# Water and Sanitation Services at the Local Government Level in Bangladesh: An Analysis of SDG 6 Implementation Status and Way Forward

**Imran Hossain*, S. M. Akram Ullah and A. K. M. Mahmudul Haque**

**Faculty of Social Science, Department of Political Science, University of Rajshahi, Rajshahi-6205, Bangladesh**

***Corresponding Author's Email: imranbd.ru@gmail.com**

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**Abstract**

This study looks into the state of SDG 6 implementation at the local government level in Rajshahi City Corporation (RCC) with a focus on water and sanitation services. The research adopts a mixed-method approach and in-depth interviews to collect primary data. The study analyses the collected data using both quantitative and qualitative techniques. It has been found that large numbers of people do not always have access to enough water, demonstrating the problem of water scarcity in the region. According to the study, only a small percentage of participants tested their drinking water, which suggests that participants were not aware of the importance of water quality. Additionally, the lack of personal water purification and reuse systems is revealed by the research, indicating a gap in sustainable water management practices. Most of the city dwellers expressed dissatisfaction with the authority's management of the water supply, indicating insufficient oversight and governance. The findings highlight the need for improved infrastructures, water treatment techniques, education campaigns, and governance mechanisms to effectively meet SDG 6 targets and guarantee residents of RCC access to clean water and sanitary facilities.

**Keywords:** Water and sanitation, Local government, Water quality, Sustainable water management, Water governance

## Introduction

The Sustainable Development Goals (SDGs), which were adopted by all United Nations Member States in 2015, are a global call to action to eradicate poverty, safeguard the environment, and secure prosperity for everyone by the year 2030 (Herath & Poon, 2021). SDG 6 stands out as a crucial commitment to ensuring everyone has access to water and sanitation services and that they are managed sustainably (Umar et al., 2020). Sustainable Development Goal 6 (SDG 6) aims to ensure access to clean water and sanitation for all by 2030 (Arora & Mishra, 2022). The pursuit of SDG 6 has significant consequences for public health,

environmental sustainability, and overall societal well-being in the context of Bangladesh, a country dealing with complicated water and sanitation issues (Haque et al., 2020). Moreover, SDG 6 is crucial for Bangladesh because of the country's crucial difficulties in providing safe and sustainable water and sanitation services to its expanding population, especially in urban areas. Access to sanitization and clean water is a basic human right and an important part of sustainable development (Gleick, 1998). Bangladesh, which has a population of more than 160 million, has made a great progress recently to increase access to water and sanitation services, but much work needs to be done (Uddin et al., 2019). Water quality is one of the most important factors in this regard that has an impact on human physiology (Etim et al., 2013). So, among the 30 substances needed to maintain life, health, and ecosystems, water is a necessary component (Al-Dulaimi & Younes, 2017). UNICEF and WHO estimate that 1.1 billion people worldwide lack access to better water supplies and 2.6 billion lack access to adequate sanitation (Moe & Rheingans, 2006). Due to population growth, land use, excessive groundwater use, and economic growth, there has been a decline in water quality and demand over the past century (Robinne et al., 2018). Unexpected urbanization has also resulted in extreme poverty and disparities in access to water services in Bangladesh (Angeles et al., 2009).

In Bangladesh, a significant proportion of the population still lacks access to these basic necessities, leading to widespread health problems. The scarcity of safe drinking water sources is a pressing concern in many parts of Bangladesh. In this aspect, the government of Bangladesh has established a number of institutions tasked with making sure that people have access to hygienic facilities and clean water. Urban water and sanitation services are primarily provided by the Ministry of Housing and Public Works, while rural water and sanitation services are provided by the Ministry of Local Government, Rural Development, and Cooperatives (Hossain & Haque, 2023; Haque, 2015). The central role played by local governments in the delivery and management of water and sanitation services cannot be understated. They often serve as the frontline institutions responsible for ensuring that communities have access to safe drinking water and adequate sanitation facilities. Analyzing the performance, capacity, and obstacles faced by local governments in Bangladesh concerning SDG 6 is essential for making informed policy decisions. In this aspect, the Union Parishads, Upazila Parishads, and City Corporations are among the local government institutions tasked with carrying out water and sanitation projects at the neighborhood level. Furthermore, the local government in Bangladesh is ineffective because of a lack of accountability, problems with revenue and expenses, limited access to funding sources, and a shoddy system of checking for the provision of high-quality services (Kader & Ullah, 2020). In Bangladesh, the achievement of SDG 6 targets depends heavily on the local government. Water and sanitation services must be planned, implemented, and monitored locally by local governments. In order to ensure the effective and efficient delivery of services, they are also in charge of mobilizing resources, interacting with communities, and working with other stakeholders. In urban areas, where the demand for water and sanitation services is rising quickly, the local government's function is particularly crucial.

