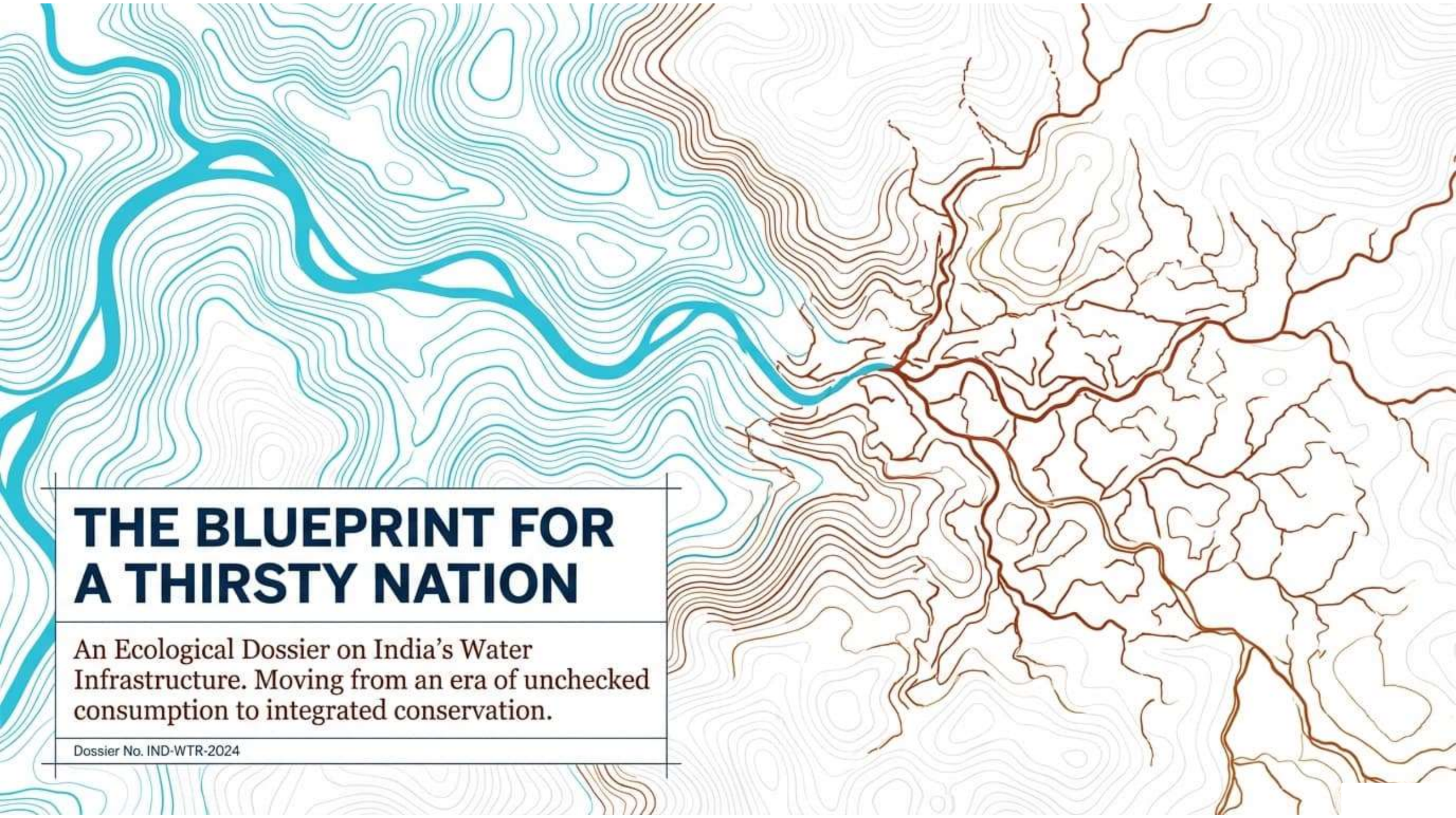

# THE BLUEPRINT FOR A THIRSTY NATION

An Ecological Dossier on India's Water Infrastructure. Moving from an era of unchecked consumption to integrated conservation.

