



## Addressing Water Scarcity

This editorial is based on the Article [India is staring at water poverty](#) which was published in The Hindu Business Line on 07/09/2023. It talks about the upcoming threat of Water Scarcity in India and solutions to it.

**For Prelims:** [South-West Monsoon](#), [World Bank](#), [El Nino](#), [Composite Water Management Index \(CWMI\)](#), [Minimum support price \(MSP\)](#), [UNICEF](#), [IoT](#), [AI](#), [Remote sensing](#), [wetlands](#), [Sugarcane](#), [Micro Irrigation Techniques](#), [National Water Policy, 2012](#), [Pradhan Mantri, Krishi Sinchayee Yojana](#), [Jal Shakti Abhiyan- Catch the Rain Campaign](#), [Atal Bhujal Yojana](#), [Per Drop More Crop](#)

**For Mains:** Reasons behind Water Scarcity in India, Effects of Water Scarcity, Steps have been taken by the Government and Way Forward

According to data released by the [India Meteorological Department](#), the [South-West monsoon](#) during June- August 2023 has been below normal in 42% of the districts. In August, rainfall in the country was 32% below normal and in the southern States it was 62%. **In the last 122 years — that is, since 1901 — India received the lowest rainfall in August this year.** With only about a month left for the end of the [South-West monsoon](#), the reduced rainfall will not only affect agriculture severely but it could also lead to massive water shortages in different regions of the country.

### What does the Data Indicate?

- The **net amount of water that can be used in India in a year is estimated at 1,121 billion cubic meters (bcm)**. However, the data published by the Ministry of Water Resources shows that the total water demand will be 1,093 bcm in 2025 and 1,447 bcm in 2050.
  - This means that there will be a major water shortage in India within 10 years.
- As per the **Falkenmark Water Index** (used for measuring water scarcity throughout the world), wherever the amount of water available per capita is below 1,700 cubic meters in a year, there is water scarcity.
  - Going by this index, **almost 76% of people are already living with water scarcity** in India.

### The Curious Case of Tamil Nadu:

In Tamil Nadu, which is one of the water-scarce States in terms of per capita availability, water demand was more than its supply even before 1990-91. For example, the total water requirement of Tamil Nadu was 31,458 million cubic meters (mcm) in 2004, but the supply was only 28,643 mcm. This means that Tamil Nadu has been experiencing water shortage for the last 30 years.

## What are the Primary Reasons behind Water Scarcity in India?

- **Uneven Distribution of Rainfall:** India experiences uneven distribution of rainfall, with the majority of precipitation occurring during the monsoon season (June to September). States like Kerala and Meghalaya receive excessive rainfall, while arid regions like Rajasthan and Gujarat face chronic water shortages.
  - The cumulative rainfall till September 1, 2023 was 11% lower than long-term average.
- **Over-extraction of Groundwater:** Excessive groundwater extraction for irrigation, industrial, and domestic purposes has led to the depletion of aquifers. According to a report by the Central Ground Water Board, India was overexploiting its groundwater resources at an alarming rate, especially in states like Punjab, Haryana, and Tamil Nadu.
  - The **Central Ground Water Board** reported in June 2022 that **Punjab's groundwater in the first 100 meters will be exhausted by 2029.**
    - The groundwater in the 300 meter reach will be exhausted by 2039.
- **Inefficient Water Management:** Inefficient water management practices, such as wastage in irrigation systems, lack of water storage infrastructure, and inadequate maintenance of water sources, contribute to water scarcity.
  - The [World Bank](#) reported that India loses over 50% of its irrigation water due to inefficiencies.
- **Rapid Urbanization and Industrialization:** Urbanization and industrial growth have led to increased water demand in cities and industrial hubs. The **NITI Aayog's Composite Water Management Index (CWMI)** highlighted that many Indian cities are grappling with water scarcity due to growing populations and urban expansion.
- **Pollution of Water Sources:** Pollution of rivers, lakes, and groundwater sources further exacerbates water scarcity. Water pollution affects the quality and quantity of water available for human and environmental use.
  - The [Central Pollution Control Board](#) reported that many of India's major rivers, including the [Ganges](#) and [Yamuna](#), were heavily polluted, impacting water quality and availability.
- **Climate Change:** Changing weather patterns and increasing temperatures associated with climate change have a profound impact on water resources. Erratic monsoons, prolonged droughts, and altered precipitation patterns have disrupted the availability of water in various regions.
  - **El Nino**, which occurs due to global warming and often reduces the rainfall in India, is becoming the new normal in recent years.
- **Inefficient use of water for agriculture:** Agriculture is the largest consumer of water in India, accounting for about 85% of the total water use. However, most of the irrigation methods are outdated and wasteful, resulting in low water productivity and high water losses. Moreover, some crops such as sugarcane, cotton, and paddy are water-intensive and are grown in regions with declining water tables.
  - The government policies that provide [minimum support price \(MSP\)](#) and electricity subsidies for these crops encourage farmers to overuse water.
- **Lack of Adequate Water Infrastructure:** Insufficient investment in water infrastructure, including storage reservoirs, canals, and treatment facilities, has limited the capacity to manage and distribute water efficiently.
- **Population Growth:** India has the largest population in the world, with about 1.4 billion people. The population is expected to grow to 1.7 billion by 2050. This puts a huge demand on the limited water resources available in the country.
- **Inadequate Policy Implementation:** Weak enforcement of water conservation measures, groundwater regulations, and environmental laws has hindered efforts to address water scarcity.