The aim of this study is to assess the current status of SDG 6 implementation at the local government level in RCC, Bangladesh, with a focus on water and sanitation services. By assessing the availability, quality, and accessibility of water sources, as well as the state of sanitation facilities, this study seeks to analyze the existing water and sanitation management systems in the RCC and identify areas for improvement. In particular, this paper will evaluate the progress local governments have made in ensuring that the public has access to services for clean water and sanitation, and it will investigate potential strategies and best practices for enhancing local governance for SDG 6 implementation in Bangladesh.

**Methodology of the study**

This research has adopted a mixed-method approach to assess the current status of SDG 6 implementation at the local government level in Bangladesh. It combines both qualitative and quantitative approaches where data have been collected from both primary and secondary sources. Both quantitative and qualitative surveys have been conducted to assess the current status of SDG-6 implementation in urban areas of Bangladesh. A field survey was conducted from November 2022 to March 2023. The data was primarily collected through structured face-to-face household surveys. The researchers had visited the selected households in the RCC. Government executives, officials and stakeholders of the RCC constituted the population of this study. A random sampling technique has been employed to select stakeholders for the survey. Among the populations, those who are knowledgeable about the process of implementation of SDGs actions were taken together to form the unit of analysis. A structured questionnaire has been developed based on the SDG 6 indicators and distributed to the respondents responsible for water and sanitation services. A statistical approach was used for sample selection and randomization in order to guarantee the validity and representativeness of this quantitative research. Based on statistical analysis, a sample size of 300 people was chosen, ensuring a sufficient sample of the population being studied. In the first step, a comprehensive sample frame that included the target population was created. In this instance, a wide range of demographic characteristics were covered by the sample frame because it included all eligible participants within the study's specified geographic area. A simple random sample procedure was used to account for potential variances within the population. The study region was separated into several categories depending on specific characteristics like age, gender, and geography. This difference made it easier for various subgroups to be represented in the larger population. Based on recognized statistical principles, the sample size was chosen while taking the desired degree of confidence and the margin of error into consideration. To ensure statistically valid results and the ability to generalize the results to a larger population, a sample size of 300 people was chosen. During the selection of the sample, representativeness was given the most importance.

Key informants from the RCC, including municipal officials, water management specialists, and local leaders, were chosen using a purposive sampling strategy**.** Four key informants were interviewed for this study**.** Five Focus Group Discussions (FGDs) have been conducted, with each group consisting of 8-10 members, involving stakeholders and local

representatives for understanding the real scenario of SDG 6 at the local government level. The FGDs have been conducted to gather in-depth information on the challenges and opportunities for improving SDG 6 implementation in RCC. Semi-structured interviews have been conducted with key stakeholders, including government officials, representatives from civil society organizations, and members of the private sectors. The data for the quantitative survey has been collected using questionnaire survey, and the data for the qualitative interviews have been collected through face-to-face interview. The questionnaire was pre-tested to ensure clarity and translated from English to Bangla (the local language) to better understand the local survey participants. Government officials have been selected for face-to-face interviews using the structured survey questionnaire. The survey has been administered in local languages to enhance respondents' understanding and participation. All the documented data have been analyzed by using simple and suitable mathematical and statistical tools like SPSS V.22. The data have been presented through tabulation, frequency, and percentage.

**Results and discussion**

Local governments play a crucial role in achieving every target under SDG 6, as they are responsible for delivering water and sanitation services to communities, managing water resources at the local level, and promoting sustainable and integrated water management practices (Deng et al., 2021). In this study, researchers aimed to assess the current status of SDG 6 implementation at the local government level in Bangladesh. A survey has been conducted among the residents of urban areas in Bangladesh, with a focus on the SDG 6 targets 6.1 and 6.2.

All the respondents have been selected from the 14 wards of the RCC, namely, wards no. 8, 10, 11, 12, 13, 18, 22, 23, 24, 25, 26, 28, 29, and 30. Table 1 indicates that 35.3 percent of respondents are male and 64.7 percent are female. The age distribution of the samples indicates that respondents came from different age groups. These age groups are below 25, 26 to 35, 36 to 45, and 46 and above. Table 1 shows that 16.6 percent of respondents belong to the young age group of <25 years, and 63.3 percent (26.3 percent and 37.0 percent) belong to the middle age group. Six different categories, such as- "Illiterate", "Primary" (I-V), "Secondary" (VI-X), "Higher Secondary" (XI-XII), "Graduate" and "Postgraduate," have been used to indicate the level of education of the respondents in the study area. It is found from Table 1 that a good number of respondents (32.3 percent) were of higher secondary level of education, while 17.0 percent and 15.3 percent completed the graduation and postgraduate levels of education, respectively. A small number of respondents (5.7 percent) were illiterate. It is found from Table 1 that the highest number (54.0 percent) of respondents came from households, while only 9.3 percent came either from farmers or laborers. 9.3 and 4.7 percent are engaged in non-government jobs and government jobs, respectively.

