

Small-Scale Sanitation in India: 4S Reports and Further Research Needs

From 2016 to 2018 Sandec and partners conducted the largest and most comprehensive evaluation of small-scale sanitation in India to date. An overview of the resulting publications and a summary of future research requirements are presented here. Lukas Ulrich¹, Marius Klinger¹, Philippe Reymond², Christoph Lüthi¹

Introduction

The project Small-Scale Sanitation Scaling-Up (4S) is the first systematic assessment of small-scale sanitation in South Asia. The research project aimed to develop evidence-based policy recommendations for the successful implementation of small-scale wastewater treatment and reuse systems at scale. 4S was implemented under the auspices of the Indian Ministry of Housing and Urban Affairs, and in collaboration with the Indian Institute of Technology Madras, BORDA (Germany) and other partners.

What is small-scale sanitation (SSS)?

A SSS system is a sewer-based sanitation system that uses a small-scale sewage treatment plant (SSTP), allowing for water reuse. In 4S, a SSS system is defined as one that serves 10–1000 households (or 50–5000 person equivalents, i.e. treating about 5–700m³ of wastewater per day). SSS systems can be installed for individual buildings or for clusters of buildings.

The 4S project carried out a technical field evaluation of more than 300 sanitation units, as well as in-depth governance and financial analyses. These main project components generated three separate detailed thematic reports, which provide details for the scientific community and readers interested in more comprehensive information. A synthesis report was also produced, highlighting the overarching project findings, conclusions and recommendations. This report is designed for decision-makers of government agencies at national, state and city levels, as well as practitioners and SSTP owners. All reports can be downloaded at: www.sandec.ch/4S.

Further research needs

The 4S project has made an important contribution to the understanding of SSS, allowing stakeholders to make evidence-based decisions for sector improvement. Compared



Photo: Wastewater sampling for the 4S Project at an SSTP in Tamil Nadu.

to conventional, large-scale wastewater management approaches, SSS is, however, a recent and rapidly evolving field. Practitioners have limited knowledge of how SSS systems are optimally implemented, operated and managed at scale. There is, therefore, a wealth of opportunities for continued scientific research at all levels, such as:

- Technology, implementation and operation: cost-effective nutrient removal, remote monitoring, and performance benchmarking using large databases to inform standards development and design
- Governance: evaluating mechanisms for efficient performance monitoring and for matching supply and demand of treated water, using an online database
- Financial sustainability: optimal degree of (de)centralisation for sewage treatment and reuse systems and testing innovative mechanisms (e.g. performance-based contracts)

For the SSS sector to grow effectively in India, it is crucial to ensure that there is a thorough scientific accompaniment to all future developments and an institutionalised learn-

ing mechanism that facilitates the uptake of newly gained knowledge. The 4S project and its reports are examples of the kind of work necessary for capacity development in the sector.

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Project Reports:

Vol. I: Technology, Implementation and Operation of Small-Scale Sanitation in India, Vol. II: Governance of Small-Scale Sanitation in India, Vol. III: Financial Sustainability of Small-Scale Sanitation in India and Synthesis Report: A Roadmap for Small-Scale Sanitation in India: Fulfilling its Potential for Healthy and Water-Secure Cities

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