Project: WASH, Informal Settlements & Integrity (WISI)

Strengthening WASH Integrity: A Community Empowerment Approach in Khulna City

Final Report of the WISI Project in Khulna City

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Bangladesh Water Partnership (BWP)

April, 2025

Funded by

Water Integrity Network Association, Berlin, Germany

BWP

Bangladesh Water Partnership

Global Water Partnership South Asia

GWP Bangladesh

WIN Water Integrity Network

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ACKNOWLEDGEMENT

We would like to express our deepest gratitude to all individuals and organizations who contributed to the successful completion of this research. First and foremost, we extend our sincere appreciation to the residents of Montu Kaloni and Nurani Mahalla in Khulna for their time, cooperation, and invaluable insights, which formed the foundation of this study. Their willingness to share their experiences and challenges regarding water, sanitation, and hygiene (WASH) facilities was instrumental in shaping this research.

We are also profoundly grateful to the local NGO—Nabolok and the Khulna Water Supply and Sewerage Authority (KWASA) for their support in providing data and facilitating field-level interactions.

Our heartfelt thanks go to the partners from Water Integrity Network (WIN) who provided constructive feedback during the research design, data analysis, and manuscript preparation phases. We acknowledge the contributions of our colleagues who assisted in data collection, validation, and analysis.

This research was supported by Water Integrity Network (WIN), and we appreciate their financial and logistical assistance.

ABSTRACT

Access to safe water, sanitation, and hygiene (WASH) remains a critical challenge in informal settlements of Khulna, Bangladesh, where governance gaps, institutional fragmentation, and socio-political marginalization exacerbate service inequities. This study assesses integrity deficiencies in WASH service delivery using the TAPA (Transparency, Accountability, Participation, and Anti-Corruption) framework, applying the Analytic Hierarchy Process (AHP) to prioritize integrity issues based on community and stakeholder inputs. Findings reveal that transparency (46.6%) is the most critical factor, followed by accountability (27.7%), participation (16.1%), and anti-corruption (9.6%), reflecting structural barriers to equitable service provision.

Empirical data from Montu Kaloni and Nurani Mahalla highlight severe WASH challenges, including poor water quality, non-functional infrastructure, unregulated submersible pump usage, and inadequate sludge management. Integrity deficiencies are 2.32 times higher in Montu Kaloni, where accountability gaps dominate (69%), while Nurani Mahalla faces transparency and participation deficits due to weak KWASA engagement and lack of local representation. Key issues include political interference in service allocation, conflicts between utility providers, and financial burdens from third-party water vendors.

The study underscores the need for legally enforceable WASH policies, community-centric accountability mechanisms, and enhanced transparency in utility operations to mitigate integrity risks. Recommendations include decentralized grievance redressal systems, participatory water management, and anti-corruption measures in infrastructure projects to ensure equitable WASH access in informal urban settlements.

Keywords: WASH governance, integrity assessment, TAPA framework, informal settlements, AHP, Khulna, Bangladesh.

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ABBREVIATIONS

ADB	Asian Development Bank
AHP	Analytic Hierarchy Process
BDT	Bangladeshi Taka (currency)
CBO	Community-Based Organization
CR	Consistency Ratio (in AHP)
DSK	Dushtha Shasthya Kendra (NGO)
FGD	Focus Group Discussion
JICA	Japan International Cooperation Agency
JJS	Jagrata Juba Shangha (NGO)
KCC	Khulna City Corporation
KDA	Khulna Development Authority
KII	Key Informant Interview
KWASA	Khulna Water Supply and Sewerage Authority
LIC	Low-Income Community
Mn++	Manganese (chemical contaminant in water)
NGO	Non-Governmental Organization
SDG	Sustainable Development Goal (UN)
TAPA	Transparency, Accountability, Participation, Anti-Corruption (framework)
TIB	Transparency International Bangladesh
WASH	Water, Sanitation, and Hygiene
WIN	Water Integrity Network
WUA	Water User Association

CHAPTER-1: INTRODUCTION

1. Background:

Khulna City, one of the Bangladesh's major urban centers, faces significant challenges in ensuring adequate Water, Sanitation, and Hygiene (WASH) services, particularly for its low-income communities (LICs). Despite efforts by the Khulna Water Supply and Sewerage Authority (KWASA) to improve these services, significant gaps remain in service delivery. As of 2023, only 65% of households have access to safe drinking water, and 55% to improved sanitation facilities, leaving many LICs underserved (Rahim et al., 2023). These gaps highlight the ongoing challenge of extending critical WASH services to all residents, especially LICs, which are often excluded from urban planning and infrastructure development (Ahmed et al., 2022).

LICs in Khulna rely heavily on shared water sources that are frequently contaminated due to poor maintenance and lack of infrastructure. This dependency reflects broader infrastructural challenges, as informal settlements are typically outside the formal service delivery system, making it difficult for KWASA to provide these communities with consistent access to clean water and sanitation services (World Bank, 2022). These shared and often unsafe water sources, coupled with inadequate sanitation, perpetuate the marginalization of LICs and hinder their access to essential services (Asian Development Bank, 2021).

Compounding these infrastructural issues are governance challenges within KWASA and other related institutions. Limited transparency in service delivery, inefficient resource allocation, and weak accountability mechanisms contribute to the inefficiencies in WASH service provision. In many cases, residents of LICs are not included in decision-making processes or provided with opportunities to voice their concerns regarding water and sanitation services (Transparency International, 2022). This lack of community engagement creates a significant gap between service providers and users, resulting in services that do not adequately address the specific needs of LICs.

To address these gaps, there is a growing need for governance models that promote inclusivity by actively involving LICs in decision-making processes. Empowering communities to participate in the governance and oversight of WASH services could improve the integrity of service delivery, ensuring that resources are allocated efficiently and that services meet the specific needs of the

communities (Water Integrity Network, 2021). Strengthening transparency, accountability, and participation would foster a more responsive and equitable WASH system, enabling better service delivery to Khulna's LICs.

This study aims to explore how empowering LICs can enhance WASH integrity by addressing service gaps, fostering community engagement, and promoting accountability within institutions such as KWASA. By focusing on integrity issues, the research seeks to identify strategies for improving the delivery and resilience of WASH services in Khulna's LICs, ensuring that these communities have access to reliable water and sanitation systems that meet their needs.

2. Rationale of the Study:

The rationale for this research stems from the urgent need to improve WASH services in Khulna's LICs through governance reforms and community-driven initiatives. Currently, integrity issues such as a lack of transparency, weak accountability, and inadequate participation by communities in decision-making processes contribute to the poor state of WASH services. This research will explore how to address these integrity challenges by implementing appropriate measures to ensure that LICs have access to reliable and safe WASH services, thereby reducing public health risks.

By focusing on empowering communities to advocate for better services, the study aligns with global efforts to meet the Sustainable Development Goals (SDGs), particularly SDG 6 on clean water and sanitation. Enhancing water integrity through community engagement will create a pathway for improving both service delivery and institutional accountability.

3. Literature Review:

3.1 Challenges in WASH Infrastructure and Service Delivery

One of the most notable studies in the context of Khulna's WASH challenges is by Rahim et al. (2023), which provides a comprehensive analysis of the WASH service gaps in the city's LICs. The study highlights that infrastructure limitations significantly undermine the ability of service providers like the Khulna Water Supply and Sewerage Authority (KWASA) to effectively deliver safe and reliable water and sanitation services. Specifically, the study points out that KWASA's infrastructure can only meet 60% of the city's water demand, leaving a large portion of the population, particularly those in LICs, without adequate services. Rahim et al. (2023) further

emphasize the role that poor governance plays in exacerbating these issues. The research highlights how a lack of coordination between service providers, insufficient resource allocation, and outdated infrastructure leads to unreliable service delivery. The study argues that without significant improvements in both infrastructure and governance, achieving equitable access to WASH services in Khulna's LICs will remain a significant challenge.

Ahmed et al. (2022) also offer critical insights into the water accessibility challenges faced by LICs in Khulna. Their research reveals that 40% of households in these communities rely on shared water sources, which are often prone to contamination due to inadequate maintenance and management. This reliance on shared water points, coupled with the lack of proper sanitation facilities, creates a situation where the health and safety of LIC residents are continually at risk. Ahmed et al. (2022) argue that these water accessibility issues stem not only from infrastructural shortcomings but also from a broader systemic failure to integrate LICs into the city's formal WASH service delivery systems. The research suggests that informal settlements are often overlooked in urban planning, resulting in these communities being excluded from formal water supply networks and sanitation programs. This exclusion contributes to the persistence of service gaps and reinforces cycles of poverty and vulnerability within LICs.

3.2 Governance and Integrity Issues in WASH Service Provision

In addition to infrastructure challenges, the literature identifies significant governance issues that impede effective WASH service delivery in Bangladesh. Transparency International (2022) provides a detailed examination of integrity issues in water governance, particularly focusing on corruption, mismanagement, and the lack of accountability in service provision. The report highlights that many public utilities in Bangladesh, including KWASA, struggle with transparency in their operations. This lack of transparency not only results in inefficiencies in resource allocation but also creates opportunities for corruption, such as unauthorized water connections and the misappropriation of funds meant for infrastructure development.

According to Transparency International (2022), addressing these integrity issues is critical for improving WASH service delivery, particularly in LICs. The report calls for the implementation of anti-corruption mechanisms that promote transparency, accountability, and community participation in water governance. By empowering communities to hold service providers

accountable, transparency can be improved, leading to better resource management and service outcomes. Transparency International's research underscores the need for a governance model that includes active participation from LICs in decision-making processes related to water and sanitation services. This participation can help ensure that services are more responsive to the specific needs of these communities, thereby improving service delivery and reducing the risk of corruption.

3.3 Community Engagement and Participation in WASH Integrity

The importance of community engagement in WASH integrity is a recurring theme in the literature. Many scholars and organizations have argued that empowering communities, especially those in LICs, to participate in the integrity and oversight of WASH services is essential for improving service delivery. Chowdhury et al. (2023) emphasize that community-based approaches to WASH management can lead to more sustainable and effective outcomes. By involving local communities in the planning, monitoring, and maintenance of WASH services, service providers can ensure that their interventions are aligned with the needs and priorities of the communities they serve. This bottom-up approach fosters greater ownership and accountability, which are key to ensuring the long-term sustainability of WASH services.

