DHAKA SATURDAY FEBRUARY 14, 2026
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The Daily Star
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Untreated wastewater is being channelled into the Buriganga through an outlet in Old Dhaka's Badamtoli area, aggrevating river pollution. PHOTO: ANISUR RAHMAN

How is ignoring safe water and sanitation slowing sustainable growth?

NASIR UDDIN KHAN

Bangladesh has around 180 million people living in a small land area and ranks 8th in the world by population, though the GDP of the country was USD 2551 in 2023. The country has not established any sewage treatment system or safe water supply system for the entire nation. In Bangladesh, waterborne diseases and dengue are the main diseases due to the disposal of untreated sewage all over the country, the lack of supply of reliable, safe drinking water. The country is mostly dependent (more than 90%) on groundwater as potable water, which is abstracted through shallow-type tubewells mostly fitted with a hand pump.

Usually, the Public Health Engineering Department (DPHE) supplies these hand pumps and sanitary latrines in the rural areas. The hand pumps are normally 100-120 ft deep, fitted with a 20-30 ft strainer at the bottom. On the other hand, the sanitary latrines are made by burying 3-4 concrete rings fitted with an Indian type of pan on top. The joints of the rings and the bottom are not sealed, so the sewage is mixed with the soil and groundwater easily. The situation becomes more hazardous during the monsoon when the surface and groundwater are all mixed with the sewage. These latrines are usually constructed in close proximity to the hand pump tubewell, which is common in rural areas, increasing the chances of fecal contamination in the tube well water.

On the other hand, the tube well water is used directly without treatment for drinking and other purposes, which is also a great threat to human health. Usually, groundwater in Bangladesh has a significant amount of iron, hardness, silica and arsenic (in some areas) and is not safe for drinking without treatment. These contaminants cause different long-term diseases such as diarrhoea, constipation, diabetes, dry skin & hair loss, nausea, cardiovascular disease, disorders in liver & kidney function in the human body, which ultimately disrupts ecological balance.

The situation in urban and suburban areas is a little different, though they are also not safe from sewage contamination and a lack of safe water supply. Dhaka WASA has only a sewerage system at a partial capacity in the city, but the remaining sewage is collected through a pipe network and disposed to the nearest rivers without treatment. Other districts and subdistrict cities do not have a sewerage network or sewage treatment at all; they use septic tanks for sewage treatment. Honestly, the septic tank system is not a true sewage treatment system at all; it is a kind of primary treatment and retains the sewage for some period, but the discharge water quality remains untreated and pollutes the surface and groundwater of the whole country from generation to generation.

The water supply of the urban and suburban areas is also dependent on the untreated groundwater supply, except for some parts of Dhaka and Chattogram city, which have a partial surface water treatment system through the transportation pipelines. Most people either boil or filter the water before drinking. By boiling or filtering the water, most of the essential minerals in the water become settled down or retained in the filter, and people are drinking almost dead water. Moreover, a huge amount of natural gas is also wasted every day for boiling water.

For ages, this primary demand of the people was not given priority, and a proper sewage treatment system has not been developed, though the sewage treatment is not a complex issue. Anyone can do this with limited resources and capabilities. For this, government initiatives and awareness are essential.

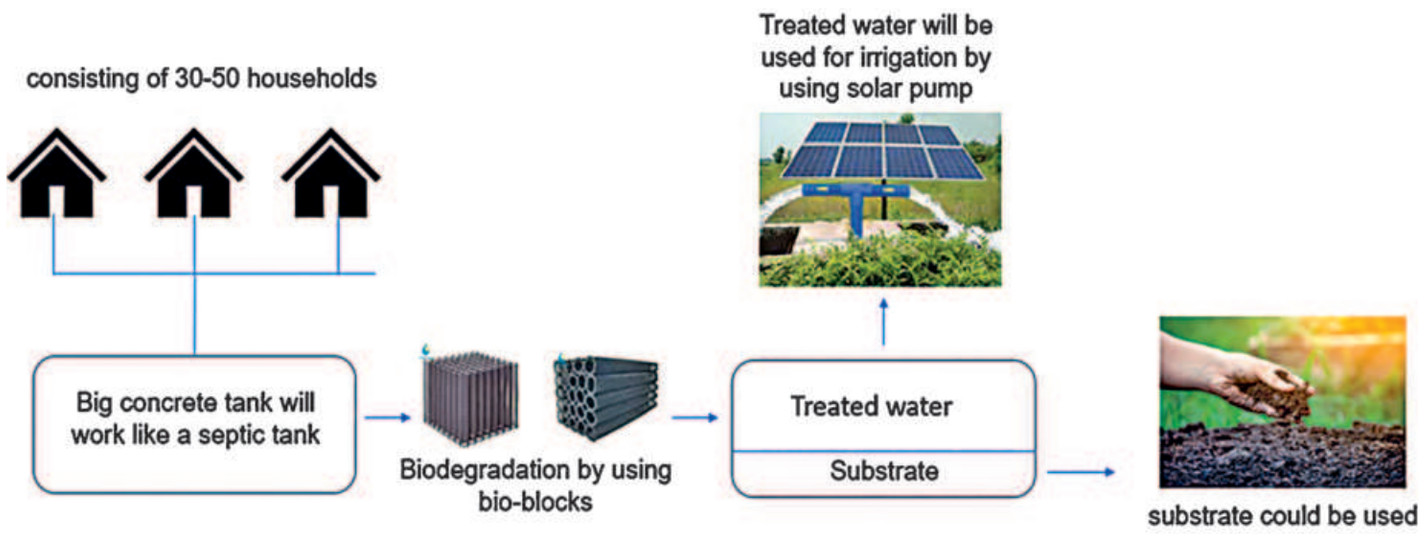

Figure 1: A Modern And Cost-Effective Sewage Treatment Plant (STP)

