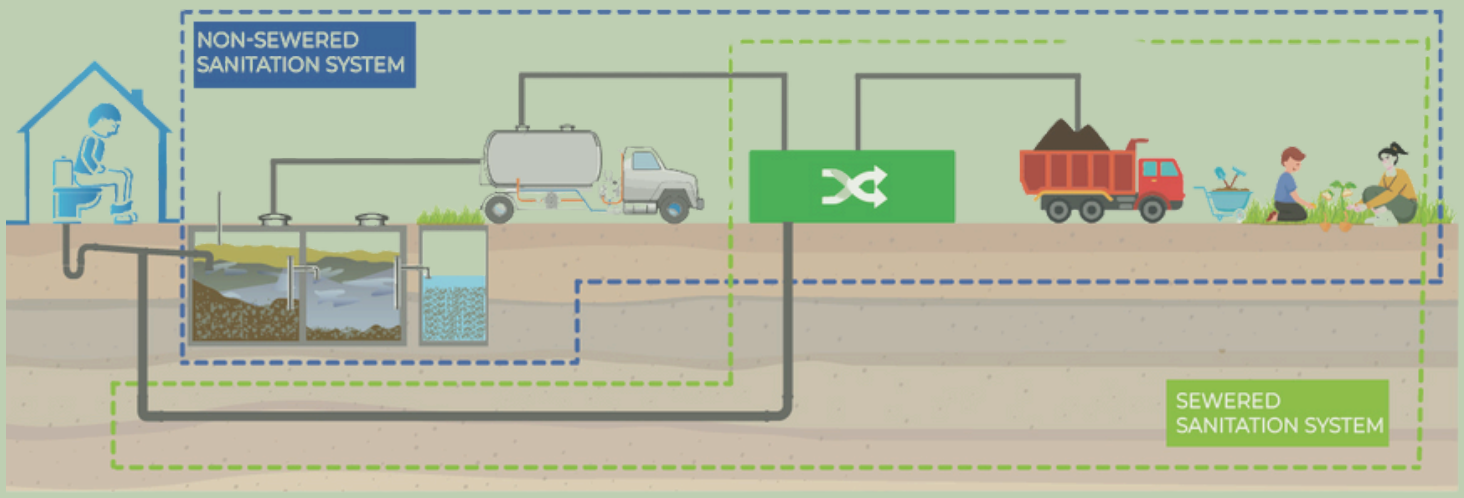
Mentor City : Mahalaxmi Municipality

Learnings from Mahalaxmi's Sanitation Initiatives

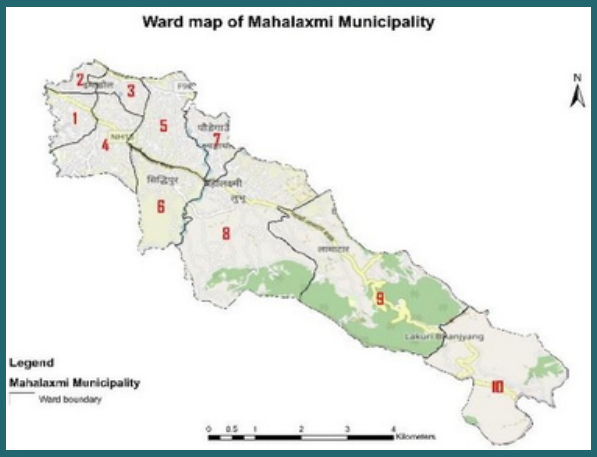


ITN-BUET
Centre for Water Supply and Waste Management
ENPHO
Creating Eco Societies
Gates Foundation

MAHALAXMI PROFILE

DEMOGRAPHICS

Mahalaxmi Municipality, situated in the Lalitpur District of Nepal, is renowned for its vibrant cultural heritage. Spanning 26.5 square kilometers, it houses a population of 123,116—comprising 62,420 males and 60,696 females—living in 32,106 households across 10 administrative wards. With the municipality experiencing rapid urban growth, ensuring sustainable sanitation has emerged as a key development priority.

