

Nepal Sanitation Tour For Citywide Inclusive Sanitation Learning and Sharing

Learning visit to explore the sanitation initiatives in Nepal for the achievements of Sustainable Development Goal 6.2



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About ENPHO

Established on 4 November 1990, Environment and Public Health Organization (ENPHO) is a service oriented, national non-governmental organization in Nepal and is constantly striving towards sustainable community development, demonstration and dissemination of eco-friendly technologies including drinking water treatment options and sustainable sanitation systems. ENPHO aims to foster eco-friendly societies by delivering high-quality services in Water, Sanitation, and Hygiene (WASH), as well as environmental and public health. Research, innovations and promotion of the WASH technologies and approaches have been the core priorities of ENPHO. It advocates for integrated community-based approaches, addressing safe water, sustainable sanitation, hygienic behavior, indoor air quality, and environmental monitoring for the creation of healthy and environment friendly communities.

As a national NGO with extensive knowledge and experience in sanitation, including Decentralized Wastewater Treatment Systems (DEWATS) and Faecal Sludge Management (FSM), ENPHO collaborates with the Nepal Government to achieve the SDG goal. Leveraging skilled personnel and professionals in sanitation, ENPHO aims to build local capacities through partnerships with relevant stakeholders. Utilizing its expertise, ENPHO is currently implementing the 'Citywide Inclusive Sanitation Scaling and Sanitation Innovation' project aiming to enhance the capabilities of stakeholders in promoting and implementing Citywide Inclusive Sanitation (CWIS) and FSM at different tiers of government.



CWIS in Nepal

The sanitation target set by the Millennium Development Goal was missed by nearly 700 million people, leading to a shift in focus towards the entire sanitation service chain in the Sustainable Development Goal. The CWIS approach was introduced to address sanitation challenges caused by population growth and urbanization. CWIS approach is a new concept and a paradigm shift in the sanitation sector, which calls for a collaborative effort to bring about the desired sanitation change.

Currently, CWIS is being implemented in over 30 countries, with a notable emphasis on South Asia. Despite these efforts, many developing countries in Central, South, and East Asia still lack safely managed sanitation services. Moreover, only one-fifth of the countries practicing open defecation are on track to eliminate it globally, highlighting the ineffectiveness of traditional sanitation methods over the past decades. CWIS aims to provide sustainable and equitable solutions tailored to local needs, addressing long-standing sanitation issues in these regions. Moreover, the Gates Foundation is scaling up CWIS in Nepal, India, and Bangladesh, focusing on capacity building right from sanitation workers at ground level to policy makers at decision making level.

In Nepal, the significance of CWIS cannot be overstated, given the country's unique socio-economic and environmental context. As a developing nation, Nepal grapples with substantial sanitation challenges that significantly impact public health, environmental integrity, and overall well-being. The urban sanitation crisis, fueled by rapid urbanization, strained infrastructure, and limited access to adequate facilities, presents a formidable obstacle to socio-economic progress. Implementing CWIS strategies is imperative in tackling these challenges. By embracing CWIS principles, Nepal can advance towards ensuring universal access to safe and inclusive sanitation services, thereby promoting public health, preserving the environment, and fostering sustainable urban development.

Since 2021, CWIS has been implemented in Nepal across three distinct thematic areas:

1) Policy and monitoring; 2) Advocacy, and 3) Capacity building. Several cities in Nepal have successfully adopted and executed CWIS principles, excelling in various sanitation components and earning recognition as "Mentor Cities". These cities serve as exemplary models where other peer cities can study and replicate successful sanitation initiatives thus contributing significantly to achieving SDG 6.2.

CWIS Framework

SERVICE OUTCOME



EQUITY

Services reflect fairness in distribution and prioritization of service quality prices and deployment of public finance / subsidies.



SAFETY

Services safeguard customers, workers, and communities from safety and health risks by reaching everyone with safe sanitation



SUSTAINABILITY

Services are reliably and continually delivered based on effective management of human, financial and natural resources

SYSTEM FUNCTION

Service authorities have a clear public mandate to ensure safe, equitable, and sustainable sanitation for all.



