



IMPACT REPORT

2020-2025

Integrated Urban Water Management (IUWM)



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Making Impact

“

“The foundation laid by our Four Pillars Replicate, Innovate, Integrate, and Disseminate will continue to guide our efforts.”

”

It is with immense pride and satisfaction that I present this Impact Report, marking the successful 6 years of our Integrated Urban Water Management (IUWM) project spanning 2020 to 2025. This period has been transformative, demonstrating the profound impact that strategic partnerships and localized innovation can have on achieving sustainable WASH services in small and medium towns across India, Nepal, and Bangladesh.

Our vision was clear to move beyond temporary fixes and establish resilient, municipally owned systems that integrate the critical themes of climate sensitivity and gender inclusivity. The progress we have made, detailed within these pages, is a testament to the dedication of our partners, the commitment of the municipal authorities in Godawari, Kirtipur, Changunarayan, and Banepa, and the hard work of our teams on the ground.

A cornerstone of this success has been the shift towards leveraging municipal funds. By proving the viability of our technical models such as the renovation of stone spouts and the development of the semi-IoT automated chlorination system we have successfully encouraged local governments to invest their own resources for replication and scale-up. This financial buy-in is the strongest indicator of sustainability and a true mark of local ownership.

As we look ahead, the foundation laid by our Four Pillars Replicate, Innovate, Integrate, and Disseminate will continue to guide our efforts. We remain committed to fostering environments where improved WASH services are not just a goal, but a guaranteed right, secured by strong local governance and empowered communities.

Thank you to everyone who contributed to this remarkable journey. The work is far from over, but the momentum we have built ensures that we are well-positioned to meet the challenges of the future and continue our collective pursuit of a healthier, more equitable world.

Rajendra Shrestha

Executive Director

Environment and Public Health Organization



OUR PROGRESS AT A GLANCE



6 Years of Impact
of successful IUWM project implementation (2020-2025)



3 Countries Reached
Delivering sustainable WASH services in India, Nepal, and Bangladesh



4 Municipal Partners
Working together with Godawari, Kirtipur, Changunarayan, and Banepa



Innovative Solutions
Renovation of stone and semi-IoT automated chlorination systems



Municipal Ownership
Securing sustainability through local investment and strong governance



Building a healthier, resilient Banepa



Improving access to drinking water, sanitation, and hygiene is a top priority for Banepa Municipality. Over the past two years, with support from the IUWM Project, we have made real progress that has positively affected the daily lives of our residents.

One of our key achievements is completing Detailed Project Reports (DPRs) for four historic stone spouts in the municipality. These reports cover the current condition of each spout, water sources, repair costs, and plans for reconstruction giving us a solid base for future investment.

We also **restored the stone spout in Baniya tole** as a pilot project. This spout has served the community for generations. We fixed leaks, restored water flow, strengthened the structure, and made it easier for residents to use. The water source was also protected to reduce contamination, which helps keep the community healthier. People in the area are happy with the results, and this project now serves as a model for restoring other stone spouts in the municipality.

In addition, we completed a **Waste Flow Diagram (WFD)** study on waste generation in Banepa. We are ready to follow its recommendations.

These achievements would not have been possible without community involvement, technical support, and the commitment of our local government. We are proud of what we have accomplished and remain dedicated to continuing this work.

Shanti Ratna Shakya
Mayor
Banepa Municipality, Kaverpalanchok



OUR PROGRESS AT A GLANCE



4 Detailed Project Reports (DPRs) completed for historic stone spouts



1 Stone spout restored (Baniya tole) serving generations with clean, reliable water



Water source protected to reduce contamination and improve public health



Waste Flow Diagram (WFD) study completed and ready for implementation



Working together for safer water, healthier communities



STRATEGIC PLANNING FOR LASTING IMPACT

As a significant achievement of this project, Detailed Project Reports (DPRs) have been successfully prepared for ten water infrastructure sites. These include six historic stone spouts Dudol, Nashakhu, Pingkhel, Karki Tole, Hitiko Dhara, and Saraswoti Khel two water source protection sites at Patleban and Jitpur Water Supply Scheme, and two wells at Sunkuwa and Mahadev Phokhari. These reports have laid a well-structured and effective foundation for future investments and reconstruction works, which are of great significance from a long-term perspective.

DELIVERING RESULTS ON THE GROUND

Regarding physical implementation, the Dudol stone spout has been successfully reconstructed through the sole investment of ENPHO, while the Nashakh stone spout was completed through joint investment with the municipality. The Mahadev Pokhari well has been rehabilitated through the independent investment of the municipality, and the Sunkuwa well through joint investment. Water sources at Patleban and Jitpur Water Supply Scheme have been protected, and a Semi-Automatic Chlorine Dosing System has been installed at Patleban, bringing about a remarkable improvement in water quality and safety. The establishment of a water refilling station at the ward office of Ward No. 8 and the development of a WASH Plan along with Standard Operating Procedures for the sustainable management of stone spouts are equally commendable achievements.

LOOKING AHEAD

Regarding future plans, the rehabilitation of Pingkhel, Saraswoti Khel, and Hitiko Dhara stone spouts will be taken forward. In addition, the installation of Automatic Chlorine Dosing Systems at twelve Water Supply Schemes across the municipality will be carried out through the joint efforts of the municipality. These plans stand as a testament to our municipality's firm commitment toward safe drinking water and sanitation for all.

A PARTNERSHIP THAT ENDURES

In conclusion, I wish to make it clear that Changunarayan Municipality does not view this collaboration merely as a project but regards it as a long-term partnership. The municipality will remain ever grateful for the technical support, knowledge, and dedication provided by ENPHO. It is our shared aspiration that this partnership continues to grow stronger and expand further in the interest of the well-being and prosperity of our residents.

Jeevan Khatri

Mayor

Changunarayan Municipality, Bhaktapur



“I wish to express my heartfelt satisfaction and gratitude for the positive transformation that the collaboration between Changunarayan Municipality and ENPHO has brought about in the areas of drinking water, sanitation, and hygiene under the IUWM Project. This partnership is not merely a relationship between two institutions, but a reflection of a shared commitment to improving the quality of life of our residents.”

KEY ACHIEVEMENTS



10

Detailed Project Reports (DPRs)
prepared for water infrastructure sites



2

Stone spouts reconstructed
Dudol (ENPHO) and
Nashakh (Municipality)



2

Wells rehabilitated
Mahadev Pokhari (Municipality
and Sunkuwa (Joint investment)



2

Water source protection sites
Patleban and Jitpur Water
Supply Scheme



1

**Semi-Automatic Chlorine
Dosing System installed**
at Patleban



Building a healthier, heritage-rich Godawari



On behalf of Godawari Municipality and its citizens, I would like to express my heartfelt gratitude to BMZ/ BORDA and ENPHO for implementing the Integrated Urban Water Management (IUWM) project in our municipality. Your support has been invaluable in helping us achieve our goals in water, sanitation, and heritage conservation.

PROGRESS IN WASH AND HERITAGE CONSERVATION

Through this collaboration, we have made remarkable progress in the Water, Sanitation, and Hygiene (WASH) sector. The reconstruction of our historic stone spouts stands as a proud symbol of this collaboration. Of the 11 to 12 stone spouts outlined in the Detailed Project Report (DPR), four have been reconstructed with the direct support of IUWM, and three have been completed by the municipality itself. The remaining stone spouts will be constructed based on these completed models, and I look forward to continued support from this project to see them through to completion.

IMPROVED WATER SUPPLY, BETTER LIVES

One of the most significant achievements was the improvement of the Lapseko Dada Water Supply Scheme, which now delivers safe water through metered taps to approximately 160 to 165 households. This project has demonstrated that even small water user committees can effectively manage distribution systems and ensure an adequate supply of safe drinking water to everyone. Additionally, the water sources for several other distribution systems have also been improved.

In Pagaban, the DPR for a Co-treatment Plant (FSTP) has been prepared, and the construction process is currently underway. We are confident that upon its completion, Godawari Municipality will significantly reduce the environmental impact of sewage and fecal sludge management.

SANITATION INFRASTRUCTURE THAT SERVES EVERYONE

Furthermore, with the support of IUWM, DPRs have been prepared for public toilets at Chapagaun Bus Park, Godawari Hospital, Tika Bhairav, and Mankamana Temple. Among these, the toilets at Chapagaun Bus Park and Godawari Hospital are now fully operational, providing accessibility to residents.

In particular, the public toilet at Chapagaun Bus Park has earned recognition for its cleanliness, hygiene, and quality facilities a achievement we are equally proud of.

A PARTNERSHIP FOR A SUSTAINABLE FUTURE

This collaboration has brought about a positive transformation in the water, sanitation, and hygiene conditions of our citizens. It has also played a crucial role in raising public awareness and highlighting the importance of investment in the WASH sector. Our stone spouts, reconstructed in their original archaeological style, are now emerging as attractive symbols of our rich cultural heritage.

In closing, I sincerely urge that this partnership be continued in the coming days, so that together we can build a clean and healthy Godawari for future generations. Thank you.

Gajendra Maharjan

Mayor

Godawari Municipality, Lalitpur



IMPACT SNAPSHOT



4

historic stone spouts reconstructed with IUWM support



3

Stone spouts completed by the municipality



160-165

households now receiving safe water from the Lapseko Dada Water Supply Scheme



Co-treatment Plant (FSTP) in Pagaban under construction



2

public toilets fully operational (Chapagaun Bus Park & Godawari Hospital)



Stronger systems, healthier citizens, proud heritage



Building a cleaner, greener, and healthier, Kirtipur



I am Krishna Man Dangol, Mayor of Kirtipur Municipality. My goal is to make Kirtipur a clean, green, odor-free, and plastic-free city. This is not just a dream we are already taking steps to make it happen.

IMPROVING HEALTH AND DIGNITY

I truly appreciate the work ENPHO has done in Kirtipur on water, sanitation, and hygiene. The handwashing stations, toilets, and laundry facilities at the waste management center have helped protect the health of workers who handle waste every day. Being able to wash up and eat clean after work has made a real difference in their lives.

PRESERVING OUR WATER HERITAGE

Kirtipur is a hilltop city with many natural water sources wells, ponds, and springs. We have a responsibility to use these sources wisely and restore our traditional stone spouts. Since 2020, ENPHO has prepared project reports and built a model stone spout. Based on this, our municipality has also built several historic stone spouts. This year, we have set aside budget to build a new stone spout in Ward No. 2. It will be a proper, traditional spout that keeps water clean and reflects our cultural heritage.

PROMOTING HYGIENE IN SCHOOLS

The handwashing station at Gorkhanath School is still running well and helping students build good hygiene habits.

STRENGTHENING WASTE MANAGEMENT

A waste collection vehicle provided in 2020 has been used to compost organic waste and send it for livestock feed. Four waste collection organizations also received POS machines, making fee collection easier.

LEARNING AND INNOVATING

I recently joined an exposé visit on waste management organized by ENPHO. It was very inspiring. The biggest lesson I learned was simple good waste management needs willpower more than anything else. I came back more motivated than ever.

LOOKING AHEAD, TOGETHER

I am grateful to ENPHO for their support and partnership. I hope we continue working together. I am committed to making Kirtipur a beautiful, clean, and green city and I invite all residents to be part of this journey.

Krishna Man Dangol

Mayor

Kirtipur Municipality, Kathmandu



“Together, we can make Kirtipur a cleanliness, heritage, and sustainability.”

KEY HIGHLIGHTS



Water, sanitation, and hygiene facilities at the waste management center improved workers' health and dignity.



Project reports prepared since 2020 and several historic stone spouts restored.



New traditional stone spout in Ward No. 2 in progress.