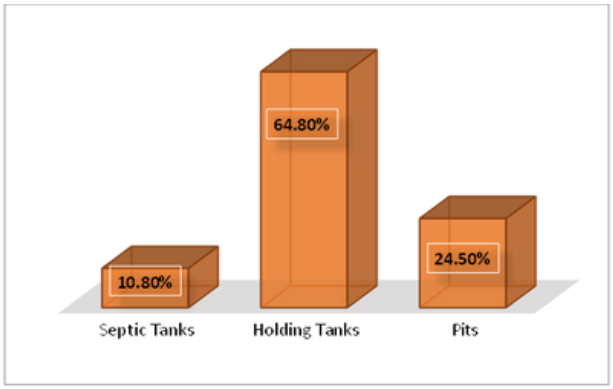


CURRENT SANITATION SNAPSHOT

According to the 2021 Census, only 0.15% of households in Mahalaxmi Municipality lack toilets, reflecting nearly universal access to basic sanitation. The types of sanitation facilities vary, with 9.8% of households connected to a sewer system, 55.1% using septic tanks, 30.1% relying on pit toilets, and 0.5% depending on public toilets. While access has improved significantly, concerns remain regarding the quality and type of containment systems in use.

BACKGROUND AND INTERVENTIONS

In 2019, the Environment and Public Health Organization (ENPHO), with technical support from Innovative Solution Pvt. Ltd., conducted a detailed sanitation situation assessment to understand the existing sanitation situation. The initial findings showed that 61.36% of households had containment systems, including 55.49% with septic tanks, 4.31% with holding tanks, and 1.56% using pits. However, questions were raised about the accuracy of septic tank classifications.



Sanitation Situation Assessment 2019 at Mahalaxmi Municipality

To validate these findings, a second round of surveys covering 400 households was conducted. The results revealed that only 10.8% of the previously reported septic tanks met the standard construction criteria. The remaining systems were either holding tanks or improperly built rectangular pits, underscoring the need for targeted sanitation improvements.

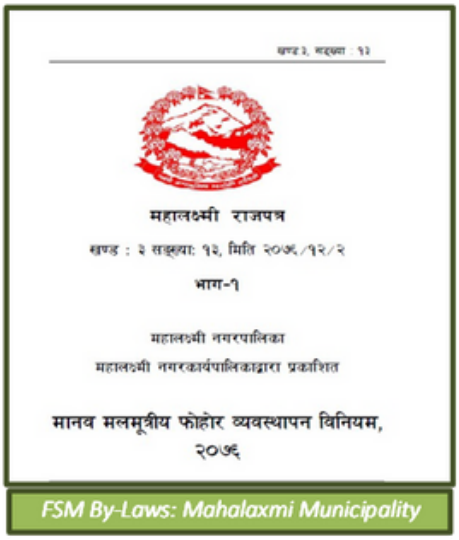
In response to these findings, Mahalaxmi Municipality recognized the urgent need to enhance its sanitation systems—not just to meet local needs, but also to serve as a replicable model for others. With a vision to become a mentoring city in sanitation, the municipality initiated a series of strategic actions to strengthen the entire sanitation service chain. The following initiatives illustrate how Mahalaxmi Municipality has progressed on its journey to becoming a mentor city, offering valuable lessons for other cities aiming to improve and replicate sustainable sanitation solutions.

MAHALAXMI SANITATION JOURNEY

- 2016 — Establishment of FSTP
- 2019 — Signed MoU between Mahalaxmi Municipality, KVWSMB & ENPHO
- 2019 — Situation Assessment of FSM
- 2020 — Conducted SFD survey
- 2020 — Endorsement of FSM By-Laws
- 2022 — Development of IMIS
- 2022 — Integration of IMIS with eBPS
- 2022 — Development of Institutional & Monitoring Mechanism
- 2023 — Capacity Building Programs
- 2023 — Launching & Implementation of Sanitation App & eBPS Field App
- 2023 — Upgradation of FSTP
- 2024 — Recognized as Mentor City
- 2024 — Selected as a model site for the Nepal Sanitation Tour