RESPONSIBILITY

Service authorities' performance against their mandate is monitored and managed with data, transparency, and incentives.



ACCOUNTABILITY

Resources—human, financial, natural, assets—are effectively managed at the national/ state level to support execution of mandate across time/space.



RESOURCE
PLANNING AND
MANAGEMENT

SANITATION TOUR



Nepal Sanitation Tour

The Nepal Sanitation Tour is a strategic platform showcasing diverse sanitation initiatives across cities in Nepal. It promotes experiential learning for sector stakeholders through first-hand exposure to effective practices and innovative approaches. The tour encourages replication and scaling of successful sanitation models both nationally and across borders.

The Nepal Sanitation Tour, offered through 3-day and 5-day packages, provides participants with a opportunity to experience sanitation systems in action across diverse urban contexts. The tour highlights include immersive visits to mentor cities such as Mahalaxmi and Waling, where citywide inclusive sanitation has been successfully institutionalized, along with exposure to a faecal sludge treatment plant demonstrating effective public-private partnership models. Participants also explore an inclusive and sustainably designed public toilet, a small-scale demonstration FSTP showcasing decentralized treatment approaches, and a hotel model that responsibly manages its own wastewater. Together, these experiences offer practical insights into innovative, inclusive, and sustainable sanitation solutions implemented by a range of stakeholders in Nepal.



3 DAY PACKAGE

3 DAYS

2 PROVINCES

4 CITIES

7 SITES

The sites featured in the 3 day packages

- Mahalaxmi Municipality, Lalitpur
- Lubhu Faecal Sludge Treatment Plant, Lalitpur
- Aerosan Public Toilet, Lalitpur
- Guheswori Wastewater Treatment Plant, Kathmandu
- Waling Municipality, Syangja
- Waling Faecal Sludge Treatment Plant, Syangja
- Waterfront Resort, Pokhara

5 DAY PACKAGE

The sites featured in the 5 day package

5 DAYS

3 PROVINCES

6 CITIES

9 SITES

- Mahalaxmi Municipality, Lalitpur
- Lubhu Faecal Sludge Treatment Plant, Lalitpur
- Aerosan Public Toilet, Lalitpur
- Guheswori Wastewater Treatment Plant, Kathmandu
- Butwal Sanitary Pvt. Ltd, Rupandehi
- Murgiya Water and Sanitation Committee, Rupandehi
- Waling Municipality, Syangja
- Waling Faecal Sludge Treatment Plant, Syangja
- Waterfront Resort, Pokhara

What to Explore?

- A** Local Government Regulatory Efforts to Strengthen Sanitation Governance
- B** Public-Private Partnerships for Sustainable Sanitation Services
- C** Centralized and Decentralized System for Wastewater and Faecal Sludge Treatment
- D** Recycling, Reuse and Resource Recovery from Faecal Sludge
- E** Viability of Private Sector in Sanitation Business Ventures

Who is it for?



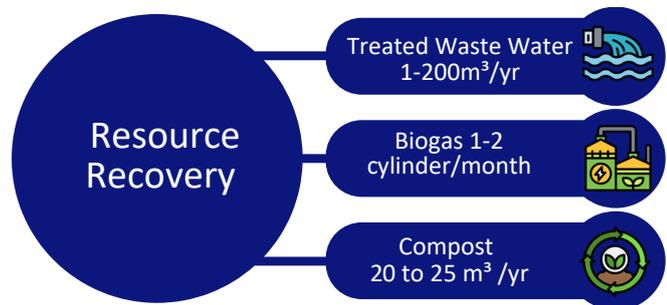
INSIGHTS INTO FSTP LUBHU

The Faecal Sludge Treatment Plant (FSTP) in Lubhu was established in 2016 following the April 2015 earthquake, primarily to manage the resulting faecal sludge from temporary settlers in the Kathmandu Valley. The FSTP was installed by ENPHO with technical collaboration of BORDA and CDD Society with the land provided by Help for Children Beilngries kathmandu in coordination with Mahalaxmi Municipality. Operating on a gravity flow system, the refurbished FSTP has served as a demonstration site and a learning hub for various stakeholders, including planners, researchers, and students, providing practical insights into sustainable faecal sludge management and resource recovery.