Studies like those by Rahman et al. (2023) also highlight the potential benefits of participatory integrity models in addressing service gaps in LICs. Rahman et al. argue that empowering community-based organizations (CBOs) and other local groups to take on active roles in WASH integrity can help bridge the service gaps left by public utilities like KWASA. These groups, through collective action and advocacy, can demand better services and hold service providers accountable for their performance. Furthermore, CBOs and youth groups can play a crucial role in promoting hygiene practices, water conservation, and the maintenance of local water points, thereby contributing to the overall resilience of their communities.

3.4 Research Gaps and the Need for Integrity-Based Approaches

While the existing literature provides substantial insights into the infrastructural and governance challenges related to WASH services in Khulna's LICs, there is a notable gap in research that explores how integrity-based approaches can be leveraged to address these issues. Specifically, there is limited research on how community empowerment and integrity tools—such as the

Transparency, Accountability, Participation, and Anti-corruption (TAPA) framework developed by the Water Integrity Network (WIN)—can be applied to improve WASH governance in LICs. This gap in the literature points to the need for a more comprehensive understanding of how participatory governance and integrity measures can be integrated into the management of WASH services to promote transparency and accountability.

Moreover, while many studies focus on the role of governance and community participation, few address the intersection of these issues with the broader challenges of institutional integrity. There is a need for research that investigates how integrity tools can be used to assess and improve the performance of public utilities like KWASA in delivering WASH services to marginalized communities. By filling this gap, future research can provide actionable recommendations for improving WASH governance in urban LICs.

4. Research Objectives:

1. To identify existing WASH conditions and Challenges in the informal settlements of Khulna City.
2. To identify service gaps of KWASA in terms of 'Water Integrity' for the LICs in Khulna City.
3. To explore opportunities for minimizing service gaps in WASH management through empowering LICs.

5. Study Area Profile:

The study is conducted in **Montu Kaloni** (Ward No. 21), and **Nurani Mahalla**, Moilapota, Sonadanga (Ward No. 17) in Khulna.

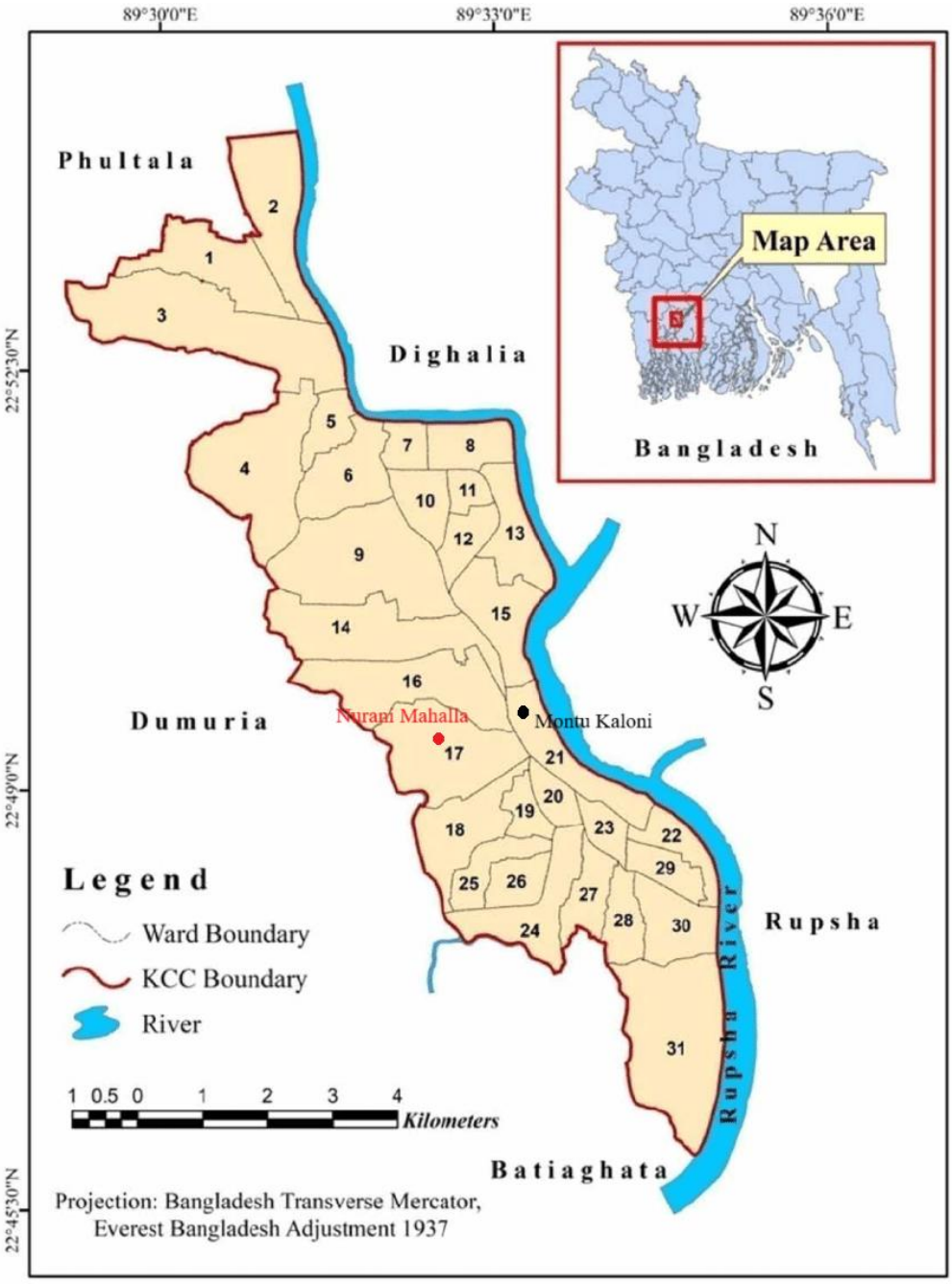

Figure 1: *Study area map*

5.1 Basic information about Montu Kaloni:

Montu Kaloni is an informal settlement facing challenges in water access and sanitation, and the visit was key in understanding the community's needs. It is located in **Ward No. 21**, Khulna, close to the city center and Khulna Water Supply and Sewerage Authority (KWASA) office. About 450 families live here with a population of nearly 2000. Although this area falls within the service jurisdiction of KWASA, it remains outside KWASA's water supply system because the land is owned by Khulna Railway. Since the land belongs to a different government entity, KWASA faces legal and administrative restrictions in extending its services. Typically, utility services like water supply are provided to areas where there is clear ownership or legal permission from the landowner. In this case, without proper agreements or permissions from the railway authorities, KWASA is unable to intervene or develop the infrastructure needed to provide water to these informal settlements.

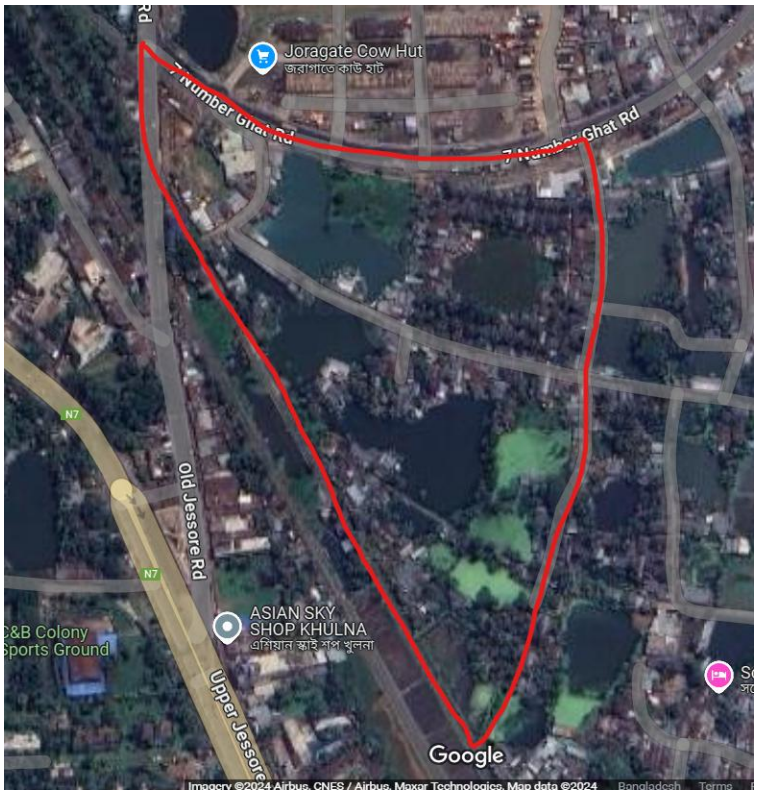

Figure 2: *Field survey area of informal settlements in Montu Kaloni (October, 2024)*

5.2 Basic information about Nurani Mahalla:

Nurani Mahalla is an urban settlement located near the city center of Khulna, making it easily accessible from key areas of the city. The community has a population of approximately 1,500 people, comprising around 350 families. Despite its proximity to the city center, the area faces various challenges related to infrastructure and services.

Nurani Mahalla falls under the jurisdiction of KWASA (Khulna Water Supply and Sewerage Authority), which is responsible for water and sanitation services. However, like many urban informal settlements, the area experiences gaps in reliable water supply, sanitation, and hygiene services. The community is actively seeking improvements in these services to address their daily needs and improve overall living conditions.

