YAMUNA CANAL REJUVENATION

Water-Quality Assessment Across 260 Monitoring Stations

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Abstract

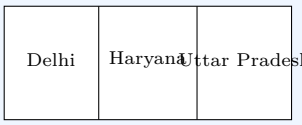
Studied water quality across **260 monitoring stations** of the Yamuna Canal. Key indicators: **Dissolved Oxygen (DO)**, **Biochemical Oxygen Demand (BOD)** and **Total Coliform**.

- DO critically low at several stretches ⇒ stressed ecology and weak self-purification.
- BOD extremely high (up to **116 mg/L**) ⇒ heavy organic load and continuous sewage.
- Total Coliform very high ⇒ severe microbial contamination, unsafe for bathing/contact.
- Pollution hotspots: **Delhi, Haryana, Uttar Pradesh**; need for **wastewater upgrades** and strict monitoring.

Objectives

1. Analyze **year-wise/station-wise** trends in DO, BOD, pH & Total Coliform.
2. Flag **hotspots** and deviations from national standards.
3. Use **Power BI & DAX** for KPIs, trends and hotspot maps.
4. Support targeted **rejuvenation & policy actions**.

Study Area Overview



Data Source & Coverage

- Source: CPCB river water-quality reports and station-wise datasets (Yamuna canal system).
- Period analyzed: **2022–2023** aggregated at annual scale for each monitoring station.
- Parameters used: DO, BOD, Total Coliform, pH and supporting meta-data (state, stretch, class).
- Spatial coverage: **260 stations** across Delhi, Haryana and Uttar Pradesh within the Yamuna basin.

Dashboard Highlights (Power BI KPIs)

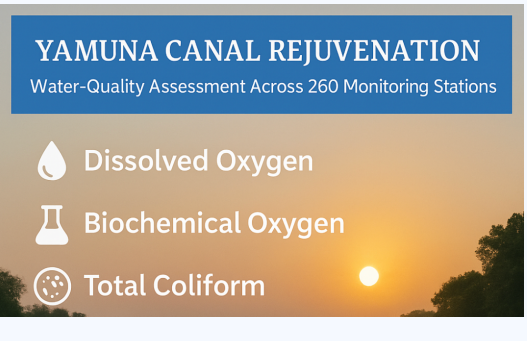
Total stations	260
Avg max Total Coliform	681,370 MPN/100 mL
Max BOD value	116 mg/L
Worst DO recorded	0 mg/L
Records below DO standard	68 samples
Percent of records with high BOD	0.48 (48%)

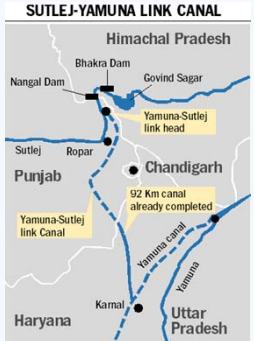
Key Indicator Summary

Indicator	Observation / Interpretation
DO	Many stations below Class B 5 mg/L limit; chronic stress on aquatic life.
BOD	Up to **116 mg/L**; values ≫ 3 mg/L show heavy organic pollution and untreated sewage.
Total Coliform	Counts far exceed bathing-water norms; indicates faecal contamination and public-health risk.

Selected References

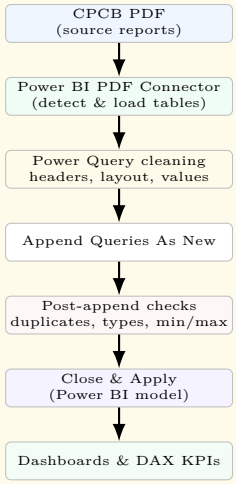
CPCB (2025) *Water Quality of Rivers – 2022*; Anand (2006) J. Env. Biology 27(1); Ravish (2013) *Current World Environment* 8(3); CPCB (2021) *Study Group Report on River Yamuna.*





Data Pre-processing & Trend Analysis

CPCB PDF → Power BI Workflow



Trends in DO, BOD & Total Coliform

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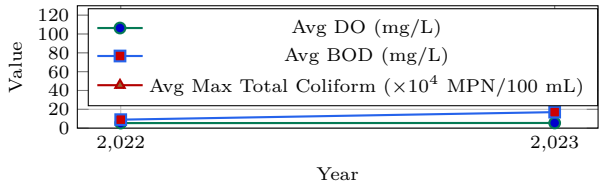


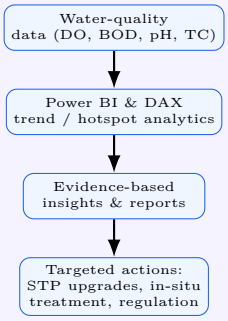
Socio-economic Impact

- Fewer water-borne diseases and reduced healthcare burden on nearby communities.
- Safer irrigation, better crop yields and improved incomes for farmers and allied livelihoods.
- Stronger industrial compliance, lower risk of fines and new jobs in monitoring/treatment.
- Overall healthier ecosystem and improved quality of life along the canal corridor.

Pollution Hotspots

State / Region	Characteristics
Delhi	Priority stretch with near-zero DO, very high BOD & coliform; major STP and drain discharges.
Haryana	Industrial belts and canal-fed drains driving high BOD & microbial pollution; many stations non-compliant.
Uttar Pradesh	Downstream carry-over of upstream pollution; weak dilution leads to chronic exceedance of norms.

Rejuvenation Framework (Analytics to Action)



Limitations & Future Work

- Extend analysis to longer time-series with seasonal (pre- and post-monsoon) resolution.
- Integrate discharge, flow and land-use data to better explain pollution drivers.
- Link water-quality metrics with health, agriculture and livelihood indicators for impact studies.
- Deploy automated alerts and early-warning dashboards for regulatory agencies and citizens.