INITIATIVES

Formulation of By-law



महालक्ष्मी राजपत्र

खण्ड : ३ सङ्ख्या: १३, मिति २०७८/१२/२

भाग-१

महालक्ष्मी नगरपालिका

महालक्ष्मी नगरकार्यपालिकाद्वारा प्रकाशित

मानव मलमूत्रीय फोहोर व्यवस्थापन विनियम, २०७८

FSM By-Laws: Mahalaxmi Municipality

"After implementing the FSM by-laws and making standard septic tanks mandatory, we have seen clear improvements in sanitation across Mahalaxmi Municipality. People now understand the difference between standard septic tanks and holding tanks. Requiring standard septic tanks in new buildings has ensured safer containment and proper treatment of waste. The use of IMIS has also made sanitation management more efficient by allowing real-time data tracking, better decision-making, and smoother workflows. These efforts have reduced the risk of contamination, especially from the open discharge of faecal sludge, and have improved public health. Other municipalities can follow this approach by adapting it to their own context, with a focus on strong regulations, effective implementation, and close coordination with stakeholders."

Hari Govinda Shrestha
Mayor, Mahalaxmi Municipality

After being declared Open Defecation Free (ODF), Mahalaxmi Municipality faced challenges in sustaining sanitation improvements due to the absence of a regulatory framework for managing on-site sanitation systems. Issues such as irregular desludging, unregulated emptying services, unsafe disposal, and environmental contamination posed risks to public health and hampered the municipality's sanitation efforts.

To address these issues, Mahalaxmi Municipality took a pioneering step by formulating and enacting Faecal Sludge Management (FSM) By-Laws in 2020—the first of their kind in Nepal. These By-Laws were endorsed during the 7th Municipal Council Meeting on March 11, 2020, and officially published in the Nepal Newspaper (Rajpatra). They provide a comprehensive legal framework that regulates the entire sanitation service chain—containment, emptying, transport, treatment, and safe disposal or reuse of faecal sludge. The By-Laws were developed through consultations with stakeholders and technical support, aligning with national sanitation goals and inclusive urban development.

The implementation of FSM By-Laws has significantly strengthened sanitation governance in Mahalaxmi Municipality. By clearly defining institutional roles and responsibilities, the municipality has improved coordination, planning, and monitoring of sanitation services. One key provision mandates the desludging of septic tanks every three years for new constructions, ensuring regular maintenance and reducing risks to public health and the environment. These by-laws have institutionalized safe sanitation practices and set a national precedent, positioning Mahalaxmi as a mentorl city in urban sanitation management.

Building on this regulatory framework, Mahalaxmi Municipality has made the construction of standard septic tanks mandatory for all new buildings through integration with the Building Permit System (eBPS). Existing non-standard septic tanks are required to be upgraded through retrofitting or new installations. This measure represents a critical step toward safe containment and effective faecal sludge management, aligning strongly with the municipality's vision of a "Clean, Hygienic, Prosperous, and Beautiful City."

Establishment of a Dedicated Sanitation Cell

Sanitation Cell at Mahalaxmi Municipality

Before the institutionalization of sanitation functions, Mahalaxmi Municipality faced challenges in coordinating, monitoring, and delivering sanitation services effectively. The absence of a central unit led to fragmented efforts, lack of data management, inconsistent service delivery, and limited public awareness regarding safe sanitation practices, especially in areas such as septic tank maintenance and desludging.

To address these gaps, Mahalaxmi Municipality established a dedicated Sanitation Cell—a specialized unit responsible for managing all sanitation-related activities across the municipality.

Fully staffed with trained personnel and equipped with the necessary infrastructure, the Sanitation Cell operates with an integrated information system and logistics support. It coordinates training programs, conducts awareness campaigns, and manages sanitation documentation. Furthermore, the cell operates the Mahalaxmi Sanitation App, enhancing public access to sanitation services and facilitating real-time data management and coordination.

The establishment of the Sanitation Cell has significantly improved the municipality's capacity to manage urban sanitation services. It has ensured better coordination among departments and partners, streamlined the implementation of sanitation programs, and standardized practices through the development of municipal guidelines. The cell's outreach activities have increased community awareness about critical topics such as safe containment, regular desludging, and hygiene practices. With improved data tracking and digital service access via the sanitation app, the municipality is now better equipped for planning, monitoring, and responsive service delivery, marking a major step forward in inclusive and efficient sanitation governance.