Dossier No. IND-WTR-2024


# THE HYDROLOGICAL PARADOX

Three-fourths of the Earth's surface is covered with water, continuously renewed through the **hydrological cycle.** Yet, by 2025, an estimated **two billion** people will live in **absolute water scarcity.**

**The scarcity is rarely an absence of natural rain; it is an outcome of profound systemic failure.**

Dossier Reference: C9023
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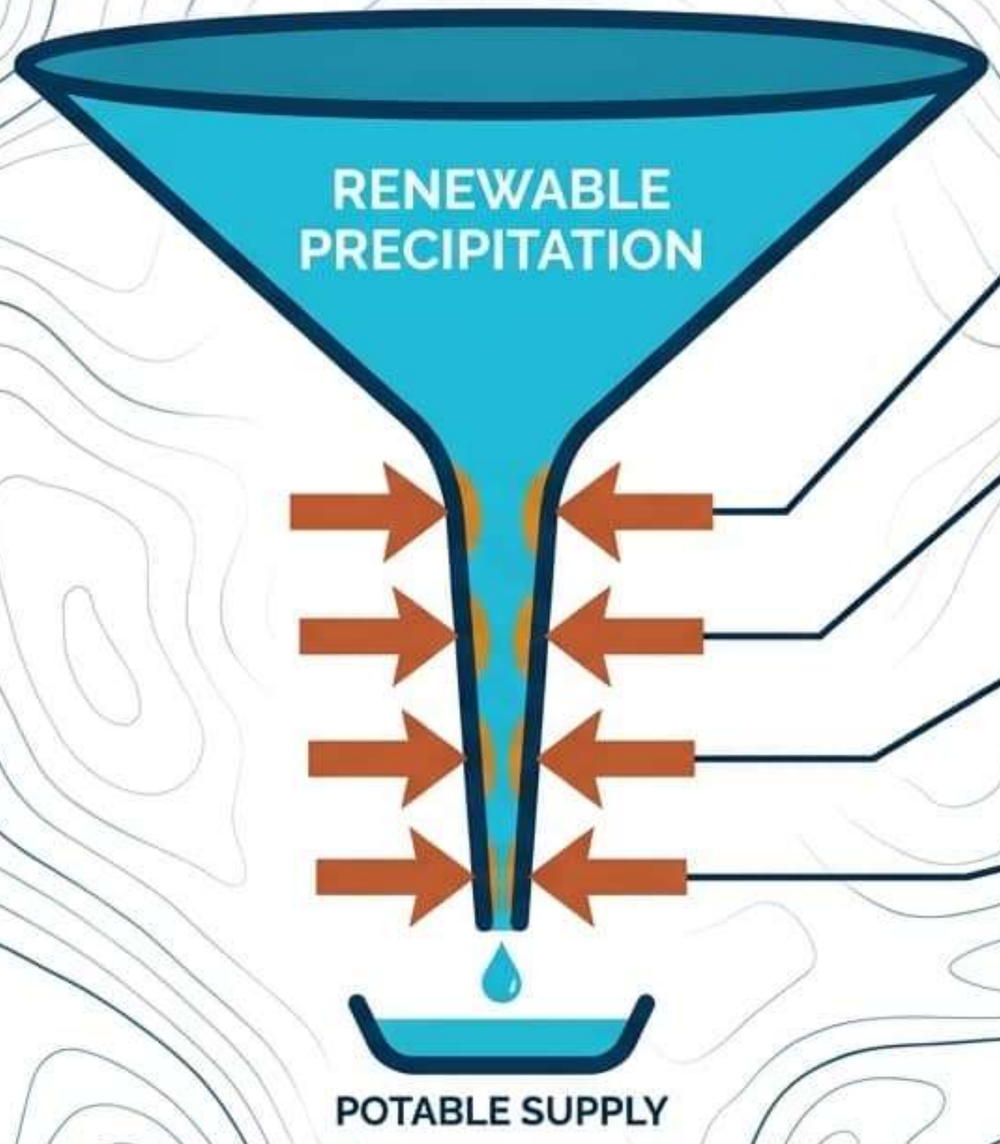
# THE SQUEEZE SIPHON




## IRRIGATED AGRICULTURE

Over-exploitation for dry-season agriculture and water-intensive commercial crops.