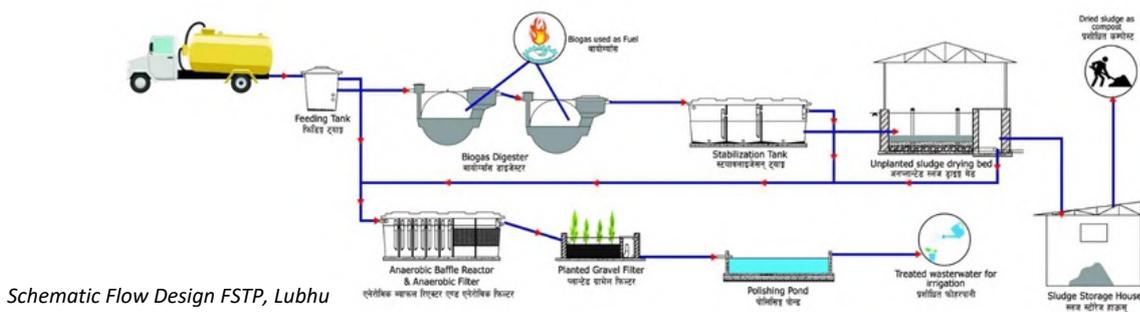
Resource Recovery

FSTP serves as a demonstration site for effective faecal sludge treatment with resource recovery, processing 6m³ of faecal sludge per week, producing 1-200 m³ of treated wastewater annually, 20-25 m³ of dried sludge annually, and yielding 2 cylinders of biogas each month.



COMPONENTS	CAPACITY
Feeding Tank	4m ³
Biogas Digester	12m ³
Stabilization Tank	10m ³
Unplanted SDB	60m ²

COMPONENTS	CAPACITY
Settler, ABR & AF	10m ³
Planted Gravel Filter	15m ³
Polishing Pond	10m ³
Sludge Storage House	11m ²



Schematic Flow Design FSTP, Lubhu

Safety

- Quarterly testing of effluent and yearly testing of dry sludge.
- Occupational Health and Safety (OHS) guidelines are maintained.
- Use of PPE set by operator.
- FSTP operators and managers undergo training on OHS and SOP to enhance their capacities.
- Medical health checkups for operators on need basis.
- Provision of gloves and mask
- Availability of handwashing station with soap and water.



Equity

- Providing accessible service even beyond the municipal area.
- Visiting fees vary based on the number of visitors, with discounts offered to students.



Responsibility

- Yearly budget allocation of up to 2 lakhs for operations and maintenance
- Capacity enhanced
- Technical support
- Quarterly testing of effluent
- Yearly testing of dry sludge
- Appointment of dedicated staff to look after the operation of FSTP.
- Ensuring the proper functioning of the FSTP
- Record keeping of data & information.
- Guiding visitors to the FSTP, offering clear guidance and support during their visit.
- Efficiently manage resources like compost and water.



Accountability

- Written agreement between the desludgers and municipality
- Technical monitoring for ensuring the proper functioning of the FSTP
- Quality testing of effluent and sludge and sharing the findings
- Technical monitoring on tracking sludge transportation trips and technical aspects of the operation
- Documentation/record keeping of every trip
- 24 hrs CC TV surveillance.
- Regular operational monitoring for ensuring proper functioning of the FSTP



Sustainability

- Recovery and Reuse of valuable
- A 3-year agreement between ENPHO, the Municipality, and Help for Children Beilngries with defined roles and responsibilities
- Tipping charge collected from desludgers (Rs 500 per tip) and used for O&M
- Operating on nature-based technology.
- Inlet lock mechanism.



