



CBSE : Grade 10
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Board: CBSE

WATER RESOURCES

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WATER -

- A renewable resource → covers $\frac{3}{4}$ th of the earth's surface → but only a small proportion of it accounts for freshwater → fit for use.

Some facts and Figures :

- 96.5 % of the total volume of world's water → exist as oceans
- Only 2.5 per cent → as freshwater.
- India receives nearly 4% of the global precipitation and ranks 133 in the world in terms of water availability per person per annum.
- By 2025 → it is predicted that large parts of India will join countries or regions having absolute water scarcity.

WATER SCARCITY AND NEED FOR WATER CONSERVATION AND MANAGEMENT -

- The lack sufficient water as compared to its demand in a region is known as → Water Scarcity.

Causes of Water Scarcity:

- ◆ Over- exploitation and mismanagement of water resources
- ◆ Excessive use and unequal access to water among different social groups
- ◆ Large & growing population
- ◆ Irrigated agriculture is the largest consumer of water → so there is a need to revolutionise the agriculture through developing drought resistant crops and dry farming techniques.
- ◆ More wells and tube-wells in farms → for irrigation to increase their produce → But may lead to falling groundwater levels → adversely affecting water availability and food security of the people.
- ◆ Intensive industrialisation and urbanisation → exerts pressure on existing freshwater resources.
- ◆ Today, in India hydroelectric power contributes → approximately 22 per cent of the total electricity produced.
- ◆ More urban areas and dense populations → have further aggravated the problem

Another situation → water is sufficiently available to meet the needs of the people → but the area still suffers from water scarcity → Reasons may be due to → bad quality of water due to domestic and industrial wastes, chemicals, pesticides and fertilisers used in agriculture, thus, making it hazardous for human use Government of India has announced the Jal Jeevan Mission (JJM) → to improve the quality of life and enhance ease of living of people in rural areas.

The Goal of JJM → to enable every rural household get assured supply of potable piped water at a service level of 55 litres per capita per day regularly on long-term basis by ensuring functionality of the tap water connections.

MULTI -PURPOSE RIVER PROJECTS AND INTEGRATED WATER RESOURCES MANAGEMENT -

- From ancient times, sophisticated hydraulic structures like → dams built of stone rubble, reservoirs or lakes, embankments and canals for irrigation
- Evidences of sophisticated irrigation works found in → Kalinga, (Odisha), Nagarjunakonda (Andhra Pradesh), Bennur (Karnataka), Kolhapur (Maharashtra) etc.



Hydraulic Structures in Ancient India :

In the first century B.C.	In the 11 th Century	In the 14 th Century	During the time of Chandragupta Maurya
↓	↓	↓	↓
Sringaverapura near Allahabad had sophisticated water harvesting system channelling the flood water of the river Ganga.	Bhopal Lake, one of the largest artificial lakes of its time was built.	The tank in Hauz Khas, Delhi was constructed by Iltutmish for supplying water to Siri Fort area.	Dams, lakes and irrigation systems were extensively built.

Dams→ Traditionally built to impound rivers and rainwater that could be used later to irrigate agricultural fields→ Today, dams are built not just for irrigation but for electricity generation, water supply for domestic and industrial uses, flood control, recreation, inland navigation and fish breeding→ Hence, dams are now referred to as multi-purpose projects.

For example→

- ◆ The Sutluj-Beas river basin, the Bhakra – Nangal project → used both for hydel power production and irrigation.
- ◆ Hirakud project in the Mahanadi basin→ integrates conservation of water with flood control.

Advantages & Disadvantages of Multi-purpose river projects :

Advantages	Disadvantages
→ Electricity generation → Irrigation → Water supply for domestic and industrial uses → Flood control → Recreation → Inland navigation → Fish breeding	→ Affects the natural flow of river causing poor sediment flow and excessive sedimentation at the bottom of the reservoir. → Destroys the habitats for the rivers' aquatic life. → Submerges the existing vegetation and soil if created on the floodplains. → Unsuccessful in controlling floods at the time of excessive rainfall. → These projects induced earthquakes, caused water- borne diseases and pests and pollution resulting from excessive use of water.

Movements against Multi-purpose river projects :

- These projects cause of many new social movements like→ the 'Narmada Bachao Andolan' and the 'Tehri Dam Andolan' etc. → due to the large-scale displacement of local communities.
- From ancient times, sophisticated hydraulic structures like→ dams built of stone rubble, reservoirs or lakes, embankments and canals for irrigation Inter-state water disputes are also becoming common with regard to sharing the costs and benefits of the multi-purpose project.

Rainwater Harvesting :

- From ancient times, sophisticated hydraulic structures like→ dams built of stone rubble, reservoirs or lakes, embankments and canals for irrigation



- **Rainwater Harvesting** → refers to the practice of storing and using of rainwater from the surface on which it falls.
- In hill and mountainous regions → people built diversion channels like the ‘guls’ or ‘kuls’ of the Western Himalayas for agriculture.
- In Rajasthan → ‘Rooftop rain water harvesting’ was commonly practised to store drinking water
- It is the most common practice in Shillong, Meghalaya → Nearly 15-25 % of the total water requirement of the household comes from rooftop water harvesting.
- In the flood plains of Bengal → people developed inundation channels to irrigate their fields.
- In arid and semi-arid regions → agricultural fields were converted into rain fed storage structures that allowed the water to stand and moisten the soil.
- In the semi-arid and arid regions of Rajasthan → almost all the houses traditionally had underground **tanks or tankas** for storing drinking water.

Khadins and Johads in Rajasthan for rainwater harvesting :

- **Johads** → small earthen check dams that capture and conserve rainwater, improving percolation and groundwater recharge → spread across more than 650 villages in Alwar district, Rajasthan.
- **Khadin** → an ingenious construction designed to harvest surface runoff water for agriculture.

'Bamboo drip irrigation ' in Meghalaya :

- A 200-year-old system of tapping stream and spring water by using bamboo pipes
- About 18-20 litres of water enters the bamboo pipe system, gets transported over hundreds of metres, and finally reduces to 20-80 drops per minute at the site of the plant.

How Tankas works?

- ◆ **Tankas** were connected to the sloping roofs of the houses through a pipe.
- ◆ Rain falling on the rooftops would travel down the pipe and was stored in these underground ‘tankas’.

