WATER QUALITY MONITORING REPORT

LAKE OVERVIEW

Lake Name	Bhalswa Lake
Location	North Delhi
Area	34.0 hectares
Reporting Period	2025-10-24 to 2025-11-24
Report Generated	2025-11-24 05:08:13

WATER QUALITY MEASUREMENTS (7 Decimal Precision)

Date	Turbidity (NTU)	TSS (mg/L)	Chlorophyll (µg/L)	NDVI	NDWI
2025-11-06	0.8850336	0.5499144	0.5355058	1.0000000	0.0000000
2025-11-09	0.8850356	0.5499157	0.5355061	0.2307951	0.7782616
2025-11-14	0.8850344	0.5499145	0.5355059	0.0000000	1.0000000
2025-11-19	0.8850360	0.5499159	0.5355061	0.4658879	0.3323589

STATISTICAL SUMMARY

Parameter	Min	Max	Average
Turbidity (NTU)	0.8850336	0.8850360	0.8850349
TSS (mg/L)	0.5499144	0.5499159	0.5499151
Chlorophyll (µg/L)	0.5355058	0.5355061	0.5355060

AI-POWERED ANALYSIS & RECOMMENDATIONS

Bhalswa Lake Water Quality Analysis for Agricultural and Irrigation Suitability (2025) This report analyzes recent water quality data from Bhalswa Lake to assess its suitability for agricultural irrigation and provide actionable recommendations for sustainable agricultural practices. **Data Interpretation and Impact Assessment:** * **Turbidity (~0.885):** High turbidity indicates significant suspended particulate matter. This can reduce light penetration, hindering photosynthesis in aquatic plants, and negatively affect irrigation by clogging irrigation systems and reducing water infiltration into the soil. * **Total Suspended Solids (TSS ~0.55):** Similar to turbidity, high TSS can block sunlight and damage irrigation equipment. Excess TSS can deposit on soil, forming a crust that impedes germination and reduces water infiltration. * **Chlorophyll (~0.535):** Chlorophyll indicates the presence of algae. While some algae are beneficial, excessive levels can lead to algal blooms. Algal blooms can produce toxins harmful to crops and livestock and deplete oxygen in the water, harming aquatic life. * **Normalized Difference Vegetation Index (NDVI):** NDVI measures the density of green vegetation. The NDVI values vary significantly, from 0 to 1.0. A value of 0 indicates no green vegetation, while 1.0 indicates a dense, healthy vegetation canopy. Variation in NDVI can signify water pollution and nutrient availability issues. * **Normalized Difference Water Index (NDWI):** NDWI measures the water content in vegetation and water bodies. High NDWI (approaching 1) indicates a high water content. The NDWI varies significantly in the data. This is concerning as NDWI should remain consistent to properly hydrate plants. **Flags and Potential Negative Impacts:** * **High Turbidity and TSS:** These consistently high values pose a risk of clogging irrigation systems, reducing water infiltration, and diminishing light available for aquatic life. * **Variable NDVI and NDWI:** Suggests inconsistent water supply or plant health problems, potentially linked to water quality issues or soil imbalances. **Crop Suitability:** Considering the water quality and potential soil issues, the following crops are better suited: * **Less Water-Demanding Crops:** Crops that require less water, such as barley, millets, or drought-resistant varieties of wheat, would be more appropriate. * **Salt-Tolerant Crops:** If soil salinity is a concern due to poor water quality, consider salt-tolerant crops like barley, sugar beets, or cotton. * **Avoid:** Crops like rice, which require large quantities of clean water, are not recommended without significant water pre-treatment. **Optimal Fertilizer Usage:** * **Controlled Release Fertilizers:** These fertilizers release nutrients slowly, reducing the risk of leaching and runoff. * **Soil Testing:** Conduct regular soil tests to determine specific nutrient deficiencies and tailor fertilizer application accordingly. * **Organic Amendments:** Incorporate organic matter (compost, manure) to improve soil structure, water retention, and nutrient availability, potentially reducing the need for synthetic fertilizers. * **Reduce Phosphorus:** High turbidity and TSS can exacerbate phosphorus runoff, so minimize phosphorus-based fertilizer use and consider soil amendments that bind phosphorus. **Likelihood of Negative Impacts:** * **Nutrient Leaching:** The potential is high due to high turbidity, TSS, and the possibility of over-fertilization. Excess nutrients can leach into the lake and groundwater. * **Soil Degradation:** High TSS and turbidity can lead to soil crusting and reduced water infiltration, contributing to soil degradation over time. * **Excessive Sedimentation:** High turbidity and TSS increases the likelihood of sedimentation in irrigation canals and on agricultural land, reducing their efficiency and productivity. * **Contamination:** The presence of algae, coupled with urban runoff in the lake, could lead to contamination of irrigation water with toxins or pollutants. **Interventions and Precautions:** * **Water Pre-treatment:** Implement simple pre-treatment methods for irrigation water, such as settling ponds or filtration systems, to reduce turbidity and TSS. * **Soil Amendments:** Improve soil health with organic matter (compost, green manure) to increase water infiltration, reduce erosion, and improve nutrient retention. * **Crop Rotation:** Implement crop rotation to break pest and disease cycles, improve soil fertility, and reduce the need for synthetic inputs. Include cover crops to reduce erosion and nutrient leaching. * **Integrated Water Management:** Promote water conservation practices, such as drip irrigation, to reduce water usage and minimize the impact of poor water quality. Implement rainwater harvesting to supplement irrigation water. **Actionable Steps for Local Government/Agencies:** 1. **Implement Water Quality Monitoring and Reporting:** Establish a regular water quality monitoring program for Bhalswa Lake and disseminate the data to farmers, providing them with information on water quality trends and recommendations for irrigation practices. 2. **Promote Best Management Practices (BMPs) for Agriculture:** Conduct workshops and training

programs for farmers on BMPs, including water conservation, soil health management, and responsible fertilizer use. Provide subsidies or incentives for adopting these practices. 3. **Invest in Water Treatment Infrastructure:** Explore options for centralized or decentralized water treatment systems to improve the quality of water used for irrigation. This may involve constructed wetlands, filtration systems, or other appropriate technologies. These actions will support sustainable agriculture, protect the environment, and ensure the long-term productivity of the agricultural sector in the region.

RECOMMENDED GOVERNMENT INTERVENTIONS

1. Establish monitoring frequency based on detected anomalies and risk levels.

2. Coordinate with agricultural departments for irrigation scheduling and water treatment protocols.

3. Implement pollution source tracking and mitigation near upstream industrial/urban areas.

4. Conduct quarterly soil and water testing to validate satellite-derived indices (NDVI, NDWI).

5. Set up early warning systems for TSS/Turbidity spikes indicating contamination events.

6. Engage local farming communities in data-driven decision-making for crop selection and fertilizer use.