**Table 1** Socio-demographic characteristics of the respondents

| Characteristics | Frequency | Percentage |
|---|---|---|
| **a. Residence of the Respondents** | | |
| Rajshahi City Corporation (RCC) | 300 | 100.0 |
| **b. Sex of the Respondents** | | |
| Male | 106 | 35.3 |
| Female | 194 | 64.7 |
| **c. Age of the Respondents** | | |
| 16-25 | 50 | 16.7 |
| 26-35 | 79 | 26.3 |
| 36-45 | 111 | 37.0 |
| 46 and above | 60 | 20.0 |
| **d. Educational Qualification of the Respondents** | | |
| Illiterate | 17 | 5.7 |
| Primary | 30 | 10.0 |
| Secondary | 59 | 19.7 |
| Higher Secondary | 97 | 32.3 |
| Graduate | 51 | 17.0 |
| Post Graduate | 46 | 15.3 |
| **e. Occupation of the Respondents** | | |
| Govt. jobs | 14 | 4.7 |
| Private jobs | 28 | 9.3 |
| Business | 47 | 15.7 |
| Household | 162 | 54.0 |
| Day Labor | 28 | 9.2 |
| Students | 14 | 4.7 |
| House maid | 2 | 0.7 |
| Unemployed | 3 | 1.0 |
| Abroad | 2 | 0.7 |

***Target 6.1: Achieve universal and equitable access to safe and affordable drinking water for all by 2030.***

Globally, 91% of the population had access to improved drinking water sources in 2020. However, only 71% of the population in Sub-Saharan Africa had access to improved drinking water sources (Martínez-Santos, 2017). In Bangladesh, as of 2020, 98% of the urban population and 86% of the rural population had access to improved drinking water sources (Ghosh et al., 2020).

**Table 2** Safe drinking water

| Variables | | f | % |
|---|---|---|---|
| Receiving enough water | Yes | 228 | 76.0 |
| | No | 72 | 24.0 |
| Safety taste of water | Yes | 61 | 20.3 |
| | No | 239 | 79.7 |
| Presence of Iron | Yes | 191 | 63.7 |
| | No | 109 | 36.3 |
| Presence of Arsenic | Yes | 15 | 5.0 |
| | No | 285 | 95.0 |
| Personal purification system | Yes | 127 | 42.3 |
| | No | 173 | 57.7 |
| Personal reusing system | Yes | 46 | 15.3 |
| | No | 254 | 84.7 |
| Initiative of the authority | Yes | 18 | 6.0 |
| | No | 282 | 94.0 |
| Authorities supervision | Yes | 30 | 10.0 |
| | No | 270 | 90.0 |

The findings of this study provide valuable insights into the current status of SDG target 6.1 implementations related to access to safe and sufficient drinking water. The study reveals that a significant percentage of respondents, approximately 24.0%, lack access to sufficient water when needed, highlighting an important gap in meeting the target's objectives. Additionally, about 76.0% of respondents reported that they receive enough water for their daily usage, it indicates that a considerable number of the people are still facing challenges in accessing to adequate water supply (Table 2).

A concerning aspect identified in the study is the limited attention given to water quality assessment. Only 20.3% of the respondents reported that they taste their drinking water. It indicates a lack of awareness or concern of the people regarding water quality. However, it is alarming that 63.7% of the respondents believed that their drinking water was contaminated with iron. This emphasizes on the need of increased monitoring and quality control measures to ensure that water sources meet the necessary standards for safe consumption.

Fortunately, the study also reveals that no instances of arsenic contamination were reported in the RCC's water supply. As indicated in the Table 2 only 5.0% of respondents have identified arsenic in their drinking water. This is a positive finding, as arsenic contamination is a significant health concern in many regions globally. Another critical aspect highlighted by the study is the absence of personal water purification and reuse system, indicating a gap in sustainable water management practices. This lack of infrastructure and resources for water purification and reuse contributes to a greater reliance on external water sources and hampers efforts to achieve water sustainability goals. Furthermore, the study points out a lack of

adequate governance and supervision in the water supply. A majority (90.0%) of city dwellers expressed dissatisfaction with the authority's supervision of water supply, indicating a need for improved oversight and governance structures to ensure reliable and consistent water availability.

