

Summary

This paper evaluates the potential for decentralised wastewater treatment systems (DEWATS) as an alternative to the conventional centralised treatment infrastructure for Vientiane, the capital city of Laos. Rapid urbanisation, weak financial and technical capacity, and a lack of centralised sewerage systems have resulted in the indiscriminate and unregulated discharge of untreated wastewater, severely threatening public health and the environment. To that end, the relevance of decentralised technologies in Vientiane's socio-economic, environmental, and institutional landscape is assessed.

The assessment adopts a multi-criteria framework based on the technical, economic, environmental, social, and institutional dimensions. A qualitative scoring matrix was applied to nine decentralised technologies, further supplemented by SWOT analyses for best-performing and suited technologies. Results show that Anaerobic Baffled Reactors (ABRs) and Constructed Wetlands (CWs) have the highest overall feasibility from their known reliable performance, operation, and compatibility with urban and peri-urban environments. Compared to other technologies, Septic Tanks were ranked lower in the evaluation; however, because they are still the most commonly used on-site system in the city and have a high potential for upgrading and improvement for a lower cost, it makes them a transitional system.

These findings were contextualised using international case studies from India, Thailand, Nepal and Vietnam, highlighting how technical performance cannot be disassociated from governance structures, financing mechanisms and community engagement. The study finds that just the selection of the appropriate technological solution is insufficient for the successful implementation of decentralised systems in Vientiane and that the strengthening of institutional coordination, the development of technical capacity, and the establishment of long-term maintenance frameworks plays a crucial role in the long-term sustainability of such systems. These recommendations hope to inform future policy, planning, and investment decisions concerning decentralised sanitation infrastructure for Laos.