Water Resources (Easy Notes of NCERT for class 10th)

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Introduction:

Our planet (earth) appears blue as **three-fourth** of the earth's surface is covered with water. Yet, we often hear the news of water scarcity. Well, many of you may know the reason, why? but don't know the solution, how? So, this chapter will direct you towards the need and corrective measures for conserving water resources. You will also come to know about some water management projects of India in this regard.

Some facts about water

- **Oceans** have 96.5% water out of total volume.
- Only 2.5% water is **fresh.**
  - Out of total fresh water, 70% water occurs as **ice sheets** and **glaciers** in Antarctica, Greenland and the mountainous regions.
  - Less than 30% water is stored as **groundwater**.
- **India receives nearly** 4% **of the global precipitation** and ranks 133 in the world in terms of water availability per person per annum.
- The total renewable water resources of India are estimated at 1,897 sq km per annum.
- However, India has a tendency of facing absolute water scarcity in the near future.

Water Scarcity And The Need For Water Conservation And Management:

Reasons for water Scarcity:

- **Natural factor:** The availability of water resources varies over space and time, mainly due to the variations in seasonal and precipitation.
- **Human factor:** Natural factors alone do not cause water scarcity, but human beings have also contributed to the problem. Let's read about two aspects of water scarcity:-
    1. ***Quantitative Aspects:*** Over exploitation, large and growing population, unequal access to water among different social groups and excessive use of water resources, mismanagement of water resources, Industrialization (increasing number of industries) and Urbanization (increase in urban population).
    2. ***Qualitative Aspects:*** Domestic and industrial wastes, chemicals, pesticides and fertilizers used in agriculture .
        - *For Example:-* from small streams to big rivers like the Ganga and Yamuna have become polluted.

Challenges:- Ecological crisis, impoverishment of water resources and health hazards.

Why conservation and water management is important?

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- Conservation is important to safeguard ourselves from health hazards.
- To ensure food security, continuation of our livelihoods and productive activities.
- Also, to prevent degradation of our natural ecosystems.

Multi-Purpose River Projects And Integrated Water Resources Management:

- In Ancient times, people constructed *lakes, embankments, canals* and *hydraulic structures* like **dams** to conserve water *for irrigation purpose.*
- However, in modern times, **dams** are being used for multiple purposes such as; *irrigation, electricity generation, water supply for domestic and industrial uses, flood control, recreation, inland navigation and fish breeding.*
    - **For Example:** The Bhakra-Nangal (Satluj-Beas river) project water is being used for hydel power production and irrigation.
    - Similarly, Hirakud project in the Mahanadi basin integrates conservation of water with flood control.
- After independence, India followed the integrated water resource management approach for progress and development of the nation. Thus, launched **multipurpose projects.**
- **Jawaharlal Nehru** also encouraged the construction of multipurpose dams because he was of the view that *it would integrate development of agriculture and the village economy with rapid industrialization and growth of the urban economy.*
    - This is why he proudly proclaimed the **dams as the *'temple of modern India'.***

Advantages of Multipurpose Projects and large dams:

1. It helps in providing irrigation facilities.
2. Electricity can be generated through dams.
3. Flood control is another advantage.
4. They help in fish breeding.
5. Also, they send water to the water scarce areas.

Disadvantages of Multipurpose Projects and large dams:

1. Dams construction can lead to Loss of life and property.
2. They affect the natural flow of river causing poor sediment flow and excessive sedimentation at the bottom of the reservoir. Thus, lead to soil erosion and flood.
3. Dams also fragment rivers making it difficult for aquatic fauna to migrate, especially for spawing.
4. The reservoirs that are created on the floodplains also submerge (completely cover) the existing vegetation and soil leading to its decomposition over a period of time.
5. Lastly, multipurpose projects can cause pollution and health problems like malaria.

Note: *Many local communities and environmentalists criticized the idea of Multi-purpose projects and large dams due to :- displacement issues, and ecological imbalance.*

- **For Example:** The Narmada Bachao Andolan and the Tehri Dam Andolan.

