

Resource Recovery from Sanitation Systems – Opportunities and Challenges



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MISSION STATEMENT

Our vision is to use all organic waste from the food chain and upgrade its quality to produce safe valuable resources for sustainable food production. Simultaneously with the waste being upgraded to valuable resources, the negative environmental impacts can also be minimized.



Challenges

Need 60-70% more food

(FAO, 2009. How to feed the world 2050)

- 60% of world lacks safely managed sanitation
- Need to reduce fertilizer use and nutrient emissions with50%

(Steffen et al. Science 2015;347:1259855)





Read more at <u>https://www.kateraworth.com/</u> https://www.stockholmresilience.org/research/planetary-boundaries.html



Challenge – Social foundation

- 9.7% of people chronically hungry (750 million)
- 16.3% are sometimes hunger (1.25 billion) (SDG report 2020)
- 2.4 billion lack basic sanitation
- 1.6 million people died of diarrheal diseases (2017)
- (1.8 million deaths from covid 2020)







Challenge – Ecological Ceiling





Planetary Boundaries (Stockholm Resilience Center)





Fly and Worm composting

- + Can be built and maintained with locally available materials.
- + Relatively low capital costs.
- + Vermicomposting requires a large, dry land area.
- + Fly larvae have the ability to digest and convert large volumes of organic wastes.
- Requires a well-trained and experienced staff
- Fly larvae treatment has higher investment costs than vermicomposting, although less land required
- Rodents and other pests can be attracted to the organic material (food waste etc.).





Black Soldier Fly larvae

Vermicomposting (worms)





Urine Drying

- New generation of urine diversion toilets
- Reduces nutrients in wastewater
- Produces dry fertilizer
- Casset changed every month
 - 200L urine (4 person family)
 - 6 kg dry fertilizer
 - 15%N 1,5%P, 5% K





Sanitizing Technology

- Safe sanitation
- Stop spread of disease
- Urea Treatment
 - Örebro, Uddevalla, Strängnäs, Södertälje mfl





Why not more Circular Sanitation?



Socio-technical systems





How do we change the system?

Landscape Existing Knowledge & Infrastructure preferences Logistics & Values Management Financial structures





Socio-technical systems analysis

- Sustainability assessments
- Barriers and opportunities for upscaling
- Acceptance
- Development of tools for communication, cooperation and dissemination of knowledge





Opportunities for collaboration

- Risk assessment of circular systems with regards to *emerging chemicals*
- <u>Field application</u> of nutrients in recovered nutrient products
- <u>Climate mitigation</u> and impacts from resource recovery technologies
- Systemic change interlinking sectors





Thank you for your attention

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