

Water out, shit in:

Innovating & phasing the resource-recovery based sanitation system

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Motivation

Large quantity of resources will flow through urban area to support the living, and most of them end up in urban waste streams. Current sanitation system could not effectively recover resources from urban waste, as it was designed with an aim to remove waste(water) as far away and as fast as possible. Moreover, urban waste streams are often highly heterogeneous, making the recovery difficult. Novel sanitation system that is designed for maximizing resource recovery from urban waste streams is required and envisioned.

Technological Principle

The core idea is to maximise the organic concentration in wastewater, which is beneficial for emerging bio-recovery processes. This can be done by minimizing the water and maximizing the organic waste entering the sewer system, namely water out and shit in.

Water out- Minimising water consumption

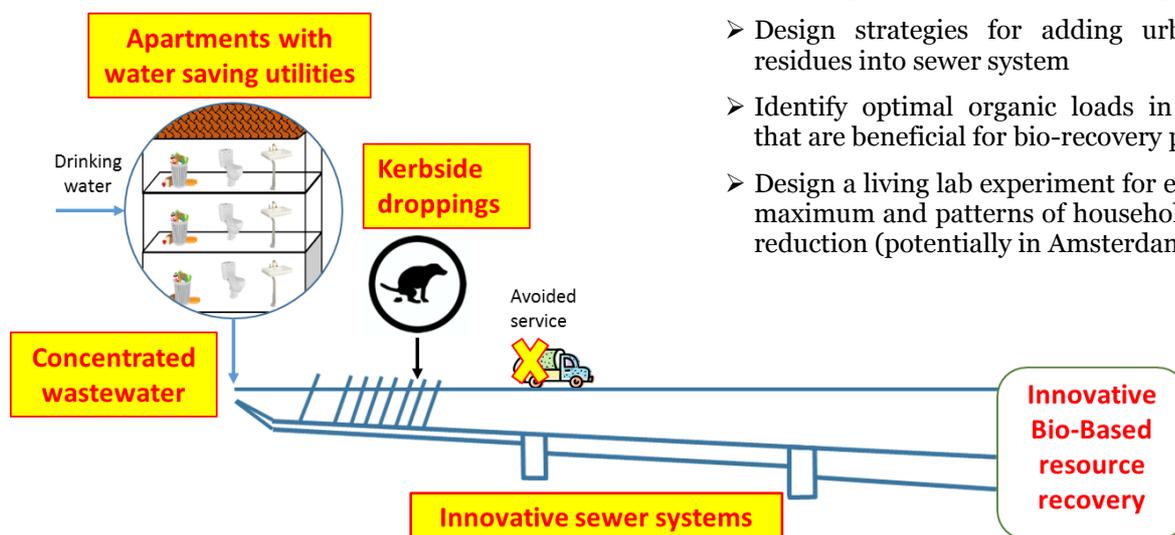
Numerous water-saving home utility has been invented and commercialized. A preliminary investigation indicates that up to 67% of household water consumption can be reduced by applying water-saving utilities. Moreover, social-ecological approaches can be applied to influence water-using behaviors of end-users, i.e. citizen in this case.

Shit in- Maximising organic waste into sewer

Organic waste can be dumped into sewer, instead of trash bin, by employing kitchen or toilet grinders. Transportation needed for kerbside collection of organic waste is avoided. A preliminary experiment showed that smaller sewer pipe may be beneficial for transporting wastewater with a high solid content.

Research challenges

- Develop technological/social approaches for reducing household water consumption
- Design strategies for adding urban organic residues into sewer system
- Identify optimal organic loads in wastewater that are beneficial for bio-recovery processes
- Design a living lab experiment for exploring the maximum and patterns of household water-use reduction (potentially in Amsterdam)



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