



## India's Ancient Water Harvesting System

**For Prelims:** [Sri Krishna Devaraya](#), [Nallamala Hills](#), [Eastern Ghats](#), [Kuruma Tribe](#), [Baoli](#), [Kuhls](#), [Shompen Tribe](#), [Great Nicobar Islands](#), [Dholavira](#), [Lothal](#), [Arthashastra](#), [Satavahanas](#), [Chola Period](#), [Feroze Shah Tughlaq](#), [Jal Jeevan Mission](#), Jhalara, [Ahar Pynes](#), Zing, Zabo.

**For Mains:** Different methods of India's Ancient Water Harvesting System.

### Why in News?

Recently, the **Cumbum tank** in Andhra Pradesh was in the news for its **ancient water harvesting system**.

- Cumbum tank is a **medium irrigation project** which is the **2nd largest** man-made reservoir in Asia and the **3rd largest** in the world.

### What are the Key Points about the Cumbum Tank?

- **Construction:** The tank was built by Vijayanagara **Princess Varadharajamma** (also known as Ruchidevi), the wife of [Sri Krishna Devaraya](#) during **1522-1524 AD**.
  - It was built by damming a gorge through which the **Gundlakamma and Jampaleru rivers flow**.
- **Geographical Features:** The tank is fed by the **Nallamallavagu**, a stream originating from the [Nallamala hills](#) in the [Eastern Ghats](#) and is part of the **Gundlakamma river system**.
- **Technological and Indigenous Wisdom:** British engineer **Sir Arthur Cotton** (**pioneer of irrigation** works in South India) observed that **earthen bunds (embankments)** built without reinforced or compacted banks have lasted effectively over time.
  - Puddled bank is a **vertical wall of clay** between the original ground level, and any new material above.
- **Restoration Efforts:** The Government of Andhra Pradesh, with support from the [Japanese International Cooperation Agency \(JICA\)](#), has modernized the tank.

### What are India's Ancient Water Harvesting Systems?

| Structure      | Description  | Region   | Key Features  |
|----------------|--|--|---|
| <b>Baoli</b>   | <b>Stepwell structure with arches, carved motifs</b> , and rooms. Integral to urban water storage in low-rainfall areas. | Rajasthan, Delhi, Gujarat, Karnataka. E.g., Chandi Baori, Rajasthan, Agrasen ki Baoli, Delhi | carvings, rooms, tiered steps, seasonal water collection. |
| <b>Jhalara</b> | Rectangular stepwells with <b>tiered steps on three or four sides</b> , designed   | Rajasthan  | Tiered steps, rectangular shape.                          |

|                       |  |                               |   |
|-----------------------|--|-------------------------------|---|
|                       | to collect water from reservoirs or lakes.   |                               |   |
| <b>Talab/Bandhi</b>   | <b>Medium-sized reservoirs</b> , natural or human-made, regulating water flow and preventing flooding.               | Various regions               | Reservoirs, water flow regulation.                              |
| <b>Taanka</b>         | <b>Cylindrical underground pit</b> paved to collect rainwater from rooftops or catchment areas.                      | Thar Desert, Rajasthan        | Underground, cylindrical, paved.                                |
| <b>Ahar Pynes</b>     | <b>Reservoirs with embankments</b> , built at the end of diversion channels for harvesting floodwater.               | South Bihar                   | Embankments, floodwater harvesting.                             |
| <b>Johads</b>         | Earthen storage pits made by excavating <b>three-sided elevated areas</b> , with soil used for the fourth side.      | Various regions               | Earthen pits, elevated area excavation.                         |
| <b>Panam Keni</b>     | <b>Cylindrical wells</b> made with soaked <b>toddy palm stems</b> , considered sacred.                               | Wayanad, Kerala               | Cylindrical, sacred, toddy palm stems.                          |
| <b>Khadin (Dhora)</b> | <b>Long earthen embankments</b> across hill slopes collecting surface runoff for agriculture.                        | Jaisalmer, Rajasthan          | Earthen embankments, surface runoff collection.                 |
| <b>Kund</b>           | <b>Saucer-shaped catchment area</b> with a central circular underground well, traditionally lined with lime and ash. | Various regions across India. | Catchment area, circular well, traditional lining.              |
| <b>Zing</b>           | <b>Small tanks in Ladakh</b> collect glacier meltwater, turning into streams by afternoon.                           | Ladakh                        | Small tanks, glacier water collection.                          |
| <b>Kuhls</b>          | <b>Surface water channels</b> in Himachal Pradesh carrying glacial waters to fields.                                 | Himachal Pradesh              | Surface channels, glacial water.                                |
| <b>Zabo</b>           | System in Nagaland combining <b>water conservation with</b>  | Nagaland                      | Rainwater collection, pond-like structures, terraced hillsides. |

|                  |   |                       |                       |
|------------------|---|-----------------------|-----------------------|
|                  | <b>forestry, agriculture, and animal care.</b>                                  |                       |                       |
| <b>Jackwells</b> | Pits surrounded by bunds made of hardwood logs, practiced by the Shompen tribe. | Great Nicobar Islands | Pits, hardwood bunds. |



## Water Management in Indian History

- **Indus Valley Civilization:** [Dholavira](#) had reservoirs to collect rainwater, while [Lothal](#) and [Inamgaon](#) had small bunds built to store water for irrigation and drinking.
- **Mauryan Empire:** The [Arthashastra](#) of [Kautilya](#) records extensive **irrigation systems**, including dams and bunds, managed under strict regulations.
  - **Taxes** were imposed based on the **source and method of water extraction**.