Resource Planning & Management

- Utilization and reuse of the resources recovered (compost, effluent water and biogas).
- Yearly Rs. 43000 of savings are derived from resource recovery (tipping fees, visitor charges, and the sale of vegetables and compost).



VISIT TO AEROSAN PUBLIC TOILET

While there are many public toilets across Kathmandu, Aerosan Hub stands out by offering more than just a basic sanitation solution. Established in response to the 2015 earthquake and launching its first toilets in March 2018, Aerosan has set a new standard for public sanitation. Through collaborations with local NGOs and municipalities and public-private partnerships, Aerosan has developed a network of 10 operational Public Toilet HUBs across the Kathmandu Valley.



Key Features :

- **Waste-to-Value Approach:** Uses anaerobic bio-digester tanks for biogas production, nature based wastewater treatment system and rainwater harvesting.
- **Inclusive & User-Friendly Design:** Ensures accessibility for women, children, and differently-abled individuals with gender and disable - friendly features
- **Hygienic & Safe Practices:** Implements internationally developed cleaning protocols, regular maintenance, and proper ventilation for a hygienic environment.
- **Women's Participation & Empowerment:** Actively involves women in facility management and operations, promoting inclusivity and economic opportunities
- **Economic Sustainability Model:** Operates an in-house café to generate revenue and enhance sustainability.

Resource Recovery



Daily revenue generation NRs 1000 from service charge



Generate biogas save NRs. 3,800 monthly—equivalent to 2 LPG cylinders



Aerosan Public Toilet Through CWIS Lens

Equity



- User-friendly (child, gender and disable friendly).
- Easy access for public due to its prime location.
- Reasonable service charge (NRs 10 per use) compared to the services it provides.
- Provide job opportunities, particularly for marginalized women.

Safety



- Follows international cleaning protocols.
- Includes sensor based taps, flushing systems, and regularly cleaned washbasins and commodes to maintain hygiene.
- Prevents 40 tones of waste per annum from being dumped into environment.
- Staff are provided with work shoes, gloves, uniforms and necessary tools to ensure their safety.
- Staffs are provided with medical insurance.

Sustainability



- Revenue generation from the service charge which is used for the operation and maintenance.
- Operates a café using biogas generated on- site for extra revenue generation.

Accountability



- Operated on PPP model (local government providing land and Aerosan Hub looking after all the operation and maintenance.
- Designated staffs for daily operation.

Responsibility



- The local level government manages, regulates, and monitors land-related issues.
- Operated & Managed by Aerosan.
- An supervisor from Aerosan visits daily for maintenance, functionality checks and cleanliness checklist completion.
- Weekly monitoring by the program officer for inspection, hygiene assessment.
- Staffs in the facility ensure the cleanliness, and grievance handling.

Resource Planning & Management



- Converts waste into renewable energy biogas, which is used for cooking purpose in the teashop, within the premises.
- Treated wastewater are used for cleaning purpose that reduce the cost .

INSIGHTS INTO GUHESHWORI WASTEWATER TREATMENT PLANT



The Guheshwori Wastewater Treatment Plant, located in Kathmandu Metropolitan City, has been operational since February 2002. Co- financed by the Asian Development Bank (ADB) and managed by the Project Implementation Directorate (PID) of Kathmandu Upatyaka Khanepani Limited (KUKL), the plant has a treatment capacity of 32.4 mega liters of wastewater per day. It serves the Upper Bagmati Basin, covering area of 995 hectares.

Key Features :

Type	Centralize Concept
Land used	2.86 Hectares
Service Area	995 Hectares
Commencement Date	2001 First Phase/2020 Second Phase
Design Period	25 first Phase expected /20 Years second phase.
Designed-Build-Operate	Cost of Design and Build Rs.2,04,29,26,328.00 and Operation for 10 Yrs Rs 37, 22,79,789.00 incl. VAT
Domestic Wastewater	80 lpcd
Industrial Wastewater	14 L/s
Wastewater characteristic	Combine wastewater (Domestic and Industrial Storm)
Design Wastewater flow	32.4 MLD/0.375 Cumec flow



Resource Recovery



Energy:
2227.77 KWH
generated
from bio-gas



Produce 2.5
tons of dry bio-
solids per day
& used as bio-
fertilizer.