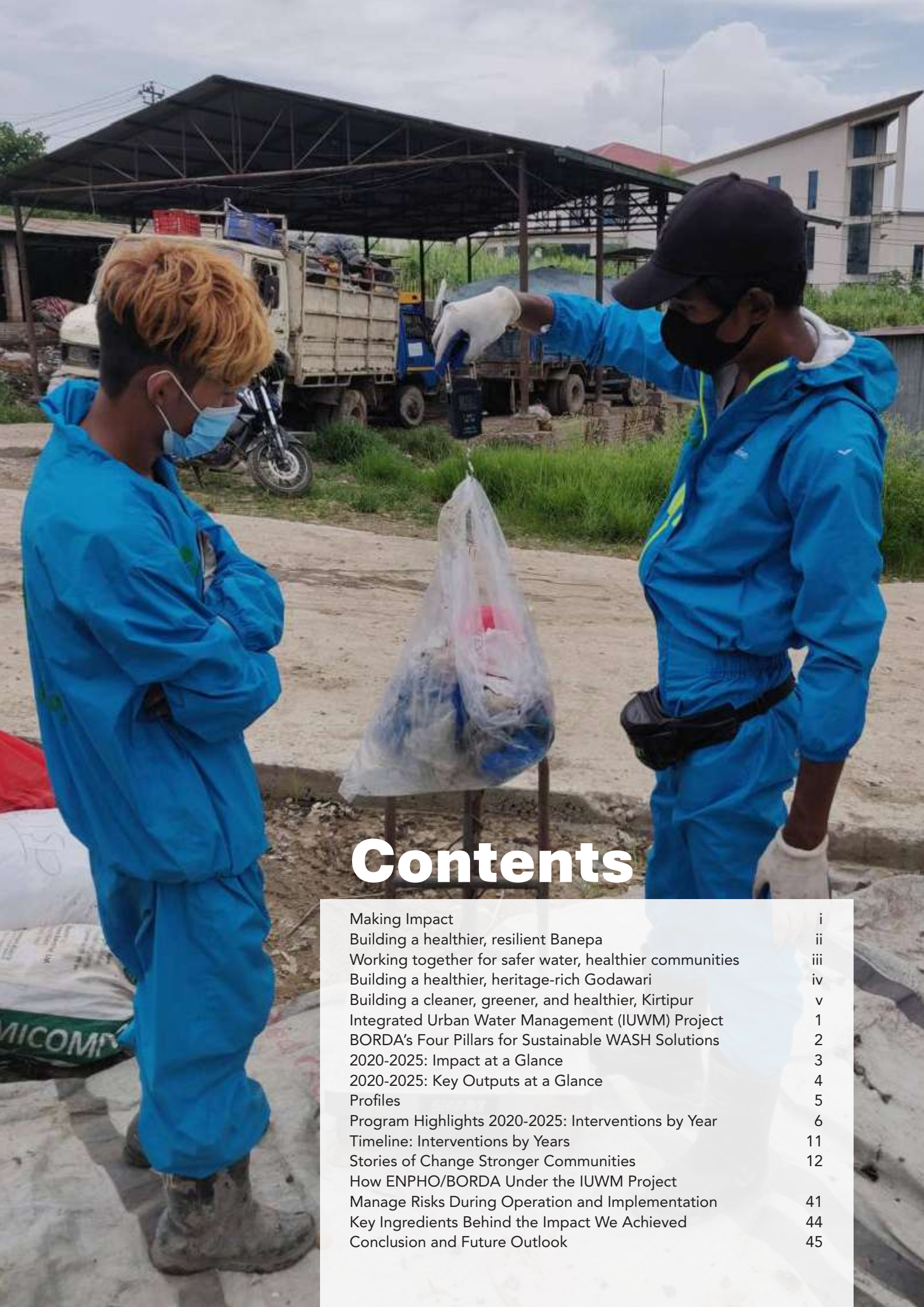
Handwashing station at Gorkhanath School promoting good hygiene habits.



Waste collection vehicle used for composting and livestock feed; POS machines support easier fee collection.



Learning through exposé visits to drive better waste management.



Contents

Making Impact	i
Building a healthier, resilient Banepa	ii
Working together for safer water, healthier communities	iii
Building a healthier, heritage-rich Godawari	iv
Building a cleaner, greener, and healthier, Kirtipur	v
Integrated Urban Water Management (IUWM) Project	1
BORDA's Four Pillars for Sustainable WASH Solutions	2
2020-2025: Impact at a Glance	3
2020-2025: Key Outputs at a Glance	4
Profiles	5
Program Highlights 2020-2025: Interventions by Year	6
Timeline: Interventions by Years	11
Stories of Change Stronger Communities	12
How ENPHO/BORDA Under the IUWM Project	
Manage Risks During Operation and Implementation	41
Key Ingredients Behind the Impact We Achieved	44
Conclusion and Future Outlook	45



Integrated Urban Water Management (IUWM) Project

The Integrated Urban Water Management (IUWM) project, spanning 2020-2025, was designed to address critical water, sanitation, and hygiene (WASH) challenges in small and medium towns across India, Nepal, and Bangladesh. The project's vision is rooted in achieving **sustainable, inclusive, and climate-resilient WASH services**.



OVERALL OBJECTIVE

The project contributes to an improvement in people's quality of life with decreasing water and sanitation related risks.

Additionally, it contributes to global efforts on climate change sensitivity and gender inclusivity.



PROJECT OBJECTIVE

Improved municipal WASH services, gradually integrating the critical themes of climate sensitivity and gender inclusivity, are provided to disadvantaged residents of small & medium towns in India, Nepal & Bangladesh.



Addressing critical water, sanitation, and hygiene (WASH) challenges



Promoting sustainable and climate-resilient WASH services



Ensuring inclusive and gender-sensitive approaches



Contributing to global efforts on climate change sensitivity



BORDA's

Four Pillars for Sustainable WASH Solutions

Our approach to achieving sustainable WASH outcomes is built upon four interconnected pillars, ensuring that interventions are not only effective but also scalable, innovative, and deeply integrated with social and environmental considerations



01 Replicate Proven Solutions

*Scaling up successful
WASH models.*

Accelerating progress by promoting time-tested and cost-efficient approaches, such as decentralized wastewater treatment and community-managed chlorination units, to reduce trial-and-error in new contexts.



02 Innovate New Solutions

Developing context-specific, modern solutions.

Integrating modern technologies like semi-IoT based water quality monitoring and energy-efficient systems. This also extends to institutional and financial models to ensure sustainability through decentralized governance.

4

**Pillars for
Sustainable
WASH**



03 Integrate Gender and Climate

*Ensuring inclusive and
resilient WASH services.*

Actively involving women and vulnerable groups in decision-making and management. Implementing climate-smart planning to prepare communities for water scarcity, flooding, and environmental degradation.



04 Disseminate Learnings

*Knowledge sharing and
policy dialogue.*

Facilitating the exchange of best practices across municipalities and countries. Informing government policies and encouraging wider adoption of sustainable WASH models at national and regional scales.



People-centered
solutions



Environmentally
responsible



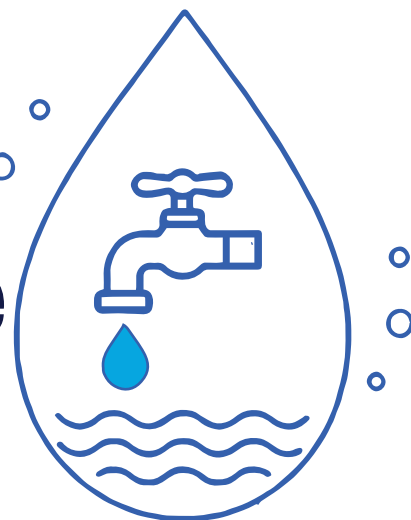
Scalable and
sustainable



Collaborative
impact

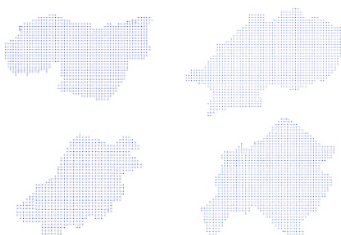
2020-2025: Impact at a Glance

The IUWM project has delivered tangible results across its partner and associate towns, laying the groundwork for long-term municipal ownership and sustainability.



4

Partners and
Associate Towns



6

Water Supply
Schemes



46,596

Numbers of
people served



23,783

Women served



22,813

Men served



1

Water Refilling
Station



210

PPE Distribution



42

DPRs (Detailed
Project Reports)



35

Foot Operated
Handwashing
Units



2

SoPs



16

Stone Spouts
Renovated



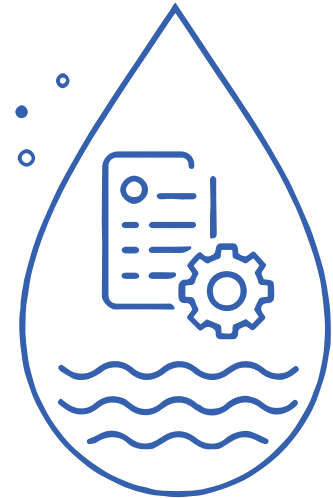
6

Water
Disinfection
Unit



KEY OUTPUTS

2020-2025: Key Outputs at a Glance



Facilities, studies, plans, and systems delivered

The IUWM project has delivered a wide range of outputs that strengthen infrastructure, systems, and knowledge across our partner towns.



1
WASH
Facility



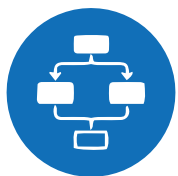
11
Training



2
Public Toilets



1
Handwashing
Facility



2
Shit Flow
Diagram



1
Waste Flow
Diagram



1
GIS Map



2
Automation
Unit (Semi-IoT)



2
Proposals



2
Solid Waste Management
Strategic Plan



2
WASH Plans



2
Guidelines



Profiles

The project focused on four municipalities in Nepal, each presenting a unique blend of cultural heritage, urban growth, and environmental challenges.

Partners Towns

1 Godawari

**Location & Population:**

Lalitpur District,
~97,600 people.

**Key Features:**

Blends rural life with modern development; hosts National Botanical Garden and Phulchowki trails.

**Challenges:**

Managing water supply, environmental protection, and building resilience against landslides.

2 Kirtipur

**Location & Population:**

~7 km SW of Kathmandu,
~82,000 people.

**Key Features:**

Historic Newar town; hosts Tribhuvan University (major educational hub).

**Challenges:**

Managing water supply, waste, and disaster resilience due to dense settlements and sloping terrain.

Associate Towns

3 Changunarayan

**Location & Population:**

Bhaktapur District,
~88,000 people.

**Key Features:**

Home to UNESCO World Heritage Site Changu Narayan Temple; recognized as a top 10 digital municipality.

**Challenges:**

Water scarcity, uneven infrastructure, and risks from landslides and floods.

4 Banepa

**Location & Population:**

~26 km E of Kathmandu,
~68,000 people.

**Key Features:**

Historic Newar trading hub ("eastern gateway"); important commercial and transport hub.

**Challenges:**

Traffic congestion, waste management, and pressure on water and sanitation systems due to rapid urban growth.



Program Highlights 2020-2025: Interventions by Year

The following table summarizes the key WASH interventions implemented across the partner and associate towns during the project period.

IUWM's 2020 Highlight



Stone Spout Renovation



Public Toilet Construction



Solid Waste Management Equipment



Improve intake of water supply scheme



WASH Facility Center



WASH Service Vehicle



Program Highlights 2020-2025: Interventions by Year

The following table summarizes the key WASH interventions implemented across the partner and associate towns during the project period.

IUWM's 2021 Highlight



Stone Spout Restoration



Community Water Access



School Handwashing Station



Public Toilet Facility

IUWM's 2022 Highlight



Stone Spout Renovation



Community Water Point



Water Source Improvement



Program Highlights 2020-2025: Interventions by Year

The following table summarizes the key WASH interventions implemented across the partner and associate towns during the project period.

IUWM's 2023 Highlight



Water Storage Infrastructure



Re-water Supply Structure



Improved Water Access



Dug Well Restoration

IUWM's 2024 Highlight



Water Source Improvement



Stone Spout Renovation



POS Machine Handover



Stone Spout Renovation



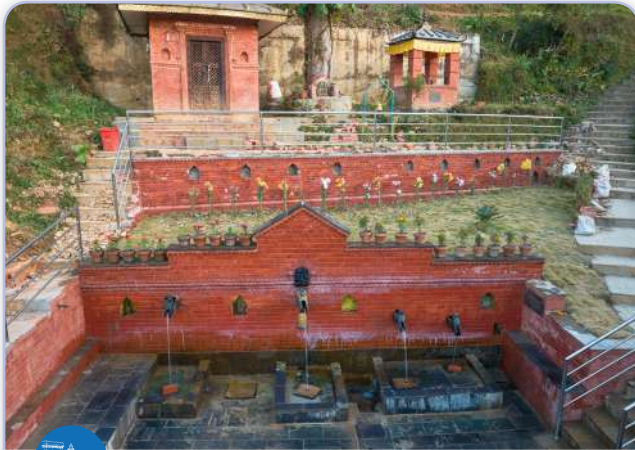
Spring Source Protection



Program Highlights 2020-2025: Interventions by Year

Selected highlights from IUWM's 2025 interventions across partner and associate towns.