**Table 3** Affordable drinking water

| Variables | | f | % |
|---|---|---|---|
| Remoteness of the drinking water source | Very Remote | 46 | 15.3 |
| | Close | 254 | 84.7 |
| Duration of water supply | Always | 156 | 52.0 |
| | Most of the time | 107 | 35.7 |
| | Sometimes | 37 | 12.3 |
| Satisfaction in water supply | Highly satisfied | 68 | 22.7 |
| | Satisfied | 175 | 58.3 |
| | Somewhat | 24 | 8.0 |
| | Unsatisfied | 33 | 11.0 |

In this study, Table 3 indicates that a significant proportion of residents in the RCC collect their drinking water from nearby sources. About 84.7% of the survey participants said they got their drinking water from places nearby. The data further revealed that residents typically require less than 15 minutes to collect drinking water, indicating convenient accessibility. However, it was noted that in certain areas, such as Word No. 10, 18, and 28, residents faced longer waiting times due to traffic congestion. Although the quality of the drinking water sources in the RCC had not always improved, the study showed that residents had a tendency to put safety first and seek out more dependable water sources. As a result, they heavily relied on these more secure water sources, which sometimes led to congestion as numerous residents congregated at the same locations.

Table 3 indicates that 52% of the respondents didn't face challenges in case of getting water. But 35.7% of the respondents faced terrible problems with the water supply. Overall, 48% of the respondents observed that water isn't available all the time. A respondent from RCC argues,

> We only receive supply water for four hours every day. It isn't accessible 24 hours a day. The supply water needed to be stored for later use. The supply of water quality in our area is not too awful. It is also drinkable. Sometimes, we consume it. However, occasionally we find trash in the water supply. I believe that this kind of issue needs to be resolved as quickly as possible (KIIs, RCC, Bangladesh).

There are a lot of reasons for this scarcity, load shedding is one of them. Due to the scarcity of available electricity, residents didn't get enough water. For this reason, people are not satisfied regarding water supply. Only 58% residents of the RCC are satisfied with water supply of the RCC. A large number of people are not satisfied with water supply. Additionally, the study

highlights the reliance on both the private and government water sources in the RCC (Hossain et al., 2023a). In terms of choosing water sources, many residents prefer government sources for their cooking and daily water needs. But there is an inconsistent water supply in RCC. Table 3 denotes that 12% of the respondents think inconsistent water supply or lack of availability of water is a significant challenge. The study also identifies specific areas where residents were compelled to wait for collecting water due to traffic congestion, emphasizing the need for infrastructure improvements and effective traffic management to enhance water accessibility.

**Table 4** Sources of water

| **Variables** | | **Frequency** | **%** | | **Frequency** | **%** |
|---|---|---|---|---|---|---|
| Drinking Water Source | Supply | 49 | 16.3 | Cooking and Other Water | 169 | 56.3 |
| | Tube well | 18 | 5.6 | | 9 | 3.0 |
| | Submersible | 233 | 77.7 | | 122 | 40.7 |
| Drinking Water Owner | Government | 63 | 21.0 | Cooking and Other Water Owner | 111 | 37.0 |
| | Own | 151 | 50.3 | | 139 | 46.3 |
| | NGO/ Others | 86 | 28.7 | | 50 | 16.7 |

People in RCC mainly rely on groundwater sources for collecting their drinking water and other uses of water. There are a large number of people who have different sources for managing drinking and other uses of water. Groundwater is the primary source of water for agriculture and drinking in the RCC (Rana & Adhikary, 2020). Table 4 makes it evident that only 16.3% of the urban population use supply water for drinking purposes. The government supplies the water through a series of pipes running across the city. This supply system also uses water that is pumped up from the ground. Thus, this method of providing water to the people is costly and unsustainable. Moreover, for collecting drinking water, 77.7% of the respondents stated that they have submersible pumps that they use this pump to raise water from the ground. Additionally, 5.3% of the respondents overall utilize tube wells, which likewise rely on groundwater.

Table 4 also states that 56.3% of the respondents collectively rely on supply water for managing their cooking and other water needs. Although the figure shows that more people are now relying on supply water, a large proportion of urban inhabitants still use groundwater to meet their needs. Table 4 illustrates how urban residents mostly rely on submersible pumps for their water supply. Tube wells are also used, though less frequently than submersibles. It is not yet a common habit to buy bottled water for daily drinking. Overall, 99.0% of people utilize groundwater for everyday activities, including drinking, washing, and other needs (Hossain et al., 2023b). Surface water use is also uncommon. Rainwater is wasted and has little use, despite being a renewable source of water. The disadvantage is that the most popular alternative, which includes tube wells, submersible pumps, and supplies provided by the government, all require

groundwater and electricity to function. This reliance on groundwater and electricity can lead to water scarcity in some parts of the world, especially during the periods of drought.

