

Improving Faecal Sludge Treatment in Nepal: Plant Performance and Management Insights



Buddha Bajracharya *, Jagam Shrestha *, Bhawana Sharma**, Rajendra Shrestha**, Sabuna Gamal**, Anita Bhuju**, Rupak Shrestha**, Asmita Shrestha**, Debendra Shrestha** - Environment and Public Health Organization (ENPHO)



Overview

Nepal is a country with diverse geography, ranging from flat Terai plains to towering hills and the highest mountains in the world. This variation has led to the adoption of different sanitation solutions. There have been several initiatives both from government and non-government sectors of Nepal for the Faecal Sludge Management (FSM). Faecal Sludge Treatment Plants (FSTPs) in Nepal hold a history of more than two decades. To assess the effectiveness of the treatment plants and technologies used for Faecal Sludge Management in Nepal, ENPHO carried out a study under Municipalities Network Advocacy on Sanitation in South Asia Phase II (MuNASS II) program.

Objective

The study aimed to investigate the effectiveness of the treatment plants, and the technologies used, providing valuable insights and recommendations for the Nepalese government to prioritize FSTP construction and standardize treatment technologies based on the country's diverse geographical conditions.

Methodology

The 2024 study assessed the functionality and treatment technologies of FSTPs in Nepal using a multi-method approach. This included Key Informant Interviews (KIIs) with operators and stakeholders, an observational study at the treatment plants, and lab tests on effluents to evaluate treatment efficiency. These methods provided a comprehensive understanding of the performance of the plants.

