

## PERFORMANCE OF LATEST SANITATION TECHNOLOGIES IN TAMIL NADU, INDIA

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### Abstract

Sanitation is intended to reduce the spread and burden of diseases transmitted from excreta. Pathogen reduction from excreta before sludge or effluent discharge to the environment would seem a logical and useful performance indicator for sanitation systems. However, the relative magnitudes of pathogen release from common sanitation technologies are not well understood. We, therefore, investigated the feasibility of performance measurement of different sanitation technologies in Tamil Nadu, India in reducing the release of the pathogen indicator *Escherichia coli* (*E. coli*). After conducting users' surveys and technical assessments of the locally prevalent sanitation systems, we classified them into 7 distinct categories (based on both observed physical characteristic and usage) within a widely-accepted physical typology. Faecal sludge and wastewater samples were collected and analysed for *E. coli* and total solids from 136 household systems, 24 community systems, and 23 sanitary sewer overflows. We estimated the average volumetric release rates of wastewater and faecal sludge from the different sanitation technologies. Average daily per capita *E. coli* release was computed, and used as one indicator of the public health performance of technologies. We found that on-site installations described by owners as "septic systems" included diverse forms of tanks and pits of uncertain performance. We observed a statistically significant difference in the average daily per capita *E. coli* release from different sanitation technologies ( $p = 0.00001$ ). Pathogen release from the studied on-site sanitation technologies varied by as much as 5 orders of magnitude from "lined pits" (5.4 Log<sub>10</sub> *E. coli* per person per day) to "overflowing sanitary sewers" and "direct discharge pipes" (10.3–10.5 Log<sub>10</sub> *E. coli* per person per day). Other technologies lay between these extremes, and their performances in *E. coli* removal also varied significantly, in both statistical and practical terms. Our results suggest that although faecal sludge management along the sanitation service chain is important, sanitation planners of the observed systems (and probably elsewhere)



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