IUWM's 2025 Highlight



Stone Spout Restoration



Heritage Waster Source Conservation



Monitoring of Wastewater System



Air Pump for Wastewater Treatment Plant



Wastewater Treatment Unit



Solid Waste Segregation for
Assessment of WFD



Program Highlights 2020-2025: Interventions by Year

Selected highlights from IUWM's 2025 interventions across partner and associate towns.

IUWM's 2025 Highlight



Solid Waste Analyzing for WFD



Improvement of Spring Water Source



Renovate Stone Spout



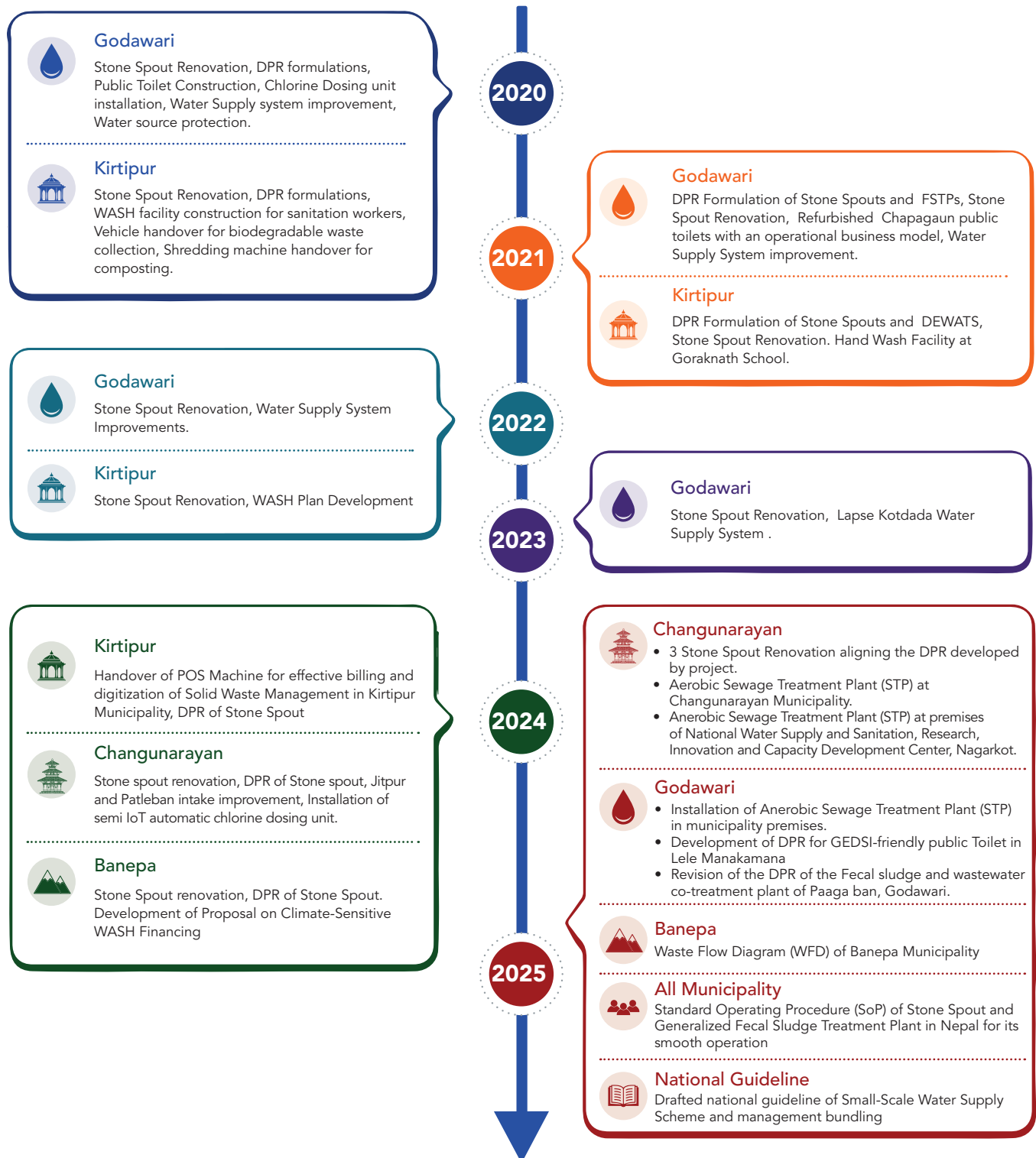
Waste Flow Diagram



PROJECT TIMELINE

Timeline: Interventions by Years

Key interventions across municipalities from 2020 to 2025.



People-centered
solutions



Environmentally
responsible



Scalable and
sustainable



Collaborative
impact



OUR IMPACT AREAS

Stories of Change Stronger Communities.

The impact stories have been organized into two overarching themes, Water and Sanitation to better reflect the transformative changes achieved across multiple municipalities.



Safe and Reliable Water

Under the water theme, the following key impact stories highlight how strategic interventions, innovation, and local leadership have strengthened water security and service delivery:



Leveraging Municipal Funds for Sustainability: Transitioning from Project Support to a Long-Term System



From Demonstration to Replication: How Strategic Planning and Aesthetic Design Catalyzed Municipal Investment in Water Heritage



Intake Improvement Works for Safe and Clean Water in Godawari Municipality



Improving Water Quality through Electrical Chlorine Dosing Units in Godawari Municipality



Innovation Spotlight – From Concept to Reality (Semi-IoT Automated Chlorination): Addressing Inconsistent Chlorination



Semi-IoT Based Chlorine Dosing Innovation: A Local-Led Solution in Changunarayan Municipality (Patleban Water Supply Scheme)



Strengthening Local Governance Through WASH Planning: An Impact Story from Kirtipur and Changunarayan Municipalities



Dignified and Inclusive Sanitation

The sanitation theme captures stories of dignity, inclusion, circular economy promotion, and improved service delivery through community-centered solutions:



WASH Facility for Sanitation Workers: A Step Towards Dignity and Inclusion in Kirtipur



Community-Led Public Toilet Improvement at Chapagaun, Godawari Municipality



Restoring Dignity Through a Safe and Inclusive Public Toilet inside a Health Facility in Godawari Municipality



Enhancing Circular Economy: Strengthening Waste Management and Composting in Kirtipur



A Small Vehicle Driving Big Change in Kirtipur



Mapping the Invisible, how Banepa became Nepal's pioneer in Waste Flow Transparency



People-centered solutions



Environmentally responsible



Scalable and sustainable



Collaborative impact



Leveraging Municipal Funds for Sustainability: The Shift from Project to Sustainable System

A core achievement of the IUWM project is the successful transition of local municipalities from being passive recipients of aid to becoming active financial owners and investors in their own water security. Mobilizing and aligning the municipal budget is the central strategy for strengthening WASH systems, ensuring that improvements are part of a sustained municipal investment plan, rather than being solely dependent on external donors.



Investment in System Management:

Municipal investment in a chlorine dosing mechanism goes beyond infrastructure construction. It is a strategic operational investment in public health and water quality assurance, demonstrating a true mark of ownership over system management and safety.



Proof of Concept & Financial Buy-in:

The project's initial actions, such as the construction of stone spouts based on project-prepared Detailed Project Reports (DPRs), served as a successful proof of concept. This led to significant self-initiated financial commitments from the municipalities:



- **Investment in Infrastructure:**

Changunarayan, Godawari, and Kirtipur Municipalities successfully used their own budgets to construct several stone spouts, validating the technical model and demonstrating the initial act of leveraging, scaling, and replication.



- **Budget Allocation:** The decision to allocate recurrent budgets for future construction is the strongest evidence of leveraging, signifying that the municipality has internalized the value of the intervention and is now using its own funds for replication and scale-up.



Validation and Replication:

The project's success extended beyond the primary partner, triggering significant leverage effects across the sector. Kirtipur and Godawari Municipalities directly replicated the model by constructing stone spouts based on the same ENPHO-prepared DPRs. This reliance on the established technical blueprint successfully leveraged the external project's investment in design and technical assistance to secure internal municipal funds for construction, demonstrating successful cross-municipal learning and trust in the technical solutions.



People-centered solutions



Environmentally responsible



Scalable and sustainable



Collaborative impact



From Demonstration to Replication:

How Strategic Planning and Aesthetic Design Catalyzed Municipal Investment in Water Heritage



The Integrated Urban Water Management (IUWM) project successfully leveraged a small-scale, high-quality demonstration to catalyze significant policy and financial commitment from local government bodies. By transforming a few traditional stone spouts into aesthetically sound and functional community assets, the project provided powerful proof of concept. This strategic intervention led to immediate demand from all four project municipalities, resulting in the allocation of local budgets for the widespread replication of the renovation model. This case study illustrates the profound impact that targeted, quality-driven planning can have on securing local ownership and ensuring the sustainability of urban heritage conservation efforts.

Traditional stone spouts, or dhunge dharas, are vital components of the urban water heritage, serving both historical and functional roles in the community. However, years of neglect, poor maintenance, and ad-hoc repairs had diminished their aesthetic appeal and functional efficiency.

“

A small, high-quality demonstration created the confidence for broader municipal investment.



The Challenge

A significant barrier to effective renovation was the lack of detailed, professional planning that integrated engineering requirements with cultural and aesthetic considerations. Without a compelling vision of what was possible, local municipalities were hesitant to invest their limited resources.



The Solution

The IUWM project initiated a comprehensive approach to address this challenge: beginning with rigorous planning and strategically selected demonstration projects.



CASE STUDY



1. Detailed Project Reports (DPRs)

The project first developed approximately 30 Detailed Project Reports (DPRs) for the renovation of various traditional stone spouts. These reports provided the necessary technical blueprint for restoration, ensuring structural integrity and improved water flow.



2. The Proof of Concept

Recognizing that a document alone is insufficient to drive change, the IUWM project strategically constructed a select few of these spouts itself. The goal was not merely to renovate, but to demonstrate how proper planning and design could transform the structures into aesthetically sound and visually striking public spaces.



Why the Demonstration Worked

This demonstration phase was critical. The constructed spouts served as tangible, high-quality examples of the potential for heritage conservation coupled with professional design. They became living showcases of the project's commitment to excellence and respect for cultural value.

“

A well-designed demonstration transformed hesitation into municipal ownership.



Conclusion: Small Investment, Big Change

The IUWM project's experience with the stone spout renovations underscores a vital lesson in development work: a small, strategic investment in quality demonstration can unlock large-scale, sustainable change. By focusing on meticulous planning and aesthetic excellence in the initial phase, the project successfully convinced local governments that even a modest budget contribution, when guided by a professional blueprint, could yield significant, visible, and highly valued community improvements. This model of demonstrating impact to secure local financial and political buy-in is now a blueprint for future urban heritage and water management initiatives.



Key Results

- Local governments gained confidence to invest.
- Municipal budgets were allocated for wider replication.
- The model now serves as a blueprint for future initiatives.



Intake Improvement Works for Safe and Clean Water in Godawari Municipality



IUWM and ENPHO supported Godawari Municipality to transform three intake sites from basic project infrastructure into a sustainable, municipally owned water system. Through strategic municipal investment and local leadership, the community shifted from passive aid recipients to active financial owners—ensuring cleaner, safer water that continues to flow long after the project ends.



Investment in System Management

Godawari Municipality allocated its own resources for operations and maintenance, ensuring long-term functionality and sustainability of the intake systems.

Proof of Concept & Financial Buy-in



Investment in Infrastructure

Municipal funds were used to construct durable intake structures with proper protection, filtration, and access facilities—significantly improving water safety and reliability.



Budget Allocation

Dedicated municipal budgets for chlorine dosing units and routine maintenance ensure consistent water quality and system performance throughout the year.



Better Quality

Cleaner, safer, and more reliable water for everyone.



Community Ownership

Local leadership ensures accountability and long-term care.



Sustainable Results

Systems built to last beyond the life of external projects.