Source: Consultation with Process Engineer
of PID

Guheshwori WWTP Through CWIS Lens

Safety



- Mechanical system treating 20 mega liters of wastewater daily.
- Treated wastewater are tested on daily basis ensuring safe disposal.
- Implements safety protocols to protect sanitation workers from hazardous exposure.
- Maintains anaerobic conditions for optimal sludge treatment.

Sustainability



- Generates biogas from sewage sludge to produce electricity, reducing energy dependency.
- Bio-conversion of excess sludge into stabilized sludge, with potential use as a soil conditioner or biofertilizer.

Accountability



- Designated human resources appointed looking after the operation of the system.
- VA Tech Wabag (Contractor) prepares monthly progress report and submit to KUKL-PID.
- Grievance collection mechanism at 4 different levels.

Responsibility



- Ministry of Water Supply bi-annually reviews monitoring reports and conducts site-inspection annually.
- Supervision & monitored by KUKL-PID.
- VA Tech Wabag (Contractor) is responsible for operation and maintenance until 2026.

Resource Planning & Management



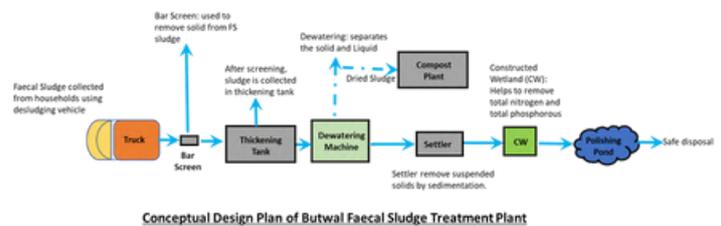
- Uses a "Design-Build-Operate" model to ensure clear outcomes and efficiency.

INSIGHTS INTO BUTWAL SANITARY



Butwal Sanitary Pvt. Ltd. was established in 2021 through the collaboration of seven service providers to address the unmanaged faecal sludge disposal in Butwal. Prior to 2022, waste was irresponsibly dumped in nearby forests and rivers, causing significant environmental concerns. The company secured land for safe waste disposal and invested in a small-scale Faecal Sludge Treatment Plant (FSTP) that treats faecal sludge and produces organic fertilizers by co-composting faecal solids with cow dung. This innovative solution addresses the pressing need for proper waste management in the region.

Apart from others is its holistic approach to sanitation and waste management, unlike traditional waste disposal services, the company operates under a circular economy model by not only treating faecal sludge but also converting it into fertilizers, Butwal Sanitary Pvt. Ltd. recovers valuable resources while promoting sustainability and environmentally friendly practices. Managed by private operators, the company efficiently integrates sanitation services, resource recovery, and financial sustainability. The introduction of a dedicated call center streamlines desludging requests, optimizing operations and resource use. Through the sale of fertilizers, the company generates income, ensuring its financial viability and offering an example of a private sector-driven model that benefits both the environment and the local community.



Resource Recovery



Capacity
Design Capacity: 40 m³/day
Operational status: 30m³/day



Number of trips per day 10-15 trips
Charge -1800-2500 depending upon distance



Revenue Generation:
NRs 600,000 per month



Produces 800 kg of fertilizer daily costing 25 per kg to dealer & 40 per kg to retailer

Butwal Sanitary Through CWIS Lens

Equity



- Includes 16 males and 3 females, with 15 members from marginalized groups.
- FSTP operates through a call center, ensuring easy access for the community.

Safety



- Processes 30m³ of faecal sludge per day.
- Each batch of sludge is routinely tested.
- Sealed, lockable vehicles used for safe transportation.
- Staff are provided with work shoes, gloves, uniforms and necessary tools to ensure their safety.
- Health insurance is provided for 10 staff members directly involved in desludging .
- Premises remain odor-free.
- Toilet facilities available for staff and visitors.