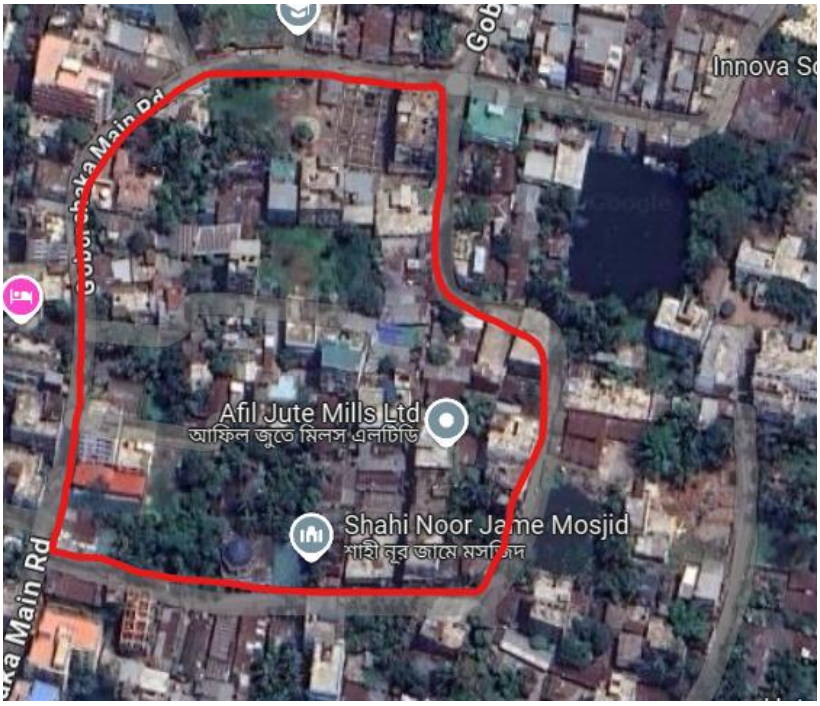

Figure 3: *Field survey area of informal settlements in Nurani Mahalla (October, 2024)*

CHAPTER-2: METHODOLOGY

6. Research Design:

This study employs a mixed-methods approach, integrating qualitative and quantitative techniques to assess Water, Sanitation, and Hygiene (WASH) integrity issues in informal settlements of Khulna, Bangladesh (Rahim et al., 2023). The research is structured around the TAPA (Transparency, Accountability, Participation, Anti-Corruption) framework developed by the Water Integrity Network (WIN, 2021), combined with the Analytic Hierarchy Process (AHP) for prioritizing integrity dimensions (Saaty, 1980; Chowdhury et al., 2023).

6.1 Conceptual Framework

The study follows a structured framework to evaluate WASH governance gaps in informal settlements, focusing on Montu Kaloni and Nurani Mahalla. The key components include:

***Table 1**: Conceptual framework of the study*

Component	Description	Data Source	Analysis Method
1. Problem Identification	Assessing WASH challenges (water quality, supply, sanitation) in informal settlements	Field surveys, FGDs, key informant interviews (KII)	Qualitative content analysis
2. TAPA Framework Application	Evaluating integrity gaps in WASH services using Transparency, Accountability, Participation, and Anti-Corruption indicators	Community surveys, expert consultations	Likert-scale scoring, AHP weighting
3. AHP-Based Prioritization	Determining the relative importance of TAPA dimensions through pairwise comparisons	Stakeholder judgments (NGOs, KWASA, community representatives)	Eigenvector-based weighting, consistency ratio (CR) validation

4. Integrity Deficiency Scoring	Quantifying integrity gaps using Likert-scale surveys (1-5) and standardized scoring (1-10)	Structured questionnaires (n=40 per settlement)	Weighted scoring (AHP × Likert responses)
5. Comparative Analysis	Comparing integrity deficiencies between Montu Kaloni and Nurani Mahalla	Field data, institutional reports	Descriptive statistics
6. Policy Implications	Recommending reforms based on TAPA gaps	Synthesis of findings	Results and findings from the TAPA tool based integrity assessment

6.2 Data Collection and Sources

Primary data was collected through Focus Group Discussions (FGDs) with community members, consisting of 20 Community-Based Organization (CBO) representatives and 20 youth members from each settlement, selected through random sampling (Rahman et al., 2023). Key Informant Interviews (KIIs) were conducted with KWASA officials and NGO representatives using purposive sampling to capture institutional perspectives (Ahmed et al., 2022). The surveys employed a validated 5-point Likert scale to measure perceptions of WASH service quality, accessibility, and integrity (Chowdhury et al., 2023). FGDs provided in-depth qualitative insights into contextual challenges (World Bank, 2022), while KIIs helped triangulate institutional barriers through stakeholder perspectives (Transparency International, 2022). Secondary data included official reports from KWASA (Khulna Water Supply and Sewerage Authority, 2023), Khulna City Corporation (KCC, 2022), and implementing NGOs such as JJS and Nabolok (Caritas Bangladesh, 2021), along with water quality monitoring records and national policy documents (Government of Bangladesh, 2020).

6.3 Analytical Framework

The study applies the TAPA framework to evaluate governance deficiencies in WASH service delivery. Each dimension—Transparency, Accountability, Participation, and Anti-Corruption—is assessed through survey responses, which are converted into standardized scores (1–10) using weighted aggregation. The Analytic Hierarchy Process (AHP) is then used to determine the

relative importance of each TAPA dimension. Stakeholders, including community representatives and institutional actors, participated in pairwise comparisons using Saaty's 1–9 scale, ensuring a structured prioritization of integrity gaps. Eigenvector analysis derives the final weights, while the Consistency Ratio (CR < 0.10) validates the reliability of judgments (Saaty, 1980; Transparency International, 2013; WIN, 2021).

6.4 Integrity Deficiency Scoring

Survey responses are transformed into integrity deficiency scores by combining Likert-scale values with AHP-derived weights. This approach quantifies governance gaps, allowing for a comparative analysis between Montu Kaloni (non-KWASA coverage) and Nurani Mahalla (partial KWASA coverage). The results highlight disparities in service delivery, institutional accountability, and community participation. Integrity issue-wise recommendations are then provided to ensure WASH integrity in the informal settlements of Khulna (WIN, 2021; Saaty, 1980; Rahman et al., 2022).

CHAPTER-3: CASE STUDIES

To identify the existing WASH conditions, one CBO and one youth group from each site area (Montu Kaloni and Nurani Mahalla) are formed, each consisting of 20 members. **Mrs. Miti**, a community leader, represented the CBO of Montu Kaloni, while **Mrs. Shipra** explained the WASH conditions of Nurani Mahalla on behalf of the community people. These CBO and youth groups were formed during previous projects of Nabolok.

Figure 4: *FGD with the youth group in Montu Kaloni*

Figure 5: *FGD with the CBO group in the Montu Kaloni*

Figure 6: *CBO and youth group in Nurani Mahalla*

Figure 7: *FGD with CBO and youth group in Nurani Mahalla*

A **FGD** was conducted to understand the WASH situation in the community, with two main objectives:

1. **Identify Existing WASH Conditions and Challenges** in this low-income community (LIC).
2. **Explore Opportunities for KWASA** (Khulna Water Supply and Sewerage Authority) to help mitigate the WASH challenges.

7. Existing WASH facilities:

7.1 Montu Kaloni:

Submersible pumps and **Tara pumps** are the primary sources of drinking water in Montu Kaloni. People use **shallow tube wells** for bathing, washing, and cleaning purposes. In addition, some households use rainwater for drinking during the rainy season, while others reserve harvested rainwater solely for cooking rice.

Before 2020, the only reliable source of drinking water for the residents of Montu Kaloni was a **deep tube well** located 30-40 minutes away by foot. Women had to collect water daily, making multiple trips, often waiting in queues for **1 to 1.5 hours**. Some used local transport like vans, which cost **50 Taka** per trip, but most households could not afford this and had to walk. For bathing, washing and cooking, the community relied on shallow tube wells, known locally as "Lobon Panir Kall" (sources of salty water), or surface water from ponds.

Since 2020, with support from various NGOs and the local commissioner, **9 submersible pumps**, **2 Tara pumps**, and **15-20 shallow tube wells** have been installed. The submersible pumps were set up by the local commissioner, Nabolok, Caritas, and Jagrata Juba Shongha (JJS) NGOs while the Tara pumps were provided by JJS and the shallow tube wells by Nabolok (which started installing them as early as 2007). Each household now pays **20-30 Taka per month** for the use of submersible pumps, with the cost determined by the electricity consumed by the pump's motor, as indicated by an electric meter.

Figure 8: *Tara pump with gender-sensitive facility*

Figure 9: *Shallow tube well (Lobon Panir Kall)*

Figure 10: *Submersible pumps for drinking water supply*

The water supply condition has improved significantly since then. People now have easier access to water, and no one has to walk long distances. The Tara pumps, designed with gender-sensitive

features, further ensure women's comfort during water collection. Additionally, **rainwater harvesting systems** have been introduced by Caritas for some households, although these systems are only used during the rainy season. Households contributed **2500-3000 Taka** for setting up the rainwater harvesting systems, and Caritas regularly inspects the water filters to ensure they remain in good condition. Interestingly, one household reported using rainwater specifically for cooking rice, as they believe it enhances the quality of the rice.

Figure 11: *Rainwater harvesting plant*

Figure 12: *Deep tube well outside the Montu Kaloni*

Figure 13: *A nonfunctional old water supply tank*

7.2 Nurani Mahalla:

The drinking water sources of Nurani Mahalla are **community tube wells**, **submersible pumps**, and **deep tube wells**. People use the **KWASA water supply** for bathing, cleaning, and washing purposes.

Before 2022, residents relied solely on **community tube wells** for drinking water. However, during the dry season, when groundwater levels dropped, these tube wells would stop functioning, forcing people to travel to nearby residential areas for water.

Figure 14: *Community tube well in Nurani Mahalla*

Since 2022, KWASA connections have been established, with water supplied through meters. In addition, submersible pumps outside the Nurani Mahalla provide water supply to the community. While KWASA water is not used for drinking due to concerns over its quality (such as the presence of dust particles), it is used for washing, bathing, and cleaning. KWASA water is available twice daily, between **8:00–10:30 AM** and **4:00–6:30 PM**. However, controlling the supply from the submersible pump can be challenging, as the individual who manages the pump regulates water distribution according to their own preferences. With assistance from **Dushtha Shasthya Kendra (DSK) NGO**, four deep tube wells have also been installed in the community.

