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Virtual Water Export Crisis in India

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Why in news: India, the **world's largest rice producer and exporter**, contributes nearly **40% of global rice trade**. While this supports food security and economic growth, it has exacerbated **groundwater depletion in water-stressed regions** such as Punjab and Haryana. This situation has been termed the **"virtual water export crisis"**, highlighting the hidden export of water embedded in agricultural commodities.

What is Virtual Water Export?

Definition: The water embedded in crops or goods that is effectively **exported abroad** when the commodity leaves the country.

India's case: Massive rice exports translate into the **export of billions of cubic metres of groundwater**, even as domestic aquifers face severe depletion.

Key Trends

1India exports **20+ million metric tonnes of rice annually**, consuming **24,000+ million cubic metres of irrigation water**.

2**Rice irrigation:** Accounts for **34–43% of global irrigation water use**.

3Northern rice belts increasingly depend on **groundwater**, not surface water.

Reasons Behind the Crisis

1**Water-intensive rice cultivation:** 3,000–4,000 litres per kg of rice; unsustainable in semi-arid northern states.

2**Distortionary subsidies:** High MSPs for rice + free/cheap electricity incentivise over-extraction.

3**Legacy of Green Revolution:** Policies focused on rice/wheat for food security, ignoring water scarcity.

4**Weak groundwater regulation:** Unrestricted borewell drilling and over-extraction.

5**Global market dependence:** India's export dominance makes reducing rice cultivation politically sensitive.

Impacts

1**Groundwater depletion:** Borewell depths in Punjab/Haryana have risen from 30 ft ? 80–200 ft; irrigation costs surge.

2**Farmer distress:** Rising input costs and debt for smallholders.

3**Climate vulnerability:** Even with adequate monsoons, aquifers fail to recharge.

4**Ecological imbalance:** Wetlands and soil moisture regimes degraded; biodiversity loss.

5**Intergenerational inequity:** Future water security compromised to support current exports.

Challenges

1**Political resistance:** MSP and procurement schemes make reform sensitive.

2**Farmer income insecurity:** Crop diversification schemes (e.g., millet incentives) often fail without assured income.

3**Uneven state capacity:** Groundwater is a State subject; enforcement varies widely.

4**Data & enforcement gaps:** NAQUIM mapping exists, but real-time extraction monitoring is lacking.

5**Short-term policy measures:** Single-season interventions fail to address systemic risks.

Government initiatives

1Jal Shakti Abhiyan (JSA): Mission-mode campaign targeting water conservation and groundwater recharge in over-exploited districts; emphasizes rainwater harvesting and community participation.

2Atal Bhujal Yojana (ABHY): Promotes community-led groundwater management in water-stressed districts; incentivizes participatory planning and monitoring of aquifers.

3Mission Amrit Sarovar: Focuses on rejuvenation of local water bodies to enhance groundwater recharge and strengthen rural water security.

4Per Drop More Crop: Promotes micro-irrigation techniques (drip and sprinkler irrigation) to improve water-use efficiency in agriculture.

5NAQUIM 2.0: Provides scientific aquifer mapping to support informed groundwater policy, management, and monitoring.