## INTENSIVE INDUSTRIALISATION

Thirst of Multinational Corporations (MNCs) and their massive hydroelectric power requirements.

## URBAN OVER-PUMPING

Multiplying dense urban centres utilizing private groundwater pumping devices, depleting fragile aquifers.

## QUALITY DEGRADATION

Chemical pesticides, fertilisers, and industrial wastes polluting the remaining supply.

# A Millennia of Engineering

## 1st Century B.C.

Sringaverapura (near Allahabad) builds sophisticated water harvesting systems channelling the Ganga's floodwaters.

## 300 B.C.

Chandragupta Maurya initiates extensive construction of dams, lakes, and irrigation systems (evidenced later in Kalinga, Nagarjunakonda, and Kolhapur).

## 11th Century

Bhopal Lake is constructed, becoming one of the largest artificial lakes of its era.

## 14th Century

Allauddin Khilji builds the tank in Hauz Khas, Delhi, to supply water to the Siri Fort area.

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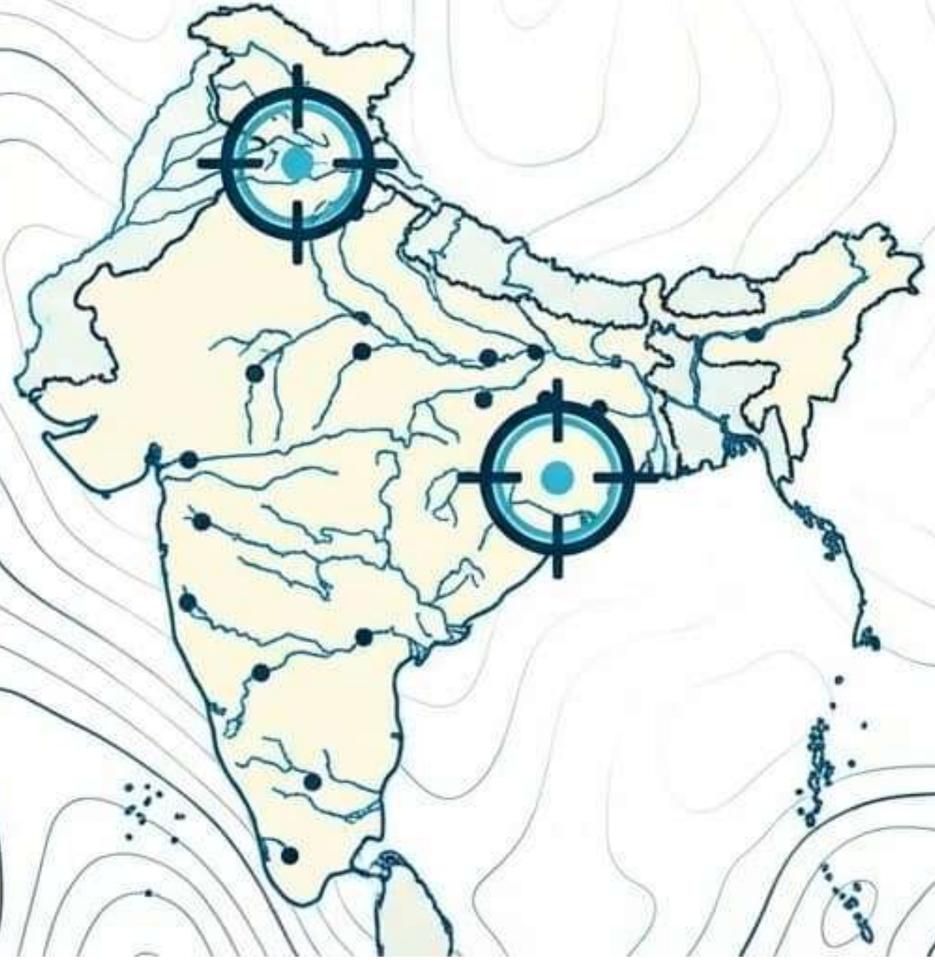
# THE ERA OF MEGA-DAMS

Post-independence, India embraced integrated water resources management through mega-dams—proudly proclaimed by Jawaharlal Nehru as the "temples of modern India." They were designed to integrate agricultural development with rapid industrialisation.