Sustainability



- NRs. 350,000 allocated for operation & maintenance cost monthly.
- Treated wastewater are used for gardening.
- Producing 800 kg of organic fertilizer and sell in the market.

Accountability



- Compost test results are posted on the company's social media.
- Butwal Sanitary conducts regular operational monitoring to ensure FSTP functions properly.
- Rewards and penalties are given based on performance.
- The company regularly collects feedback from farmers regarding the compost they provide.

Responsibility



- All the operational and maintenance activities are led by Butwal sanitary.
- ENPHO provides technical support, training, and capacity development for staff.
- Appointment of dedicated staff to look after the operation.

Resource Planning & Management



- Monthly 2.5 lakhs of savings are derived from resource recovery (compost, tipping fee).
- It can serve as an example of how private companies can efficiently manage FSTPs, ensuring profitability and sustainability.

MURGYA WATER & SANITATION COMMITTEE



Murgya Water & Sanitation Committee, a community-based organization, manages a Wastewater Treatment Center. Following the operation of the Sainamaina 3 Rambasti treatment center in 2016, the need for an additional facility which led to the establishment of the Sainamaina 4 Asnaiya Dadha treatment center in 2019. This center was developed to improve local sanitation and water supply services. It serves around 400 households, treating wastewater from kitchens, bathrooms (greywater), and blackwater, with the treated water being released into the Ghamaha River.

Murgya Water & Sanitation Committee Through CWIS Lens

Equity

- Provides services to low income community.
- Households consuming up to 5 units of water are exempt from tariffs.



Safety

- Wastewater is treated before being released into rivers.
- Reduces health risks by ensuring safe wastewater processing.



Sustainability

- Generates revenue through a 20% water tariff, which is used for the operation and maintenance of the treatment center.



Accountability

- Murgya Water & Sanitation Committee looks after all the operation and maintenance.
- The committee conducts regular audits of households connected to the treatment center for verification.
- Penalties are imposed on households that fail to follow the rules, including the suspension of services.



Responsibility

- The treatment center is managed by technical staff from the sanitation committee, while cleaning personnel are hired separately.



Resource Planning & Management

- Yearly revenue from the tariff are saved for infrastructure maintenance.



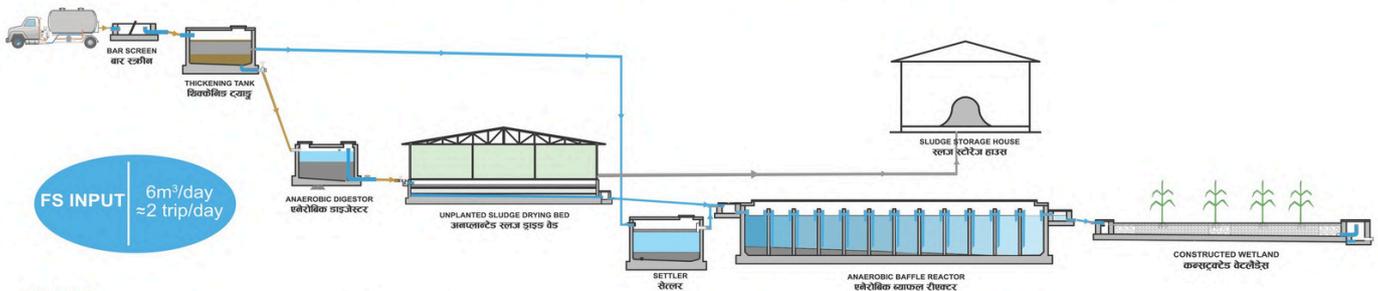
FAECAL SLUDGE TREATMENT PLANT AT WALING SANITATION CENTER



The Waling FSTP is located along the banks of the Adhikhola River in Ward No. 1 of Waling Municipality, within the premises of the Waling Sanitation Center. Established in 2020, the facility was developed by Waling Municipality with full ownership and technical support from ENPHO. It is built on an area of approx. 8150 sq m. and serves not only Waling Municipality but also neighboring municipalities such as Galyang Municipality and Chapakot Municipality.

