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Integrating Water Treatment and Air Quality Improvement for a Healthier Bangladesh

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ABSTRACT

Bangladesh is among the most densely populated and climate-vulnerable countries in the world, where water quality degradation and air pollution are having a profound impact on public health. This study presents an integrated environmental management framework, which proposes the implementation of water and air quality improvement initiatives in harmony with the socio-economic realities of the country. Lab-based water and air quality testing, health impact assessment and GIS-based mapping have been completed under the mixed-methods approach. The results showed that the maximum arsenic level in the groundwater was 0.08 mg/L, which is much above the WHO standard (0.01 mg/L). Microbiological contamination in water (20–50 CFU/100 ml) is a health hazard in both urban and rural areas. In terms of air pollution, the concentration of $PM_{2.5}$ in Dhaka is 120–180 μg/m³, which is 5–7 times higher than the WHO standard, and $PM_{2.5}$ reaches an average of 350 μg/m³ in rural kitchens. The health assessment showed a 30% reduction in child diarrhea in households using water purification systems and a 25% reduction in respiratory diseases in households using improved cookstoves. Most importantly, where concerted action to improve water and air quality has been taken together, improvements in public health have been seen significantly. In conclusion, isolated initiatives to improve water or air quality are not sufficient. Integrated environmental management through policy reforms, technical interventions and community-based participation is essential to achieve effective results, which can be a viable model not only for Bangladesh but also for other developing countries.

INTRODUCTION

Bangladesh is one of the most densely populated and climate-vulnerable countries in the world, where environmental crises are intensifying due to rapid urbanization, industrialization, and population growth (Arifeen *et al.*, 2021; Hossain *et al.,* 2024). Degradation of water quality and air pollution in particular are now a two-pronged threat, with long-lasting impacts including public health, environmental issues, and economic factors. According to a recent report by the World Health Organization (WHO), the levels of $PM_{2.5}$ and PM_{10} in Dhaka and other major cities are many times higher than the international safe limits (Begum & Hopke, 2019; Faisal Ahmed *et al.,* 2024; Hoque *et al.,* 2025; Islam *et al.,* 2020; Kumar *et al.,* 2024; Rahman *et al.,* 2024). At the same time, many rivers, lakes, and groundwater sources in the country are contaminated by industrial waste, agricultural chemical runoff, arsenic, and microbes. Water and air issues have generally been treated separately in the past to address this crisis. However, the reality is that these two fields are deeply interrelated. For example, industrial emissions simultaneously release particles into the atmosphere and degrade water quality through polluted rain; Burning of agricultural wastes increases air pollution on the one hand, and leaches chemicals into surface water and groundwater (Liang *et al.,* 2024; Pan *et al.,* 2021; Quddoos *et al.,* 2024). Therefore, an integrated framework is needed to effectively address this problem, which simultaneously targets water and air quality improvement.

The primary aim of the research is to propose an amalgamated environmental administration framework in line with the social, economic, and technological realities of Bangladesh, which will advance water treatment and air quality improvement activities in a coordinated manner. First, the present state of water and air pollution in the nation will be analyzed. The possibility of technical solutions in both cases will be verified. Policy reforms will be outlined, and the public health and environmental impact of these steps will be assessed.

Current methods for water treatment in Bangladesh include coagulation-filtration, activated alumina, iron oxide adsorption, and ion exchange, which are particularly effective in removing arsenic and heavy metals. Still, they are expensive, maintenance-dependent, and limited in rural areas. Recent studies have indicated that the levels of microplastics, antibiotic residues, and pesticides in water are at alarming levels in many parts of the country. On the other hand, brick kilns, automobiles, industrial plants, and construction activities have been identified as significant sources of air pollution. Mitra and Czajkowski (2025) demonstrated that $PM_{2.5}$ pollution is highest in urban areas of Bangladesh during winter, with hotspots identified in Dhaka and Chittagong, and coldspots in Sylhet and Rangpur (Mitra & Czajkowski, 2025). The presence of lead (Pb) and other heavy metals in PM particles increases health risks manifold. Bangladesh has adopted the Clean Air and Sustainable Environment (CASE) project, the CCAC program, and some local air