From Table 4, we can observe that 21.0% of the respondents rely on the government's water supply for drinking. But 50.3% of the respondents use their submersibles for drinking water. Moreover, for cooking and other purposes, people in the RCC are mainly dependent on the government supply (37.0%). From this condition, researchers understand that the people of the RCC rely heavily on the government service to ensure cooking and other water-related activities. But for drinking purposes, they are dependent on their submersible pump. So, the people of urban Bangladesh are mainly dependent on supply water provided by the government body and their submersible pumps for collecting their drinking, cooking, bathing, and other uses of water. However, the government provided water at RCC is not so improved for consuming. Considering this, a respondent from RCC argues,

> I can only use the supply water for cleaning and bathing purposes; I don't drink it. I never feel comfortable using supply water because of contamination. Even though it contains a little amount of iron. I utilize Tube-well for drinking water. However, it is even more secure than supply water. I always collect safe drinking water from a long distance because the water from the distance source is more secured. Therefore, it would be quite useful for us if the City Governance Institutions (CGIs) play a significant role in the purification of supply water (KIIs, RCC, Bangladesh).

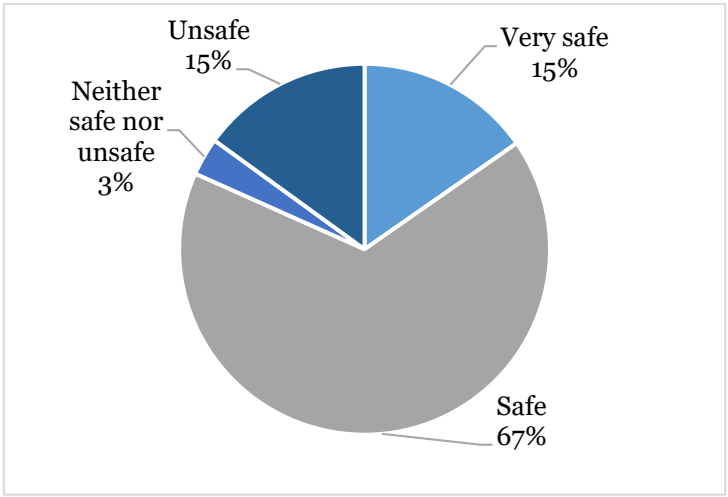


**Figure 1** Safety of Drinking Water

Based on the data collected by the researchers, it is evident that there is a significant level of skepticism and lack of trust among the residents regarding the safety of their water usage. This aligns with the findings from the study, where only 67% of the participants expressed confidence in the safety of their water usage. This lack of confidence is concerning and indicates a potential issue with the quality and safety of the water supply in the city. Additionally, a considerable proportion of the population, about 15%, holds the belief that consuming water is not safe for them (Figure 1). It highlights the prevailing concerns and

doubts among the residents regarding the quality and safety of the water they consume. Such a perception may have significant implications for public health and well-being. Furthermore, the study revealed that only a small percentage, specifically 15% of the respondents, considered their drinking water as very safe for consumption. It indicates a significant disparity between the perceived safety and the actual safety of the drinking water. This finding raises serious concerns about the quality of the water sources and the effectiveness of the water treatment processes in the RCC.

From this study, it can be concluded that the majority of people did not consume enough water. Particularly, RCC slum residents are unable to collect available water (Alam et al., 2013). According to Alam et al. (2013), Tube-wells are the primary sources of water for slum dwellers' drinking and cooking needs. The same conclusions are supported by this study as well. Both studies show that there is no water supply system in the slum areas operated by the government. Moreover, the region's drinking water quality has not been significantly improved (Afroz et al., 2022). Most people don't pay much attention to the quality of their drinking water. The water provided by the government is not at all good. Availability of supply water in this area is mainly the responsibility of Rajshahi WASA (RWASA). The water supplied by RWASA has a lot of dangerous contaminants. Roy et al. (2018) found that the $p^H$ of RWASA's water in the chosen areas was within acceptable limits. Additionally, they discovered that odor, turbidity, iron, hardness, and a few others varied from their typical values. In this regard, Rasul & Jahan (2010) also show that concentrations of arsenic, iron, manganese, total hardness, total coliform, and fecal coliform bacteria were found above the allowable limits for potable water out of all the parameters of groundwater that were taken into consideration. They also show that before being distributed for drinking purposes, water from rivers must be properly treated. They contend that the Padma situated in the region of RCC area is the most environmentally friendly source of drinking water. This study also shows that the RCC lacks sufficient water purification facilities. The RCC failed to take any effective steps in this regard to set up the available water purification plants (Hasan et al., 2021). It is evident to us from the above discussion that the RCC residents do not receive enough safe drinking water. People occasionally need to travel long distances to manage their drinking water. Water is available for cooking, bathing, and other uses for RCC's permanent residents. But due to various RWASA issues, the majority of the residents are not happy. Surface water cannot be used as a sustainable water source using any method. The reservoir and water purifier are insufficient. Finally, these findings highlight the gaps and difficulties in achieving SDG target 6.1. In order to effectively meet the target's objectives, the study emphasizes on the significance of addressing issues related to water availability, quality assessment, infrastructure development, governance, and sustainability.