Figure 15: *Water supply pipeline from the submersible pump outside Nurani Mahalla*

Figure 16: *KWASA water supply line in a household of Nurani Mahalla*

Figure 17: *KWASA water supply meter in Nurani Mahalla*

8. Existing WASH Challenges:

8.1 Montu Kaloni:

Montu Kaloni, located in Khulna City, faces several critical water, sanitation, and hygiene (WASH) challenges. Despite its proximity to urban areas and being within KWASA's jurisdiction, the settlement struggles with access to safe drinking water, effective sanitation facilities, and overall water security. These challenges are exacerbated by the environmental conditions in Khulna, such as groundwater depletion and seasonal water scarcity. Below is a detailed examination of the key issues affecting the residents of Montu Kaloni:

1. Poor Water Quality:

A major issue in Montu Kaloni is the poor quality of water available from Tara pumps and submersible pumps. These water sources are often linked to widespread health problems within the community, especially for women and children. **Skin diseases** and **diarrhea** are common among residents, with **hair loss** being a particular concern for girls and women. The water, in some instances, has a foul odor, making it unfit for consumption and daily use.

This issue is largely attributed to the depth from which the water is being drawn. Shallow water extraction increases the risk of contamination from various pollutants in the groundwater, a situation that is increasingly common across informal settlements in Khulna. As the city grows, unchecked pollution and the lack of proper water treatment exacerbate these risks. Without alternative sources of clean water, residents are forced to rely on these substandard water sources, perpetuating the cycle of waterborne diseases and health risks.

2. Water for Domestic Animals:

While there is just enough drinking water for human consumption, the situation is dire for domestic animals like cows, goats, and ducks. These animals are vital to the livelihoods of many families in Montu Kaloni, providing milk, meat, and other products. However, the water available for these animals comes from shallow tube wells, which is often salty and of poor quality.

As a result, these animals frequently fall ill after consuming the contaminated water, leading to additional economic burdens on households that rely on them for sustenance and income. This issue highlights the broader problem of water scarcity in Khulna, where even non-human water needs are not being met effectively. Ensuring clean water for animals is essential not only for the health of the livestock but also for the economic well-being of the families that depend on them.

3. Non-Functional Deep Tube Wells:

The depletion of the groundwater table in Khulna has caused many deep tube wells in Montu Kaloni to become non-functional. Over-extraction of groundwater, combined with inadequate recharge systems, has significantly lowered the water table. This phenomenon is not unique to Montu Kaloni but is prevalent across Khulna City, where growing urbanization has placed immense pressure on available water resources.

With fewer functioning tube wells, residents are increasingly reliant on shallow water sources, which are more likely to be polluted. The absence of reliable deep tube wells further limits access to safe water for the community, intensifying their vulnerability, especially during dry seasons when groundwater availability becomes even more constrained.

4. Unsanitary Latrine Practices:

Sanitation is another critical challenge in Montu Kaloni. Many of the pit latrines installed by NGOs are poorly managed and improperly connected to the local drainage system. These latrines often discharge directly into nearby water bodies, such as ponds and marshy lands. This creates significant health risks, as the contaminated water is accessible to local poultry like hens and ducks, which roam freely in the area. The animals swim in these polluted waters, increasing the spread of diseases within the community. Moreover, the discharge from latrines into ponds and marshes introduces toxic elements into the food chain. Fish cultivated in these water bodies are consumed by the local population, further escalating the risk of illness. In some cases, human sludge is discharged into areas where vegetables are grown, contaminating the soil and water used for agriculture. This not only poses a threat to human health but also affects the safety of the food supply. Additionally, polluted water from these areas is often used to prepare food for domestic animals, increasing the likelihood of illness among livestock. This situation exemplifies the severe

lack of proper sanitation infrastructure in informal settlements like Montu Kaloni and highlights the urgent need for improved waste management and sanitation solutions.

Figure 18: *Outlet of human sludge is directly connected to local marshy lands*

Figure 19: *Outlet of human sludge is directly connected to the vegetable garden*

Figure 20: *Local poultry like hens and ducks are roaming in contaminated water*

Figure 21: *Preparation of food for domestic animals using polluted water*

5. Water Shortages During Dry Seasons:

Seasonal water shortages are a recurrent problem in Montu Kaloni, especially during the dry season when the groundwater table drops significantly. This results in many shallow tube wells becoming unusable, making it difficult for residents to access water for drinking, cooking, and maintaining basic hygiene. The shortage of water during these periods compromises the community's ability to maintain cleanliness and sanitation, leading to a rise in health issues.

In Khulna, this seasonal fluctuation in water availability is a growing concern as climate change intensifies the frequency and severity of droughts. The increasing demand for water, coupled with diminishing groundwater levels, makes it difficult for informal settlements like Montu Kaloni to secure enough water to meet their daily needs. Without interventions such as rainwater harvesting systems or improvements in KWASA's water distribution network, the community will continue to face severe water stress during dry periods.

8.2 Nurani Mahalla:

Nurani Mahalla, located near the city center of Khulna, continues to face significant water-related challenges despite being under the jurisdiction of KWASA (Khulna Water Supply and Sewerage Authority). With a population of approximately 1,500 residents, the community struggles with insufficient water services, mainly relying on submersible pumps that are unreliable and unsafe for meeting their needs. These challenges, when analyzed through the integrity lens using the

TAPA tool (Transparency, Accountability, Participation, and Anti-corruption) developed by the Water Integrity Network (WIN), reveal critical governance and service delivery issues. Below are the key challenges and associated integrity issues:

1. Health Concerns from Submersible Pump Water:

A major challenge faced by residents is the health risks associated with using water from submersible pumps. Many people, especially women and girls, have reported skin issues, such as rashes and irritation, as well as hair loss after prolonged exposure to water drawn from these pumps. The poor quality of water is exacerbated by a noticeable foul odor, which makes it unsuitable for drinking in many cases. This issue has become widespread across the settlement, with residents expressing concern over the long-term health implications. The substandard quality of submersible water is a reflection of broader groundwater contamination issues in Khulna, affecting various informal settlements. The community is left with no choice but to continue using this poor-quality water due to a lack of viable alternatives.

Figure 22: *Water from this submersible connected pipeline is undrinkable due to odor problem in Nurani Mahalla*

2. KWASA Water Quality Issues:

Although Nurani Mahalla is within KWASA's service area, the poor quality of KWASA water presents a significant challenge. Residents do not trust KWASA’s water for drinking purposes, citing poor taste and occasional contamination. This forces the community to use KWASA water

only for non-drinking purposes such as bathing, washing clothes, and cleaning. The lack of **transparency** in water quality reporting and testing processes undermines trust in the service provider. Residents have repeatedly expressed a desire for better water quality, but there is limited **participation** in decision-making processes or opportunities for the community to engage with KWASA on this issue. Improving water quality would require greater accountability from KWASA, ensuring that the water provided meets national drinking standards and addressing the community's health concerns.

3. Lack of a Local KWASA Representative:

One of the most pressing challenges is the absence of a designated KWASA representative in Nurani Mahalla. Without a local liaison, residents have no clear avenue to report issues such as service disruptions, complaints about water quality, or billing discrepancies. This lack of **accountability** on the part of KWASA results in poor service delivery and unaddressed grievances. The community's **participation** in service monitoring and feedback is also limited due to the lack of communication channels with KWASA. From an anti-corruption perspective, the lack of a formal representative can lead to informal or corrupt practices if residents are forced to rely on unofficial middlemen to access services or have their issues resolved. Appointing a local representative would enhance both accountability and transparency, ensuring that the community has a reliable way to voice concerns and receive timely responses.

4. Non-Functional Tube Wells:

Many of the community's tube wells, which once provided a crucial source of water, have become non-functional due to the depletion of the groundwater table. Groundwater depletion is a growing issue across Khulna, driven by excessive extraction and inadequate recharge, particularly in densely populated urban areas like Nurani Mahalla. As a result, residents who once relied on tube wells for their water needs are now forced to depend on submersible pumps, which often deliver water of poor quality. The non-functional tube wells leave the community with fewer reliable options for accessing clean water, further complicating their already difficult water situation.

Figure 23: *Nonfunctional deep tube well in Nurani Mahalla*

5. High Cost of Drinking Water:

Accessing safe drinking water imposes a significant financial burden on households in Nurani Mahalla. On average, families in Nurani Mahalla spend an additional 200-300 BDT per month on drinking water due to the reliance on submersible pump systems and the lack of a reliable water source. This extra cost comes on top of other daily living expenses, placing an undue financial strain on many households, particularly those with lower incomes.

6. Limited KWASA Coverage:

Currently, around 20% of Nurani Mahalla is not connected to KWASA's water supply network, leaving those households entirely dependent on submersible pumps or private water sources. This gap in coverage points to an **accountability** issue, as KWASA has failed to extend services to all parts of the community despite its jurisdiction over the area. The unequal distribution of water services disproportionately affects the most vulnerable residents and undermines the principle of equitable service delivery. **Transparency** is also a concern, as there is little information available

about plans to expand KWASA's network or how residents can access these services. Expanding KWASA's coverage to include the entire community is crucial for ensuring fairness and integrity in service provision, while also reducing the reliance on unsafe and expensive alternatives.

CHAPTER-4: ANALYSIS AND FINDINGS

9. Application of the Analytic Hierarchy Process (AHP) for TAPA-tool based Integrity Assessment in WASH:

Ensuring integrity in Water, Sanitation, and Hygiene (WASH) services is critical in informal settlements, where access to basic services is often restricted due to legal ambiguities, weak institutional coordination, and socio-political marginalization. The **TAPA Tool**—standing for **Transparency, Accountability, Participation, and Anti-Corruption**—proposed by the **Water Integrity Network (WIN)**, provides a conceptual foundation for assessing integrity gaps and prioritizing reform interventions.