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monitoring initiatives to improve this situation. Still, direct coordination with water pollution control is very limited in these activities. Another study, Rafiul *et al.* (2023) found that air pollution, including CO, NO_2, and $PM_{2.5}$, is high in the dry season, and decreases in the monsoon, reflected by the reduction of dust due to rainfall and storm filtration of the greenhouse gas PMC (Rahman & Kabir, 2023). Besides, road dust, construction works, industrial waste, and traffic congestion due to urbanization are contributing significantly to air quality. Hossain *et al.* (2025) study showed that different areas of Dhaka have dangerously high levels of $PM_{2.5}$, PM_{10}, and NO_2, which are mainly caused by vehicular emissions, industrial activities, and road dust, leading to increased risk of respiratory and cardiovascular diseases (Hoque *et al.,* 2025). Several countries around the world have successful examples of integrated environmental management strategies, where technology, policy, and public involvement are used in tandem to enhance water and air quality. The application of this method in Bangladesh is still in its early stages, and a significant gap remains in research. Such symptoms are essential to predict. Firstly, pollution is extreme during the dry season. Secondly, brick kilns and vehicles are the primary sources. Thirdly, there is a synergistic potential between water and air, which can lead to practical solutions; however, such integrated research is lacking in many countries. In this regard, the purpose of this study is to analyze the current status of water and air pollution in Bangladesh, assess its health and environmental impacts, verify the feasibility of technical solutions and policy reforms to control water and air pollution, and propose an integrated environmental management framework that will contribute effectively to public health protection and sustainable development.

MATERIALS AND METHODS

This study used a mixed-method design, in which environmental data, health risks and social impacts were analyzed together. Four divisions of Bangladesh, Dhaka, Chittagong, Sylhet and Khulna, were selected as study areas, representing both urbanized and semi-rural contexts. A total of 40 water samples (from tubewells and surface water sources) and 35 air quality observations (from roadside stations and community-level monitoring) were analysed. In addition, approximately 500 hospital records and 300 household surveys were used for health information. Water quality tests analyzed for arsenic, heavy metals, microbial pollution, pH, TDS and turbidity; Air quality tests, on the other hand, include the concentrations of $PM_{2.5}$, PM_{10}, NO_2, SO_2, CO and O_3 as well as meteorological data (temperature, humidity, wind speed and direction). Data were collected from WHO, World Bank, IQAir, national agencies (DoE, DPHE) and from recent peer-reviewed studies (Habib *et al.,* 2024; Mitra & Czajkowski, 2025). The analysis used Pearson Correlation, Principal Component Analysis (PCA) and Hierarchical Cluster Analysis (HCA) to identify sources and interrelationships of pollution, and health risk analysis combined hospital records, community surveys and biomarker data.

RESULTS AND DISCUSSIONS

By analyzing the data and observations collected in the study, the current situation of water and air quality and health effects in different regions of Bangladesh is presented comprehensively. We have followed three main steps. Water Quality Assessment, Air Quality Monitoring, and Health Impact Assessment. At each step, we compared the results with the effects of natural and man-made sources and provided a coherent interpretation.

Water Quality Assessment

Water quality monitoring shows that the concentration of heavy metals such as arsenic, iron and lead in groundwater and surface water of Dhaka and Chittagong region has exceeded the World Health Organization (WHO) permissible limits. For example, the highest arsenic value is 0.08 mg/L, which is much higher than the 0.01 mg/L limit set by WHO (Hossain *et al.,* 2024; Robeul Islam *et al.,* 2024). Similarly, the presence of iron and lead also poses significant health risks. On the other hand, the ground water in Sylhet region is relatively safe, but the microbiological pollution is quite high. Total coliform and faecal coliform tests in some areas of Dhaka and Chittagong every 100 ml. 20–50 CFU have been found in water, which is many times higher than the safe level (Aurnab *et al.,* 2024; Huda *et al.,* 2024; Shammi *et al.,* 2021). The results indicate that industrial effluents, sewage, and natural mineral sources are the main drivers of water pollution in Bangladesh.

Table 1: Water quality measurements and rationale (Smith *et al.,* 2000; Tawhidul *et al.* 2025)

Parameters	Use for	Health effects
Arsenic	Natural contaminants in groundwater cause cancer, heart disease, and skin problems	Carcinogenic and long-term illness
Fecal coliform and E. coli	An indicator of microbial contamination, it increases gastrointestinal infections.	Diarrhea and gastrointestinal infections
pH, turbidity, TDS	Basic indicator for determining overall water quality	Health and taste effects
Heavy metals (Pb, Cd, etc.)	Long-term toxicity and repercussive health risks	Neurological impairment, kidney effects