What sets Waling FSTP apart is its innovative approach. Beyond its primary function, it also serves as a recreational park. Additionally, it has gained recognition as a learning hub, attracting municipalities, researchers, and professionals from across South Asian Region.

S.N	COMPONENTS	CAPACITY
1	BAR SCREEN	1m ³
2	THICKENING TANK	6.3 m ³
3	ANAEROBIC DIGESTOR	10m ³ X 2 Nos
4	SETTLER	6.8 m ³
5	UNPLANTED SLUDGE DRYING BED	14m ² x 15 Nos
6	ANAEROBIC BAFFLE REACTOR	32.4m ³
7	CONSTRUCTED WET LAND	30 m ²



Resource Recovery

Treats 3 m³ of faecal sludge weekly for gardening

Produce 69.84 m³ of compost yearly & use for gardening

Collects NRs 52,000 monthly from tipping fee

Waling FSTP Through CWIS Lens

Accountability

- A separate sanitation unit is in place within the Municipality.
- All the operational and maintenance activities are led by the Municipality, under the sanitation unit.



Equity

- Easy access for the desludging service providers, as it is located in prime location.
- As the FSTP also serves as a recreation center, it is free for the public to visit around. It also serves beyond the Municipal areas serving



Safety

- The FSTP is treating 3 m³ of faecal sludge on weekly basis.
- The process of co-composting using earthworm is followed.
- Proper safety measures are followed by the operator.
- No foul smell is present in the premises.



Sustainability

- Treated wastewater and compost are used for gardening.
- Revenue generated from the tipping charge is used for the operation and maintenance of the FSTP.



Responsibility

- Maintenance costs are covered by the municipality's annual budget.
- A designated focal person, designated by the Waling Municipality oversees the operation of the FSTP.
- Technical support is provided by ENPHO.



Resource Planning & Management

- The FSTP is constructed with multipurpose concept (learning hub, recreational park and FSTP)
- The municipality charges NRs 6500 as tipping fee, which is reused for the operation of the plant.



WATERFRONT RESORT- DEWATS



Waterfront Resort, a renowned 4-star hotel in Pokhara, Nepal, has set a remarkable example in sustainable wastewater management. Situated along the banks of Phewa Lake, the hotel recognized the critical need to address wastewater contamination while preserving the surrounding ecosystem. With technical support from UN- HABITAT and a financial investment of 1.5 million, the hotel established an advanced wastewater treatment plant in 2012. This initiative has enabled the effective management of both greywater and blackwater, ensuring environmental sustainability while maintaining high operational standards.

Key Features :

- **Large-Scale Wastewater Treatment:** Processes 12,000 to 15,000 liters of wastewater daily, ensuring efficient wastewater management.
- **Routine Water Testing:** Periodic laboratory analysis of effluent ensures treated water meets quality and safety standards.
- **Water Reuse for Sustainability:** Treated water is reused for cleaning and watering plants.
- **Efficient Operational Management:** The admin department oversees daily operations, ensuring smooth functionality.



Resource Recovery



13,500 liters of treated water are collected daily and reused for cleaning

Waterfront Resort Through CWIS Lens

Accountability



- Administration department looks after the operation and maintenance of the system.
- Designated human resource allocated for daily monitoring of the system.

Sustainability



- Has been in function for 13 years.
- Over 90% of wastewater is reused for cleaning and watering purpose.

Safety



- Underground and well protected system in- place.
- Effluent is periodically tested in the laboratory to ensure safety.
- No complaints regarding odor from the DEWATS.

Responsibility



- Hotel takes the responsibility for treating wastewater within its premises.

Resource Planning & Management



- 1.5 million investment for plant construction and maintenance.
- Use of treated wastewater has reduced water related cost.



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