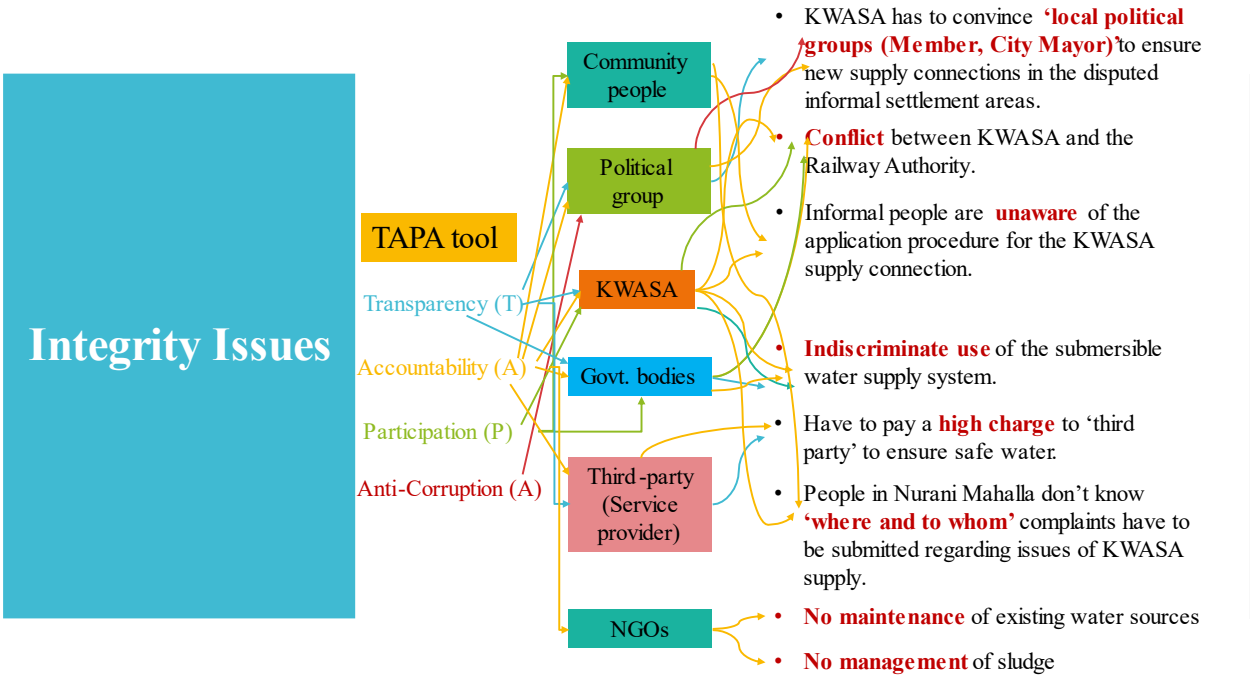

Figure 24: *Integrity issues in WASH under specific TAPA tool and responsible stakeholders in informal settlements of Khulna*

This study applies the **Analytic Hierarchy Process (AHP)** to derive weighted priorities among the four TAPA pillars in the context of **informal settlements in Khulna**, particularly focusing on marginalized communities such as **Montu Kaloni,** which lacks formal WASH coverage by public

utility providers such as KWASA, and **Nurani Mahalla**, which faces disruption in continuous and standard quality of water supply from KWASA. The AHP technique allows for a structured, transparent assessment of subjective judgments made by stakeholders and experts on the relative importance of each integrity dimension.

9.1 Selection of Criteria:

The study employs the four core TAPA dimensions as AHP criteria:

- **C_1: Transparency (T)**:

  Transparency refers to the accessibility, clarity, and timeliness of information related to WASH services, rights, responsibilities, infrastructure status, service quality, pricing, and grievance mechanisms. In the context of integrity, it implies that both service providers and public authorities make critical information available to all stakeholders, especially marginalized communities.

- **C_2: Accountability (A):**

  Accountability refers to the existence and effectiveness of **institutional mechanisms** that ensure service providers, decision-makers, and communities are **held responsible** for their actions and decisions in the delivery and governance of WASH services. This includes systems for monitoring, reporting, oversight, and redressal.

- **C_3: Participation (P):**

  Participation captures the extent to which **community members are meaningfully involved** in the planning, design, implementation, and monitoring of WASH services. This includes their presence in decision-making forums, consultations, feedback mechanisms, and citizen-led monitoring processes.

- **C_4: Anti-Corruption (A2)**:

  Anti-Corruption refers to measures taken to **prevent, detect, and address corrupt practices** in the governance and delivery of WASH services. This includes corruption in

procurement, political favoritism, illicit payments, capture of subsidies, and manipulation of service eligibility criteria.

9.2 Construction of Pairwise Comparison Matrix:

To assess the relative significance of the four core water integrity dimensions—**Transparency (T), Accountability (A), Participation (P), and Anti-Corruption (A2)**—the study employed the **Analytic Hierarchy Process (AHP)** developed by **Saaty (1980)**. AHP provides a structured technique for organizing and analyzing complex decisions based on pairwise comparisons and eigenvalue-based priority ranking. The method is particularly suited for multi-criteria decision-making problems, such as evaluating governance attributes in complex, informal urban contexts.

A 4 × 4 pairwise comparison matrix $A=[a_{ij}]$ was constructed to quantify the relative importance of each criterion in the context of WASH integrity in informal settlements of Khulna. Each element a_{ij} in the matrix represents the judged importance of criterion i relative to criterion j, based on Saaty's 1–9 scale, where:

- **1** implies equal importance,
- **3** indicates moderate importance,
- **5** reflects strong importance,
- **7** denotes very strong importance, and
- **9** implies extreme importance.

Reciprocals (e.g., 1/2, 1/3) are used when i is less important than j.

The matrix was populated using stakeholder consultation data, including focus group discussions (FGDs) conducted with CBO members and youth groups in Montu Kaloni and Nurani Mahalla. Insights were triangulated with the perceptions of local communities and service officials. The judgments are as follows:

Table 2: *AHP matrix for assessment of weightage of TAPA tool in WASH integrity*

Criteria	**Transparency (T)**	**Accountability (A)**	**Participation (P)**	**Anti-Corruption (A2)**
Transparency (T)	1	2	3	4
Accountability (A)	1/2	1	2	3
Participation (P)	1/3	1/2	1	2
Anti-Corruption (A2)	1/4	1/3	1/2	1

9.3 Justification of Judgments:

Each entry in the matrix is grounded in the **perceived influence and feasibility of action** regarding the four integrity criteria, as follows:

- **Transparency (T)** was consistently rated highest (with relative scores of 2, 3, and 4 against other criteria). This prioritization emerged from repeated community concerns over the **lack of accessible and timely information**. In informal settlements, residents often do not know whether they are eligible for municipal WASH services, and are unaware of existing grievance mechanisms, water tariffs, or infrastructure plans. Hence, improving transparency was seen as the **most immediate enabler** of citizen action and accountability.
- **Accountability (A)** followed as the **second-highest criterion**, with relative scores of 1/2, 2, and 3. Community stakeholders and NGO staff emphasized the absence of mechanisms to **track complaints, assign responsibility, or sanction poor service**. Although accountability is structurally more complex than transparency, it was still seen as **operationally critical** for sustainable improvements.

- **Participation (P)** was ranked lower, despite being acknowledged as important. With values such as 1/3 and 1/2 against T and A, participation was judged to be **less influential**, primarily due to **systemic barriers**—including informal land tenure, weak legal recognition, and limited space for meaningful engagement. Stakeholders noted that community input is often **tokenistic or restricted to NGO-led forums**.
- **Anti-Corruption (A2)** was rated the lowest (receiving 1/4, 1/3, and 1/2 against other criteria), despite its acknowledged significance. The rationale was its **perceived intractability**—corruption often manifests in informal settlements in subtle or embedded forms (e.g., political favoritism, informal payments to secure connections). Residents reported a sense of **powerlessness and risk** in confronting such issues. As a result, anti-corruption efforts were seen as **indirect and long-term goals**, less actionable than the other dimensions.

9.4 Computation of Priority Vector:

Step 1: Column-wise Normalization

Each element a_{ij} is divided by the sum of its column:

Table 3: *Computation of priority vector*

Criteria	T (Σ=2.083)	A (Σ=3.833)	P (Σ=6.5)	A2 (Σ=10)
T	0.48	0.522	0.462	0.40
A	0.24	0.261	0.308	0.30
P	0.16	0.130	0.154	0.20
A2	0.12	0.087	0.077	0.10

Step 2: Priority Vector (Eigenvector)

The row-wise average gives the weights (W):

- **w_1 (T)** = (0.48 + 0.522 + 0.462 + 0.40) / 4 = 0.466

- **w_2 (A)** = (0.24 + 0.261 + 0.308 + 0.30) / 4 = 0.277
- **w_3 (P)** = (0.16 + 0.130 + 0.154 + 0.20) / 4 = 0.161
- **w_4 (A2)** = (0.12 + 0.087 + 0.077 + 0.10) / 4 = 0.096

9.4.1 Assessment of Consistency

To ensure the validity of judgments, the **Consistency Index (CI)** and **Consistency Ratio (CR)** were assessed.

$$CI = \frac{\lambda_{max} - n}{n - 1} = \frac{4.053 - 4}{3} = 0.0177$$

$$RI_{(n=4)} = 0.90 \quad \Rightarrow \quad CR = \frac{CI}{RI} = \frac{0.0177}{0.90} \approx 0.0197$$

Since **CR < 0.10**, the matrix is consistent.

9.5 AHP based Weights and Ranks:

The derived AHP-based priority weights offer crucial insight into the relative importance of the four TAPA dimensions—**Transparency**, **Accountability**, **Participation**, and **Anti-Corruption**—within the complex governance environment of informal settlements in Khulna. These findings not only reflect community perceptions but also reveal the practical and institutional opportunities and constraints for strengthening water integrity. The final weights for the TAPA dimensions for WASH integrity assessment in the informal settlement of Khulna are:

Table 4: *Weightage and Rank of TAPA tool regarding WASH integrity in Khulna*

Criterion	Priority Weight	Rank
Transparency	0.466	1st
Accountability	0.277	2nd
Participation	0.161	3rd
Anti-Corruption	0.096	4th

9.5.1 Transparency (46.6%) – The Cornerstone of Service Equity and Community Empowerment

The dominant weight assigned to **transparency** signifies its foundational role in improving WASH service delivery in contexts marked by institutional ambiguity and informational asymmetries. In settlements where residents often lack legal land tenure, face shifting jurisdictional authority (e.g., between KWASA and Khulna Railway), and have limited contact with formal service providers, access to accurate and timely information emerges as both a right and a necessity.