***Target 6.2: Achieve access to adequate and equitable sanitation and hygiene for all by 2030, and end open defecation, paying special attention to the needs of women and girls and those in are vulnerable situations***

Globally, 71% of the population had access to basic sanitation services in 2020. However, only 27% of the population in Sub-Saharan Africa had access to basic sanitation services (WHO, 2021). In Bangladesh, as of 2020, 63% of the urban population and 34% of the rural population had access to improved sanitation facilities (Hossain et al., 2022).

**Table 5** Sanitation and hygiene facilities

| Variables | | Frequency | Percentage |
|---|---|---|---|
| Using soap for cleansing | yes | 287 | 95.7 |
| | no | 3 | 1.0 |
| | Sometimes | 10 | 3.3 |
| Washing hand before meal | yes | 195 | 65.0 |
| | no | 57 | 19.0 |
| | Sometimes | 48 | 16.0 |
| Washing hand After using toilet | yes | 292 | 97.3 |
| | no | 2 | .7 |
| | Sometimes | 6 | 2.0 |
| Using sanitary napkin during period | yes | 251 | 83.7 |
| | no | 20 | 6.7 |
| | Sometimes | 29 | 9.7 |
| Using sanitary napkin during going outside | yes | 265 | 88.3 |
| | no | 15 | 5.0 |
| | Sometimes | 20 | 6.7 |
| Any support regarding sanitation | no | 300 | 100.0 |

This study's findings provide valuable insights into the current status of SDG Target 6.2, which focuses on achieving adequate and equitable sanitation and hygiene for all. The study reveals positive trends in hygiene practices, with approximately 95.7% of respondents using soap for cleaning purposes. Additionally, a significant majority of city dwellers, around 65%, reported that they wash their hands before meals, highlighting positive hygiene behavior. Furthermore, the study found that 97.3% of respondents wash their hands with soap and water after using the toilet, indicating good adherence to hygiene practices related to sanitation (Table 5). These findings demonstrate the importance and effectiveness of hygiene promotion campaigns and awareness initiatives in improving hygiene behaviors.

Regarding menstrual hygiene management, a large number of female respondents, approximately 83.7%, reported that they used sanitary napkins during their periods. However, a concerning 6.7% of respondents did not have regular access to sanitary napkins, indicating a lack of availability and affordability issues. Additionally, going outside during their periods, 5.0% of respondents did not use sanitary napkins regularly, suggesting challenges in maintaining proper menstrual hygiene practices in public settings. Nonetheless, it is

encouraging to note that 88.3% of female respondents reported that they used sanitary napkins in the time of going outside (Table 5).

The RCC's residents have access to sufficient and equitable sanitation and hygiene facilities. Slum residents are not receiving enough facilities for sanitation and hygiene in this regard. Even so, some non-governmental organizations continue to work to improve their standard of living and stop open defection. The RCC's authority in this situation failed to play the necessary roles for raising their awareness of the need to provide fair sanitation and hygiene facilities. We can infer from this study that city dwellers do not sufficiently support sanitation and hygiene facilities. The study also highlights the need for support from responsible authorities in addressing sanitation needs. Unfortunately, the findings reveal that the responsible authority has not provided any support for sanitation purposes, which is a matter of great concern. Adequate support from authorities is essential for ensuring access to necessary sanitation facilities, including the provision of sanitary napkins, particularly for vulnerable population. The study's findings show that although progress has been made in promoting good hygiene habits and menstrual hygiene management, there are still gaps and difficulties that must be resolved in order to meet SDG Target 6.2. Therefore, efforts should be directed toward increasing sanitary napkin availability and affordability, providing adequate sanitation facilities and services, and increasing investments in water and sanitation infrastructure.