Revitalization of the Faecal Sludge Treatment Plant (FSTP)

Although the Faecal Sludge Treatment Plant (FSTP) at Lubhu—established in 2016 after the 2015 earthquake—was a landmark facility for the Kathmandu Valley, it ceased to function after three years due to multiple technical and operational issues. Challenges included inappropriate sludge feeding, overloading beyond its design capacity, poor maintenance, improper documentation, clogging, leakages, unpleasant odors, surface runoff issues, and lack of clear operational guidelines. The shutdown posed risks to public health, environmental safety, and effective faecal sludge management in the region. Recognizing the urgency to restore the facility, Mahalaxmi Municipality, with support from ENPHO and Help for Children, initiated a comprehensive revitalization of the FSTP. Technical interventions included cleaning and repairing key components such as the bar screen, biogas digester inlet, stabilization tanks, and sludge passing pipes. Infrastructure improvements included waterproofing manhole covers, covering sludge drying beds, managing side drainage, constructing a new sludge storage house, and installing acrylic hoarding boards for visibility.

To ensure sustained functionality, a tri-party agreement was signed between the Municipality, ENPHO, and Help for Children, defining roles and responsibilities for the next five years. The municipality committed to an annual operations and maintenance (O&M) budget of NPR 200,000, while ENPHO provided ongoing technical support and Help for Children ensured routine monitoring and record-keeping.

The successful revitalization of the Lubhu FSTP re-established it as the only functional FSTP in the Kathmandu Valley, significantly improving the municipality's faecal sludge management capacity. The plant now operates efficiently, with routine maintenance and stronger technical systems in place. Its operations support public health, protect the local environment, and contribute to sustainable sanitation. Additionally, the facility has integrated resource recovery components such as compost and biogas production, promoting circular economy practices. With its institutional backing, financial commitment, and partnership model, the Lubhu FSTP stands as a replicable example of sustainable and resilient sanitation infrastructure in Nepal.

Faecal Sludge Treatment Plant, Lubhu

Unconnected ABR cum AF in the system - Before

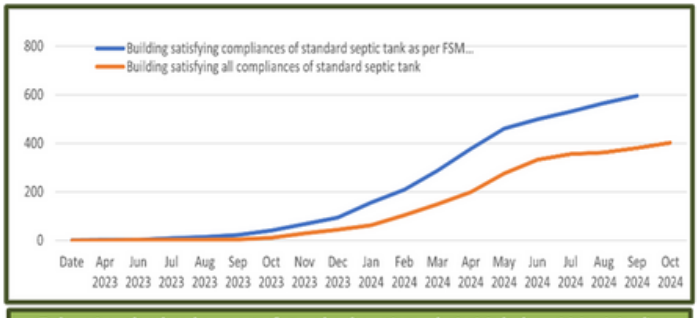
ABR cum AF connected in the System with inlet - After

Development of the Integrated Municipal Information System (IMIS)

Prior to the introduction of digital systems, sanitation planning and implementation in Mahalaxmi Municipality were hindered by fragmented data, limited access to real-time information, and poor coordination among departments. The absence of reliable and integrated data systems made it challenging to track sanitation infrastructure development, ensure compliance with septic tank standards, and monitor ongoing sanitation services.

To address these systemic data and planning gaps, Mahalaxmi Municipality became the first in Nepal to develop and implement an Integrated Municipal Information System (IMIS). Built to support the Citywide Inclusive Sanitation (CWIS) approach and progress towards SDG 6.2, IMIS integrates web, mobile, and GIS technologies on an open-source platform. This system enables centralized planning, tracking, and monitoring of sanitation activities, particularly the construction and verification of standard septic tanks.

To ensure practical field-level application, the municipality developed a mobile verification application and introduced a sanitation module within the electronic Building Permit System (eBPS). A dedicated Sanitation Field Desk was established for field validation of septic tanks. Through a custom-built Application Programming Interface (API), the IMIS is fully integrated with the eBPS, enabling real-time updates to sanitation and building records as new constructions are approved.



