



## Mains Practice Question

**Q.** Groundwater depletion is a growing concern in many parts of India. Evaluate the factors contributing to this issue and discuss sustainable water management practices that can address this problem. **(150 words)**

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### Approach

- Introduce the answer by highlighting the extent of groundwater depletion in India
- Give Factors Contributing to Groundwater Depletion
- Highlight key Sustainable Water Management Practices
- Conclude suitably.

### Introduction

**Groundwater depletion** has emerged as a critical environmental and socio-economic challenge in India, threatening **water security, agricultural sustainability, and overall economic development.**

- The total estimated groundwater depletion in India is in the range of **122-199 billion meter cubes.**

### Body

#### Factors Contributing to Groundwater Depletion:

- **Over-extraction for Irrigation: Agriculture accounts for about 80-90% of India's freshwater use, with groundwater supplying 60% of irrigation needs.**
  - In Punjab, the water table has been declining at a rate of **0.7-1.2 meters per year** due to intensive rice-wheat cultivation.
  - The Central Ground Water Board reports that **1,186 out of 6,881 assessed units in India are over-exploited**, primarily due to agricultural use.
- **Population Growth and Urbanization:** Increasing water demand for domestic and industrial use in rapidly growing urban areas.
  - In Delhi, groundwater levels have dropped by **24 meters in the 2011-2020** due to population growth and urbanization.
  - India's urban population is projected to reach **600 million by 2036**, further straining groundwater resources.
- **Inefficient Water Use and Distribution:** High water losses due to leakages, inefficient irrigation methods, and outdated infrastructure.
  - The city of Mumbai loses about **30-35% of its water supply** due to leakages and theft.
- **Climate Change:** Altered precipitation patterns and increased evaporation rates affect groundwater recharge.
  - **The 2018 Kerala floods, followed by severe droughts**, highlight the impact of climate change on water resources.
  - The Indian Meteorological Department reports a **6% decline in mean annual rainfall**

since the 1950s.

- **Lack of Regulation and Enforcement:** Weak groundwater laws and inadequate monitoring of extraction rates.
  - Despite the implementation of the **Model Bill for groundwater regulation** in several states, enforcement remains a challenge.
  - As of 2021, only **19 states/UTs have enacted legislation for the management of ground water** and among them, the legislation was only partially implemented in four states.

### Sustainable Water Management Practices

- **Improved Agricultural Practices:** Promote water-efficient crops and irrigation methods.
  - The **System of Rice Intensification (SRI) in Tamil Nadu** has reduced water use by 40% while increasing yields.
- **Rainwater Harvesting and Artificial Recharge:** Implement large-scale rainwater harvesting and groundwater recharge projects.
  - The "**Jal Shakti Abhiyan**" campaign aims to create rainwater harvesting structures in 256 water-stressed districts, a significant step.
- **Demand Management and Water Conservation:** Promote water-saving technologies and practices in urban and rural areas.
  - The city of **Bengaluru** has made rainwater harvesting mandatory for all buildings with a roof area of **2,400 sq ft or more**, which can be replicated in more cities.
- **Integrated Water Resource Management (IWRM)** Adopt a holistic approach to water management, considering surface and groundwater resources.
  - The principles of **Integrated Water Resources Management (IWRM) outlined in the National Water Policy 2012** need to be implemented more effectively.
- **Strengthening Regulatory Framework:** Enhance groundwater legislation and enforcement mechanisms.
  - The **proposed National Water Framework Bill** to establish a uniform national legal framework for water management, should be expedited.

### Conclusion

Addressing **groundwater depletion in India** requires a multi-faceted approach combining **improved agricultural practices, efficient water use, artificial recharge, demand management, and strengthened regulations**. By implementing these sustainable water management practices, India can work towards ensuring water security for its growing population and economy while preserving this critical natural resource for future generations.