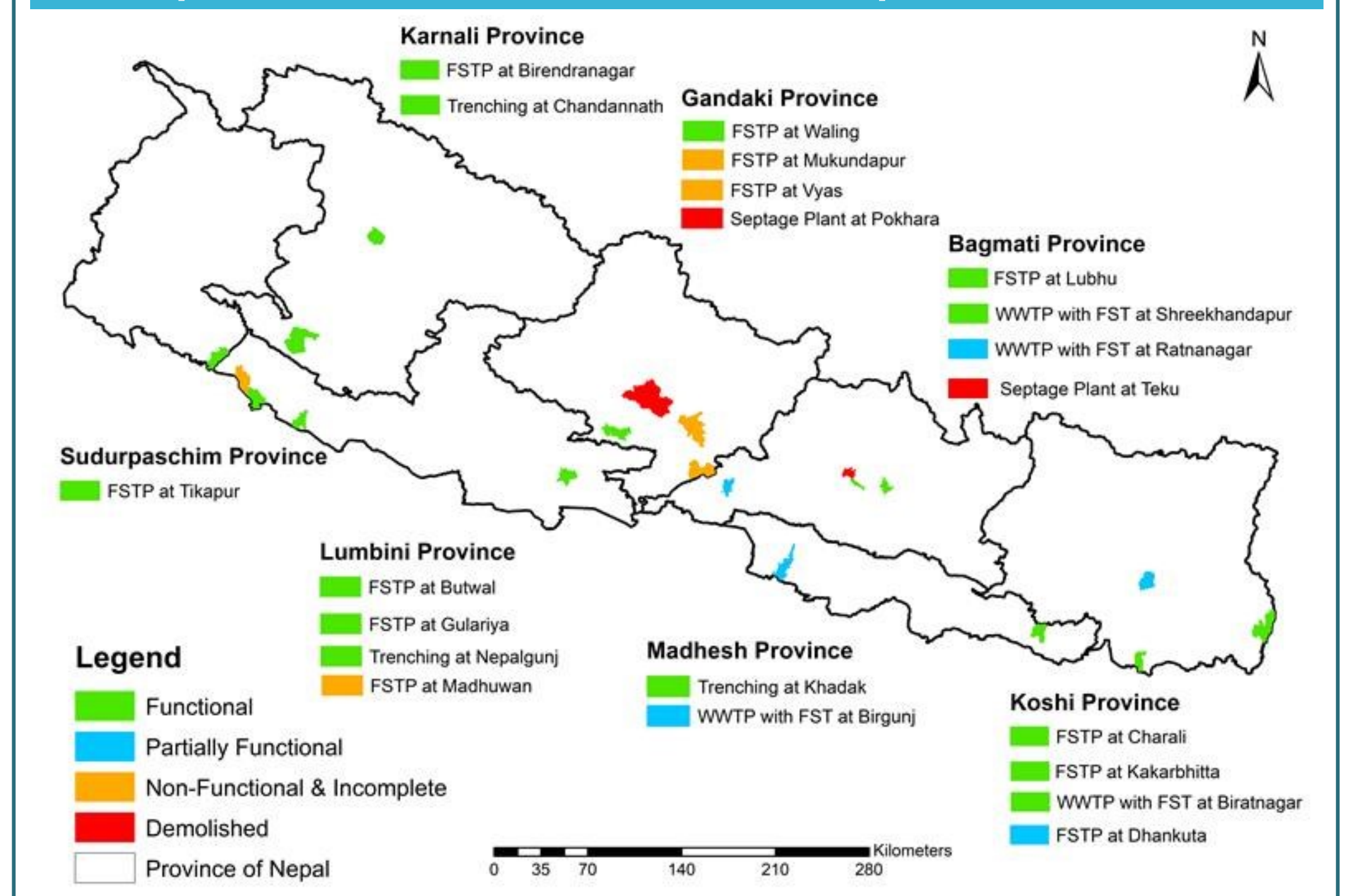
Findings

The existing FSTPs in Nepal have designed capacity of approximately 252 m³ per day, but only about one third of the sludge transported in the plant is being treated, indicating the FSTPs are not operating at its full designed capacity. This is because of the unwillingness of private desludging service providers to transport to the FSTPs and prevalence of direct application of emptied Faecal Sludge (FS) to the farmland. Likewise, the manual emptying is very prevalent. Construction of the containments mostly contributing to leachate percolation ultimately hindering the mechanical desludging service.

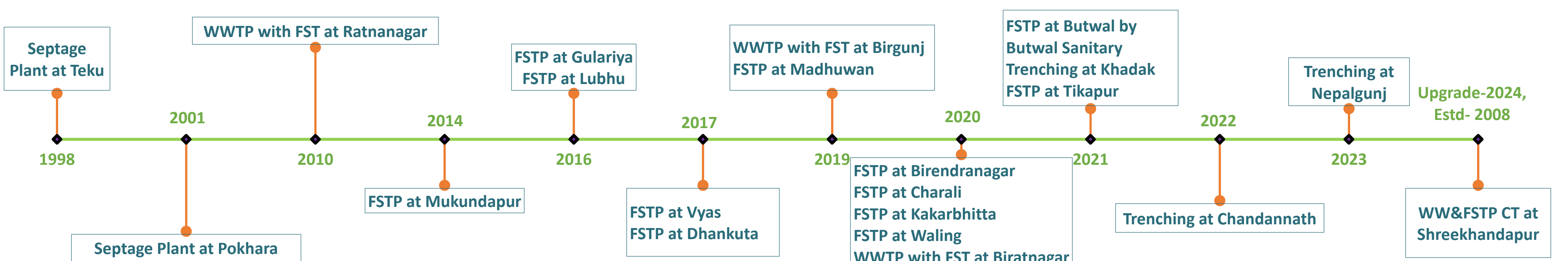
The treatment technologies used in almost all the treatment plants were based on the nature-based treatment process. Most of the treatment plants have combination of solid-liquid separation units, aerobic/anaerobic digestion units and dewatering units to treat the sludge, while constructed wetlands were installed to treat supernatant along with effluent discharged from consecutive sludge treatment units. The most common components used were bar screen, thickening tank, planted/unplanted sludge drying bed, anaerobic baffle reactor and constructed wetland followed by the polishing ponds.

The treatment efficiency of the seven operating FSTPs were measured by assessing quality of treated effluent.