Enhancing the development of standard septic tanks in Mahalaxmi Municipality

Functions of IMIS

The implementation of IMIS has transformed Mahalaxmi Municipality's sanitation governance. By integrating real-time data across departments and digitalizing compliance processes, the municipality now ensures that all new buildings meet sanitation standards—particularly for septic tank construction. As the first municipality in Nepal to link septic tank inspection with building permit approval, Mahalaxmi has institutionalized sanitation compliance within the urban development process. This has improved the quality and safety of containment systems, enhanced monitoring and planning capacities, and contributed to better public health and environmental outcomes. IMIS stands as a scalable model for digital sanitation governance in Nepal and beyond.

"Managing sanitation data was a big challeng,e records were scattered and often incomplete, which made it hard to plan and track progress. After learning to use the eBPS, Sanitation App, and IMIS, I can now collect accurate data in real time and access it easily whenever needed. This has improved our ability to analyze sanitation services and make informed decisions quickly. The quality and reliability of our data have greatly increased, helping us deliver better services to the community."

Rabindra Upreti
Sanitation Head, Mahalaxmi Municipality

Capacity Strengthening for Sustainable Sanitation Governance

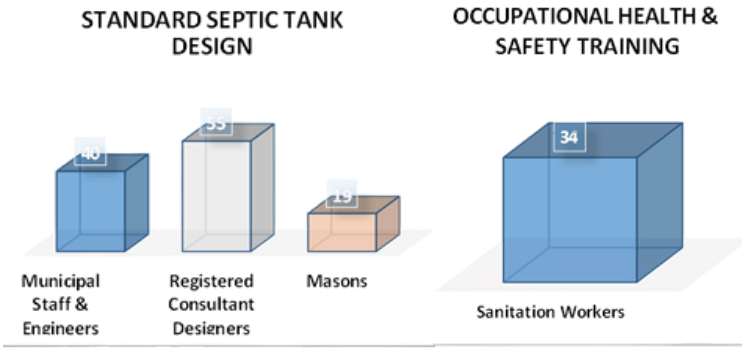
Training on OHS to Sanitation Workers

Prior to targeted interventions, Mahalaxmi Municipality faced gaps in technical knowledge, digital proficiency, and standard compliance related to sanitation management. Municipal officials, engineers, designers, masons, and sanitation workers often lacked formal training in modern tools, systems, and standards—resulting in inefficiencies in service delivery, substandard septic tank construction, and occupational safety risks for frontline workers.

To address these capacity gaps, Mahalaxmi Municipality, in collaboration with ENPHO, launched a series of structured capacity-building programs across multiple stakeholder levels. These initiatives are focused on:

- Digital Skill Enhancement: Department heads and engineers were trained in the use of the eBPS Field App, the Sanitation App, and IMIS, enhancing their ability to monitor field-level activities and make data-informed decisions.
- Technical Training: Over 40 municipal staff and engineers received hands-on training in standard septic tank design, equipping them with the knowledge to plan, review, and implement compliant sanitation systems.
- Consultant Designer Orientation: 55 registered private consultants were trained to design septic tanks that meet municipal regulations and CWIS standards.
- Implementation-Level Skill Building: 19 masons were trained to construct standard-compliant septic tanks, ensuring field-level quality.
- Occupational Health & Safety (OHS): 34 sanitation workers received OHS training, promoting safer and more dignified working conditions.

Mahalaxmi's capacity-building initiatives have institutionalized efficient and inclusive sanitation governance. By professionalizing technical staff, enhancing worker safety, and integrating digital tools, the municipality has established a sustainable model for high-quality urban sanitation management.



"The Occupational Health & Safety training has transformed the way I work as an FSTP operator. Previously, I often worried about falling ill while handling fecal sludge and lacked proper protection. Now, I make sure to wear PPE correctly, maintaining strict hygiene, and following safe procedures, I feel safe, work more efficiently, and can serve the community without putting my health at risk."