**Conclusion and recommendations**

This study clarifies the state of SDG 6 implementation at the local government level in RCC, Bangladesh. The results highlight the difficulties and gaps in achieving the goals outlined by SDG 6. The study highlights the issue of water scarcity by showing that a sizeable portion of the RCC population lack access to enough water when needed. Additionally, issues with water contamination and quality are brought up, particularly in regard to iron. However, it is encouraging to see that the RCC's water supply is not contaminated with arsenic. The research reveals the lack of personal water purification and reuse systems, highlighting the requirement for infrastructure development and sustainable water management practices. Inadequate oversight by the responsible authority and a lack of necessary rules and regulations for water reuse also contribute to city dwellers' dissatisfaction. The RCC population's water needs must be met despite the reliance on both private and public water sources as well as the inconsistent availability of water from those sources. Infrastructure, water treatment methods, and governance mechanisms need to be improved due to the relatively low levels of satisfaction with the water supply.

It is critical to prioritize investments in water infrastructure, improve water treatment procedures, increase public awareness of water quality and sanitation standards, and strengthen governance and oversight systems in order to address these issues and improve SDG 6 implementation. Additionally, for RCC to achieve equitable and sustainable access to clean water and sanitation services, cooperation between the local government, stakeholders, and the community is crucial.

The RCC can work to increase access to clean drinking water by enhancing water supply infrastructure, encouraging water efficiency and conservation, and fostering behavior change through campaigns to promote good hygiene and sanitation. By concentrating its efforts on underserved and marginalized communities and offering them sufficient water supply services, the RCC can also contribute to the achievement of equitable access to clean drinking water.

The RCC can give a higher priority to low-income households, rural areas, and informal settlements when it comes to providing safe and affordable drinking water. Through public awareness campaigns, pricing regulations for water, and financial incentives for water-saving practices and technologies, they can encourage water conservation. They can also make regulatory frameworks stronger to guarantee that water service providers are responsible for giving all residents access to clean, reasonably priced drinking water. This can involve establishing and enforcing quality standards, keeping an eye on service delivery, and ensuring fair and affordable tariffs.

For ensuring sufficient and available sanitation services to all residents, the RCC can develop and implement sanitation infrastructure, such as public restrooms, private toilets, and sewage systems. By keeping an eye on sanitation quality and putting in place the proper treatment procedures to get rid of contaminants, they can also make sure that sanitation facilities are secured and of high quality. The RCC can give low-income households, rural areas, and informal settlements a higher priority when it comes for providing sanitation services. They can also promote good hygiene practices by involving the community, communicating with people to change their behavior regarding water usage, and running public awareness campaigns. Promoting handwashing, managing menstrual hygiene, and safely disposing of solid waste are a few examples of this.

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**References**

Afroz, F., Hossain, S., & Rimi, R. A. (2022). *Assessment of the Sustainability of Water, Sanitation and Hygiene on Educational Institution*: *A Case Study of Rajshahi City Corporation* (pp. 361-372). In Climate Change and Water Security*:* Select Proceedings of VCDRR 2021. Singapore: Springer.

Alam, M. Z., Rahman, M. A., & Al Firoz, M. A. (2013). Water supply and sanitation facilities in urban slums: a case study of Rajshahi City corporation slums. *American Journal of Civil Engineering and Architecture*, *1*(1), 1-6.

Al-Dulaimi, G. A., & Younes, M. K. (2017). Assessment of potable water quality in Baghdad City, Iraq. *Air, Soil and Water Research*, *10*, 1178622117733441.

Angeles, G., Lance, P., Barden-O'Fallon, J., Islam, N., Mahbub, A. Q. M., & Nazem, N. I. (2009). The 2005 census and mapping of slums in Bangladesh: design, select results and application. *International journal of health geographics*, *8*(1), 1-19.

Arora, N. K., & Mishra, I. (2022). Sustainable development goal 6: Global water security. *Environmental Sustainability*, *5*(3), 271-275.

Deng, W., Cheshmehzangi, A., Ma, Y., & Peng, Z. (2021). Promoting sustainability through governance of eco-city indicators: a multi-spatial perspective. *International Journal of Low-Carbon Technologies*, *16*(1), 61-72.

Etim, E. E., Odoh, R., Itodo, A. U., Umoh, S. D., & Lawal, U. (2013). Water quality index for the assessment of water quality from different sources in the Niger Delta Region of Nigeria. *Frontiers in science*, *3*(3), 89-95.

Ghosh, G. C., Khan, M. J. H., Chakraborty, T. K., Zaman, S., Kabir, A. E., & Tanaka, H. (2020). Human health risk assessment of elevated and variable iron and manganese intake with arsenic-safe groundwater in Jashore, Bangladesh. *Scientific reports*, *10*(1), 5206.