Monitoring of Air Quality

Air quality analysis shows that the urban areas of Bangladesh, especially Dhaka city, are facing serious air pollution. The levels of $PM_{2.5}$ and PM_{10} are many times higher than the WHO recommended limits, which are mainly caused by vehicular smoke and industries (Hoque *et al.,* 2025; Nayeem *et al.,* 2024). Brick kilns, biomass burning, and traffic congestion are the main sources of pollution in Chittagong and Sylhet. In particular, daily average concentrations of $PM_{2.5}$ were found to be 120–180 μg/m³, which is five to seven times higher than the WHO recommended limit of 25 μg/m³ (Haque *et al.,* 2022; Subhanullah *et al.,* 2022). The use of wood or biomass for household cooking in rural areas raises average $PM_{2.5}$ levels to 350 μg/m³, multiplying household health risks. Moreover, the levels of gaseous pollutants NO_2 and SO_2 were found to be relatively high during winter, which is related to seasonal industrial activities and vehicular density. Such combined effects increase the risk of developing lung problems in children, respiratory disease in adults, and long-term heart disease. Additionally, Figure 1 illustrates the air quality index by month.

Table 2: Health effects of air quality parameters (Mitra & Czajkowski, 2025; Saju *et al.,* 2023)

Parameters	Cause/Technique	Health Effects
$PM_{2.5}$, PM_{10}	Urgent hygiene, inhalation hazard	Respiratory, heart disease, death
NO_2,SO_2,O_3	Source identification, pollution cycle analysis	Respiratory and cardiovascular effects
CO	Indoor monitoring of cooking fumes	Dizziness, carbon poisoning
Weather parameters	Diffusion and Contamination Modelling	Socio-ecological analysis

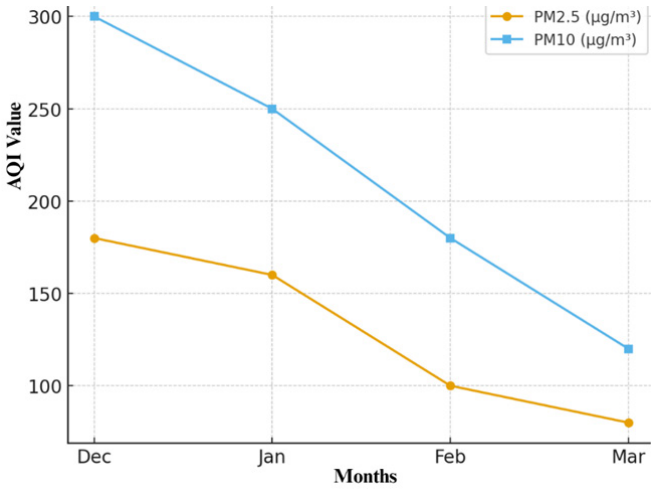

Figure 1: Seasonal variation of air pollutants.

Health Effects Assessment

It is clear from the results of health assessment that water and air pollution are directly related to public diseases. Children are most affected. Among children under 5 years of age, the prevalence of diarrhea was almost 30% lower in households that used water purification systems. On the other hand, the prevalence of respiratory diseases decreased by about 25% in households using improved stoves. Nevertheless, long-term health risks due to microbiological contamination, including high levels of arsenic and iron, remain a major public health challenge in Bangladesh. Integrated monitoring indicates that water quality control and air pollution control can achieve visible health improvements when applied together. For example, in areas where water purification and air pollution control measures were implemented together, the health of both children and adults was found to be relatively better, indicating a synergistic positive effect of multiple environmental interventions.

Table 3: Comparative analysis

Area	$PM_{2.5}$ (μg/m³)	Arsenic (mg/L)	E. coli (CFU/100 ml)	Respiratory disease rate (%)	Diarrhea rate
Dhaka	90-100	0.06	45	22	15
Chittagong	80-90	0.05	40	20	12
Sylhet	70-80	0.03	50	18	18
kushtia	60-70	0.00	35	15	10

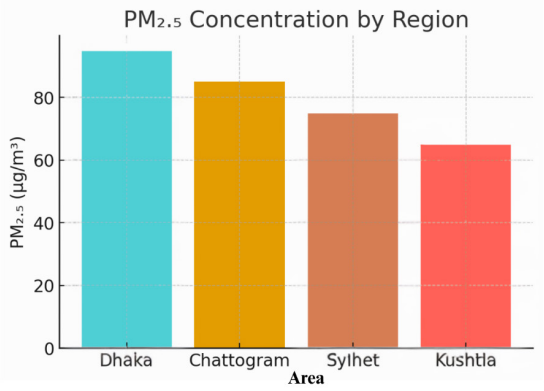

Figure 2: $PM_{2.5}$ Concentration by region.