Stronger Future

Municipal investment drives resilience and long-term impact.



CASE CONTINUED

"Earlier, we used to get turbid water throughout the year, and without proper intake, chlorination was very difficult. But after improving the intake, we now get clear water most of the time."

Suman Nagarkoti
Chairperson
Basuki WUC, Godawari Municipality-6



Validation and Replication

The project's success extended beyond the primary partner, triggering significant leverage effects across the sector. Kirtipur and Godawari Municipalities directly replicated the model by constructing stone spouts based on the same ENPHO-prepared DPRs. This reliance on the established technical blueprint successfully leveraged the external project's investment in design and technical assistance to secure internal municipal funds for construction, demonstrating successful cross-municipal learning and trust in the technical solutions.



Community Pride and Stewardship

The intake sites themselves have become spaces of community pride. With clean surroundings, protective structures, and aesthetically improved areas, the intake zones now resemble small parks invitingly. Well maintained spaces where community members can gather, relax, and appreciate their shared water resources. This transformation has strengthened stewardship, encouraging local residents to protect and care for these vital systems.



Overall Impact

The intake improvement works have not only enhanced water quality but also inspired broader municipal action, strengthened community ownership, and created multifunctional spaces that benefit both public health and community wellbeing.



People-centered solutions



Environmentally responsible



Scalable and sustainable



Collaborative impact



Improving Water Quality through Electrical Chlorine Dosing Units in Godawari Municipality



The installation of electrical chlorine dosing units in six water supply systems across Godawari Municipality has been an important step toward improving drinking water safety. These units were introduced with the intention of providing a consistent level of disinfection and reducing the risk of waterborne diseases in the community. Their presence has helped raise awareness among local operators and communities about the importance of water treatment and has encouraged more systematic water quality monitoring.

However, these dosing units are basic models without any automation or flow-paced control. Because of this limitation, the chlorine dose cannot automatically adjust to changes in water flow or quality. As a result, the effectiveness of the disinfection process cannot be fully guaranteed. In times of fluctuating flow or sudden changes in raw water conditions, the units may underdose or over-dose, leading to inconsistent water quality.

While the installations mark a positive starting point, they highlight the need for more advanced, reliable, and automated chlorination systems to ensure safe water for all residents in the long run.



Stronger Awareness, Safe Water

The introduction of dosing units has increased awareness of water treatment and supported more consistent monitoring across communities.



A Foundation for the Future

Basic, non-automated units limit precise dosing during changing conditions. Upgrading to automated systems is essential to ensure reliable and safe water for all.



People-centered solutions



Environmentally responsible



Scalable and sustainable



Collaborative impact



Concept to Reality (Semi-IoT Automated Chlorination):

Addressing the Challenge of Inconsistent Chlorination

A persistent operational challenge in many community-managed water supply systems in Nepal is the difficulty of maintaining consistent chlorination due to fluctuating water flow, irregular supply schedules, and variable source discharge. Manual adjustment of chlorine doses is often impractical, leading to either under-dosing (risk of microbiological contamination) or overdosing (unpleasant taste and consumer complaints).



The Solution: Semi-IoT Automated Dosing

To address this deep-rooted problem, the project team-initiated trials and research, resulting in the development and installation of a semi-IoT (Internet of Things) based automated chlorine dosing system.

- **Mechanism:** The system uses sensors and flow data to automatically regulate chlorine dosing in real time, ensuring the dosing quantity corresponds precisely to the actual volume of water being supplied.

- **Adaptability:** This innovation is highly valuable for its adaptability, as it can be installed in both gravity-fed and pumped systems, regardless of reservoir size or water source.
- **Connectivity:** The semi-IoT configuration ensures reliability by not requiring constant internet connectivity; local data storage and intermittent synchronization are sufficient for performance tracking and reporting.
- **Impact:** The automation system continuously adjusts the dose to maintain the Free Residual Chlorine (FRC) level within the WHO-recommended range, marking a significant milestone for small and medium-scale water supply systems in the region.



**Smarter dosing.
Safe water.
Strong communities.**





Semi-IoT Based Chlorine Dosing Innovation:

A Local-Led Solution from Changuanaryan Municipality: Patleban Water Supply Scheme



The concept for a semi-automated chlorine dosing system in Patleban Water Supply Scheme, Ward No. 8 of Changuanaryan Municipality, originated from a practical challenge deeply rooted in the realities of community-managed water supply systems in Nepal. Like many semi-urban and rural schemes, the Patleban Water Supply Scheme relies on multiple water sources, including natural springs and deep bore wells. Water is stored in reservoir tanks (RVTs) of varying capacities, and the flow fluctuates continuously depending on pumping schedules, seasonal variations, and consumer demand. Under these conditions, maintaining a consistent and safe chlorine dosage has always been a major operational challenge.

Traditionally, chlorination was managed manually by a local operator responsible for mixing and dosing chlorine solutions. However, this process demanded constant attention the operator had to adjust dosing levels every time the flow rate changed, which was nearly impossible to manage in real time. Given their other daily responsibilities, it was not practical

for the caretaker to maintain the appropriate dosing continuously. As a result, the chlorine levels often fluctuated significantly, leading to periods of under-chlorination, which increased the risk of microbial contamination, or over-chlorination, which caused user dissatisfaction due to strong chlorine taste and odor. This inconsistency had become a long-standing “headache” for most small and medium-scale water supply systems in Nepal, including Patleban Water Supply Scheme.

Acknowledging this recurring problem, the local water user committee, with technical support from partners such as ENPHO with financial support from BMZ/Borda and Doppler/Simavi and the municipality, initiated a focused effort to find a sustainable and locally adaptable solution. Through continuous trials, field testing, and collaboration among local technicians and engineers, a semi-IoT based automated chlorine dosing system was conceptualized, developed, and installed in Patleban Water Supply Scheme.



A local innovation that brings consistency, safety, and relief to operators.



“The automated chlorine dosing system solved a problem we faced for many years. Even with irregular flow and multiple sources, the chlorine level now remains within the safe range. This is a big relief for us as operators.”

Man Kumar Khadka

Water Supply System Operator
Patleban Water Supply User Committee



This system is designed to automatically regulate chlorine dosing in response to real-time variations in flow rate. It integrates sensors that measure water flow and a controller that adjusts the chlorine feed proportionally, ensuring that the dosing corresponds precisely to the actual water volume being supplied. Importantly, the system operates under semi-IoT architecture, meaning that it can function effectively even with limited internet connectivity data that can be stored locally and synchronized periodically for monitoring and analysis.

Since installation, the system has been able to maintain Free Residual Chlorine (FRC) levels within the WHO-recommended range of 0.2–0.5 mg/L, both at the treatment outlet and within the distribution system. This automation ensures that water delivered to households consistently meets safety standards,



even during irregular flow conditions. Moreover, it has reduced the workload and stress on the operator, who no longer needs to manually adjust chlorine levels multiple times a day.

Beyond technical success, the Patleban Water Supply Scheme case represents a milestone for local-led innovation in Nepal’s water sector. It demonstrates how municipal commitment, community participation, and locally tailored technology can jointly overcome long-standing WASH challenges. The system’s development process driven by local observation, supported by municipal leadership, and refined through collaboration with technical experts, embodies the essence of local-led adaptation.

The success of the semi-IoT chlorine dosing system in Patleban Water Supply Scheme offers a scalable model for other small and medium water supply systems across Nepal. It shows that by leveraging local knowledge, municipal budgets, and appropriate technology, communities can achieve reliable water safety management, reduce dependence on external technical support, and build climate-resilient, sustainable water systems.



KEY OUTCOMES

- Consistent chlorine dosing for safe drinking water
- Maintained FRC within WHO range (0.2–0.5 mg/L)
- Reduced operator workload and stress
- Local-led innovation with community ownership
- Scalable model for Nepal’s water systems



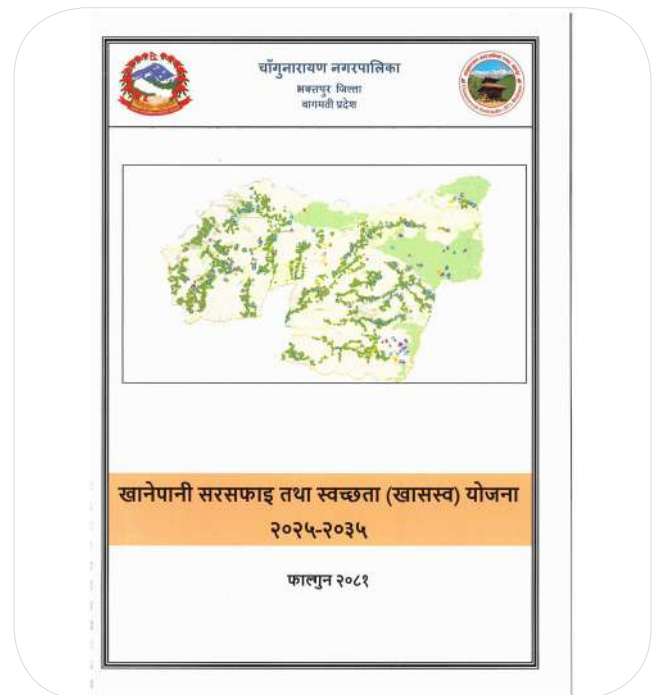
Strengthening Local Governance Through WASH Planning:

An Impact Story from Kirtipur and Changunarayan Municipalities

Across Nepal, the government has made it mandatory for every municipality to develop a Water, Sanitation and Hygiene (WASH) Plan, a crucial step in strengthening local systems, improving service delivery, and ensuring that water and sanitation needs are addressed with long-term vision. While the mandate is clear, many municipalities often struggle with limited technical capacity, scattered data, and competing priorities. This is where the Integrated Urban Water Management (IUWM) project, supported by BORDA and BMZ and implemented by ENPHO, stepped in to make a meaningful difference.

For Kirtipur and Changunarayan Municipalities, the journey toward developing a structured and strategic WASH Plan began with a realization: although both municipalities were growing rapidly, there was no consolidated document that outlined their water supply status, gaps, future needs, or financial strategies. Year after year, budgets were allocated reactively based on immediate demands or political urgency rather than through informed planning. As a result, long-standing issues such as aging pipelines, insufficient water sources, sanitation gaps, and unequal service distribution remained unresolved.

Recognizing these challenges, the IUWM project facilitated a comprehensive and participatory process to develop WASH Plans for both municipalities. ENPHO's technical team worked closely with municipal staff, elected representatives, water user groups, and community stakeholders to gather data, analyze local needs, and craft a strategic roadmap. The process itself became a learning platform for the municipal leaders engaged in discussions on water balance, service coverage, sanitation realities, and budgetary planning with newfound clarity.



The resulting WASH Plans went far beyond fulfilling a government requirement. These plans provided municipalities with a powerful tool for decision-making. Each plan included:



Detailed assessments of existing water supply systems, including sources, capacities, households reached, and critical gaps.



Designs and cost estimates for new infrastructure and system upgrades—helping municipalities know what is feasible and how much investment is required.



Household-level WASH data, bringing clarity to inequalities and guiding targeted interventions.



Financial strategic and phased investment plans, strengthening municipal readiness for funding and efficient resource use.