- **Early Medieval India:** The [Satavahanas](#) introduced **brick and ring wells**.
  - The [Chola period](#) saw advanced systems like **chain tanks** (interconnected tanks) for efficient water distribution.
  - The **Rajputs** built large reservoirs, such as the **Bhopal Lake under King Bhoja**, while the **Pal and Sen dynasties** constructed numerous tanks and lakes in eastern India.
- **Medieval Period:** [Feroze Shah Tughlaq](#) built the **Western Yamuna Canal**, while **Emperor Shahjahan** developed the **Bari Doab or Hasli Canal**.
  - The [Vijayanagar Kingdom](#) constructed tanks like the **Anantraj Sagar and Korangal Dam**.
  - **Sultan Zain Uddin** established an extensive canal network in **Kashmir**.

## What is a Water Harvesting System?

- **About:** A water harvesting system refers to a **technique or structure designed to capture, store, and use rainwater, surface runoff**, or other sources of water for various purposes, such as agriculture, domestic use, and groundwater recharge.
  - It is a sustainable water management practice aimed at conserving water and addressing water scarcity.
- **Types:**
  - **Rainwater Harvesting (RWH):** Collecting and storing **rainwater** through methods like **rooftop collection and underground storage** to conserve water.
  - **Groundwater Recharge Systems:** Techniques such as **recharge wells** that allow rainwater to **seep into the ground** to maintain and improve groundwater levels.
  - **Surface Water Harvesting:** Collecting rainwater from **land or open fields** using ponds and reservoirs for irrigation and other uses.
  - **Urban Water Harvesting:** Capturing rainwater in cities from **rooftops and surfaces** to reduce pressure on **municipal water systems** and manage stormwater.
- **Significance:**
  - **Reliable Water Source:** Ensures a dependable water supply with **minimal evaporation or pollution**, suitable for daily use. Enhances **groundwater quality** and combats seawater intrusion in coastal areas.
  - **Flood Prevention:** Reduces **flood risk and water logging**, protecting property and infrastructure. Protects the environment and property by minimizing erosion and flooding.
  - **Groundwater Recharge:** **Replenishes groundwater**, enhancing availability during dry periods. Minimizes **surface runoff, preserving soil** and preventing sedimentation in water bodies.
  - **Sustainability:** Supports water conservation and combats **groundwater depletion** amidst urbanization.

## What are India's Initiatives Related to Water Conservation?

- [National Water Policy, 2012](#)
- [National Aquifer Mapping and Management Program \(NAQUIM\)](#)
- [Mission Amrit Sarovar](#)
- [Jal Jeevan Mission \(JJM\)](#)
- [Jal Shakti Abhiyan \(JSA\)](#)
- [Atal Bhujal Yojana \(ABY\)](#)

## Conclusion

India's rich history in [water harvesting](#), from ancient systems like **Jhalaras and Baolis** to modern initiatives like the [Jal Jeevan Mission](#), highlights its deep-rooted expertise in **sustainable water management**. Both historical and contemporary approaches emphasize innovative water conservation,

ensuring water accessibility and supporting agriculture in diverse climatic regions across the country.

**Drishti Mains Question:**

Discuss the traditional water conservation methods practiced in different parts of India.

**UPSC Civil Services Examination, Previous Year Questions (PYQs)**

**Prelims**

**Q. What are the benefits of implementing the 'Integrated Watershed Development Programme'? (2014)**

1. Prevention of soil runoff
2. Linking the country's perennial rivers with seasonal rivers
3. Rainwater harvesting and recharge of groundwater table
4. Regeneration of natural vegetation

**Select the correct answer using the code given below:**

- (a) 1 and 2 only  
(b) 2, 3 and 4 only  
(c) 1, 3 and 4 only  
(d) 1, 2, 3 and 4

**Ans: (c)**

**Q. Which of the following practices can help in water conservation in agriculture? (2017)**

1. Reduced or zero tillage of the land
2. Applying gypsum before irrigating the field
3. Allowing crop residue to remain in the field

**Select the correct answer using the code given below:**

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

**Ans: (c)**

**Mains**

**Q. What is water stress? How and why does it differ regionally in India? (2019)**

**Q. "The ideal solution to depleting ground water resources in India is water harvesting system". How can it be made effective in urban areas? (2018)**

**Q. Enumerate the National Water Policy of India. Taking river Ganges as an example, discuss the strategies which may be adopted for river water pollution control and management. What are the legal**

provisions of management and handling of hazardous wastes in India? (2013)

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