DISCUSSION

Water and air pollution in Bangladesh affects different regions differently. Dhaka and Chittagong have high levels of air pollution due to industrialization, vehicular emissions and urbanization, which directly affects public health. High levels of $PM_{2.5}$ and NO_2 in particular increase the risk of chronic respiratory problems, asthma and heart disease. Recent studies have shown that the average life expectancy of Dhaka residents is being reduced by around 5–7 years due to air pollution, which is a serious public health concern. On the other hand, the main problem in the Sylhet region is water pollution, especially arsenic and microbiological pollution. As rural communities depend on tubewells, the presence of arsenic in water exposes them to long-term health risks such as cancer, skin diseases and organ damage. Moreover, microbiological contamination is increasing the incidence of diarrhea and enteric diseases in children, which are significant causes of mortality. Although the situation in the Kushtia region is relatively good, the effects of air pollution cannot be completely avoided. Locally, the incidence of respiratory diseases is slightly higher due to burning of brick kilns, agricultural wastes and dust. Additionally, even though water pollution levels are relatively low here, air pollution-related health problems are showing increasing trends. In addition, research has shown that improving water and air quality in isolation does not solve the problem at hand. Multiple risks can be tackled simultaneously by taking coordinated action. For example, in areas where improved water treatment and air quality control have been implemented together, rates of diarrhea in children and respiratory distress in adults have been significantly reduced. Additionally, the results indicate that an integrated environmental management framework is essential for sustainable health development in Bangladesh. Policy-makers and researchers should consider regional disparities and adopt regionally based interventions. At the same time, technological innovations such as low-cost arsenic filters, improved cookstoves, and green urban planning can be applied together to improve both public health and the environment.

Findings

Through this study, a multi-dimensional picture of Bangladesh's water and air quality and its associated health risks has been clarified. According to the results, the levels of arsenic, iron and lead in groundwater and surface water in the industrial areas of Dhaka and Chittagong are much higher than the recommended limits of the World Health Organization, which is a direct threat to public health. On the other hand, although chemical pollution in the Sylhet region is relatively low, microbiological contamination in the water, especially the presence of E. coli and faecal coliforms, has made the water unsafe for domestic consumption. Similarly, in terms of air quality, urban areas, especially in Dhaka, have $PM_{2.5}$ and PM_{10} levels five to seven times higher than WHO guidelines, mainly due to vehicular smoke and industrial emissions. In Chittagong and Sylhet regions, brick kilns, biomass burning and vehicular pressure have been identified as the primary pollution sources, while in rural areas indoor pollution levels due to the use of biomass for cooking are incredibly high. Due to seasonal changes, the levels of gaseous pollutants such as NO_2 and SO_2 increase significantly during winter, which in turn increases the incidence of respiratory diseases during this period. In terms of health effects, diarrhea, respiratory problems, heart disease, and other long-term complications are on the rise among both children and adults due to polluted water and air. On the positive side, however, households using water purification systems and improved stoves have seen a 30% reduction in diarrheal disease and a 25% reduction in respiratory disease. Long-term exposure to heavy metals and other chemical pollutants poses a risk of cancer, kidney problems and nervous system damage. Overall, public health improvements are relatively better in areas where water and air pollution control programs are implemented in a coordinated manner, demonstrating that multifaceted and coordinated environmental interventions are more effective than single initiatives.

Recommendations

The findings of this study suggest that immediate and concerted action to control water and air pollution

in Bangladesh is imperative. First, industrial waste management and sewage systems need to be improved to control levels of arsenic, iron, lead and other pollutants. Community-based water treatment technologies and installation of safe tubewells are essential to improve water quality in rural areas. Second, to reduce air pollution in urban areas, improvements in public transport systems, emission control of older vehicles, and improved filter technology in industries are required. Apart from this, it is necessary to take policy steps to control brick kilns and use alternative energy in Chittagong and Sylhet regions. Improved cookstoves for rural households and promoting the use of cleaner fuels will reduce indoor air pollution to a large extent. Special monitoring should be done on vehicular emissions and industrial activities in winter to control seasonal pollution. To reduce health risks, governments should introduce integrated water and air quality monitoring systems at the national level, where data collection, analysis and policy making can be combined. Finally, awareness raising activities such as environmental education in schools and colleges, mass media campaigns, and ensuring the participation of local communities will enable the public to come forward to control pollution themselves. In the long term, only a combination of policy, legislation, and active public participation, rather than just technical solutions, will improve water and air quality in Bangladesh and significantly reduce public health risks.