Gleick, P. H. (1998). The human right to water. *Water policy*, *1*(5), 487-503.

Haque, A. K. M. (2015). *Environmental governance of urban-local government in Bangladesh: Policies and practices* (Doctoral dissertation). Rajshahi, Bangladesh: University of Rajshahi.

Haque, S. S., Yanez-Pagans, M., Arias-Granada, Y., & Joseph, G. (2020). Water and sanitation in Dhaka slums: access, quality, and informality in service provision. *Water International*, *45*(7-8), 791-811.

Hasan, M. M., Pal, T. K., Paul, S., & Alam, M. A. (2021). Quality Measurement of Drinking Water in Rajshahi City Corporation and Effectiveness of Different Water Purifiers. *IOSR Journal of Applied Chemistry*, *14* (8), 38-45.

Herath, G., & Poon, W. C. (2021). Climate change, hunger and food security in asia with special reference to Sri Lanka: Can the sustainable development goals be achieved by 2030? *Exploring Synergies and Trade- offs between Climate Change and the Sustainable Development Goals*, 37-54.

Hossain, I., & Haque, A. M. (2023). Role of Responsible Institution in Urban Water Governance and Sanitation Management: A Focus on Metropolitan Areas of Bangladesh. *Research Square.* https://doi.org/10.21203/rs.3.rs-3064713/v1

Hossain, I., Haque, A. K. M., & Ullah, S. M. (2023b). Role of City Governance Institutions in Ensuring Sustainable Water: A Study on Gazipur City of Bangladesh. *SSRN Electronic Journal*. http://dx.doi.org/10.2139/ssrn.4480760

Hossain, I., Haque, A. M., & Ullah, S. A. (2023a). Assessment of Domestic Water Usage and Wastage in Urban Bangladesh: A Study of Rajshahi City Corporation. *The Journal of Indonesia Sustainable Development Planning*, *4*(2), 109-121.

Hossain, M. I., Habib, M. J., Haq, I., Zinnia, M. A., Kabir, S., Saleheen, A. A. S., & Talukder, A. (2022). Determinants of regional prevalence and variations in handwashing practices

among households in Bangladesh: An application of generalized mixed-effects model. *Asian Journal of Social Health and Behavior*, *5*(3), 122.

Kader, M. A., & Ullah, M. N. (2020). Project management of local government in Bangladesh: challenges and remedies. *Journal of Humanities and Social Science*, *25*(4), 51-58.

Martínez-Santos, P. (2017). Does 91% of the world's population really have "sustainable access to safe drinking water?" *International Journal of Water Resources Development*, *33*(4), 514-533.

Moe, C.L. & Rheingans, R.D. (2006). Global challenges in water, sanitation and health. *Journal of water and health*, *4*(S1), 41-57.

Rana, M. M., & Adhikary, S. K. (2020). *A Demand-Driven Water Management Framework for Rajshahi City Corporation in Bangladesh*. In 5th International Conference on Civil Engineering for Sustainable Development (ICCESD 2020). Khulna, Bangladesh: Khulna University of Engineering & Technology.

Rasul, M. T., & Jahan, M. S. (2010). Quality of ground and surface water of Rajshahi city area for sustainable drinking water source. *Journal of Scientific Research*, *2*(3), 577-577.

Robinne, F. N., Bladon, K. D., Miller, C., Parisien, M. A., Mathieu, J., & Flannigan, M. D. (2018). A spatial evaluation of global wildfire-water risks to human and natural systems. *Science of the Total Environment*, *610*, 1193-1206.

Roy, K., Akter, S., & Islam, M. (2018). *Assessment of Supplied Water Quality of Rajshahi Wasa* (*RWASA*) *in Bangladesh*. In Proceedings of the 4th International Conference on Civil Engineering for Sustainable Development (ICCESD 2018). Khulna, Bangladesh: Khulna University of Engineering & Technology.

Uddin, M. N., Rahman, M. A., Mofijur, M., Taweekun, J., Techato, K., & Rasul, M. G. (2019). Renewable energy in Bangladesh: Status and prospects. *Energy Procedia*, *160*, 655-661.

Umar, T., Egbu, C., Ofori, G., Honnurvali, M. S., Saidani, M., Shibani, A., & Goh, K. (2020). *UAE's commitment towards UN Sustainable Development Goals* (pp. 325-343). In Proceedings of the Institution of Civil Engineers-Engineering Sustainability. London, England: Thomas Telford.

World Health Organization (2021). Progress on household drinking water, sanitation and hygiene 2000-2020: Five years into the SDGs. Retrieved from https://apps.who.int/iris/bitstream/handle/10665/345081/9789240030848-eng.pdf