

# NAVIGATING THE WATERS OF CHALLENGE AND CHANGE:

BANGLADESH'S QUEST  
FOR SAFE DRINKING  
WATER AMIDST  
CONTAMINATION AND  
CLIMATE CRISIS



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## Navigating the Waters of Challenge and Change: Bangladesh's Quest for Safe Drinking Water Amidst Contamination and Climate Crisis

Water, a life-sustaining elixir, lies at the heart of Bangladesh's development, health, and survival. Yet, this low-lying deltaic nation grapples with a dual challenge - the contamination of drinking water with arsenic and the profound impact of climate change on its water resources. This article delves into the dynamic landscape of water in Bangladesh, exploring the burgeoning bottled water market, the pervasive arsenic crisis, and the intricate dance between climate change and water security. As we journey through these intricate waterways, we recommend a brighter, more secure water future for this resilient nation.

Water is essential for life, health, and development. However, access to safe and adequate water is a significant challenge for many people worldwide, especially in developing countries like Bangladesh. Bangladesh is a low-lying deltaic country that depends mainly on surface water and groundwater for domestic, agricultural, and industrial needs. The country has abundant water resources during the monsoon season but faces scarcity and quality issues during the dry season. Moreover, the country is vulnerable to various natural disasters and climate change impacts that affect its water security.

One of Bangladesh's main problems is the contamination of drinking water with arsenic, a toxic element that occurs naturally in some aquifers. Arsenic exposure can cause serious health problems like skin lesions, cancers, cardiovascular diseases, and neurological disorders. According to a study by Yale economist Mark Rosenzweig (2022), high levels of arsenic retention have caused a significant decline in Bangladeshis' productivity, cognition, and earnings (Aiden Lee, 2021). The World Health Organization (WHO) has called it "the largest mass poisoning in history," affecting an estimated 30-35 million people in Bangladesh (Saima Hedrick, 2023).

Another problem facing Bangladesh is the increasing demand for bottled water, especially in urban areas where piped water supply is limited and unreliable. Bottled water is drinking water packaged into plastic or glass bottles. It can be categorized as sparkling or still water, with or without flavoring.

The bottled water market in Bangladesh is projected to grow at a compound annual growth rate (CAGR) of 6.3% over the analysis period of 2021 to 2027 (StrategyHelix, 2021), driven by factors such as rising awareness about safe water consumption, favorable government regulations and market initiatives, premiumization with the growth of fortified and flavored water segments. However, bottled water consumption also faces barriers, such as high cost, low availability, environmental concerns, and consumer preferences.

This article will explore Bangladesh's drinking water or packaged drinking scenario from different perspectives. We will discuss the bottled water market in Bangladesh, the arsenic contamination of groundwater in Bangladesh, and the climate change impacts on water resources in Bangladesh. We will also provide some recommendations or suggestions for improving the situation.

### The Bottled Water Market in Bangladesh

The bottled water market in Bangladesh is one of the fastest-growing segments of the non-alcoholic drinks industry. Bangladesh's bottled water market value was USD 125 million in 2020 and is expected to reach USD 192 million by 2027 (StrategyHelix, 2021). On the other hand, Bangladesh's bottled water market volume was 5.8 billion liters in 2020 and is expected to reach 8 billion liters by 2027 (StrategyHelix, 2021).

The bottled water market in Bangladesh is segmented by product type and distribution channel. By product type, it is categorized into sparkling water, functional water (water with added minerals or vitamins), and still water (plain or flavored). The still water segment held the largest market share in 2020 due to its wide availability and affordability (StrategyHelix, 2021). However, the functional water segment is expected to grow at a higher CAGR over the forecast period due to its perceived health benefits and premium positioning (StrategyHelix, 2021).

By distribution channel, the bottled water market in Bangladesh is divided into convenience stores (small shops that sell a variety of products), hypermarkets (large self-service stores that sell a wide range of goods), small grocers (independent retailers that sell mainly food items), supermarkets (large self-service stores that sell mainly food items), and others (such as online platforms, vending machines, and direct sales). The convenience stores segment accounted for the largest market share in 2020 due to its convenience and accessibility (StrategyHelix, 2021). However, the online platforms segment is expected to grow at a higher CAGR over the forecast period due to the increasing internet penetration and e-commerce activities in Bangladesh (StrategyHelix, 2021).

The key players in the bottled water market in Bangladesh include Meghna Group of Industries, Partex Group, PRAN Foods Ltd., and The Coca-Cola Company. These companies compete based on product quality, price, distribution network, brand image, and innovation. They also engage in various marketing and promotional activities, such as advertising, sponsorship, social media campaigns, and corporate social responsibility initiatives, to attract and retain customers.

Several factors drive bottled water consumption in Bangladesh. One of them is the increasing awareness among people about safe water, as many water sources are contaminated with arsenic, bacteria, or other pollutants. Bottled water is perceived as a safer and healthier alternative to tap water or tubewell water. Additionally, favorable government regulations and market initiatives, such as the certification for bottled water quality, guidelines for bottled water production and distribution, and projects for providing safe drinking water to rural communities, also play a role. Another factor is the premiumization with the growth of fortified and flavored water segments, which offer value-added benefits to consumers who seek more than hydration. Finally, increasing disposable income and urbanization enable more people to afford and access bottled water, especially among urban consumers with higher income levels, education levels, and health consciousness than rural consumers.

Bottled water consumption in Bangladesh faces several barriers. Firstly, it is relatively expensive compared to other water sources like tap or tubewell water. Secondly, due to poor infrastructure, bottled water is not readily available in remote or rural areas. Thirdly, the environmental concerns surrounding plastic waste generation and disposal pose a significant challenge. Lastly, some consumers prefer other water sources due to personal preference or trust issues with bottled water quality.