# Macro Intervention: Sardar Sarovar

## Scope

Covers four states: Maharashtra, Madhya Pradesh, Gujarat, Rajasthan.

## Gujarat Impact

Irrigates **18.45 lakh hectares** across **3,112 villages** (**75%** in drought-prone areas).

## Rajasthan Impact

Irrigates **2,46,000 hectares** in strategic desert districts like **Barmer and Jalore.**

## Primary Goal

Transform drought-prone zones into **drought-proof agricultural hubs.**

# The Infrastructure Balance Sheet

| Intended Dividends | Ecological & Social Deficits |
| --- | --- |
| Hydel power generation for industrial growth. | Submergence and decomposition of existing vegetation. |
| Expansion of cultivable area under assured irrigation. | Severe interstate water disputes (e.g., Krishna-Godavari conflict between Karnataka/Andhra Pradesh and Maharashtra). |
| Mitigation of natural flood events in volatile river basins. | Large-scale displacement of local communities. |
| | Alteration of cropping patterns leading to soil salinisation. |

# The Dam Ripple Effect

## River Dammed

Natural flow of the river is severely regulated.

## Sediment Trapped

Silt accumulation occurs at the bottom of the reservoir.

## Habitat Altered

Stream beds become rockier, devastating aquatic fauna migration and spawning.

## Floodplains Starved

Downstream floodplains are deprived of silt, their primary natural fertiliser.

## Degradation & Floods

Surrounding land degrades, and ironically, excessive reservoir sedimentation triggers uncontrolled floods during heavy rainfall.

# The Sustainable Pivot: Eco-Regional Harvesting

| Region/Terrain | Hydrological Challenge | Indigenous Structure | Mechanism of Action |
|---|---|---|---|
| Western Himalayas | Mountainous flow | **Guls & Kuls** | Diversion channels built for mountain agriculture. |
| Bengal Flood Plains | Excess monsoon water | **Inundation Channels** | Trenches built to capture and divert floodwaters to irrigate fields. |
| Arid Rajasthan (Jaisalmer) | Arid soil, sporadic rain | **Khadins & Johads** | Rain-fed storage structures allowing water to stand and moisten the soil. |
| Semi-Arid Rajasthan (Bikaner/Barmer) | Extreme heat, no surface water | **Underground Tankas** | Deep subterranean tanks capturing rooftop runoff for drinking. |

# Anatomy of the Tanka System

## The Catchment

Sloping roofs capture rainwater. The first spell is discarded to flush the pipes.

## The Conduit

Pipes route subsequent rainfall into the central courtyard or main house.

## The Storage

Massive underground tanks (up to 6m deep). The stored ‘palar pani’ is considered the purest natural water.

## Thermal Benefit

Adjoining underground rooms are built around the tanka to naturally beat the summer heat.

# Anatomy of Bamboo Drip Irrigation

## Stage 1: The Tapping

Perennial hilltop springs are tapped, diverting 18-20 litres of water per minute into primary bamboo channels using gravity.

## Stage 2: The Transit

Water is transported over hundreds of metres, passing above roads and descending slopes, distributed through increasingly complex bamboo branches.

## Stage 3: The Delivery

Channel sections are reduced at the final stage, perfectly controlling the flow to drop exactly 20-80 drops per minute directly at the plant's roots.

# Modern Community Adaptations

## The Rural Model

In Gendathur, Karnataka, 200 households installed rooftop harvesting systems. With 1,000 mm of annual precipitation and 80% collection efficiency, the village nets 1,00,000 litres of harvested rainwater annually, becoming a rare water-rich community.

## The Urban Paradox

Meghalaya's capital, Shillong, faces acute water shortages despite being only 55km from Mawsynram and Cherrapunjee (the wettest places on earth). Consequently, nearly every household relies on rooftop structures for 15-25% of their total water requirement.

(Note: Tamil Nadu is the first state to legally mandate this infrastructure).

# Policy & The Conservation Shift

## Jal Jeevan Mission (JJM)

Ensuring functionality of tap connections to deliver an assured potable supply of 55 litres per capita per day to every rural household.

## Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)

Expanding cultivable area under assured assured irrigation (‘har khet ko pani’) and maximizing on-farm water use efficiency (‘per drop more crop’).