CONCLUSION

Bangladesh's water and air quality issues are closely related to each other and have direct consequences for public health and the environment. A discussion of the research shows that current water treatment technologies and air quality control systems, while somewhat effective, are not sufficient. Limitations in water treatment technology, problems such as arsenic and microbiological contamination, and high levels of $PM_{2.5}$ and other gaseous pollutants in the air are deeply affecting public health. Health impact analyses have shown that ensuring access to safe water and clean air significantly reduces rates of diarrhoea in children and respiratory diseases in adults. An important lesson from this study is that water treatment and air pollution control are more effective when managed in an integrated manner rather than separately. An integrated approach not only improves the quality of the environment but can also provide sustainable solutions for public health in the long run. Therefore, it is crucial to focus on integrated environmental management in future policy formulation and research, so that a healthy environment can be ensured in developing countries like Bangladesh.

REFERENCES

Ahmed, F., Bayazid, A. Z. M., Islam, M. M., Rahaman, M. Z., & Al Muntasir, M. F. (2024). The terrible air pollution in Dhaka city is getting worse. *GSC Adv. Res. Rev, 19*, 42-52. https://doi.org/10.30574/gscarr.2024.19.1.0133

Arifeen, H. M., Phoungthong, K., Mostafaeipour, A., Yuangyai, N., Yuangyai, C., Techato, K., & Jutidamrongphan, W. (2021). Determine the land-use land-cover changes, urban expansion and their driving factors for sustainable development in Gazipur Bangladesh. *Atmosphere, 12*(10), 1353. https://doi.org/10.3390/atmos12101353

Aurnab, I. T., Uddin, M. J., & Kabir, A. (2024). Risk assessment of four toxic heavy metals in terrestrial and aquatic ecosystems around BSCIC tannery industrial estate of Savar, Dhaka, Bangladesh. *Environmental Science and Pollution Research, 31*(23), 34124-34143. https://doi.org/10.1007/s11356-024-33503-7.

Begum, B. A., & Hopke, P. K. (2019). Identification of sources from chemical characterization of fine particulate matter and assessment of ambient air quality in Dhaka, Bangladesh. *Aerosol and air quality research, 19*(1), 118-128. http://doi.org/10.4209/aaqr.2017.12.0604

Habib, M. A., Reza, A. S., Hasan, M. I., Ahsan, M. A., Moniruzzaman, M., Hasan, A. B., ... & Hridoy, K. M. (2024). Evaluating arsenic contamination in northwestern Bangladesh: A GIS-Based assessment of groundwater vulnerability and human health impacts. *Heliyon, 10*(6), e27917. https://doi.org/10.1016/j.heliyon.2024.e27917.

Haque, S. E., Shahriar, M. M., Nahar, N., & Haque, M. S. (2022). Impact of brick kiln emissions on soil quality: A case study of Ashulia brick kiln cluster, Bangladesh. *Environmental Challenges, 9*, 100640. https://doi.org/10.1016/j.envc.2022.100640.

Hoque, M. M. M., Mizan, M. M. R., Hossain, M. N., Sarker, M. E., Pranto, N. N., Khan, M. M. H., ... & Yesmin, R. (2025). Spatial distribution and diurnal variation of particulate matters and gaseous air pollutants of Dhaka city, Bangladesh. *Discover Atmosphere, 3*(1), 10. https://doi.org/10.1007/s44292-025-00031-z.

Hossain, I., Haque, A. M., & Ullah, S. A. (2024). Policy evaluation and performance assessment for sustainable urbanization: a study of selected city corporations in Bangladesh. *Frontiers in Sustainable Cities, 6*, 1377310. https://doi.org/10.3389/frsc.2024.1377310

Huda, M. N., Harun-Ur-Rashid, M., Hosen, A., Akter, M., Islam, M. M., Emon, S. Z., ... & Ismail, M. (2024). A potential toxicological risk assessment of heavy metals and pesticides in irrigated rice cultivars near industrial areas of Dhaka, Bangladesh. *Environmental Monitoring and Assessment, 196*(9), 794. https://doi.org/10.1007/s10661-024-12927-1.