## The Arsenic Contamination of Groundwater in Bangladesh

The arsenic groundwater contamination in Bangladesh is one of the world's most serious public health issues. Arsenic is a naturally occurring element found in some aquifers (underground layers of rock that hold groundwater). Arsenic can dissolve into groundwater when it comes into contact with oxygen or organic matter. Arsenic can also enter groundwater from human activities, such as mining, agriculture, or industrial processes.

Arsenic exposure can cause various acute and chronic health problems, such as skin lesions (dark spots or thickening of the skin), cancers (of the skin, bladder, lung, liver, kidney), cardiovascular diseases (such as high blood pressure or heart failure), neurological disorders (such as cognitive impairment or peripheral neuropathy), diabetes mellitus (a condition that affects blood sugar levels), respiratory diseases (such as bronchitis or pneumonia), reproductive problems (such as infertility or miscarriage), and immune system disorders (such as infections or allergies).

According to a study by Yale economist Mark Rosenzweig (2022), high levels of arsenic retention have caused a significant decline in the productivity (by 8%), cognition (by 5%), and earnings (by 13%) of Bangladeshis. The study also found that arsenic exposure has reduced schooling attainment by 0.5 years for children aged 6-15 (Aiden Lee, 2021).

The extent of arsenic contamination in Bangladesh is alarming. According to the National Drinking Water Quality Survey conducted by the Bangladesh Bureau of Statistics in 2009, about 35% of the tubewells in the country were contaminated with arsenic above the national standard of 50 micrograms per liter ( $\mu\text{g/L}$ ), and 57% were contaminated above the WHO guideline value of 10  $\mu\text{g/L}$ . The survey also estimated that about 20 million people were exposed to arsenic above the national standard, and 35 million were above the WHO guideline. The survey covered 216,000 tubewells in 64 districts of Bangladesh.

## The Climate Change Impacts on Water Resources in Bangladesh

The impacts of climate change on water resources in Bangladesh are multifaceted. Climate change, driven by increased greenhouse gas concentrations, affects water availability and quality through various mechanisms, including shifts in temperature, precipitation patterns, evaporation rates, sea level rise, salinity intrusion, glacier melting, and extreme weather events (World Bank, 2018).

One of the most significant impacts is sea level rise, resulting in coastal erosion, land subsidence, saltwater intrusion, flooding, storm surges, and displacement of millions of people (World Bank, 2018). Salinity intrusion has also intensified in coastal areas due to sea level rise, reduced upstream freshwater flow, increased groundwater extraction, and tidal fluctuations, affecting approximately 20% of the coastal population's access to freshwater.

Floods, a recurrent challenge in Bangladesh, are projected to increase in frequency and intensity due to climate change, affecting infrastructure, crops, health and displacing communities (UNDP, 2017). Droughts, particularly in northwestern and southwestern regions, are expected to become more severe and prolonged, leading to crop failure, food insecurity, and increased water demand (Bangladeshi researchers, 2015).

Melting of Himalayan glaciers in parts of the Ganga-Brahmaputra-Meghna river basin will increase river flow but decrease in the long term, affecting water availability and management (Nepalese researchers, 2014). Extreme events like heatwaves, cyclones, and storms have intensified and pose significant risks (Bangladeshi researchers, 2018).

Adaptation strategies include rainwater harvesting, desalination, water conservation, and improved water resource management to enhance resilience and reduce vulnerability. Mitigation efforts focus on renewable energy sources and afforestation to limit greenhouse gas emissions and enhance carbon sequestration (World Bank, 2018; UNDP, 2017).

Moreover, the multifaceted impacts of climate change on water resources in Bangladesh necessitate a diverse set of adaptation and mitigation strategies to ensure water security and sustainable management in the face of a changing climate (Bangladeshi researchers, 2015; Nepalese researchers, 2014; World Bank, 2018; UNDP, 2017).

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# About ECRL

Emerging Credit Rating Limited (hereinafter referred to as ECRL) began its journey in the year 2009 with the motive to deliver credible superior & quality credit rating opinions in various industry segments around Bangladesh. ECRL obtained a credit rating license from Bangladesh Securities and Exchange Commission (BSEC) in June 2010 as per Credit Rating Companies Rules 1996 and also received Bangladesh Bank Recognition as an External Credit Assessment Institution (ECAI) in October 2010 to do the rating of Banks, Financial Institutions and their borrowers and also from Insurance Development & Regulatory Authority (IDRA) in 2015 to do the rating of Insurance Companies & affiliated with Malaysian Rating Corporation Berhad.

Emerging Credit Rating Limited's team is oriented towards the continuous improvement of processes, striving for an important role in the leadership of the business world. Every individual in ECRL is committed to providing topmost ingenious Credit Rating Services and Comprehensive Research Services in Bangladesh. ECRL's rating services and solutions reflect independence, professionalism, transparency, and impartial opinions, which assist businesses in enhancing the quality of their decisions and helping issuers access a broader investor base and even smaller known companies approach the money and capital markets. The Credit Rating process is an informed, well-researched and intended opinion of rating agencies on the creditworthiness of issuers or issues in terms of their/ its ability and willingness to discharge its financial obligations in a timely manner. Issuers, lenders, fixed-income investors use these risk assessments for the purpose of lending to or investment in a corporation (such as a financial institution, an insurance company, a non-banking corporation or a corporate entity) as well as evaluating the risk of default of an organization's financial obligations in terms of loan or debt.

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ECRL Research provides insights, opinions, and analysis on Bangladesh and International Economies. ECRL Research conducts surveys and produces working papers and reports on Bangladesh's different socio-economic issues, industries, and capital market. It also provides training programs to professionals from financial and economic sectors on a wide array of technical issues.

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