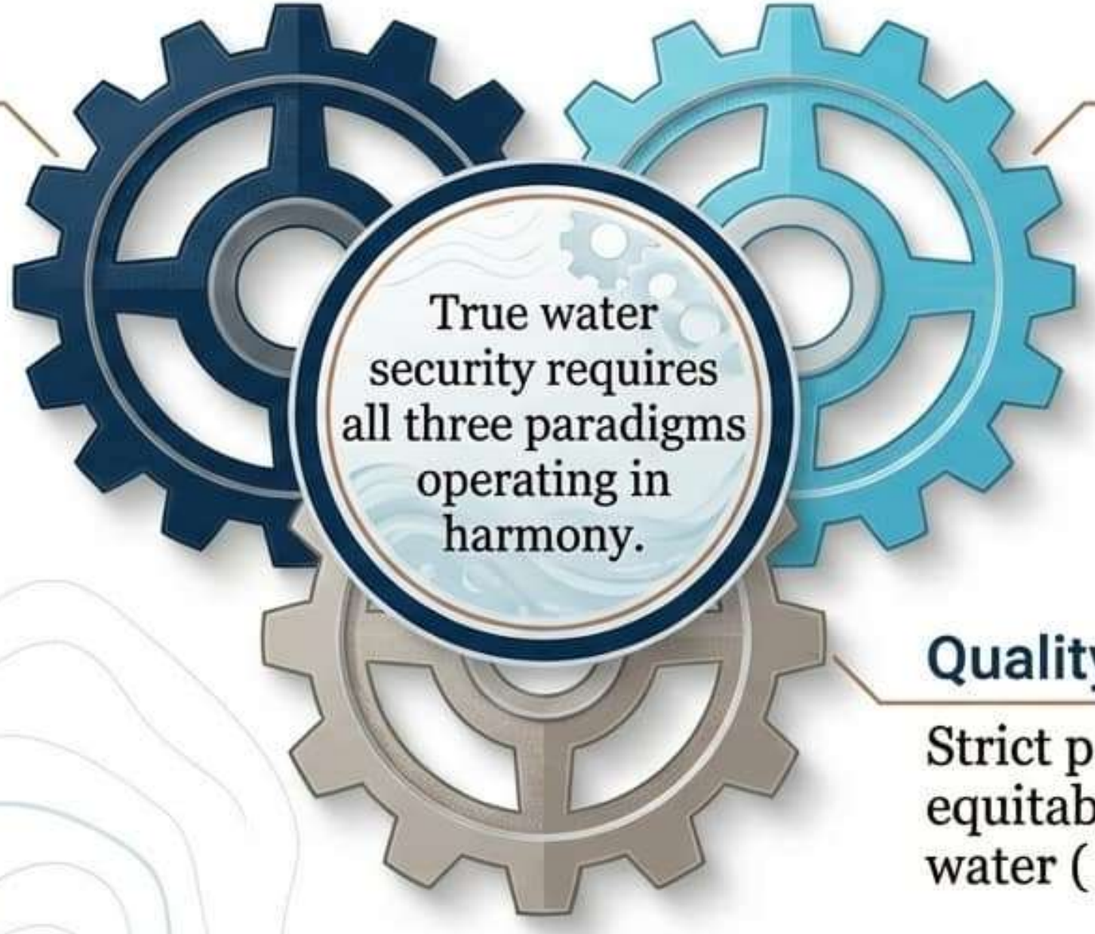
## Atal Bhujal Yojana (Atal Jal)

Targeting 80 severely water-stressed districts to engineer a behavioral shift at the Gram Panchayat level—moving from a culture of consumption to intelligent conservation.

# The Integrated Water Paradigm

## Macro-Infrastructure

Strategic deployment of large-scale dam infrastructure and PMKSY agricultural efficiency.




## Micro-Harvesting

Decentralised, ecologically specific community rainwater harvesting (Atal Jal behavioral shifts).

## Quality & Policy

Strict pollution management and equitable distribution of potable water ( 20%) (Jal Jeevan Mission).

**Water is renewable, but its availability is a function of our structural design. We must shift from extracting resources to architecting resilience.**