Sardar Sarovar Dam:-

- *Sardar Sarovar Dam in Gujarat* which has been built over the Narmada River covers four states- Maharashtra, Madhya Pradesh, Gujarat and Rajasthan.
- Interestingly, it is one of the largest water resource projects of India.
- Moreover, this project helped in meeting the requirement of water in drought-prone and desert areas of Gujarat and Rajasthan.

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Inter-State Water Disputes:

- Water, vital for life, can also be a source of conflict among states, as seen in the **Cauvery river dispute** between **Karnataka and Tamil Nadu.**
  Both states required water from the Cauvery for agricultural purposes, leading to disputes over its sharing.
- To address this, the **Cauvery Water Disputes Tribunal** was established in 2007.
- Finally, in 2018, the Supreme Court of India intervened, issuing a verdict aimed at fairly allocating water to both states in an effort to resolve the issue.

Rainwater Harvesting:

Due to the above given disadvantages, people felt the need to find better ways for conserving water resources. Consequently, rainwater harvesting became an alternative to Multi-purpose projects.

- Rain water harvesting system is both socio-economically and environmentally viable.

- This system has been practiced in India since ancient times.

Places or States	Water harvesting system
1. In hills and mountainous regions	People built diversion channels like the ‘Guls’ and ‘Kuls’.
2. Rajasthan	‘Rooftop rainwater harvesting’ to store drinking water.
3. In flood plains of Bengal	People developed inundation (huge) channels to irrigate their fields.
4. Arid and Semi-arid regions	Rain fed storage structures: ‘Khadins’ (Jaisalmer, Western Rajasthan) and ‘Johads’ (Rajasthan)

Water harvesting in traditional houses of Rajasthan:

- People living in the **semi-arid** and **arid regions of Rajasthan** used to build underground tanks or tankas for storing drinking water.
- Many houses constructed underground rooms adjoining the **‘tanka’** to meet two needs together.
  - The tank filled with water helped them survive hot and dry summers.
  - Also, it kept the room cool.
- Particularly, people of **Bikaner, Phalodi** and **Barmar** regions practiced this method of rainwater harvesting.
- The tanks were usually large.
  - *For example:* one household in Phalodi had a tank that was 6.1 metres deep, 4.27 metres long and 2.44 metres wide.
- These tanks were built inside the main house or the courtyard.
- They were connected to the sloping roofs of the houses through a pipe.
- Rainwater or palar pani in dry parts of Rajasthan is considered the purest form of natural water.

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Unfortunately, this practice has been on decline in Rajasthan. The reason is availability of plenty of water. It is due to the perennial Indira Gandhi Canal, many people in western Rajasthan don’t feel the need of maintaining tankas.

Water shortage in Mawsynram, Meghalaya:

- Despite being a heavy rainfall area, the North East region faces water shortages. You know why?
  - It due to **topography**, **inadequate infrastructure** for conserving water, **seasonal variations**, **population growth**, and **climate change**.

– Do you know which state of India receives the highest rainfall?

Meghalaya

– Which state made Bamboo Drip Irrigation System in India?

Meghalaya

– Which state is the first state in India which has made rooftop rainwater harvesting compulsory to all the houses across the state?

Tamil Nadu

– In which region is rooftop rainwater harvesting the most common practice?

Shillong, Meghalaya

Meaning of Terms used :

Drip Irrigation System:- It is a system that sends water straight to plant roots using tubes and emitters. Its main goal is to save water by cutting down on evaporation and runoff. This makes it a really efficient way to water crops.

Roof top rain water harvesting: It is for collecting rainwater from rooftops using gutters and pipes. This harvested rainwater can be stored for various purposes such as watering plants, flushing toilets, cleaning, or other non-potable uses.

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Guls, Kals, Khadins and Johads: There are traditional water harvesting structures used in different regions, in India, to capture and store rainwater.

- **Guls:** These are deep pits dug into the ground to collect rainwater, allowing it to seep into the soil and recharge groundwater.
- **Kuls:** Kuls are embankments built across streams to slow down water flow, enabling it to spread and recharge groundwater.
- **Khadins:** Traditional dams constructed across seasonal streams divert water into fields for irrigation and groundwater recharge.
- **Johads:** These are small ponds built in dry regions to capture rainwater during the monsoon, supporting groundwater recharge, irrigation, and local biodiversity.

Category

1. Class 10th

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