

Living in a cleaner environment in India: A strategic analysis and assessment

Executive summary

This is the outcome of a research study on water quality in urban environment carried out by TERI during 2008-11. The study was carried out with financial support from UNICEF-Delhi. This research study focuses on the presence of heavy metals in different environmental compartments as a source of concern because of their persistent, toxic, and bio-accumulative nature. The findings are based on extensive primary and secondary research that include literature reviews, interviews, and field studies of agricultural community in Delhi working along the Yamuna bank and select villages of Haryana.

The study assesses the extent of heavy metal contamination in Yamuna river water, agricultural soil, vegetables, and in people living in the adjacent areas. It also explores the health effects arising from the contamination of surface water and soil, which arise from the manner in which river system is being currently managed. In summary, it portrays our preparedness in confronting rapid urbanization.

The research raises the issues involved and asks the disturbing question: Are we ready to pay the price or face the consequences of poor management of river water? It also urges all stakeholders – the government, funding agencies, industry, and farming community, to work together in a concerted manner to facilitate the progress towards a cleaner environment and a healthier community.

Key messages

- Based on the evidence gathered in the study, the levels of nickel (Ni), manganese (Mn), and lead (Pb) in river Yamuna's water from the Delhi segment, were found to be higher than the commonly used international aquatic water quality criteria.
- Levels of Ni, Mn, Pb, and mercury (Hg) were above the permissible international standards in agricultural soil along the river. While, moderately high levels of contamination were recorded in urban areas, the rural areas showed negligible levels. High level of these pollutants in the flood plains can be associated with treated and untreated effluents or with sewage flowing into the river.
- Two hotspots for soil contamination were identified, one around Wazirabad and another at Okhla barrage, as they showed higher levels of analysed heavy metals.
- Industrial activities involving metal alloys, coal, and oil combustion contribute to these metals in our environment. E-wastes constituents such as nickel batteries, metal coatings, magnetic tapes, and pigments for paints also add to the heavy metal concentrations in the wastewater. The mixing of waste with river initiates the contamination of not just water but also the flood plains.
- Vegetables grown in the flood plain of the Yamuna area show higher levels of heavy metals contamination than those cultivated in rural areas, therefore acting as the entry point for toxic metals into human food chain.

- Bio-monitoring of vulnerable population – women and children in the study area – was undertaken. Significantly higher levels of heavy metals (Hg, Cr, Pb) in urine and blood samples were measured than rural unexposed participants – a reflection of the environment each group lives in.
- In the Yamuna bank area, 23% children had lead in blood above the 10 µg/dl level – the limit above which adverse health effects are noted widely acceptable by the Centers for Disease Control and Prevention (CDC) guideline.
- Effective implementation of regulations for waste disposal, regular monitoring of hot spots, and raising awareness about health effects would ensure the new beginning that is sought by both environmental scientists and public health interest groups.