Surya Prasad Ghimire
Operator, FSTP-Lubhu

Awareness Among City Dwellers About Septic Tanks

Despite the municipality's ongoing efforts to regulate sanitation infrastructure, many residents of Mahalaxmi Municipality were still unaware of the importance of building standard septic tanks and practicing safe containment. This lack of awareness led to poorly constructed or unregulated sanitation systems, increasing risks to public health and the environment.

To address this gap, Mahalaxmi Municipality implemented a focused community outreach campaign to raise awareness about the need for standard septic tank construction and safe containment practices. The initiative was implemented in two key phases:

- Door-to-Door Awareness Campaign: Youth volunteers were mobilized to conduct household visits across all wards. These interactions focused on explaining the need for standard septic tanks, their components, and the health and environmental benefits of safe containment.
- Mobile Booth Campaign: Building on the momentum of the door-to-door campaign, the municipality organized mobile information booths in every ward. Led by Ward Chairpersons, these booths served as community engagement points where residents could access visual materials, technical guidance, and one-on-one consultations on septic tank standards and proper sanitation practices.

The dual-phase awareness campaign significantly enhanced public understanding of on-site sanitation standards in Mahalaxmi Municipality. Residents became more informed and proactive about constructing septic tanks that comply with municipal by-laws and CWIS principles. The visible leadership of Ward Chairpersons and the active involvement of youth volunteers fostered community trust and participation. This collective shift in awareness has contributed to better containment practices at the household level, reinforcing the municipality's commitment to safe sanitation for all.

CHALLANGES

Before Mahalaxmi Municipality emerged as a mentor city, it faced numerous deep-rooted challenges in managing faecal sludge. From inadequate infrastructure and poor regulatory mechanisms to a lack of technical expertise and limited community awareness, these issues hindered effective service delivery. The following infographic outlines the major challenges encountered, their on-ground consequences, and the strategic actions implemented by the municipality to transform its sanitation landscape.

Lack of Structured Sanitation Framework

- Sanitation practices varied widely across households and public spaces due to the absence of clear guidelines.
- Public toilets were poorly maintained, and many homes had improperly built sanitation systems, causing problems like overflowing septic tanks, open defecation, and polluted water sources.
- The municipality lacked policies and technical knowledge to make improvements.

1. Conducted public awareness campaigns to build political support by highlighting the health benefits of improved sanitation.
2. Developed and enforced a clear sanitation policy with standards for household and public toilets.
3. Adopted the CitywideInclusive Sanitation (CWIS) approach to ensure equitable and sustainable sanitation services for all.

Widespread Misunderstanding of Septic Tank Standards

- The public in Mahalaxmi Municipality was unaware of what a septic tank is, how it should be constructed, the standards to follow during construction, and the importance of a proper septic tank. (General scenario: People believed a holding tank was a septic tank.)

1. Launched awareness campaigns to educate residents about the importance of proper septic tank construction.
2. Explained the difference between septic tanks and holding tanks.
3. Trained local masons, sanitation workers to build septic tanks that follow national standards.

Gaps in Capacity Development

- Necessary skills were lacking in design, constructing, and managing safe sanitation systems. This led to poor monitoring and weak implementation of sanitation plans.

1. Provided technical training for municipal staff, engineers, and sanitation workers.
2. Organized workshops focused on faecal sludge management, safety practices, and how to use digital monitoring tools.

No Proper Data Management System

- There was no structured system to record data on sanitation progress, desludging activities, and faecal sludge disposal. The absence of a data-driven approach led to uncoordinated efforts and ineffective monitoring.

1. An Integrated Municipal Information System (IMIS) for sanitation data tracking was developed.
2. The ePBS sanitation app was implemented to monitor desludging services and ensure proper documentation.

KEY LEARNINGS

The progress in sanitation within Mahalaxmi Municipality was the result of a series of coordinated and sustained efforts, rather than a single intervention. Multiple actions, taken over time, collectively contributed to strengthening the overall sanitation system. This journey highlights the value of continuous collaboration among local authorities, technical partners, and the community to bring about long-term, meaningful changes.

1. Change Takes a Collective Push:
The improvement in sanitation was not the result of a single action but a series of cumulative efforts and initiatives. It highlighted the importance of consistent and collaborative work among local government, technical teams, and community stakeholders to bring about sustainable improvements.

