

CITYWIDE INCLUSIVE SANITATION (CWIS)

A PhD project is based out of Eawag-Sandec to develop a novel approach to urban sanitation planning for developing countries, with a focus on India. It considers two different sanitation contexts- retrofitting for informal settlements and peri-urban planning in mega and secondary cities. For India, it comes at a time when sanitation has received its highest priority and such research will be useful for future citywide inclusive sanitation planning.

Context

The urban sanitation challenge is exacerbated by population increase and rapid urbanisation. Present predictions are that about 70% of the world's population will be urbanised by 2050, with an additional 2.25 billion people from the developing world across Asia, Africa and Latin America living in cities. Such urbanisation almost always surpasses the sanitation infrastructure provision in developing cities, and presents an opportunity to move from conventional sanitation systems to a whole spectrum of decentralised sanitation technologies. However, the right scale of decentralisation has yet to be determined. Further, sanitation planning has traditionally followed a top-down approach without consideration of local knowledge and stakeholder preferences, but the above calls for an innovative and holistic approach, that considers the engineering aspects, as well as the incorporation of social, economic, institutional, cultural and environmental factors in urban sanitation planning.

Research Objectives

The aim of this research is to develop a holistic methodology that synthesizes information about the existing sanitation landscapes of cities in a low/middle income country, and then presents sanitation solutions based on the aforementioned factors. These would be comprehensive solutions, encompassing spatial and temporal considerations, and would be modelled using Python and GIS. The institutional drivers and barriers for the uptake for such a methodology will also be studied.

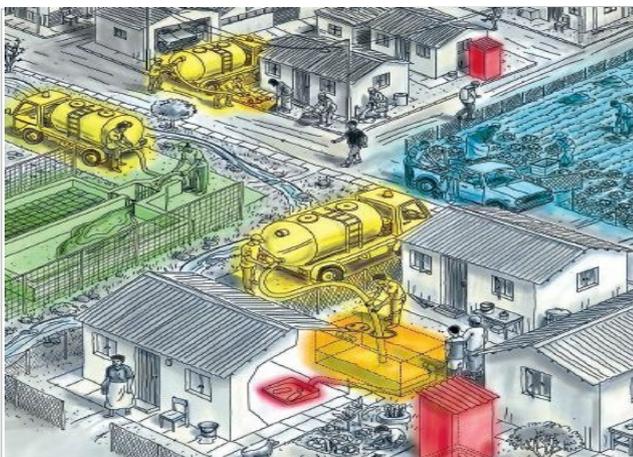
Focus Region

India has made sanitation and sustainable urbanisation a national priority since 2014, as is evident from national level schemes, such as the Swachh Bharat Mission and Smart City Initiative, respectively. With more than half of the world's open defecation and rapid urbanisation taking place in the country, India is a unique case to study in this context. Two challenges of urban sanitation will be analysed – retrofitting in megacities, and peri-urban regional planning of urbanising secondary cities. Chennai and Trichy have been chosen as the primary case studies, and other cities, such as Bangalore, Mysore, Pune, and Coimbatore, will act as secondary cases.

Methodology

A mixed-method of quantitative and qualitative research methodologies will be applied to truly make the study holistic. Stakeholder mapping, key-informant interviews, social network analysis, focus group discussions, household surveys and document analysis will form the core of the qualitative research. Modelling in Python and overlaying GIS data for sanitation solution generation will be carried out, and will encompass the unbiased and systematic quantitative optioneering.

Sanitation landscaping will be done at three different levels: city, ward and neighbourhood, using Shit Flow Diagrams, Sanitation Spectrum Analysis and Sanitation Zoning techniques, respectively. Sanitation planning exercises will take place at the neighbourhood level only.



Different decentralised sanitation systems could exist in an urban area.

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This is an inter-disciplinary PhD project of based out of Eawag and ETH Zurich, under the supervision of Dr. Christoph Luthi and Prof. Max Maurer.

Partners (*potential*)

- Bill and Melinda Gates Foundation
- SuSanA / GIZ
- 100RC Rockefeller Foundation
- 4S and WINGS at Eawag
- Earth2Orbit

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