Transparent practices—such as public disclosure of service plans, pricing, water quality data, and grievance mechanisms—not only empower communities but also serve as enablers for the other integrity dimensions. Increased visibility of operational processes reduces space for arbitrary decisions, builds trust, and lays the groundwork for citizen oversight.

9.5.2 Accountability (27.7%) – Mechanisms for Responsive and Responsible Governance

Ranking second in importance, **accountability** reflects the need for enforceable feedback and redress mechanisms to accompany transparency. Communities express clear expectations for avenues through which service users can hold providers — governmental or non-governmental responsible for delivery failures, mismanagement, or negligence.

However, in informal contexts where governance is often fragmented and formal complaint systems are inaccessible or ineffective, accountability must be reconceptualized. Locally driven initiatives, such as community scorecards, citizen audits, and participatory monitoring, represent feasible entry points. These mechanisms create feedback loops that can pressure duty bearers to respond while enhancing social legitimacy and participatory governance.

9.5.3 Participation (16.1%) – A Valued Yet Constrained Dimension

While **participation** is recognized as a fundamental tenet of democratic governance, its relatively lower weight underscores the **practical challenges** faced by informal settlement residents in translating participation into influence. Structural exclusions—particularly insecure tenure, lack

of official recognition, and weak integration into planning frameworks—limit the extent to which communities can contribute to or influence decision-making processes.

Nevertheless, community-based organizations (CBOs), youth groups, and women's collectives have shown potential in advocating for local needs and mobilizing for collective action. As such, participation remains a crucial medium- to long-term goal that requires both capacity development and institutional recognition. Its current weight reflects the need for simultaneous investments in enabling environments and inclusive governance structures.

9.5.4 Anti-Corruption (9.6%) – Normatively Important but Practically Elusive

Anti-corruption emerged as the least prioritized dimension in terms of perceived actionability and immediate impact. While corruption—whether in the form of informal payments, favoritism, or opaque procurement—is widely acknowledged as a threat to equitable service delivery, stakeholders regard it as deeply entrenched and **difficult to address at the community level** without institutional reforms.

This view highlights a pragmatic understanding that anti-corruption efforts must be embedded within broader systemic changes that address upstream governance processes. However, community actions that promote transparency and accountability—such as tracking fund flows, monitoring project implementation, or publicly reporting service delays—can serve as **indirect deterrents** to corruption and build a culture of integrity over time.

10. Status of Integrity Issues in the WASH sector of informal settlements in Khulna:

10.1 Scoring of Integrity Issues:

A ‘Likert scale’ format is used to design the survey questions, and the indicator-specific standardized score (1-10) is calculated from participants' responses (Joshi et al., 2015). In this study, the ‘Likert scale’ is categorized into five classes: Very low (1), Low (2), Medium (3), High (4), and Very high (5). Questionnaires are prepared to identify the score of integrity issues in the

WASH sector based on the TAPA tool. Increase in the score of integrity deficiency refers to the decrease in WASH status.

$$X'_{ij} = X_{ij} \times \text{‘Likert scale’ value} \qquad (i[1,m], j[1,n]) \qquad (1)$$

Where, X'_{ij} = ‘Likert scale’ generated score of i^{th} indicator under j^{th} integrity issue having ‘likert scale’ value n; X_{ij} = Number of respondent under i^{th} indicator; m = number of indicator; n = ‘likert scale’ value (1-5)

$$\text{Standardized score, } S_{ij} = \frac{N_{ij}}{N} \times 10 \qquad (2)$$

$$N_{ij} = \sum_{j=1}^{j=n} X'_{ij} \qquad (3)$$

Where, S_{ij} = Standardized score (1-10) of i^{th} indicator for j^{th} integrity issue and N_{ij} = Summation of ‘likert scale’ based score of i^{th} indicator under j^{th} integrity issue having ‘likert scale’ value n

$$N = \text{Highest rank of response}(5) \times \text{Total respondent } (40) \qquad (4)$$

$$\text{Integrity deficiency, } I_{ij} = S_{ij} \times W_{(T,A,P,A2)} \qquad (5)$$

Where, I_{ij} = Integrity deficiency (0-10) of i^{th} indicator for j^{th} integrity issue and $W_{(T,A,P,A2)}$= AHP based weightage value of TAPA tool

10.2 Existing Integrity Issues:

- **Issue 1:**

KWASA has to convince 'local political groups (Member, City Mayor)' to ensure new supply connections in the disputed informal settlement areas (e.g.- informal settlements in Khulna Railway area).

Table 5: *TAPA tool based score of integrity deficiency under specific indicators of integrity issue-1*

Location	**Respective TAPA tool**	**Responsible Stakeholder**	**Indicator**	**Parameter**	**'Likert scale (1-5)' based Integrity deficiency**	**Respondent**	**Score of Integrity deficiency**
Montu Kaloni	Transparency	Member, City Mayor	Legal documents	Legal 'Policy framework'	Very high (5)	40	4.66
	Accountability	Member, City Mayor	Aware of public rights	Effective measure	Medium (3)	40	1.66
				Response	Very high (5)	40	2.77
	Anti-corruption	Member, City Mayor	Access	Political relation	Very high (5)	40	0.96
							∑=10.05

- **Issue 2:**

Conflict between KWASA and the Railway Authority for providing KWASA supply line.

Table 6: *TAPA tool based score of integrity deficiency under specific indicators of integrity issue-2*

Location	**Respective TAPA tool**	**Responsible Stakeholder**	**Indicator**	**Parameter**	**'Likert scale (1-5)' based Integrity deficiency**	**Respondent**	**Score of Integrity deficiency**
Montu Kaloni	Accountability	KWASA	Legal documents	Legal 'Policy framework'	High (4) Medium (3)	27 13	2.04
	Participation	KWASA	Legal rights	Legal 'Policy framework'	High (4)	40	1.29
	Accountability	KCC, KDA	Legal documents	Legal 'Policy framework'	Very high (5)	40	2.77
	Participation	KCC, KDA	Legal rights	Legal 'Policy framework'	Very high (5)	40	1.61
							∑=7.71

- **Issue 3:**

Informal people are unaware of the application procedure for the KWASA supply connection.

Table 7: *TAPA tool based score of integrity deficiency under specific indicators of integrity issue-3*

Location	**Respective TAPA tool**	**Responsible Stakeholder**	**Indicator**	**Parameter**	**'Likert scale (1-5)' based Integrity deficiency**	**Respondent**	**Score of Integrity deficiency**
Montu Kaloni	Accountability	KWASA	Advertisement of KWASA service facilities	Public meeting, announcement, poster, leaflets, miking	Very high (5)	40	2.77
	Accountability	Community people	Aware of KWASA facilities	Literacy	Very high (5)	40	2.77
				Awareness	Very high (5) High (4) Medium (3)	19 13 8	2.37
							$\sum$ =7.91

- **Issue 4:**

Indiscriminate use of the submersible water supply system.

Table 8: *TAPA tool based score of integrity deficiency under specific indicators of integrity issue-4*

Location	**Respective TAPA tool**	**Responsible Stakeholder**	**Indicator**	**Parameter**	**'Likert scale (1-5)' based Integrity deficiency**	**Respondent**	**Score of Integrity deficiency**
Montu Kaloni, Nurani Mahalla	Accountability	KWASA	Rules and regulations	Application	Very high (5)	40 (M), 40 (N)	2.77 (M), 2.77 (N)
Montu Kaloni	Accountability	KWASA	Service area	Households under KWASA supply connection	Very high (5)	40	2.77
Nurani Mahalla	Accountability	KWASA	Service area	Households under KWASA supply connection	High (4) Medium (3)	16 24	1.88
Nurani Mahalla	Accountability	KWASA	Water Quality	Consumer satisfaction	Very high (5)	40	2.77
				Repair and Maintenance	Very high (5)	40	2.77
							$\sum$ =12.96

- **Issue 5:**

Have to pay a high charge to 'third party' to ensure safe water.

Table 9: *TAPA tool based score of integrity deficiency under specific indicators of integrity issue-5*

Location	**Respective TAPA tool**	**Responsible Stakeholder**	**Indicator**	**Parameter**	**'Likert scale (1-5)' based Integrity deficiency**	**Respondent**	**Score of Integrity deficiency**
Montu Kaloni, Nurani Mahalla	Transparency	Third party service provider	Rules and regulations	Consumer friendly price set	Very high (5) High (4)	21 (M), 32 (N) 19 (M), 8 (N)	4.22(M), 4.47(N)
Montu Kaloni, Nurani Mahalla	Accountability	Third party service provider	Cost	Unit price	High (4) Medium (3)	28 (M), 40 (N) 12 (M)	2.05(M), 2.22(N)
							∑ =6.27(M) =6.69(N)

- **Issue 6:**

People in Nurani Mahalla don't know 'where and to whom' complaints have to be submitted regarding issues of KWASA supply.