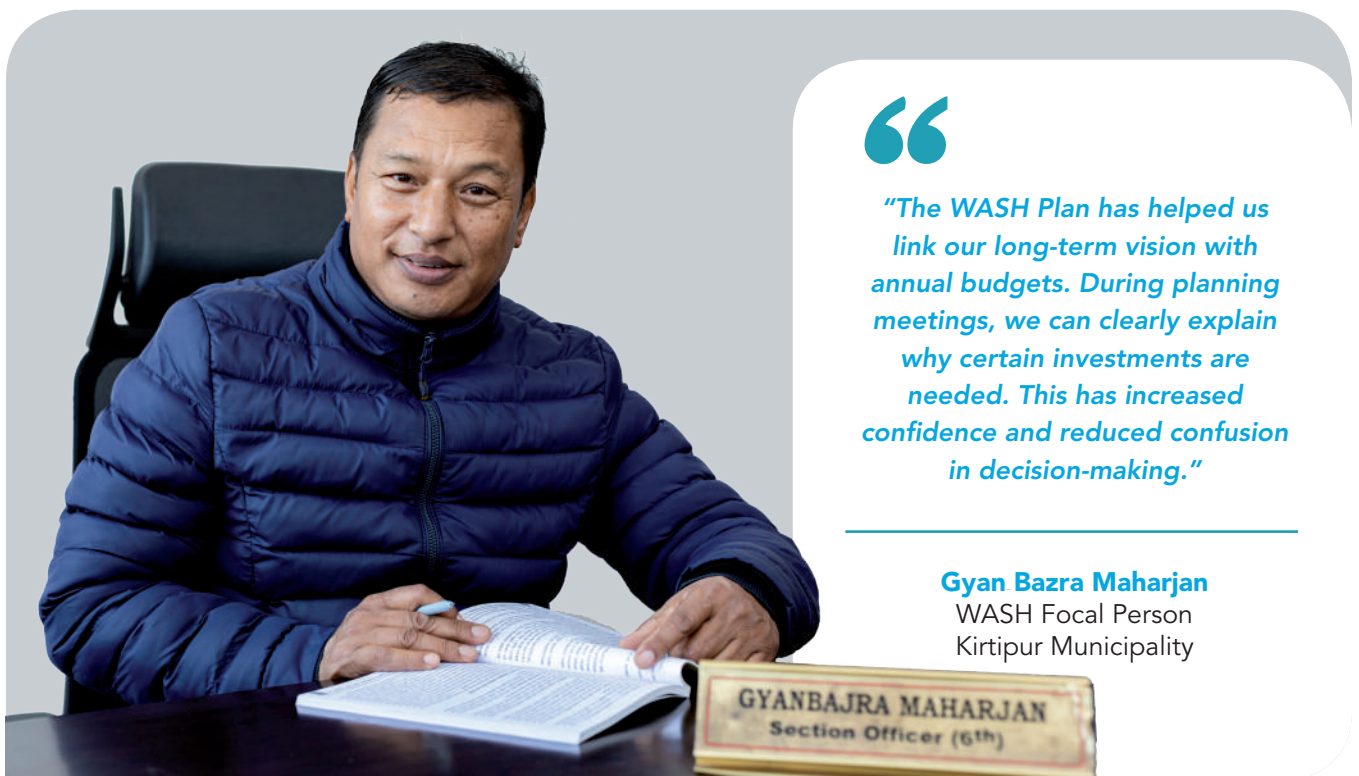


- A budgetary roadmap, enabling municipalities to prioritize WASH investments annually based on evidence, not assumptions.
- A clear picture of the overall WASH scenario, which served as a baseline for measuring progress in future years.

These plans quickly became reference documents for planners, policy makers, and municipal officials. For Changunarayan Municipality, the value was immediately recognized, and the WASH Plan was formally endorsed by the municipal council, making it an official guiding document for annual planning and budgeting. This endorsement marked a moment of pride for the municipality, demonstrating strong local ownership and commitment to improving WASH services for its residents.

However, the journey also revealed a new challenge. While technically sound and comprehensive, the WASH Plans were complex documents, rich with data, engineering designs, and detailed estimates. For many municipal staff who were not from technical backgrounds, navigating the plan felt overwhelming. The richness of information, though valuable, required simplification for daily use.

This insight became an important lesson: a WASH Plan is only as effective as its usability. Municipalities expressed the need for a more user-friendly version, one that retains technical integrity but is easier to understand, apply, and reference during meetings, budget discussions, and ward-level planning. This feedback has sparked ongoing efforts to make future iterations more streamlined and accessible without compromising the technical depth.



“

“The WASH Plan has helped us link our long-term vision with annual budgets. During planning meetings, we can clearly explain why certain investments are needed. This has increased confidence and reduced confusion in decision-making.”

Gyan Bajra Maharjan
WASH Focal Person
Kirtipur Municipality



“Before the WASH Plan, our planning was based on immediate demands and limited data. Now we have a clear picture of our water and sanitation situation. The plan helps us prioritize activities, estimate budgets properly, and present evidence-based proposals to the municipal council.”

Surendra Lamichaney
WASH Focal Person
Changunarayan Municipality

Despite these challenges, the impact remains remarkable. For the first time, both Kirtipur and Changunarayan Municipalities are equipped with a structured WASH framework that can guide their annual budgets and long-term strategies. No longer do WASH investments rely solely on yearly debates or scattered information, municipal leaders now have the evidence, the vision, and the financial roadmap needed to prioritize their actions.

The WASH Plans have become more than documents; they are catalysts for better governance. They encourage municipalities to think ahead, invest wisely, and address WASH problems holistically. They also offer a model for other municipalities across Nepal, demonstrating that strong planning can directly contribute to healthier communities, resilient infrastructure, and better resource management.

Most importantly, the development of these plans has created a sense of empowerment at the local level. Municipal teams now better understand

their own systems, data, and responsibilities. They recognize that effective WASH service delivery begins with informed planning, and they are more confident in making decisions that directly affect the lives of their citizens.

In the larger landscape of Nepal's development, the WASH Plans for Kirtipur and Changunarayan stand as proof that when local governments are supported with technical expertise and capacity building, they can lead meaningful change. While simplification for ease of use is the next step, the foundation has been laid. The plans are already guiding budgets, shaping priorities, and inspiring action.

And in the years to come, the true impact of these WASH Plans will be seen not only in documents or municipal meetings but in every household that gains reliable water access, every community with improved sanitation, and every citizen whose dignity and well-being are strengthened through better WASH services.



WASH Facility for Waste Workers:

A Step Towards Dignity and Inclusion in Kirtipur



The construction of a dedicated WASH facility within the premises of the waste collection site in Kirtipur Municipality represents a powerful intervention that transcends mere infrastructure development. It is a direct and tangible commitment to the health, hygiene, and dignity of the municipality's waste workers, a group that is often marginalized and excluded from formal planning processes in Nepal.



Addressing Exclusion and Stigma:

In the Nepalese context, waste management is frequently viewed as an undignified profession, leading to the social exclusion of waste workers. This marginalization often translates into a lack of basic facilities, severely compromising their health and hygiene. The IUWM project recognized that improving WASH services must be an inclusive process that prioritizes the most vulnerable. By focusing on the waste collection site, the project directly addressed the needs of these essential workers who are constantly exposed to health hazards.

Facility Components and Impact:

The facility was designed in close consultation with the workers to ensure it meets their specific needs, providing a comprehensive suite of amenities that allow them to maintain personal hygiene and take necessary rest breaks. The facility includes:



Sanitation Units:

Clean, private toilets.



Hygiene Stations:

Dedicated handwashing and bathing units.



Welfare Amenities:

A rest room, locker services for secure storage of personal belongings, and a laundry area for washing work clothes.



Water Access:

A safe drinking water point.





Recognition, Well-being, and Worker Voice

The WASH facility is more than a building; it is a symbol of institutional recognition and respect. Its construction signifies that the municipality and the project partners acknowledge the vital role waste workers play in urban sanitation and public health.



Valuing Essential Workers

By addressing the needs of waste workers, the municipality reaffirms that these workers are indispensable to a clean, healthy, and resilient Kirtipur.



Partnership in Action

The collaboration between the municipality and project partners demonstrates a shared commitment to inclusive, equitable, and sustainable urban development.



A Model for Inclusion

This intervention serves as a model for how municipal planning can be made truly inclusive by prioritizing the needs of its most overlooked workforce.



By providing a safe, clean, and private space for hygiene and rest, the facility directly supports the workers' well-being, reduces their exposure to occupational diseases, and, most importantly, restores a measure of dignity to their essential work.

This intervention serves as a model for how municipal planning can be made truly inclusive by prioritizing the needs of its most overlooked workforce.



"Before this WASH facility, we had no safe place to use the toilet, wash ourselves, or change clothes. Now we have a clean toilet, bathing room, locker, and laundry space. It helps us maintain hygiene during work and return home with dignity. This facility makes us feel respected as women and as waste workers."

Sumitra Deula

Operator, WASH Facility



Impact in Action

With improved sanitation and hygiene, waste workers can focus on their work with greater health, confidence, and dignity. This investment in people strengthens the entire system of urban sanitation and uplifts the community as a whole.





Community Led Public Toilet Improvement at Chapagaun, Godawari Municipality



The improvement of the community led public toilet in Chapagaun has become a practical example of how small infrastructure upgrades can create meaningful change for both public health and local livelihoods. Under the IUWM project, ENPHO supported the development of the Detailed Project Report (DPR), supervised construction, and formally handed over the upgraded facility to Godawari Municipality.



One of the most notable outcomes of this initiative is the successful transition of the public toilet into a locally managed business model. The operator selected from the community now runs a small tea and grocery shop attached to the facility. This model not only ensures daily maintenance and cleanliness but also creates a sustainable source of income for the operator. The operator is fully responsible for keeping the toilets clean, managing daily operations, and collecting user fees.



This public toilet has become my main source of income. Along with toilet services, I run a small tea and grocery shop here. The daily users help me earn regularly, and I can manage my household expenses with confidence.

Mangal Maya Pujari
Public Toilet Operator
Chapagaun Buspark



~100
USERS PER DAY
benefiting from clean
and safe services



NPR 5
FOR URINATION
well accepted by the
community



NPR 10
FOR DEFECACTION
well accepted by
the community



IMPROVED
SANITATION & HYGIENE
reduces open defecation
risks and improves
hygiene



The Challenge

The traditional stone spouts and the public toilet structure had suffered from poor maintenance, affecting cleanliness, usability, and overall appearance. Limited resources and lack of a sustainable management model made it difficult to ensure regular upkeep and service delivery.



The Solution

Through the IUWM project, ENPHO supported the renovation of the facility based on DPR and quality construction. The upgraded toilet was handed over to the municipality with a community-selected operator, who runs a tea and grocery shop to manage the facility sustainably.



Conclusion

Overall, the Chapagaun public toilet improvement demonstrates how community ownership, supported by technical guidance and infrastructure investment, can lead to sustainable urban sanitation solutions. The success of this model offers a replicable approach for other wards within the municipality and beyond.



CASE STUDY



A Well-Managed Facility

The upgraded facility now serves around 100 users per day. The fee structure NPR 5 for urination and NPR 10 for defecation has been well accepted by the community. The steady footfall has made the revenue stream promising, helping the operator maintain the facility while generating sufficient earnings for their livelihood.



"This toilet is clean and well managed. I feel comfortable using it, even while traveling or waiting for the bus. Paying a small fee feels fair because the service is good."

Raghu Nath Kuwar
Public Toilet user



Strengthened Public Trust & Better Sanitation

The clean, well-managed condition of the toilet has also strengthened public trust and encouraged regular use. This, in turn, contributes to better sanitation practices, reduces open defecation risks, and enhances the overall hygiene environment of the area.



Strengthened Public Trust and Better Replication

Overall, the Chapagaun public toilet improvement demonstrates how community ownership, supported by technical guidance and infrastructure investment, can lead to sustainable urban sanitation solutions. The success of this model offers a replicable approach for other wards within the municipality and beyond.



THE IMPACT AT A GLANCE



**~100
USERS PER DAY**
benefiting from
clean and safe
services



**NPR 5
FOR
URINATION**
well accepted
by the
community



**NPR 10
FOR
DEFECATION**
well accepted
by the
community



**IMPROVED
SANITATION
& HYGIENE**
reduces open
defecation risks
and improves
hygiene



**SUSTAINABLE
LIVELIHOOD
CREATED**
for the operator



**REPLICABLE
MUNICIPAL
MODEL**
for other wards
and beyond



KEY TAKEAWAYS

- Community ownership and local management ensure daily maintenance and cleanliness.
- A small investment in infrastructure can create lasting impact on public health and livelihoods.
- The model is financially sustainable and replicable within Godawari Municipality and beyond.



Restoring Dignity Through a Safe and Inclusive Public Toilet inside a Health Facility in Godawari Municipality



“The WASH Plans have become more than documents; they are catalysts for better governance. They encourage municipalities to think ahead, invest wisely, and address WASH problems holistically.”



Usability Matters

A WASH Plan is only as effective as its usability. Municipalities called for a more user-friendly version that is easy to understand, apply, and reference in daily work.

This insight became an important lesson: a WASH Plan is only as effective as its usability. Municipalities expressed the need for a more user-friendly version, one that retains technical integrity but is easier to understand, apply, and reference during meetings, budget discussions, and ward-level planning. This feedback has sparked ongoing efforts to make future iterations more streamlined and accessible without compromising the technical depth.



