

Citizen based water quality surveying of groundwater

Background

- Generate information using **Akvo Caddisfly, a mobile water quality monitoring tool** to assess ambient water quality along with contextual information on water resource use, flagging up potential water quality issues in the project locations:
 - 13 sampling points in Delhi
 - 30 sampling points in 6 villages (Motipur, Trilokpur, Pewandi, Alalualpur, Kulgaon and Kishanpur) in Kanpur
- Scope of monitoring exercise focussed on screening water quality for groundwater sources such as handpumps, submersible pumps, wells
- Monitoring was conducted in two periods: February/March and June/July, 2023
- Water quality parameters included Electrical Conductivity, pH and Nitrate
- Facilitated capacity building of regional organisation (Solidaridad) on testing water quality without extensive scientific backgrounds and technical knowledge to monitor and assess the quality of their local water resources effectively
- Data collection offered an opportunity to engage with community to contribute of selection of sampling points, and share observations about quality, quantity and usage of their water sources



Summary of results - Delhi

Water use

- The ten borewells and three handpumps under observation predominantly cater to public institutions, including temples, office complexes, schools, and households. Two specific sampling points exhibit the highest user count, with a range of 7000-8000 users.

Water quality

- pH levels in the sampled sources consistently fell within the permissible drinking range (6.5-8.5) across both monitoring cycles. However, one location showed a pH below 6.5, indicating increased acidity
- Electrical Conductivity recorded during both monitoring rounds remained below acceptable limits ($< 2500 \mu\text{S}/\text{cm}$)
- In May 2023, two sampling locations recorded nitrate concentrations exceeding 30 mg/l, but levels decreased in the October 2023 monitoring. These sources are primarily used for bathing and cleaning, not drinking or cooking. Notably, the Indian drinking water nitrate limit is 40 mg/l.



Summary of results - Kanpur



In Alaulapur, pH levels in sampled sources consistently remained within the permissible range (6.5-8.5) during two monitoring cycles. However, one location exhibited acidity with a pH below 6.5.

In Motipur, pH concentrations at two sampling points fell below the acceptable range (6.5-8.5) during the second monitoring cycle. Meanwhile, Shiekpur maintained pH levels within the permissible limits in both monitoring cycles.

Trilokpur experienced a pH level below the acceptable range at one sampling point, indicating an acidic condition.

Summary of results - Kanpur

In Alaulapur, EC readings in October remained within acceptable limits, notably reducing from 4940 $\mu\text{S}/\text{cm}$ in May at one sampling point.

Kishanpur saw a normalization of EC readings in the second monitoring round compared to levels above 2500 $\mu\text{S}/\text{cm}$ in May.

Kulgoan exhibited higher than acceptable EC levels in three sampling points.

Shiekhpur showed a contrast, with elevated EC readings initially but within acceptable limits in October.

In Trilokpur, elevated EC readings in October were observed at two sampling points, and one of them also showed nitrate levels exceeding >30 mg/l.



Summary of results - Kanpur

In Kishanpur, nitrate concentrations significantly decreased in three water sources during the second monitoring round, except for one sampling point that remained above 30 mg/l. The presence of earthen lining in the irrigation channel may be contributing to groundwater contamination

In Trilokpur, one sampling point with elevated EC readings in October also exhibited nitrate levels exceeding 30 mg/l

Nitrate readings were within permissible limits in Alaulapur, Kulgoan, Motipur, and Sheikpur



Wastewater safety plan-Kanpur

- Survey conducted in 3 villages (Alaulapur, Kulgaon and Lalu kheda)
- Village mapping exercise and Household surveys
- E.coli monitoring of selected water sources in the three villages (i.e., each 5 drinking water and 5 irrigation water sources)
- Sampling campaigns started early September 2022 (monsoon season) and ended end of November 2022 (post-monsoon season)
- Semi-quantitative health risk assessments for villagers following the World Health Organization's guideline ('Sanitation Safety Planning', WHO 2015)