Table 10: *TAPA tool based score of integrity deficiency under specific indicators of integrity issue-6*

Location	**Respective TAPA tool**	**Responsible Stakeholder**	**Indicator**	**Parameter**	**'Likert scale (1-5)' based Integrity deficiency**	**Respondent**	**Score of Integrity deficiency**
Nurani Mahalla	Accountability	KWASA	Advertisement of KWASA service facilities	Public meeting, announcement, poster, leaflets, miking	Very high (5)	40	2.77
	Accountability	Community people	Aware of KWASA facilities	Literacy	Very high (5)	40	2.77
				Awareness	High (4) Medium (3)	17 23	1.90
	Participation	Community people	Interested to attend dialogue session in KWASA	Attendance	Very high (5)	40	1.61
							$\sum$ =9.05

- **Issue 7:**

No maintenance of existing water sources

Table 11: *TAPA tool based score of integrity deficiency under specific indicators of integrity issue-7*

Location	Respective TAPA tool	Responsible Stakeholder	Indicator	Parameter	'Likert scale (1-5)' based Integrity deficiency	Respondent	Score of Integrity deficiency
Montu Kaloni	Accountability	NGOs	Monitoring of provided water sources	Water quality test	Very high (5)	40	2.77
							∑ =2.77

- **Issue 8:**

No management of sludge

Table 12: *TAPA tool based score of integrity deficiency under specific indicators of integrity issue-8*

Location	Respective TAPA tool	Responsible Stakeholder	Indicator	Parameter	'Likert scale (1-5)' based Integrity deficiency	Respondent	Score of Integrity deficiency
Montu Kaloni	Accountability	NGOs	Sludge management	Direct connection of latrine to water sources	Very high (5)	40	2.77
							∑ =2.77

Table 13: *AHP and 'Likert scale' based Ranking of Integrity deficiency*

Serial no.	Integrity Issues	Score	Rank
1.	Indiscriminate use of the submersible water supply system.	12.96	1st
2.	KWASA has to convince 'local political groups (Member, City Mayor)' to ensure new supply connections in the disputed informal settlement areas (e.g.- informal settlements in Khulna Railway area)	10.05	2nd
3.	People in Nurani Mahalla don't know 'where and to whom' complaints have to be submitted regarding issues of KWASA supply	9.05	3rd
4.	Informal people are unaware of the application procedure for the KWASA supply connection.	7.91	4th
5.	Conflict between KWASA and the Railway Authority for providing KWASA supply line.	7.71	5th
6.	Have to pay a high charge to 'third party' to ensure safe water (Nurani Mahalla)	6.69	6th
7.	Have to pay a high charge to 'third party' to ensure safe water (Montu Kaloni)	6.27	7th
8.	No maintenance of existing water sources	2.77	8th
9.	No management of sludge	2.77	8th

10.3 Integrity Deficiency in Montu Kaloni and Nurani Mahalla:

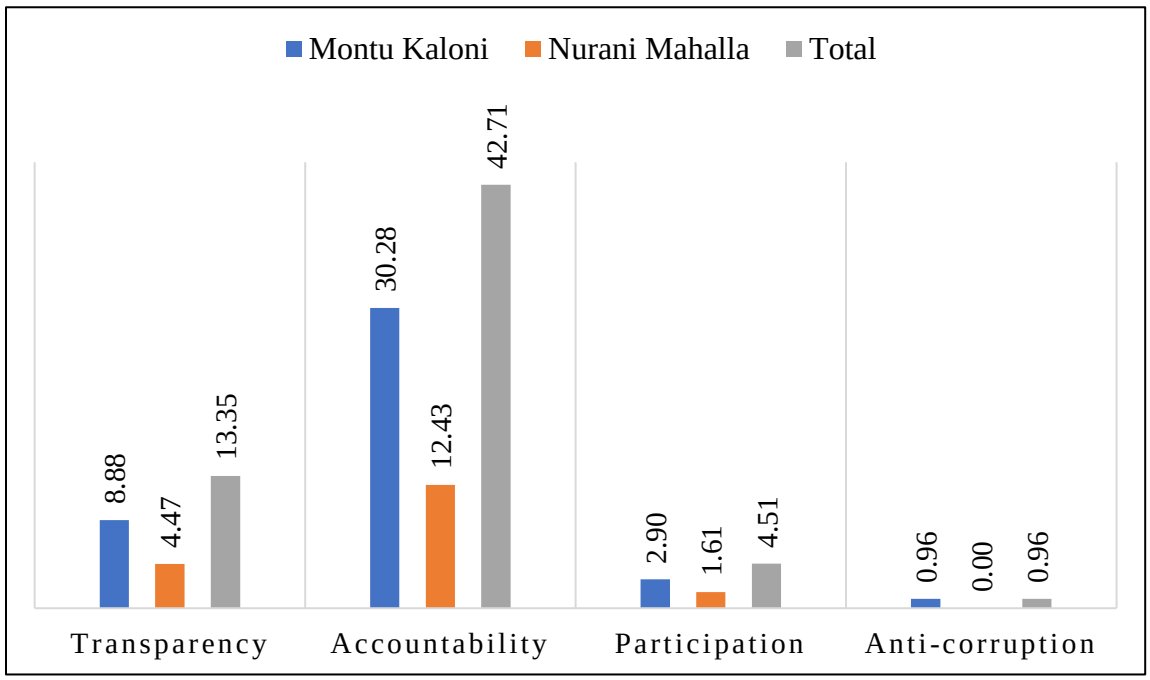

Figure 25: *Integrity deficiency in Montu Kaloni and Nurani Mahalla*

Figure 25 shows that integrity deficiency is 2.32 times higher in Montu Kaloni than in Nurani Mahalla. In the study area, the maximum deficiency of WASH integrity is covered by accountability issues (69%), and the least portion is under anti-corruption (2%) (Figure 26). In comparison with Nurani Mahalla, Montu Kaloni has respectively 1.99, 2.44, and 1.80 times higher integrity deficiency, regarding transparency, accountability, and participation. Anti-corruption tool based integrity issue is missing in Nurani Mahalla where integrity deficiency under anti-corruption tool is found 2% (Figure 26). Integrity issues under transparency have also severe impact on integrity deficiency in the WASH sector of informal settlements in Khulna. Transparency issues cover 22% of the study area's WASH-related integrity deficiency, where coverage of integrity issues under transparency is found 21% and 24% respectively in Montu Kaloni and Nurani Mahalla. Participation related WASH integrity issues are also present in this area. Integrity issues under participation cover 7% of the integrity deficiency in the study area, where Nurani Mahalla has the least participation, as it covers 9% of the total integrity deficiency, and regarding Montu Kaloni, integrity issues under participation cover 7% of the total integrity deficiency.

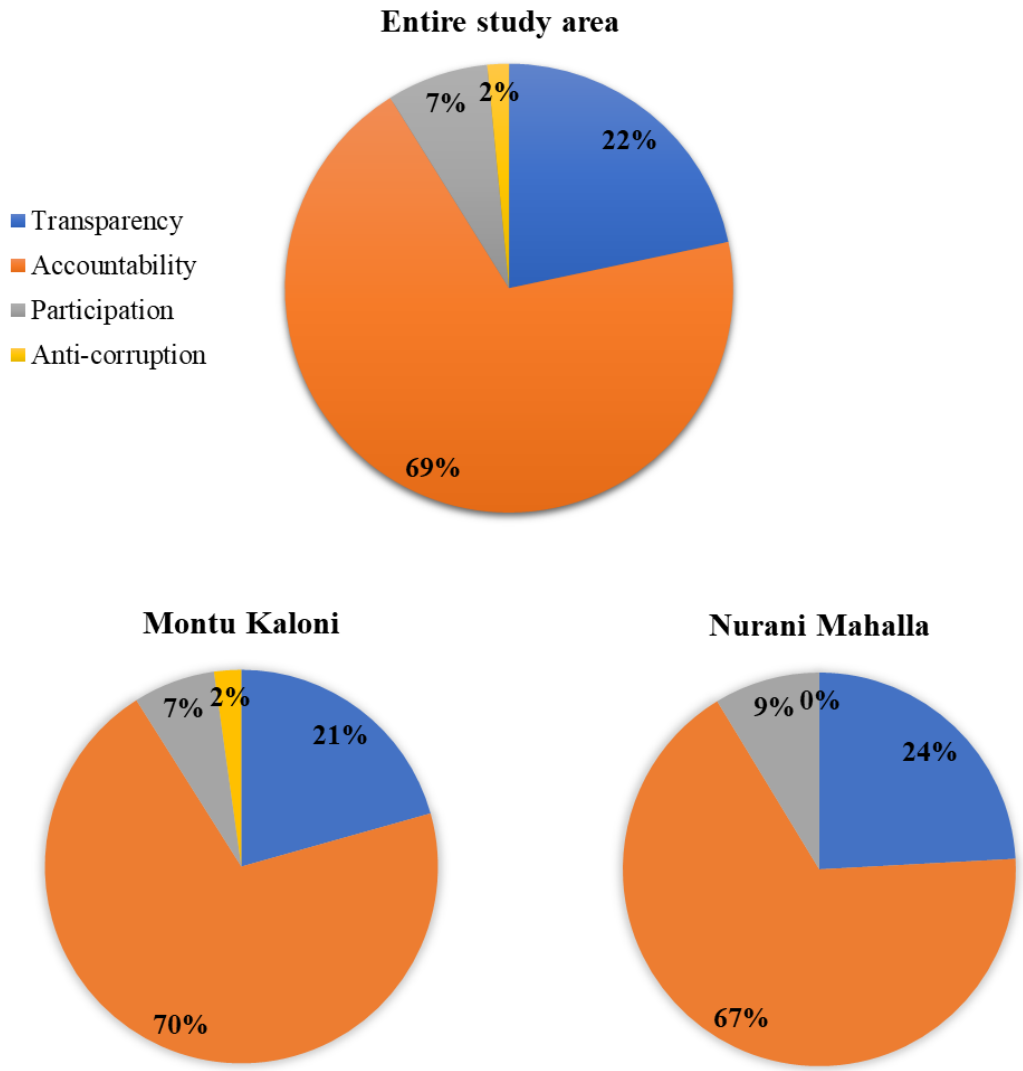

***Figure 26**: TAPA tool based integrity deficiency in WASH facility in the informal settlements of Khulna*

Accountability related integrity issues dominate the integrity deficiency indicators as there is no 'Legal policy framework' regarding WASH facilities for the informal settlements. As a result, KWASA, along with other stakeholders (Khulna railway authority, KCC, City corporation), can not take effective measures regarding WASH related issues like ensuring water supply in the informal settlements. Besides, many organizations take advantage of the policy gap as they do no properly respond and cooperate with KWASA regarding protecting KWASA's water supply

networks during the construction of roads, maintenance of underground gas lines, internet cables, and other facilities. Transparency is most of the time neglected due to a lack of proper application of existing rules and regulations. Most often, KWASA can not strictly apply its rules regarding the indiscriminate use of submersible pumps, as KWASA only ensures water supply for 60% of the targeted population. Even people have a negative viewpoint towards KWASA's water quality. As a consequence, people are taking ground water from submersible pumps resulting in serious threat to public health (e.g. diarrhea and hair fall) due to contamination of manganese (Mn^{++}). Again, poor sludge management exists in Montu Kaloni as most of the latrines are directly connected to nearby water bodies causing serious threat to health and environment. In this regard, KWASA is currently establishing sewerage lines all over the Khulna city which is expected to functional in full phase within 2026. Participation related integrity issues in WASH sector in Khulna arise as community people has limited and most often no access to the decision-making process regarding WASH development. KWASA implies that people's participation is many times impossible or limited access as the development projects are designed by the foreign donors (e.g. ADB, JICA etc.). Besides, people are unaware of the importance of participation, their rights, and do not even know how to participate, as most of them are illiterate and do not dare to raise their voice for their rights.