Stronger Planning, Better Outcomes

A structured WASH framework helps municipalities plan ahead, allocate budgets wisely, and build resilient infrastructure for healthier communities.

Despite these challenges, the impact remains remarkable. For the first time, both Kirtipur and Changuarayan Municipalities are equipped with a structured WASH framework that can guide their annual budgets and long-term strategies. No longer do WASH investments rely solely on yearly debates or scattered information; municipal leaders now have the evidence, the vision, and the financial roadmap needed to prioritize their actions.



Local Empowerment

Municipal teams now better understand their systems, data, and responsibilities, leading to more informed decisions that improve WASH service delivery.

The WASH Plans have become more than documents; they are catalysts for better governance. They encourage municipalities to think ahead, invest wisely, and address WASH problems holistically. They also offer a model for other municipalities across Nepal, demonstrating that strong planning can directly contribute to healthier communities, resilient infrastructure, and better resource management.



Model for Others

These plans serve as a model for other municipalities across Nepal, showing how strong planning drives healthier communities and sustainable development.

Most importantly, the development of these plans has created a sense of empowerment at the local level. Municipal teams now better understand their own systems, data, and responsibilities. They recognize that effective WASH service delivery begins with informed planning, and they are more confident in making decisions that directly affect the lives of their citizens.

In the larger landscape of Nepal's development, the WASH Plans for Kirtipur and Changuarayan stand as proof that when local governments are supported with technical expertise and capacity building, they can lead meaningful change. While simplification for ease of use is the next step, the foundation has been laid. The plans are already guiding budgets, shaping priorities, and improving lives.



Impact in Action

From planning to practice, the WASH Plans are helping municipalities build better systems, make smarter investments, and deliver lasting impact for their communities.





CASE STUDY

“Using the hospital toilet always carries a risk of contamination. However, this touch-free system prevents such contact, ensuring a safer and more hygienic experience. It not only minimizes the spread of germs but also gives users confidence and peace of mind while using shared facilities.”

Hari Bhakta
Supervisor



Safer and More Hygienic

The touch-free system minimizes contact, reducing the risk of contamination and the spread of germs.



Confidence and Peace of Mind

Users feel safer and more comfortable using shared facilities, knowing hygiene standards are ensured.



Dignity and Well-being

Clean and reliable sanitation improves the overall experience, protects health, and upholds the dignity of every user.

And in the years to come, the true impact of these WASH Plans will be seen not only in documents or municipal meetings but in every household that gains reliable water access, every community with improved sanitation, and every citizen whose dignity and well-being are strengthened through better WASH services.



Impact in Action

Touch-free toilets in hospitals provide safer, cleaner, and more dignified facilities. They reduce infection risks, build user trust, and promote healthier communities through better sanitation.





Enhancing Circular Economy: Waste Management and Composting in Kirtipur



The partnership with the private waste collection company Kirtipur Fohor Byabasthapan Sewa Pvt. Ltd. in Kirtipur Municipality has been instrumental in establishing a more sustainable and circular approach to solid waste management. This model moves beyond simple disposal, focusing instead on resource recovery and value creation, which is crucial for urban environments with limited landfill capacity.

“A sustainable approach to waste management that turns waste into resources and strengthens the circular economy.”

The Segregation and Recovery Model:

At the core of this initiative is the systematic segregation of waste at the transfer station. This process allows for the recovery of valuable resources:



Organic Waste: This fraction is immediately processed on-site and converted into compost, a valuable soil amendment that supports local agriculture and reduces the volume of waste requiring final disposal.



The Challenge

Rapid urbanization and limited landfill capacity were leading to increasing waste accumulation and environmental pollution. The municipality needed a sustainable solution that could manage waste efficiently while creating economic and environmental benefits.



The Solution

By establishing a segregation and recovery system at the transfer station and processing organic waste into compost, the initiative promotes resource recovery, reduces landfill dependency, and supports local agriculture.



CASE STUDY



Inorganic Recyclables: Materials such as plastics, metals, and paper are sold to scrap vendors, integrating them back into the formal recycling economy and generating revenue for the waste management company.



Residual Waste: Only the non-recoverable, unwanted waste is transported to the designated landfill site for final dumping.

IUWM Project Support: The Impact of the Shredding Machine:

To significantly enhance the efficiency and quality of the composting process, the IUWM project provided a shredding machine to the waste collection company. This intervention directly addresses a key bottleneck in organic waste management:



Accelerated Composting: By shredding the organic material into smaller, uniform pieces, the machine dramatically increases the surface area exposed to microbial activity. This accelerates the decomposition process, allowing the company to produce high-quality compost in a comparatively shorter timeframe.



Improved Operational Efficiency: The increased speed of compost production allows the company to manage the continuous influx of organic waste more effectively, preventing backlogs at the transfer station and improving overall operational flow.



"This strategic support not only strengthens the private company's capacity to manage organic waste but also reinforces the municipality's commitment to a greener, more resource-efficient urban environment, demonstrating a successful model for public-private partnership in sustainable waste management."



Key Takeaways



Promotes resource recovery and value creation from waste.



Reduces the volume of waste sent to landfill.



Enhances operational efficiency and cost-effectiveness for the waste company.



Strengthens public-private partnership for sustainable urban development.



A Small Vehicle Driving Big Change in Kirtipur

In the winding, historic lanes of Kirtipur Municipality where steep slopes and narrow alleys often limit access waste collection has long been a difficult task. Many households, especially in unserved and hard-to-reach communities, struggled with irregular waste pickup. This gap not only affected cleanliness but also the confidence of residents in the waste management system.

To strengthen Kirtipur's waste management ecosystem, an organic waste collection vehicle was provided with the initial intention of supporting a local private sector partner engaged in compost production. Yet, as soon as the Municipality received the vehicle, they saw an opportunity to address a deeper challenge: reaching communities where larger vehicles simply could not go.

The small but smartly designed vehicle quickly became a symbol of practical innovation. Its compact size allowed it to weave through the dense neighborhoods and steep roads of Kirtipur, bringing waste collection services to households that had never been reached before. For many residents, this was the first time they felt truly included in the municipal waste system.

Aesthetically, the vehicle turned heads. Wrapped with clear, colorful messages promoting segregation and responsible waste practices, it doubled as a moving awareness campaign. Children pointed at it, adults paused to read the messages, and gradually, the municipality noticed a shift, people were beginning to talk more openly about waste management and their role in keeping Kirtipur clean.



“Narrow roads made it very difficult for us to reach every household with our waste collection vehicles. Thanks to the vehicle supported by the IUWM project, we can now efficiently collect waste even from the narrowest streets.”

Sujeet Maharjan
Driver
Kirtipur Municipality

Most importantly, the hydraulic lifting system built into the vehicle eased the workload of waste workers who previously had to manually load heavy organic waste. With less physical strain and more efficient operations, the team could cover more areas with improved morale and dignity.

What started as a simple investment in a small vehicle grew into a powerful reminder: appropriate technology, when thoughtfully applied, can transform how a city serves its people. Today, the organic waste collection vehicle stands as a practical success story in Kirtipur proving that innovation doesn't always have to be big to make a big impact.



The Challenge

Steep slopes and narrow alleys in Kirtipur made it difficult for larger waste collection vehicles to reach many communities, leading to irregular waste pickup and lack of confidence in the municipal system.



The Solution

A compact organic waste collection vehicle with a hydraulic lifting system was provided, enabling the municipality to reach previously inaccessible areas efficiently while improving working conditions.



From Scarcity to Security:

The Community Managed Self-Sustained Water Supply System of Lapse Kotdanda



The improvement of the community-managed water supply system in Lapse Kotdanda has become a strong example of how technical upgrades combined with community ownership can address long-standing water scarcity challenges in semi-urban areas. Located in Godawari Municipality, the Lapse Kotdanda system had suffered from aging infrastructure, seasonal water shortages, and declining water quality, forcing households to rely on unsafe alternative sources.

Under the Integrated Urban Water Management (IUWM) project, ENPHO, with support from BORDA, facilitated the preparation of a Detailed Project Report (DPR), incorporated climate- and disaster-resilient design measures, and supported the rehabilitation of the existing gravity-

fed system. The project also strengthened institutional arrangements by working closely with the Water User and Sanitation Committee (WUSC) and the municipality to ensure long-term sustainability.

One of the most important outcomes of this initiative is the establishment of a community-led, self-sustained management and financing model. The WUSC now manages daily operation and maintenance, tariff collection, and water quality monitoring. Regular fee collection, transparent accounting, and public audits have enabled the committee to cover routine operational costs and build a reserve fund. As a result, the water supply system is now financially stable and capable of sustaining itself without external financial support for day-to-day operations.

“

A community-led approach turned scarcity into security through ownership, accountability, and smart management.



The Challenge

Aging infrastructure, seasonal shortages, and cleaning water quality left the community without reliable access to safe drinking water. Limited resources and weak management made it difficult to maintain the system and plan for long-term improvements.



The Solution

Through the IUWM project, ENPHO and BORDA supported technical upgrade, climate-resilient design, and institutional strengthening. The WUSC adopted a self-sustained management and financing model to ensure reliable and long-term service delivery.

Key Results



24/7 access to safe drinking water for 722 residents



Climate-resilient infrastructure ensures year round reliability



Community-led management ensures accountability



Self-sustained financing model covers operation and maintenance



Improved water quality and public health outcomes



Strengthened partnership between community and municipality



CASE STUDY



The upgraded system provides reliable, 24/7 access to safe drinking water to 722 residents through household tap connections. Climate-resilient infrastructure, including protected reservoirs, pipeline protection, runoff diversion, and gabion structures, has strengthened the system's resilience to extreme weather events. Recent flooding events did not disrupt water services, demonstrating the effectiveness of these measures.

Improved water quality and uninterrupted supply have reduced reliance on unsafe water sources, contributing to better public health outcomes and easing the daily burden on households, particularly

women and children. Increased community ownership, trained local technicians, and clear operational roles have further reinforced the system's long-term functionality.

Overall, the Lapse Kotdanda water supply system demonstrates how community ownership, supported by strong technical planning and municipal coordination, can deliver resilient, financially stable, and sustainable water services. This experience offers a practical and replicable model for other wards within Godawari Municipality and for similar rural and semi-urban contexts across Nepal.



The Challenge

Aging infrastructure, seasonal water shortages, and cleaning water quality left households dependent on unsafe sources, creating health risks affecting the quality of life in the community.



The Solution

Technical upgrade, climate-resilient design, and strong community management through the WUSC created a self-sustained water supply system that ensures reliable, 24/7 access to safe drinking water.

“

Our upgraded water system now provides safe, reliable water, with more households connected than before. Strong community management, regular fees, and a growing reserve fund have made the system fully financially stable and self-sustained”

Gyan Bahadur Tamang
Chairperson, Lapse Kotdada
Godawari Municipality





Where Handwashing Becomes a Habit:

Construction of School Handwashing Station at Shree Gorakhnath Secondary School, Kirtipur Municipality



The construction of a new handwashing station at Shree Gorakhnath Secondary School in Ward 9 of Kirtipur Municipality has significantly strengthened the school's WASH environment. Previously, the school lacked an adequate and well-designed facility to serve its 180 students and 20 teachers, resulting in irregular handwashing practices, particularly during peak hours such as before meals. The newly constructed station was designed to be child-friendly, durable, and easy to maintain. It includes eight taps, automatic soap dispensers, anti-skid tiles, a 2000-liter water storage tank to ensure a reliable water supply, proper drainage, and a protective roof. The layout allows multiple students to wash their hands at once, making daily hygiene practice practical and convenient.

The impact is clearly visible in everyday school routines. Students now wash their hands regularly before meals and after using sanitation facilities, while teachers consistently reinforce hygiene behavior in classrooms. The reliable availability of water and soap has removed barriers to proper hand hygiene, contributing to improved health and reduced risk of preventable illnesses. This supports better attendance and improved concentration in class. At the same time, the school management committee has taken responsibility for routine operation and maintenance, ensuring long term functionality. The new facility has not only improved hygiene practices but also fostered a sense of dignity, responsibility, and shared ownership among students and staff, creating a healthier and more supportive learning environment for nearly 200 daily users.

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Reliable water and soap, everyday, for better health and better learning.