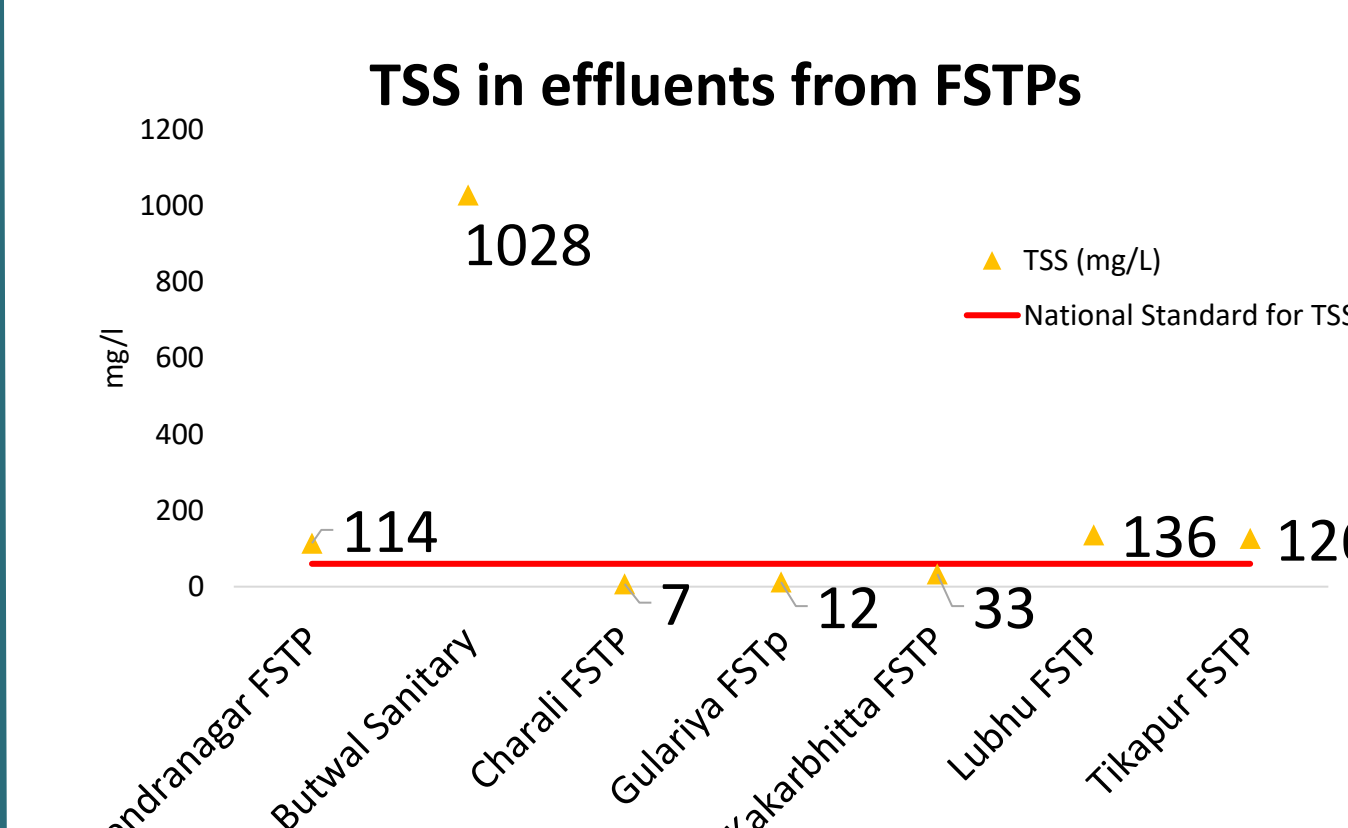
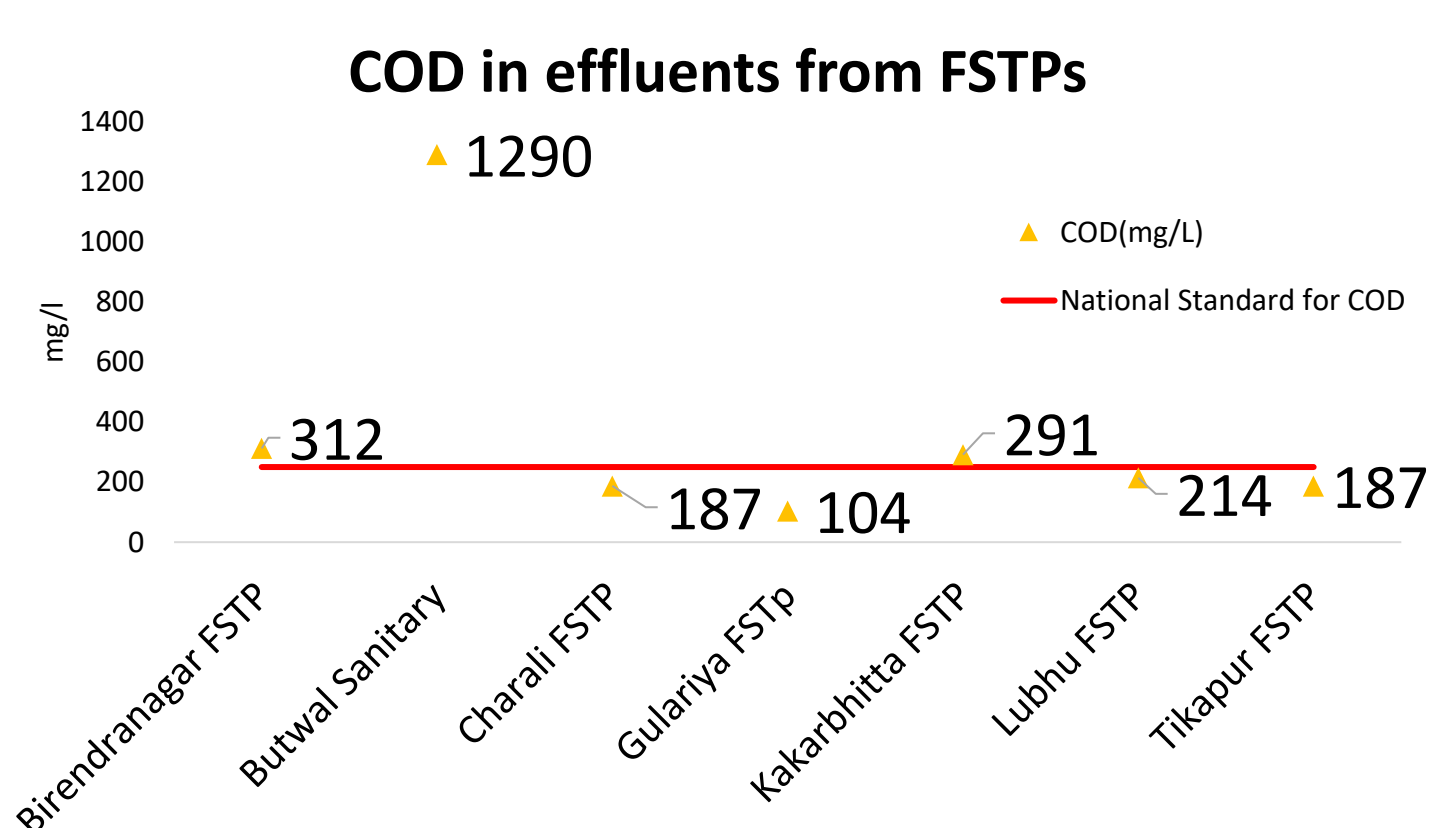
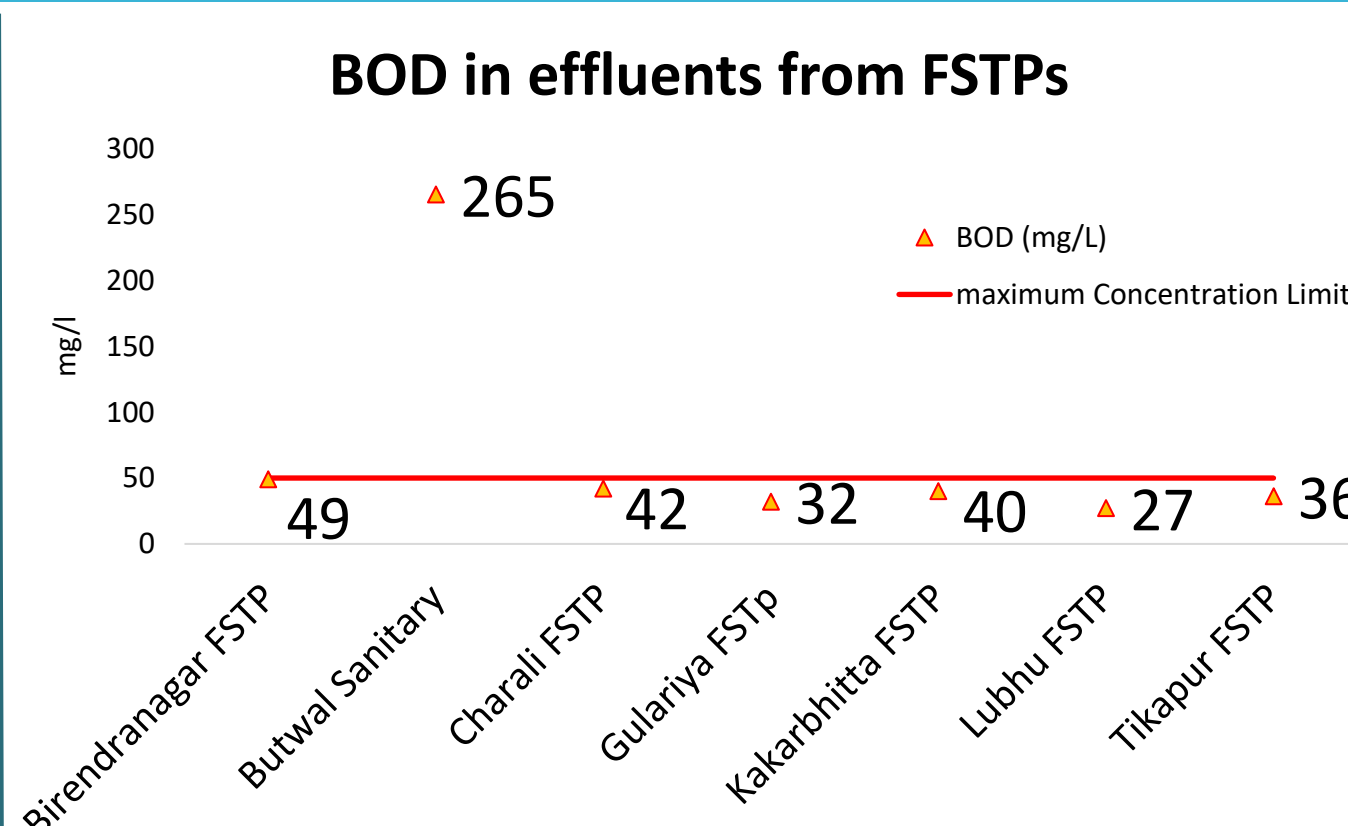
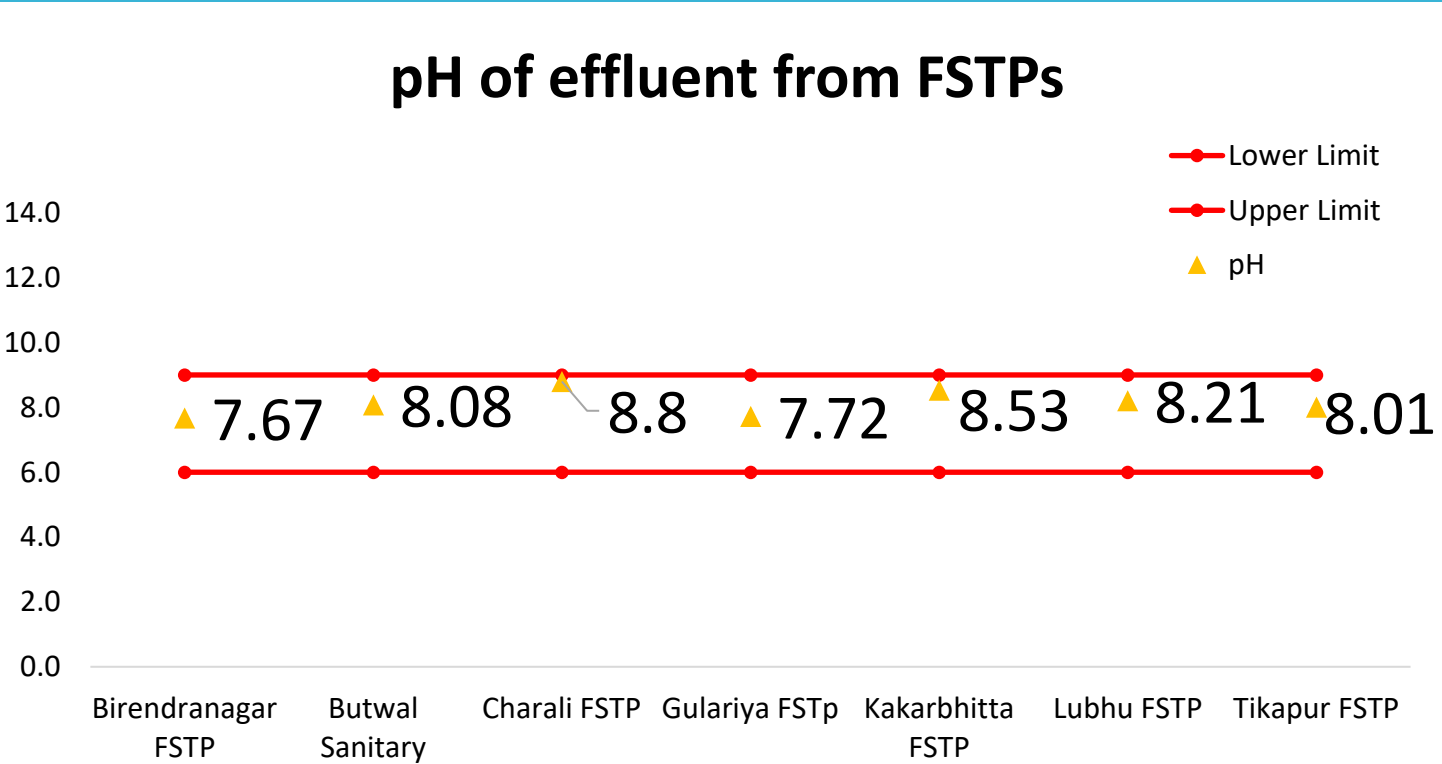
Mapping Treatment Plants Treating Faecal Sludge Across Nepal: Provincial Distribution and Operational Status



Chronological Order of the Treatment Plants Established in Nepal



Effluent Test Results of Functional FSTPs



Conclusion

This study highlights critical challenges, including underutilization of FSTPs, unsafe disposal practices like direct application of sludge to farmlands, and inefficiencies due to unregulated desludging services. These issues possess significant public health and environmental risks, undermining the effectiveness of existing treatment plants. The need for improved monitoring, regulation, and infrastructure planning is clear to ensure sustainable and efficient faecal sludge management in the country.

Recommendation

Strengthen Monitoring of FSTPs: Regular inspections and centralized database to track operational status and full capacity utilization.

Regulate Desludging Services: Mandate licensing for desludging service providers, ensuring sludge transport to FSTPs and safe disposal methods.

Discourage Direct Sludge Application to Farmland: Prohibit untreated sludge application on farmlands and promote safe use of treated sludge.

Improve FSTP Design and Planning: Use data-driven planning to construct appropriate size of FSTPs and consider modular designs for future growth.

Scan this for more information:
FSM Inventory in Nepal

