## 3. Central Ground Water Board (CGWB) - Environment

Toxic aquifer beneath our feet- India faces its worst groundwater crisis. A recent Central Ground Water Board (CGWB) report reveals that nearly 20% of India's aquifers are critically contaminated with toxic substances like uranium, arsenic, and nitrates due to agricultural pollution, geogenic factors, and weak governance. This crisis threatens public health, agricultural productivity, and export competitiveness, necessitating urgent policy reforms and integrated monitoring.

### Resource Overview

**The Core Issue-** The Central Ground Water Board (CGWB) has flagged a disturbing and rising trend of toxic contaminants in aquifers across India.

**The Resource-Population Imbalance-** India supports 18% of the world's population. However, it possesses only 4% of the global freshwater resources.

**Result-** This disparity places immense pressure on available water systems.

**Dependency Statistics-**

**Rural Drinking Water-** Groundwater meets approximately 85% of needs.

**Irrigation-** Groundwater accounts for around 60% of agricultural water requirements.

### The Crisis of Groundwater Contamination

**Widespread Toxicity-** India's aquifers are facing simultaneous contamination from a cocktail of hazardous substances, including- Arsenic, Fluoride, Nitrate, Uranium, Salinity, Heavy metals

**Extent of Contamination-** Nationwide, nearly 20% of samples exceed the permissible limits for critical contaminants like uranium, fluoride, nitrate, and arsenic.

**Regional Distribution of Contaminants**

(Differentiation by Region and Contaminant Type)

| Region | Primary Contaminants | Observations |
|---|---|---|
| North India (Punjab, Haryana, Rajasthan, Delhi) | Uranium | Alarming levels detected in both pre- and post-monsoon samples. |
| Central India | Fluoride & Nitrate | Increasing concentrations are directly linked to agricultural intensification. |
| Eastern India | Arsenic | Continues to struggle with persistent arsenic pockets. |

### Drivers Behind the Crisis

The contamination is driven by a mix of human activity, policy gaps, and geological factors.

**Agricultural Pollution**

**Fertilizer Misuse-** Excessive application of nitrogenous fertilisers causes nitrate leaching into the groundwater.

**Monoculture Effects-** The prevalent Paddy-Wheat monoculture in North India accelerates groundwater depletion. This depletion forces extraction from deeper strata, increasing the uptake of heavy metals.

**Geogenic (Natural) Contamination**

**Source-** Contaminants like Fluoride and Arsenic largely originate from natural geological formations.

**Human Aggravation-** The practice of drilling deeper borewells to access water intensifies the exposure to these naturally occurring toxins.

**Anthropogenic (Man-Made) Factors-** Rapid urbanization and industrialization have led to the introduction of heavy metals and toxins through- Industrial effluents. Untreated sewage. Landfill seepage. Peri-urban waste dumping.

**Weak Groundwater Governance**

**Legal Framework-** India operates under the principle that "Land ownership confers groundwater **ownership,"** which allows for unrestricted and unregulated extraction by landowners.

**Institutional Gaps-** Fragmented roles among agencies and limited monitoring capabilities hinder long-term, sustainable aquifer management.

### Impact of Contaminated Groundwater

The consequences extend beyond health to the economy and trade.

**Public Health Cost**

**Physical & Cognitive Damage-** Exposure to Arsenic and Fluoride causes long-term skeletal, neurological, and cognitive impairments.

**Vulnerable Demographics-** These impacts disproportionately affect children.

**Case Study (Mehsana, Gujarat)-** Fluorosis has reduced the earning capacity of residents, trapping families in a cycle of wage loss, accumulating debt, and rising medical expenses.

**Impact on Agricultural Productivity**

**Soil & Crop Health-** Heavy metals and chemical residues damage soil health and reduce overall crop yields.

**Food Chain Entry-** Toxins enter the food chain, affecting consumers.

**Economic Loss-** Research indicates that farms located near polluted water bodies suffer from lower productivity and reduced incomes.

**India's Export Competitiveness**

**Global Standards-** International markets are increasingly demanding "clean, traceable, and compliant" agricultural produce.

**Trade Risks-** Emerging instances of export rejections due to residue levels signal a serious risk. If contamination becomes widespread in major export crops, India's agricultural export sector faces severe setbacks.

## Government Initiatives

The government has launched several schemes to address water scarcity and quality.

**Jal Shakti Abhiyan (2019)-** A campaign focused on water conservation and groundwater recharge, specifically targeting water-stressed districts.

**Amrit Sarovar Mission-** Aimed at developing and rejuvenating 75 water bodies per district to improve local water availability.

**National Aquifer Mapping Program (NAQUIM)-** A scientific initiative to delineate and characterize aquifers to assist in sustainable management.

**Atal Bhujal Yojana-** Launched to improve community-led groundwater management in priority areas identified as critical or overexploited.

## Way Ahead

To mitigate the crisis, a multi-pronged approach is required.

**Comprehensive Policy Reforms-** Establish stringent extraction limits in zones classified as over-exploited. Create incentives for farmers to adopt water-efficient agricultural practices (e.g., drip irrigation, crop diversification).

**Integrated Monitoring Systems-** Utilize real-time data analytics to track contamination trends. Develop predictive models to identify future risks before they become critical.

**Public Awareness Campaigns-** Educate communities about the health risks of specific contaminants. Promote the adoption of low-cost water treatment technologies at the household level.

**Targeted Remediation-** Deploy solutions specific to the regional problem.

*Examples*- Rainwater harvesting in salinity-prone areas to dilute salt levels; Phosphate reduction strategies to curb fluoride and nitrate contamination.

**Source-** https-//www.business-standard.com/opinion/editorial/toxic-aquifer-beneath-our-feet-india-faces-its-worst-groundwater-crisis-125120401484_1.html