The Challenge

The school lacked an adequate handwashing facility for 180 students and 20 teachers, leading to irregular handwashing, especially before meals. Limited infrastructure and water storage made it difficult to promote proper hygiene consistently.



The Solution

A well-designed handwashing station was constructed with eight taps, automatic soap dispensers, anti-skid tiles, a 2000 liter water tank, proper drainage, and a protective roof ensuring reliable, convenient, and hygienic handwashing for all.

Key Results



Regular handwashing practices established before meals and after using toilets



Improved health and reduced risk of preventable illness



Better attendance and improved concentration in class



Reliable availability of water and soap removed hygiene barriers



Sustainable operation through school dedicated maintenance and responsibility



Strengthened dignity, ownership, and a healthier learning environment



Digitizing Waste Services for Transparency and Trust in Kirtipur Municipality

In the vibrant, fast-growing neighborhoods of Kirtipur Municipality, waste management has always demanded coordination, trust, and accountability. With thousands of households and diverse settlement patterns, from dense heritage lanes to newly urbanized clusters, the municipality knew that relying solely on traditional, paper-based collection systems was no longer enough.

To tackle this challenge, Kirtipur took a bold step: mobilizing four private waste collection companies to manage household waste collection and disposal. Each company was responsible for transporting waste from homes to the designated temporary waste transfer point before it was moved to the dumping site. This public-private engagement significantly improved coverage, but soon another challenge emerged and that is about transparency.

For years, households expressed uncertainty about fee payments, and the municipality struggled to track revenue flows. Without accurate data, planning and oversight were difficult. Waste collectors noted constant disputes over unpaid fees, incorrect records, and delays in collections. Trust on all sides was eroding.

Recognizing that sustainable waste management required more than vehicles and manpower, the municipality turned to digital innovation. With municipal leadership, dedicated revenue management software was developed for private companies. This system allowed waste collectors to record payments, track household coverage, and maintain accurate billing records, finally bringing structure to a previously scattered process.



Digital tools have brought clarity, efficiency, and trust to our waste management system. It's a big step toward a cleaner and more accountable Kirtipur.



Key Takeaways

- ✓ **Transparent** and accountable revenue management
- ✓ **Real-time tracing** of collections and household coverage
- ✓ Reduced disputes and **increased trust** among all stakeholders
- ✓ Stronger data for **better planning** and decision making
- ✓ **Improved efficiency** and sustainability of waste services

Key Results



Digital receipts instantly issued at the doorstep



Real-time dashboard for revenue and performance insights



Reduced disputes and increased transparency



Stronger oversight of private waste collection companies



Improved trust between citizens, service providers, and the municipality



Cleaner city through better accountability and service delivery



From Paper Records to Digital Accountability:

How Kirtipur Municipality Digitized Waste Collection for Transparency and Trust

But Kirtipur wanted to go further. The municipality requested ENPHO's support to introduce Point-of-Sale (POS) machines, enabling collectors to generate digital receipts instantly at the doorstep. For users, this brought comfort and assurance. For many households, the POS receipt became a symbol of reliability proof that their payments were recorded and that their fees were contributing to a cleaner city.

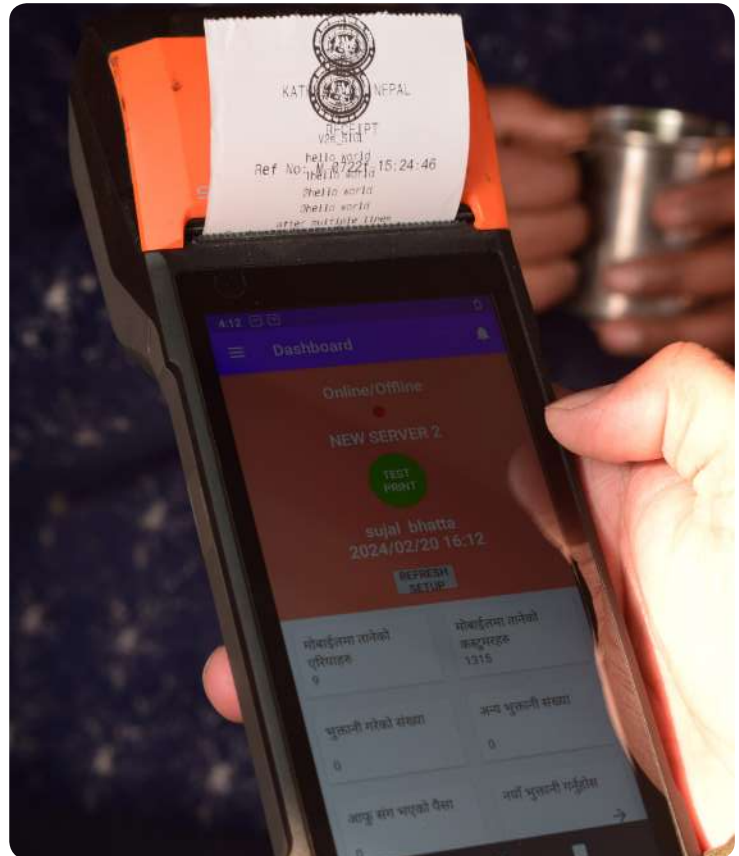
On the municipal side, the impact was profound. The revenue collected by each company began appearing clearly on a digital dashboard, giving real-time insights into:

- how much income was generated,
- which areas had higher or lower payment rates,
- whether private companies were delivering services as agreed, and
- how operations could be improved.

For the first time, the municipality could see the entire waste revenue system briefly transparent, verifiable, and data driven.

This digital transformation strengthened accountability between households, service providers, and the municipality. Disputes decreased. Reporting improved. Planning became smarter and more evidence based. And the people of Kirtipur began trusting their waste service more than ever before.

What started as a simple request for support has now evolved into a powerful example of how technology, when aligned with community needs and good governance, can transform everyday services. In Kirtipur, digitizing waste payment did more than streamline revenue it helped build a cleaner city, a more accountable system, and a stronger relationship between citizens and their municipality.



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The POS receipt became a symbol of reliability proof that payments are recorded and fees were contributing to a cleaner city.



The Challenge

Waste collection relied on paper-based records, making it difficult to verify payments, track revenue, and monitor service performance. Households and private companies faced disputes, while the municipality lacked real-time data for effective oversight and planning.



The Solution

Kirtipur Municipality introduced POS machines and a digital revenue management system. Collectors generate digital receipts at the doorstep, and data appears on a real-time dashboard. This improved transparency, accountability, and data-driven decision-making across the waste management system.

Key Results



Digital receipts instantly issued at the doorstep



Real-time dashboard for revenue and performance insights



Reduced disputes and increased transparency



Stronger oversight of private waste collection companies



Improved trust between citizens, service providers, and the municipality



Cleaner city through better accountability and service delivery



Mapping the Invisible, how Banepa became Nepal's pioneer in Waste Flow Transparency



For years, Banepa Municipality faced a challenge shared by many growing cities in Nepal: waste was being generated faster than the systems designed to manage it.

While trucks collected household waste and informal workers scavenged valuable recyclables, a portion of waste still found its way to riverbanks, open spaces, and roadside corners. Everyone knew the problem existed, but no one knew its true scale. Without clear data, planning remained reactive, fragmented, and often ineffective.

Then came a breakthrough.

Under the IUWM Project, ENPHO and BORDA introduced an innovative approach that had been practiced in India the Waste Flow Diagram Survey, a method that had never before been implemented in Nepal. Banepa Municipality became the first to adopt this pioneering study, marking a milestone in how Nepali municipalities understand and manage solid waste.

Why a Waste Flow Diagram?

ENPHO/BORDA believed that to solve the problem, the municipality needed to visualize the entire journey of waste from the moment it is generated inside a home to its destination.



The Challenge

Waste was being generated faster than the existing systems could manage. A portion was escaping formal collection and ending up in open spaces and rivers. Without reliable data, the municipality could not plan effectively or address the real magnitude of the problem.

The survey was designed to uncover the hidden realities of Banepa's waste system:

- How much waste do households manage on their own?
- What portion is handled by the municipality?
- How much is collected by private companies?
- What role do informal waste pickers play?
- How much waste is recycled, composted, or recovered?
- And critically how much is dumped illegally in open areas, riverbanks, or roadsides?



For the first time, Banepa could quantify what was previously just an assumption

Revealing the Invisible

The results reshaped the municipality's understanding. The study highlighted not only the efficiency of different service providers but also the "leakages" waste that slipped through the system and ended up polluting the environment.

It showed how much resource value was being lost due to lack of segregation or recovery, how much of the city's waste burden was quietly shouldered by informal waste workers, and how much strain uncontrolled dumping was putting on the ecosystem.



The Solution

Banepa Municipality, under the IUWM Project, partnered with ENPHO and BORDA to conduct a first-of-its-kind Waste Flow Diagram Survey in Nepal. The study mapped the entire waste journey, quantified flows, identified leakages, and revealed the true state of waste management.



CASE STUDY

More importantly, it clearly laid out the balance between what is recovered and what is discarded, offering a complete picture that Banepa had never seen before.

Turning Data into Action

What made the study truly powerful was the way the findings were presented. The Waste Flow Diagram culminated in a Sankey Diagram, a simple, intuitive visual map showing the flow of waste through different channels. For busy municipal officials, elected representatives, and community leaders, this visual tool acted like a torchlight, illuminating problem areas briefly.

The Sankey Diagram made it easy to:



Identify priority areas for investment,



Understand where system improvements were most needed,



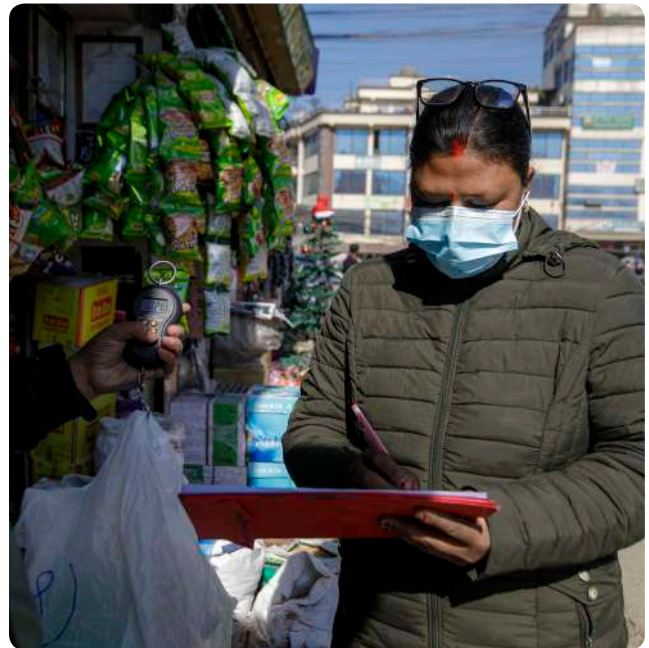
Allocate resources based on evidence,



Strengthen recycling and recovery systems, and



Reduce illegal dumping.



With this clarity, Banepa Municipality could finally plan smarter, faster, and more strategically.

A Landmark for Nepal

Banepa's experience is more than just a local success story, it is a national milestone. By becoming the first municipality in Nepal to adopt a Waste Flow Diagram Survey, Banepa has set a precedent for cities across the country. The study demonstrated that with the right tools and partnerships, even complex systems can be understood, managed, and improved.

Today, Banepa stands as a model for evidence-based waste governance. ENPHO/BORDA's initiative under the IUWM Project, the municipality has not only mapped its waste but also mapped a clearer path toward sustainability.

A problem once hidden in plain sight has now been visualized and with that, Banepa has taken a stronger, more confident step toward a cleaner, more accountable future.

“

The Waste Flow Diagram has turned complex data into simple insights. It empowers us to make better decisions for a cleaner Banepa.