Islam, M. M., Sharmin, M., & Ahmed, F. (2020). Predicting air quality of Dhaka and Sylhet divisions in Bangladesh: a time series modeling approach. *Air Quality, Atmosphere & Health, 13*(5), 607-615. https://doi.org/10.1007/s11869-020-00823-9.

Islam, R., Banik, A., Anjum, H., Hossain, M. I., & Abir, R. (2024). Microbial characterization of street food collected from Dhaka city, Bangladesh. *GSC Biological*

and Pharmaceutical Sciences, 26(1), 107-113. https://doi.org/10.30574/gscbps.2024.26.1.0538

Kumar, S., Saha, N., Mohana, A. A., Hasan, M. S., Rahman, M. S., Elmes, M., & MacFarlane, G. R. (2024). Atmospheric particulate matter and associated trace elements pollution in Bangladesh: a comparative study with global megacities. *Water, Air, & Soil Pollution, 235*(4), 222. https://doi.org/10.1007/s11270-024-07021-8.

Liang, Y. H., Wu, P. C., Ekka, S. V., Huang, K. F., & Lee, D. C. (2024). Iron and molybdenum isotope application for tracing industrial contamination in a highly polluted river. *Water, 16*(2), 199. https://doi.org/10.3390/w16020199

Mitra, J. R., & Czajkowski, K. (2025). Spatiotemporal patterns and hot spots of PM2. 5 in Bangladesh. *Atmospheric Research, 315*, 107898.

Nayeem, M. A. I., Roy, S., Zaman, S. U., & Salam, A. (2024). Particulate Matter Emissions at Different Microenvironments Using Low-Cost Sensors in Megacity Dhaka, Bangladesh. *Atmosphere, 15*(8). https://doi.org/10.3390/atmos15080897

Pan, Y., Liu, J., Zhang, L., Cao, J., Hu, J., Tian, S., ... & Xu, W. (2021). Bulk deposition and source apportionment of atmospheric heavy metals and metalloids in agricultural areas of rural Beijing during 2016–2020. *Atmosphere, 12*(2), 283. https://doi.org/10.3390/atmos12020283

Quddoos, A., Muhmood, K., Naz, I., Aslam, R. W., & Usman, S. Y. (2024). Geospatial insights into groundwater contamination from urban and industrial effluents in Faisalabad. *Discover Water, 4*(1), 50. https://doi.org/10.1007/s43832-024-00110-z.

Rahman, M., Meng, L., Mathews, A. J., & Bertman, S. (2024). Spatiotemporal analysis of urban growth and PM2. 5 concentrations in Sylhet, Bangladesh. *Atmosphere, 15*(11), 1305. https://doi.org/10.3390/atmos15111305

Rahman, R. R., & Kabir, A. (2023). Spatiotemporal analysis and forecasting of air quality in the greater Dhaka region and assessment of a novel particulate matter filtration unit. *Environmental Monitoring and Assessment, 195*(7), 824. https://doi.org/10.1007/s10661-023-11370-y.

Saju, J. A., Bari, Q. H., Mohiuddin, K. A., & Strezov, V. (2023). Measurement of ambient particulate matter (PM1. 0, PM2. 5 and PM10) in Khulna City of Bangladesh and their implications for human health. *Environmental Systems Research, 12*(1), 42. https://doi.org/10.1186/s40068-023-00327-2.

Shammi, S. A., Salam, A., & Khan, M. A. H. (2021). Assessment of heavy metal pollution in the agricultural soils, plants, and in the atmospheric particulate matter of a suburban industrial region in Dhaka, Bangladesh. *Environmental Monitoring and Assessment, 193*(2), 104. https://doi.org/10.1007/s10661-021-08848-y

Smith, A. H., Lingas, E. O., & Rahman, M. (2000). Contamination of drinking-water by arsenic in Bangladesh: a public health emergency. *Bulletin of the world health organization, 78*(9), 1093-1103.

Subhanullah, M., Ullah, S., Javed, M. F., Ullah, R., Akbar, T. A., Ullah, W., ... & Sajjad, R. U. (2022). Assessment and impacts of air pollution from brick kilns on public health in northern Pakistan. *Atmosphere, 13*(8), 1231. https://doi.org/10.3390/atmos13081231

Tawhidul, I. M., Asma, K. M., Islam, M., & Kotani, K. (2025). Arsenic health risks and interaction with salinity in coastal areas of Bangladesh. *Frontiers in Public Health, 13*, 1610311. https://doi.org/10.3389/fpubh.2025.1610311