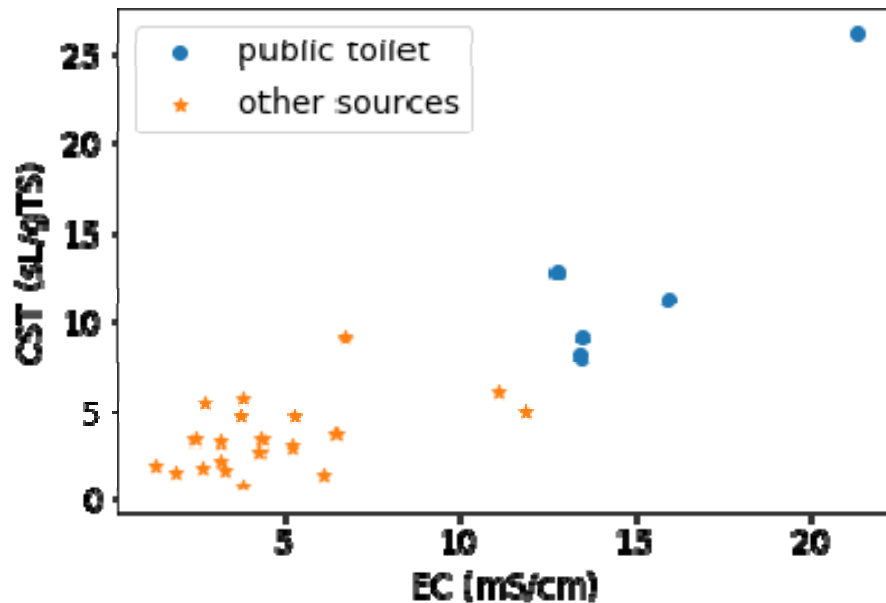
Correlations with EPS and physical-chemical properties



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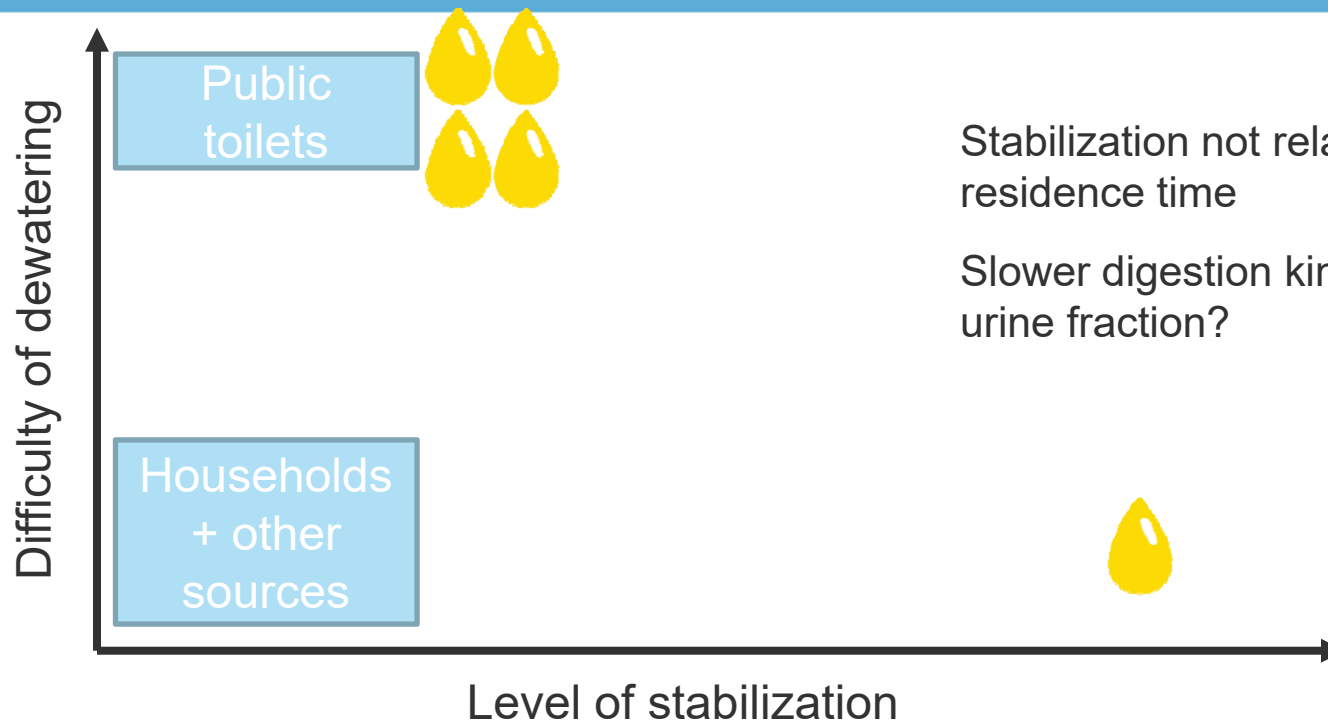
Results: Dewatering time and turbidity

Correlations with CST and physical-chemical properties



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How this fits within our current understanding