Key Results



High Organic Fraction

More than half of the waste is organic, highlighting the potential for composting and resource recovery



Significant Recovery Potential

Over 27% of the total waste is already being recycled or recovered, showing the value of strengthening these systems,



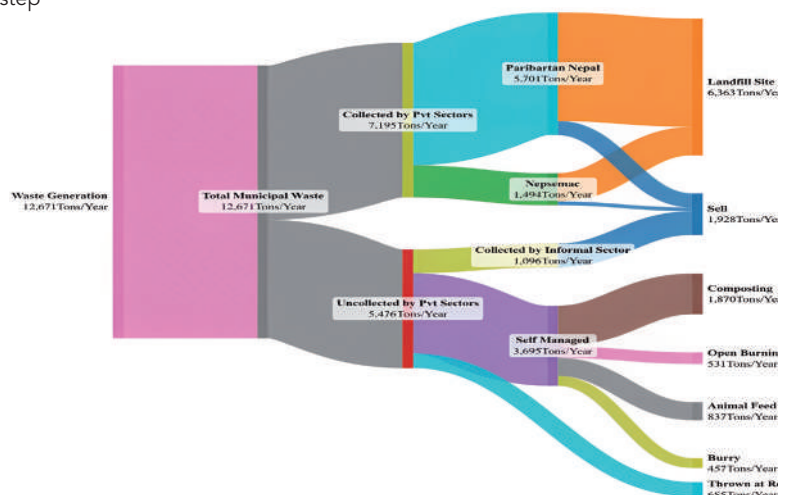
Collection Gaps

About 15% of waste remains uncollected, leading to open dumping or burning and causing environmental and health risks.



Data-Driven Decisions

The Sankey Diagram provides a clear, evidence based foundation for planning, investment and policy action.





How ENPHO/BORDA Under the IUWM Project Manage Risks During Operation and Implementation

Risk management has been at the heart of the IUWM project's success. Across water supply, sanitation, waste management, and institutional strengthening, ENPHO and BORDA adopted a proactive, people-centered, and systems-based approach to minimize risks and ensure long-term sustainability. Drawing from the interventions and impact stories, the following elements illustrate how risks were effectively managed throughout the project cycle:



Sensor-based taps and lights in health facilities to minimize infection risks.



Reinforced intake structures designed for fluctuating turbidity.

By grounding technology in local reality, the project reduced maintenance failures and improved reliability.



Promoting hygiene and dignity with sensor-based handwashing and sanitary napkin vending machine in public spaces.

1

Strong Municipal Ownership to Reduce Sustainability Risks

One of the greatest risks in development projects is dependency on external support.

ENPHO/BORDA mitigated this by cultivating strong municipal leadership and co-investment:

- Municipalities committed their own resources for intake improvements, dosing systems, toilet management, and waste operations.
- Local technicians were trained to operate and maintain systems like electrical chlorination and Semi-IoT dosing.
- The shift from project-funded activities to municipal-funded systems reduced long-term operational and financial risks.

This ensured that interventions became part of the municipal system not temporary project assets.

2

Appropriate and Adaptive Technologies to Minimize Technical Risks

Introducing technology without local suitability can lead to breakdowns and poor adoption. The project managed this by choosing simple, practical, and context-appropriate technologies:

- Semi-IoT dosing systems instead of high-cost automated machines.
- Compact waste vehicles suitable for narrow streets.
- Sensor-based taps and lights in health facilities to minimize infection risks.
- Reinforced intake structures designed for fluctuating turbidity.

By grounding technology in local reality, the project reduced maintenance failures and improved reliability.

3

Human-Centered Design to Address Social and Operational Risks

Ignoring user needs can lead to underuse or misuse of infrastructure. ENPHO/BORDA addressed this by emphasizing dignity, safety, and accessibility:

- Gender- and disability-friendly toilets in community and health settings.
- WASH facilities tailored to waste workers' occupational needs.
- Awareness messages on waste collection vehicles to promote behavior change.
- Community participation in decisions—such as Chapagaun's public toilet renovation.

This ensured that facilities were widely accepted, responsibly used, and valued by the community.



This ensured that facilities were widely accepted, responsibly used, and valued by the community.



4 Health and Safety Measures in High-Risk Environments

Healthcare facilities and waste operations require strict safety controls. To mitigate health risks:

- Touchless sensor systems prevented cross-contamination in health posts.
- Hydraulic lifts reduced operator injuries in waste collection.
- Automated chlorination reduced human error in dosing.
- Waste worker WASH spaces improved occupational health.
- These choices safeguarded both users and service providers.

5 Environmental Safeguards to Prevent Ecological Risks

- Poorly designed interventions can harm water sources and ecosystems. To prevent this:
 - Intake upgrades protected raw water from contamination.
 - Accurate dosing systems prevented under- and over-chlorination.
 - Waste-to-compost initiatives reduced landfill pressure.
 - Sanitation facility designs considered wastewater handling.
- This ensured that environmental protection was embedded across all interventions.



6 Adaptive Management and Learning to Mitigate Emerging Risks

Field realities often evolve. The ability to adapt quickly was a key risk management strategy:

- Designs were adjusted when new challenges appeared.
- Demonstration units (e.g., electric dosing systems) were used to test acceptance.
- Pilots were scaled only after proven success.
- Continuous monitoring helped identify issues early.

7 Capacity Building and System Strengthening to Reduce Operational Risks

One major risk is that local systems fail due to limited knowledge or weak institutional structures. To address this, ENPHO/BORDA invested heavily in capacity development:

A comprehensive package of tools and documents were developed, including:

- Guidelines and Standard Operating Procedures (SoPs)
- Plans and policies for water, sanitation, and waste services
- Training modules for technicians, operators, and municipal staff
- IEC materials for community awareness
- Detailed Project Reports (DPRs) for infrastructure planning
- Field exposure visits to demonstrate real-world learning
- Reports, studies, and documentaries to share knowledge

These tools strengthened municipal governance, improved technical competency, and built confidence among stakeholders—minimizing risks related to poor operation or lack of preparedness.



8 Multi-Stakeholder Collaboration to Manage Governance Risks

Water and sanitation systems span multiple actors. Poor coordination can delay implementation or dilute accountability. IUWM mitigated this by ensuring:

- Joint assessments and planning with municipalities
- Collaboration with private sectors, water user committees, and communities
- Clear role-sharing between ENPHO, BORDA, and local institutions
- Regular coordination meetings and feedback loops

This harmonized approach reduced institutional risks and strengthened collective responsibility.





Key Ingredients Behind the Impact We Achieved

The diverse impact stories from improved water quality systems to dignified sanitation facilities share a common thread: they are not isolated successes, but the result of several core ingredients working together. Based on the interventions and changes witnessed, the following elements emerge as the true drivers of impact:

1



Strong Municipal Ownership and Leadership

Across all municipalities, one of the strongest catalysts for change was the willingness of local governments to step forward, invest their own funds, and adopt innovations introduced by the project. This shift from relying on project support to taking long-term responsibility allowed solutions to mature into sustainable systems rather than temporary fixes.

2



Co-Creation and Local-Led Innovation

Whether it was the Semi-IoT chlorination system in Changunarayan or the adaptive use of waste collection vehicles in Kirtipur, the success came from allowing local actors to lead, adapt, and innovate. By building on the knowledge of municipal technicians, water user committees, and community members, solutions became more relevant, acceptable, and resilient.

3



Integration of Technology That Serves People

From automated chlorine dosing machines to sensor-based public toilets, technology played an essential but appropriately scaled role. Instead of over-engineered systems, we focused on simple, affordable innovations that directly addressed local challenges. This made adoption easier and enhanced the reliability of services.

4



Dignity-Centered Service Delivery

A major part of the impact was rooted in the belief that every person, whether a patient, waste worker, or community resident deserves safe, dignified services. This respect for human dignity influenced everything: gender- and disability-friendly toilets, safer working conditions for waste workers, and improved access to previously neglected households. These social elements multiplied the value of technical improvements.

5



Multi-Stakeholder Collaboration

The impacts were not achieved by one actor alone. Municipalities, ENPHO, BORDA, private sectors, communities, and water user committees all played important roles. This integrated approach meant that problems were viewed holistically, and responsibilities were shared. Such collaboration strengthened systems and ensured that improvements were not lost over time.

6



Turning Challenges into Opportunities

Instead of seeing limitations like narrow streets in Kirtipur or inconsistent chlorination in Godawari as barriers, the project teams treated them as opportunities for innovation. This mindset allowed for creative solutions: compact waste vehicles, upgraded intake structures, and homegrown dosing systems that matched local realities.

7



Focus on Behavior Change and Awareness

The visible messages on waste vehicles, cleaner public toilets, and strengthened communication between water providers and users helped shape more aware and responsible communities. When people understand the system and see improvements, they engage more actively, making the change more sustainable.

Conclusion and Future Outlook

The 2020-2025 IUWM project has successfully demonstrated a model for sustainable and inclusive WASH service delivery. By focusing on four key pillars—replication, innovation, integration of gender and climate, and knowledge dissemination—the project has not only improved infrastructure but has also fostered local ownership and financial sustainability, as evidenced by the leveraging of municipal funds.

The successful deployment of the semi-IoT automated chlorination system highlights the project's commitment to practical, technology-driven solutions for public health. The foundation is now set for the partner municipalities to continue scaling these successes and moving towards full realization of the Sustainable Development Goals (SDGs) related to water and sanitation.



01

REPLICATION

Proven solutions and approaches have been documented and are ready for replication across more municipalities.



02

INNOVATION

Technology-driven interventions like the semi-IoT chlorination system have enhanced service efficiency and reliability.



03

INTEGRATION OF GENDER & CLIMATE

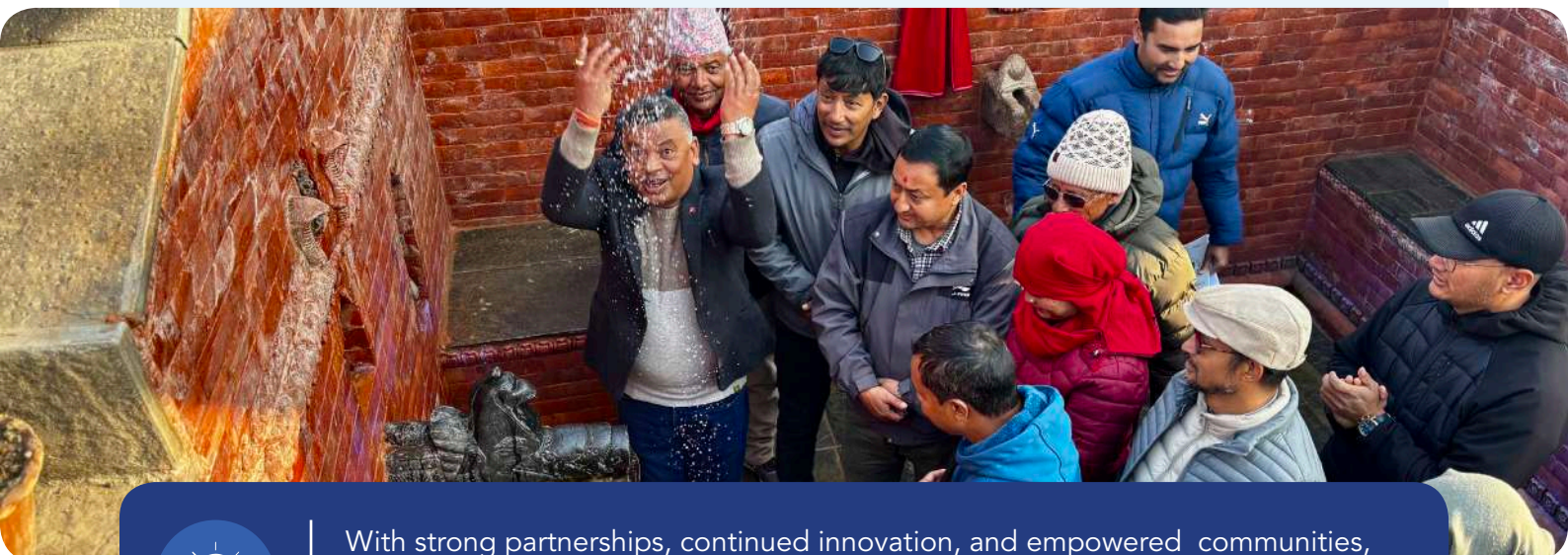
Inclusive, climate-resilient strategies have been integrated to ensure equitable and sustainable service delivery.



04

KNOWLEDGE DISSEMINATION

Tools, reports, and learning materials have been shared widely to build capacity and inspire continued progress.



With strong partnerships, continued innovation, and empowered communities, we are confident in building resilient, inclusive, and sustainable WASH services for a healthier and better future for all.