## What could be the Effects of Water Scarcity in India?

- **Health Issues:** Lack of access to safe drinking water can cause various health problems such as dehydration, infections, diseases, and even death. A report by the [NITI Aayog](#) stated that around 2 lakh people die in India every year due to inadequate water supply.
  - According to the [World Bank](#), **India has 18% of the world's population, but only has enough water resources for 4% of its people. In 2023, around 91 million Indians will not have access to safe water.**

- **Ecosystem Damage:** Water scarcity also poses a threat to the wildlife and the natural habitats in India. Many wild animals have to venture into human settlements in search of water, which can lead to conflicts and endangerment. Water scarcity also disrupts the biodiversity and the ecological balance of the ecosystems.
- **Reduced Agriculture Productivity:** Water scarcity can have a negative impact on the agricultural sector, which consumes 85% of the country's water resources. Water scarcity can reduce crop yields, affect food security, and increase poverty among farmers.
- **Economic Losses:** Water scarcity can hamper the economic growth and development of India. Water scarcity can affect industrial production, reduce energy generation, and increase the cost of water supply and treatment. Water scarcity can also affect tourism, trade, and social welfare.
  - In the report, 'Climate Change, Water and Economy', the [World Bank](#) (2016) underlines that countries with water shortages may face a major setback in economic growth by 2050.

## What Steps have been taken by the Government?

- [National Water Policy, 2012](#)
- [Pradhan Mantri Krishi Sinchayee Yojana](#)
- [Jal Shakti Abhiyan- Catch the Rain Campaign](#)
- [Atal Bhujal Yojana](#)
- [Per Drop More Crop](#)

## How to Address the Water Scarcity?

- **Reducing Overconsumption:** One of the main drivers of water scarcity is the excessive and inefficient use of water by various sectors, such as agriculture, industry, and households. By **using modern technologies, such as IoT, AI, and remote sensing, water consumption can be measured and managed more effectively.**
  - For example, **remote sensing and satellite monitoring can help farmers plan irrigation procedures based on weather conditions and local topography.** This can save water and increase crop productivity.
    - Prashant Maroo a Chhattisgarh farmer used **IoT** in his farm which resulted in a 20% increase in crop yield and reduced water consumption.
  - Also, India needs to reform its electricity subsidy policies.
- **Improving Water Efficiency:** Another way to address water scarcity is to improve the performance of water systems and infrastructure, such as distribution networks, treatment plants, and storage facilities. By repairing leaks, reducing losses, and upgrading equipment, water wastage can be minimized and water quality can be enhanced.
  - For example, **UNICEF** has rehabilitated urban water distribution networks and treatment systems in several countries to reduce water leakage and contamination.
- **Expanding Water Sources:** Explore alternative or additional sources of water, such as rainwater harvesting, aqueducts, desalination, water reuse, and groundwater extraction. These methods can increase the availability and accessibility of water for different purposes and locations.
  - For example, **desalination** can convert seawater into freshwater for drinking and irrigation in coastal areas.
- **Protecting Water Resources:** Protect and restore the natural resources that provide and regulate water, such as rivers, lakes, **wetlands**, forests, and soils. These ecosystems play a vital role in maintaining the water cycle, filtering pollutants, preventing erosion, and mitigating floods and droughts.
  - For example, **restoring wetlands can improve water quality and quantity** by storing runoff and recharging groundwater.
- **Changing Water Policies:** Reform the policies and institutions that govern water management and allocation. This involves **setting clear rules and incentives for water use, pricing, and conservation;** promoting stakeholder participation and cooperation; enhancing monitoring and enforcement; and integrating water issues into broader development plans.
  - For example, **introducing minimum support policies for less water-intensive crops** can reduce the pressure on agricultural water use.