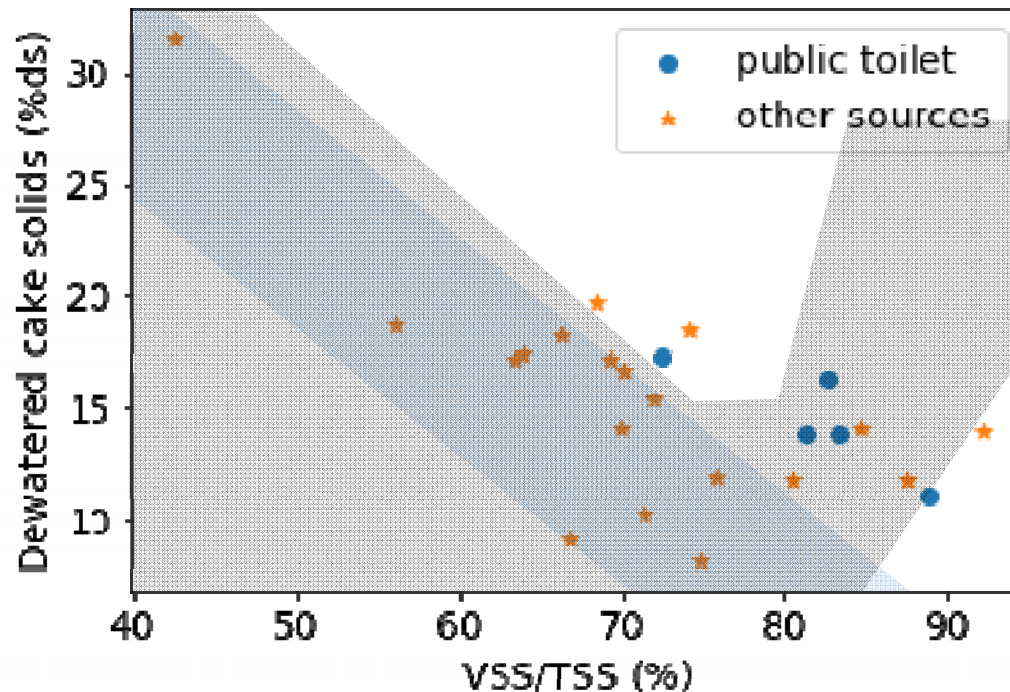


Stabilization not related to residence time

Slower digestion kinetics due to higher urine fraction?



Results: Dewatered cake solids



Existing trends for:

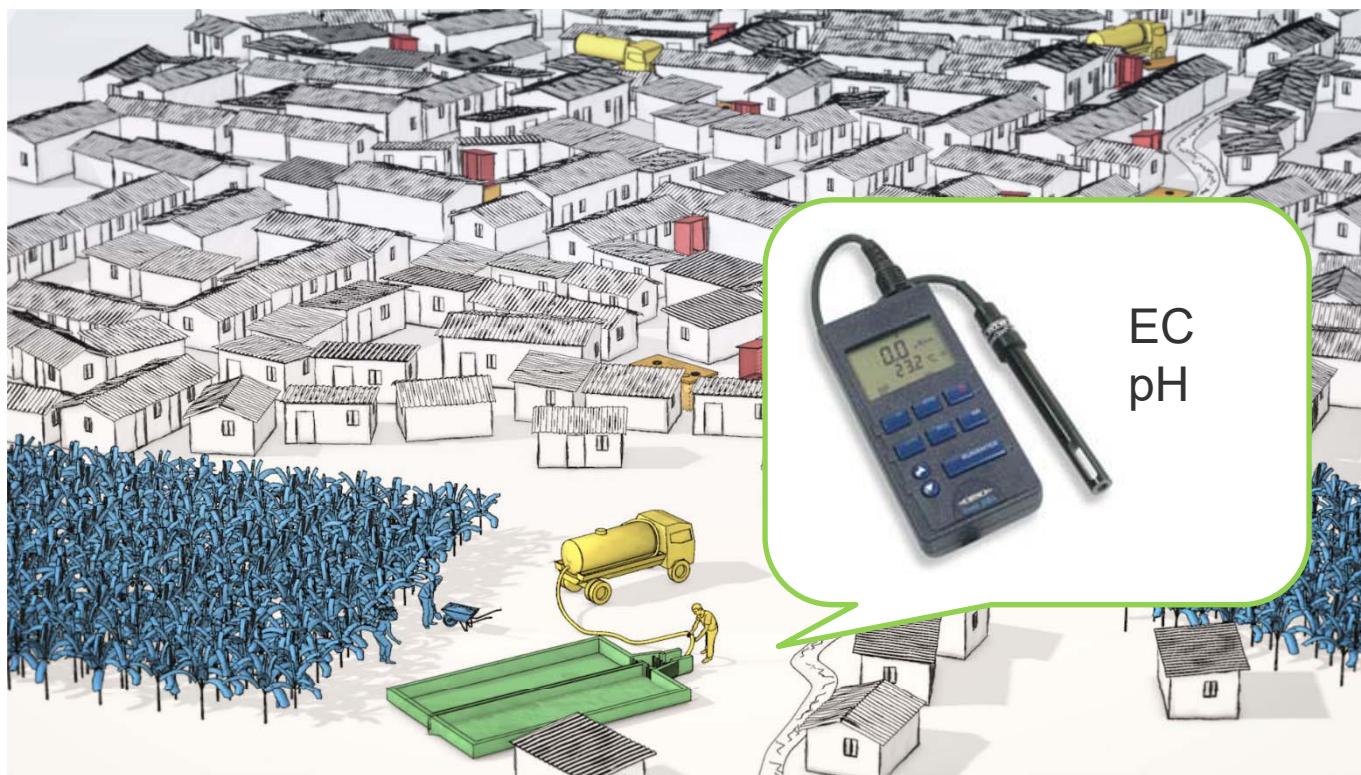
- Wastewater sludges
- Faecal sludges

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Gold, M., et al. (2018). "Cross-country analysis of faecal sludge dewatering." *Environmental technology* **39**(23): 3077-3087.

Skinner, S. J., et al. (2015). "Quantification of wastewater sludge dewatering." *Water Research* **82**: 2-13.

Applications for Future Research





www.sandec.ch/fsm_tools

Barbarajeanne.Ward@eawag.ch



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