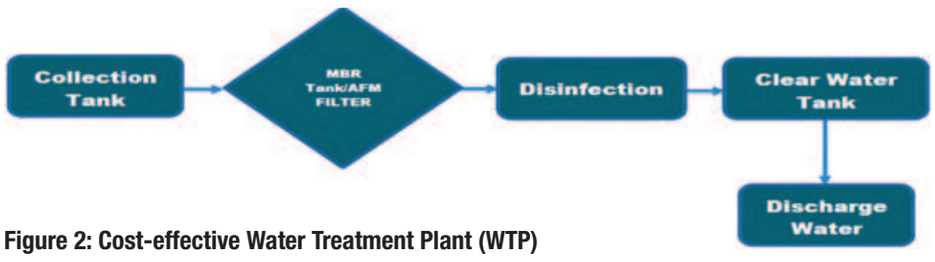

Figure 2: Cost-effective Water Treatment Plant (WTP)

SEWAGE TREATMENT PLANT IN BANGLADESH

Sewage treatment plants collect, treat, and discharge wastewater, providing a service essential to environmental and public health. The national Sewage Treatment Plant (STP) system in Bangladesh is gradually expanding, primarily to address the growing sanitation needs in urban areas, especially Dhaka. The Dhaka Water Supply and Sewerage Authority is leading the effort, with key projects like the Dasherkandi STP, which is the largest in the country and the first of its kind on a large scale. The Dasherkandi STP, inaugurated in 2023, has the capacity to treat 500 million liters of sewage per day, covering a population of approximately 5 million people. It uses modern biological treatment processes to significantly reduce environmental pollution by treating domestic wastewater before it is discharged into rivers. This project is part of the broader government strategy under the Bangladesh Delta Plan 2100, supported by development partners like Asian Development Bank (ADB) and China CAMC Engineering Co. Ltd., aiming to improve urban sanitation and protect public health. However, challenges remain in terms of expanding similar facilities to other cities and integrating decentralised systems for rural areas.

PHOTO: COLLECTED

In response to this pressing challenge, a modern and cost-effective Sewage Treatment Plant (STP) for rural areas is suggested below.

First, we must isolate the sewage from the surrounding soil, which could be done by using a plastic tank instead of rings. The plastic tank should be half-buried under the ground, and the commode/pan should be placed over that tank. This individual plastic tank should be connected to a bigger concrete retention tank (should be in a common place consisting of 30-50 households in the rural community) by pipeline to carry the sewage into that bigger concrete tank, as shown in Figure 1. This bigger tank will work like a septic tank. The overflow from the concrete tank should then be taken for biodegradation by using bio-blocks and solar pumps. Treated water from the bio-degradation tank will be safe for disposal or for use in irrigation. The substrate from the biodegradation tank could be used as organic fertiliser after dehydration. The technology for sewage treatment is easy, and the equipment is available in the local market. This biodegradation system could also be used in the urban and suburban areas where there are no sewerage systems, and people are using only septic tanks. This initiative could be implemented as a small community-based project consisting of 30-50 or a maximum of 100 households where the community members will take the responsibility to operate and maintain the system on their own. The total system will be operated by solar electricity.

SUGGESTIONS ON MODERN AND COST-EFFECTIVE STP

SUGGESTIONS ON MODERN AND COST-EFFECTIVE WTP

A water treatment plant could also be designed for the targeted people in the community-based project based on groundwater or surface water treatment basis. Figure 2 shows that the primary step in treating the water involves screening, where large debris and objects are removed to prevent equipment damage. After screening, water will be taken to a holding tank and later pumped to ultrafiltration or activated filter media (which consists of recycled glass sand). Finally, the treated water will be collected in a treated water tank for distribution after passing through disinfection by chlorination or UV filter. The entire water treatment system could be operated by solar electricity, so that the WTP could be placed anywhere to meet the SDG goal, which should highlight the proximity to residence, availability onsite and free from pollution & germs. This is the best way to treat well water, groundwater, or surface water. This water treatment plant will supply only the drinking water from the project and the residents under the project should collect their daily drinking water from there on a daily basis.

Contaminated water sources degrade ecosystems, increase disease burden, and disproportionately affect vulnerable communities, thereby hindering inclusive growth. Addressing these challenges through integrated water resource management, investment in sustainable sanitation technologies, and strong governance is essential for achieving long-term environmental sustainability and meeting national and global development goals in Bangladesh. By implementing such an initiative step by step, we can bring the whole nation under the sewage treatment and safe water supply network, which also saves huge amounts of money from the health sector by eliminating or reducing the waterborne and other diseases every year.

It is evident that sewage treatment and safe water are not luxuries for Bangladeshi citizens, but they are civil rights irrespective of people's race, religion, and geographical boundary. This proposal outlines a comprehensive plan for establishing a modern Sewage Treatment Plant (STP) and Water Treatment Plant (WTP) aimed at improving wastewater management, reducing environmental pollution, and contributing to the national goals outlined in the Bangladesh Delta Plan 2100 and Sustainable Development Goal 6 (Clean Water and Sanitation). This document presents the technical approach, expected outcomes, and implementation strategy to support long-term sustainable sanitation infrastructure in Bangladesh.

Nasir Uddin Khan, *PhD is a waste management specialist. He lives in Kent, United Kingdom. He can be reached at nukhan05@gmail.com*