11. Recommendations:

The Water, Sanitation, and Hygiene (WASH) challenges in Khulna's informal settlements stem from governance gaps, institutional inefficiencies, and socio-political marginalization. To address these issues, the TAPA framework (Transparency, Accountability, Participation, and Anti-Corruption) provides a structured approach to enhancing integrity in WASH service delivery. Below are detailed recommendations under each TAPA pillar:

1. Transparency: Ensuring Open and Accessible Information:

Transparency is the most critical factor in improving WASH integrity. Key interventions include:

- **Public Disclosure of WASH Policies and Services:**
  - KWASA should publish clear guidelines on water connection eligibility, tariffs, and application procedures in local languages (Bangla) and disseminate them through:
    - Community meetings, posters, and leaflets.

- Mobile announcements (miking) and social media (where applicable).
- Local NGOs and Community-Based Organizations (CBOs) for wider outreach.

- Establish an online/offline WASH information hub where residents can access:
  - Water quality test results.
  - Service schedules (e.g., KWASA supply timings).
  - Grievance redress mechanisms.

- **Transparent Water Pricing and Billing:**
  - Standardize pricing for submersible pump usage to prevent exploitation by third-party operators.
  - Display tariff structures publicly near water points to avoid hidden charges.
- **Regular Water Quality Reporting:**
  - KWASA and NGOs should conduct and share monthly water quality tests (e.g., for manganese, salinity, bacterial contamination) via:
    - Public notice boards.
    - SMS alerts (for literate residents).
    - Community health workers.

2. Accountability: Strengthening Oversight and Redress Mechanisms

Accountability ensures that service providers are answerable to the community.

- **Formalize Grievance Redress Systems:**
  - Appoint a local KWASA representative to:
    - Receive complaints (e.g., water contamination, supply disruptions).
    - Track resolution timelines (e.g., 48-hour response for urgent issues).
  - Introduce a toll-free WASH helpline for reporting issues anonymously.
- **Strengthen Monitoring and Enforcement:**
  - KWASA should penalize illegal submersible pump usage by:

    - Conducting surprise inspections.
    - Imposing fines on unauthorized operators.
  - NGOs should ensure post-installation maintenance of water sources (e.g., tube wells, rainwater harvesting systems).

- **Legal and Policy Reforms:**
  - Clarify jurisdictional responsibilities between KWASA, KCC, and Khulna Railway Authority to avoid conflicts.
  - Develop a WASH policy for informal settlements to ensure legal recognition of their rights to water access.

3. Participation: Empowering Communities in Decision-Making:

Participation ensures that marginalized groups have a voice in WASH governance.

- **Community-Led Water Committees:**
  - Form Water User Associations (WUAs) with equal gender representation to:
    - Monitor water supply and quality.
    - Liaise with KWASA and NGOs on infrastructure needs.
  - Train community leaders on WASH rights and advocacy.
- **Inclusive Planning and Feedback Mechanisms:**
  - KWASA should hold quarterly public consultations to:
    - Discuss service improvements.
    - Incorporate community feedback into project designs.
  - Use participatory budgeting to prioritize WASH investments (e.g., new pipelines, sludge management).
- **Awareness and Capacity Building:**
  - Conduct literacy programs on WASH rights and hygiene practices.

- Engage youth and women's groups in awareness campaigns (e.g., dangers of contaminated water).

4. Anti-Corruption: Preventing Exploitation and Leakages:

Anti-corruption is essential for equitable service delivery.

- **Crack Down on Informal Payments:**
  - KWASA should investigate and penalize middlemen charging illegal fees for water connections.
  - Digitize application processes to reduce human interference and bribery risks.
- **Transparent Procurement and Contracting:**
  - Publish NGO and contractor performance reports (e.g., project completion rates, fund utilization).
  - Encourage whistleblowing through anonymous complaint boxes in community centers.
- **Social Audits and Public Oversight:**
  - Conduct annual social audits of WASH projects with community participation.
  - Use community scorecards to rate KWASA and NGO performance.

Cross-Cutting Interventions:

1. Strengthen Collaboration Between Stakeholders:

- Establish a multi-stakeholder WASH task force (KWASA, KCC, NGOs, CBOs) to coordinate efforts.
- Leverage donor-funded projects (e.g., ADB, JICA) to improve infrastructure while ensuring community participation.

2. Promote Alternative Water Sources:

- Expand rainwater harvesting with subsidies for low-income households.
- Explore desalination or piped water alternatives for areas with saline groundwater.

3. Improve Sludge and Wastewater Management:

- NGOs should install proper sewage systems to prevent contamination of water bodies.

CHAPTER-5: CONCLUSION

12. Conclusion:

The study highlights critical Water, Sanitation, and Hygiene (WASH) challenges in the informal settlements of Montu Kaloni and Nurani Mahalla in Khulna, Bangladesh, emphasizing governance and integrity gaps that hinder equitable service delivery. The application of the TAPA (Transparency, Accountability, Participation, and Anti-Corruption) framework, coupled with the Analytic Hierarchy Process (AHP), reveals that transparency (46.6%) and accountability (27.7%) are the most pressing integrity dimensions, while participation (16.1%) and anti-corruption (9.6%) remain constrained by structural and institutional barriers.

Key findings indicate that accountability-related deficiencies dominate (69% of total integrity gaps), primarily due to the absence of a legal policy framework for informal settlements, weak enforcement of regulations, and poor institutional coordination among KWASA, local authorities, and NGOs. Transparency gaps (22% of deficiencies) stem from inadequate public disclosure of WASH service information, pricing, and grievance mechanisms, leaving communities uninformed about their rights and service eligibility. Indiscriminate use of submersible pumps (highest integrity deficiency score: 12.96) exacerbates health risks, with contaminated water linked to skin diseases, hair loss, and gastrointestinal illnesses.

The study also identifies political interference in service provision, conflicts between KWASA and the Railway Authority, and the financial burden of securing safe water through third-party vendors as major integrity challenges. While Montu Kaloni faces 2.32 times higher integrity deficiencies than Nurani Mahalla, both settlements suffer from poor sludge management, non-functional deep tube wells, and seasonal water shortages, further aggravated by climate variability and groundwater depletion.

To address these gaps, the study recommends:

1. Strengthening transparency through community awareness campaigns, public disclosure of WASH service standards, and accessible grievance mechanisms.

2. Enhancing accountability by establishing local KWASA representatives, enforcing regulations on submersible pump use, and integrating informal settlements into municipal WASH planning.
3. Promoting participatory governance by involving community-based organizations (CBOs) and youth groups in decision-making and monitoring processes.
4. Investing in sustainable infrastructure, such as expanded rainwater harvesting systems and proper sludge management, to reduce dependency on groundwater and protect public health and the environment.

These measures require multi-stakeholder collaboration among KWASA, local governments, NGOs, and communities to ensure equitable, resilient, and integrity-driven WASH services. Future research should explore the socio-political dynamics influencing WASH governance and evaluate the long-term impacts of integrity interventions in informal urban contexts.

By prioritizing transparency and accountability, Khulna can mitigate WASH-related health risks, reduce service inequities, and advance Sustainable Development Goal (SDG) 6—ensuring clean water and sanitation for all.

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Appendix

QUESTIONNAIRE

SECTION 1: TRANSPARENCY (T)

1. Availability of information about KWASA water connection procedures
    - (1) Very Low (2) Low (3) Medium (4) High (5) Very High
2. Clarity of water tariff (pricing) information
    - (1) Very Low (2) Low (3) Medium (4) High (5) Very High
3. Frequency of water quality reports shared with community
    - (1) Very Low (2) Low (3) Medium (4) High (5) Very High

SECTION 2: ACCOUNTABILITY (A)

4. KWASA's responsiveness to water supply complaints
    - (1) Very Low (2) Low (3) Medium (4) High (5) Very High
5. Enforcement of rules against illegal water connections
    - (1) Very Low (2) Low (3) Medium (4) High (5) Very High
6. Effectiveness of local leaders in holding KWASA accountable
    - (1) Very Low (2) Low (3) Medium (4) High (5) Very High

SECTION 3: PARTICIPATION (P)

7. Opportunities for community input in WASH projects
    - (1) Very Low (2) Low (3) Medium (4) High (5) Very High
8. Inclusion of women in water-related decision making
    - (1) Very Low (2) Low (3) Medium (4) High (5) Very High

SECTION 4: ANTI-CORRUPTION (A2)

9. Fairness in distribution of water connections
    - (1) Very Low (2) Low (3) Medium (4) High (5) Very High
10. Prevalence of bribery to obtain water services

- (1) Very Low (2) Low (3) Medium (4) High (5) Very High

SECTION 5: WASH SERVICE QUALITY

11. Safety of drinking water from current sources

- (1) Very Low (2) Low (3) Medium (4) High (5) Very High

12. Adequacy of water supply during dry seasons

- (1) Very Low (2) Low (3) Medium (4) High (5) Very High

13. Proper disposal of human waste in your area

- (1) Very Low (2) Low (3) Medium (4) High (5) Very High

SECTION 6: OPEN-ENDED QUESTIONS

14. What is the most serious water problem your household faces?
15. What single improvement would help most in your water situation?

CASE STUDIES

Figure 1: Case study at Montu Kaloni

Figure 2: Case study at Nurani Mahalla

KII

Figure 3: KII with the KWASA official

TRAINING

Figure 4: InWASH Training for CBO and youth people of Montu Kaloni and Nurani Mahalla

WATER TREATMENT PROCESS OF KWASA

Figure 5: Different steps of water treatment process of KWASA

DIALOGUE SESSION

Figure 6: Research Associate of BWP is presenting the findings of the WISI project

Figure 7: A CBO woman is sharing her sufferings and demands to the WASH stakeholders in Khulna