FROM LIFELINES TO LIABILITY

The growing threat in Bangladesh's rivers

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Globally, the boundary for biogeochemical flows of natural nutrient cycles, mainly nitrogen and phosphorus, through activities such as fertiliser use and sewage discharge from freshwater to the ocean has already passed a safe operating space for humanity. The concept of river pollution encompasses a broader definition than biogeochemical flows; it is driven by various waste products, including sewage, industrial effluents, nutrients, pesticides, plastics, and chemicals. Yet the boundaries for river pollution are unknown across the globe.

The growing threat of climate change and other sustainability challenges, such as population growth, urbanisation, and water scarcity, is increasing the risk of generating large-scale abrupt or irreversible social–ecological catastrophe. The impacts of river pollution can be drastic or immediate, no matter the drivers, but can severely risk the ecological and societal systems in which we live.

Bangladesh is known as the land of rivers and flooding. River pollution in Bangladesh is a myth to both local and global society. However, the transboundary context of rivers in Bangladesh and growing local drivers, such as industry, population, urbanisation, and degradation of wetlands, have polluted our rivers, where the impacts are experienced in both social and ecological systems. Bangladesh is among the top 20 countries contributing to plastic emissions from rivers to the ocean. Additionally, and alarmingly, India and China are at the top of the list, with which Bangladesh shares many transboundary rivers, including the mighty Ganges and Brahmaputra.

Although river pollution in Bangladesh was initially limited to urban areas, mainly around Dhaka city, the transboundary context of the rivers and growing local drivers are increasing pollutants in the rivers. The rivers surrounding Dhaka, including the Buriganga, Turag, and Shitalakkhya, are among the most polluted in Bangladesh. These rivers receive vast amounts of untreated waste from factories (at least ~3,000) that discharge industrial effluent directly into rivers without proper treatment. Forever chemicals, originating from tanneries, textiles, and chemical industries, have been detected in the rivers around Dhaka city. These substances impose a significant risk to the ecosystem and human health due to their unique, persistent nature of stability, accumulation in living organisms, and the challenge of removing these chemicals using conventional methods.

The Department of Environment (DoE) stated in the water quality report (2023) that rivers around Dhaka city do not meet national standards. Our recent analysis of water quality data from eight major rivers, spanning 2017 to 2023, reveals that the water quality is unsuitable for fisheries in the Meghna, Buriganga, Shitalakkhya, and Turag rivers. The decline in water quality is mainly driven by organic and inorganic pollutants originating from municipal sewage, domestic waste, and industrial wastewater (mostly textile and leather).

The presence of heavy metals (chromium, lead, arsenic, copper, and nickel) in major rivers, including rivers in Dhaka city, is alarmingly high. Heavy metal pollution has reached critical thresholds in major Bangladeshi rivers, most notably the Buriganga, Shitalakkhya, Padma, Karnaphuli, and Dhaleshwari. This environmental deterioration is the direct result of rapid urbanisation, agricultural runoff, and poorly managed industrialisation. The effluent profiles of the textile, pharmaceutical, and tannery industries remain the dominant sources of these hazardous metallic contaminants.

The agricultural runoff also plays a significant role in river pollution, which in turn negatively impacts irrigation and fish health, ultimately entering the food chain, severely posing health risks (including carcinogenic risks and neurological disorders) due to polluted river waters. With the growing economy and population of Bangladesh, microplastics in river waters are alarmingly increasing due to industrial production and the use of plastic materials, which also significantly spread during the monsoon season due to rainfall and flooding across the rivers in Bangladesh. Though the safety standard for microplastics remains unclear, globally, there is a call to understand the effects of these pollutants and to minimise the production, design, and disposal of plastics more responsibly.

The coastal rivers are highly saline due to sea-level rise, and the reduction of freshwater from upstream imposes risks to the ecosystem, health, and human wellbeing. The daily struggles for safe drinking water and the damage to agriculture, fisheries, and mangrove forests due to high salinity

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Water, which has been coloured by textile dye and will eventually flow through the Labandha, Turag and Buriganga rivers, is released near a paddy field in the Mawna Union area, north of Gazipur.

KEY POINTS

1. River pollution is escalating, threatening social-ecological stability.
2. Transboundary flows and local industries are intensifying toxins and plastic pollution.
3. Urban waste, agriculture, and heavy metals endanger both health and fisheries.
4. Weak enforcement, poor monitoring, and inequitable governance exacerbate these risks.
5. Urgent regional cooperation, regulation, and restoration are needed to avert catastrophe.