- India also needs to relook its existing **MSP** regime which promotes the cultivation of water guzzling crops such as paddy and Sugarcane.
- **Using Micro Irrigation Techniques: Using practices such as Drip and Sprinkler irrigation can not only reduce the water consumption but also can increase the productivity.**
  - As per the **MS Swaminathan committee** report on 'More Crop and Income Per Drop of Water' (2006), drip and sprinkler irrigation can save around 50% of water in crop cultivation and increase the yield of crops by 40-60%.
- **Using Buried Clay Pot Plantation Technique: The success rate of this method is 90% and it has very high efficiency, even better than drip irrigation. As plantation in Rajasthan is difficult and survival remains a challenge, this method is very effective in saline soil and desert conditions. It has proved useful for land restoration in very arid environments.**
  - Buried clay pot irrigation is an **ancient method of irrigation that uses porous clay pots to water plants**. The pots are filled with water and buried in the ground, with only the neck protruding above the soil.
    - The water seeps through the clay and slowly disburse to the surrounding plants. The pots can provide moisture and water to the plant for at least five days.

**Drishti Mains Question:**

What are the main factors contributing to water scarcity in India, and what strategies can be implemented to address this critical issue?

**UPSC Civil Services Examination, Previous Year Question (PYQ)**

**Prelims**

**Q.1. Which one of the following ancient towns is well known for its elaborate system of water harvesting and management by building a series of dams and channelizing water into connected reservoirs? (2021)**

- (a) Dholavira
- (b) Kalibangan
- (c) Rakhigarhi
- (d) Ropar

**Ans: (a)**

- The city of Dholavira was located on Khadir Beyt in the Rann of Kutch, where there was fresh water and fertile soil. Unlike some of the other Harappan cities, which were divided into two parts, Dholavira was divided into three parts, and each part was surrounded with massive stone walls, with entrances through gateways.
- There was also a large open area in the settlement, where public ceremonies could be held. Other finds include large letters of the Harappan script that were carved out of white stone and perhaps inlaid in wood.
- This is a unique find as generally Harappan writing has been found on small objects such as seals.
- Being the 6th largest of more than 1,000 Harappan sites discovered so far, and occupied for over 1,500 years, Dholavira not only witnesses the entire trajectory of the rise and fall of this early civilization of humankind, but also demonstrates its multifaceted achievements in terms of urban planning, construction techniques, water management, social governance and development, art, manufacturing, trading, and belief system.
- With extremely rich artefacts, the well-preserved urban settlement of Dholavira depicts a vivid picture of a regional centre with its distinct characteristics, that also contributes significantly to the existing knowledge of Harappan Civilization as a whole.
- **Therefore, option (a) is the correct answer.**

**Q.2. With reference to 'Water Credit', consider the following statements: (2021)**

1. It puts microfinance tools to work in the water and sanitation sector.
2. It is a global initiative launched under the aegis of the World Health Organization and the World Bank.
3. It aims to enable the poor people to meet their water needs without depending on subsidies.

**Which of the statements given above are correct?**

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

**Ans: (c)**

- WaterCredit is a program that addresses one of the major barriers to safe water and sanitation i.e. affordable financing. WaterCredit helps bring small loans (microfinance) to those who need (poor people) access to affordable financing and expert resources to make household water and toilet solutions a reality. WaterCredit is the first to put microfinance tools to work in the water and sanitation sector. **Hence, statement 1 is correct.**
- The model empowers people to address their own water and sanitation needs in developing countries who often lack access to traditional credit markets. It eliminates the need for subsidies. **Hence, statement 3 is correct.**
- WaterCredit is a global initiative launched by Water. org, a non-profit organization working to bring water and sanitation to the world. **Hence, statement 2 is not correct. Therefore, option (c) is the correct answer.**

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## **Mains**

**Q.1** What are the salient features of the Jal Shakti Abhiyan launched by the Government of India for water conservation and water security? **(2020)**

**Q.2** Suggest measures to improve water storage and irrigation system to make its judicious use under the depleting scenario. **(2020)**