2. Leadership Lights the Way:
Strong leadership and unwavering commitment from the Municipality were crucial to drive the sanitation agenda forward. Prioritizing sanitation within local government agendas ensured that the necessary resources, policies, and frameworks were put in place for the improvement process.

3. Capacity building empowers effective implementation:
Strengthening the knowledge and skills of municipal staff, engineers, mansons, and sanitation workers was critical. Training ensured all stakeholders were equipped to design, construct, and maintain sanitation systems aligned with technical standards and safety protocols.

4. Tech-Driven Transformation:
The adoption of digital platforms such as the IMIS and sanitation mobile apps transformed how sanitation services are tracked and managed. Real-time data enabled informed decision-making, improved service coordination, and increased accountability.

5. Community involvement drives sustainability:
Actively involving local stakeholders—from ward leaders to households and youth volunteers—ensured that sanitation solutions were rooted in the community context. Training local masons and sanitation workers also fostered ownership and sustained improvements beyond project timelines.

TESTIMONIALS

"The visit to Mahalaxmi Municipality was highly insightful. One of the key learnings was the effective use of the Integrated Municipal Information System (IMIS) to support sanitation planning, monitoring, and decision-making. The integration of IMIS within municipal systems clearly demonstrates how data-driven tools can strengthen service delivery and accountability. This experience has provided practical insights that we aim to adapt and replicate in Waling Municipality to enhance sanitation management."

Ms. Kabita Tiwari
Deputy Mayor,
Waling Municipality, Nepal

"Mahalaxmi Municipality has demonstrated how strategic and focused efforts even at a small scale, can lead to impactful results in sanitation. Its recognition as a mentor city is well deserved, given the innovative and practical initiatives it has implemented. From regulatory reforms to technical capacity building and digital tools for monitoring, each step has contributed to meaningful change. We've learned a great deal from Mahalaxmi's journey, and I'm confident that some of these initiatives will inspire and guide similar actions in our cities in Bangladesh."

Mr. Parimal Kumar Dev
CEO,
Municipal Association of Bangladesh

"Participating in the Nepal Sanitation Tour 2025, our visit to Mahalaxmi Municipality was particularly impactful. The interaction with the Executive Board highlighted how committed leadership can drive meaningful changes in urban sanitation. Mahalaxmi's creation of a dedicated sanitation cell and its effective use of digitalmonitoring tools stoodout as inspiring practices. These efforts have positioned the municipality as a leading example of inclusive and sustainable sanitation—both nationally and globally."

Dilruba Farzana
Deputy Project Director,
10 Towns Project,DPHE

WAY FORWARD

Mahalaxmi Municipality has emerged as a trailblazer in sanitation and FSM through its innovative initiatives, such as the formulation of FSM by-laws, the establishment of a dedicated Sanitation Cell, the revitalization of the FSTP, and the implementation of IMIS. To ensure these initiatives achieve long-term sustainability and serve as a model for other municipalities, the focus should now shift to scaling up efforts, addressing emerging challenges, and positioning Mahalaxmi as a mentor city.

Ensuring the long-term sustainability of existing initiatives is critical. This includes regularly reviewing and updating the FSM By-laws to address new challenges, providing continuous funding and resources to the Sanitation Cell, and allocating a dedicated budget for the FSTP's operation and maintenance. Expanding public awareness campaigns to address misconceptions about septic tanks and promoting proper construction practices will further strengthen community engagement. Additionally, formalizing public- private partnerships and enhancing capacity-building programs for municipal staff, engineers, and masons will ensure the continued success of these efforts.

Mahalaxmi has the potential to set an example for other municipalities by documenting and sharing its best practices, hosting learning exchanges, and advocating for the adoption of its FSM frameworks at the national level. Addressing emerging challenges, such as integrating climate-resilient practices into sanitation planning and expanding wastewater management efforts, will further solidify Mahalaxmi's position as a leader in sustainable urban sanitation.

By building on its achievements and sharing its experiences, Mahalaxmi Municipality can not only improve the health and well-being of its residents but also inspire and guide other municipalities in Nepal to achieve similar success in sanitation.

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