

Water Resources

Check Point 01

Q. 1. What percentage of fresh water is stored as ice sheets and glaciers?

Answer: 70%

96.5% of the total volume of the earth consists of water out of which 2.5% is fresh water. Out of the 2.5% of the total freshwater present on the earth, 70% of the fresh water is present in glaciers and ice sheets in Antarctica, Greenland and mountainous regions. Less than 30% is stored as groundwater.

Q. 2. Why is water availability per person low in India?

Answer: India ranks 133rd in the world in terms of water availability per person per annum. The reason for the low availability of water per person per annum is that India receives nearly 4% of global precipitation which is very less for the dense population in India. Also, the total estimated renewable water resources in India is 1,897 square km per annum.

Q. 3. According to citizen's Fifth report CSE 1999, which two rivers are far from being pure?

Answer: Ganga and Yamuna

India's rivers have turned into toxic streams due to urbanisation and industrialisation. Also, big rivers of India such as Ganga and Yamuna have been mentioned in the citizen's Fifth report CSE 1999, which said that these rivers are far from being pure.

Q. 4. Which ruler in ancient India had extensively built dams, lakes and irrigation system?

Answer: Chandragupta Maurya

Water harvesting system was started in the first century B.C to channel the flood water of river Ganga. It was during the reign of Chandragupta Maurya that these water bodies such as dams, lakes and rivers were extensively built.

Q. 5. What percentage of energy requirement is fulfilled by hydroelectricity in India?

Answer: 22%

Industrialisation in India has led to more demand for water and electricity. Most of the electricity to the industries is supplied by the hydroelectric power. 22% of electricity is produced by the hydroelectric power plants in India today.

Check Point 02

Q. 1. Multipurpose project on which river has created an interstate dispute between Karnataka and Tamil Nadu?

Answer: Kaveri river project

More demand, inadequate supply to one region are the main reasons due to which disputes arise between two states, for example, Tamil Nadu and Karnataka. The two states Tamil Nadu and Karnataka have disputes due to the Kaveri river multipurpose project which is based on a historical project.

Q. 2. What was the cause due to which the Sabarmati basin farmers agitated up to a level of a riot?

Answer: More supply to urban areas

One of the multi-purpose projects was 'dam' which satisfied the needs but also created conflicts due to various requirements of the people with the help of these projects. The Sabarmati-basin farmers had agitated because the water supply was provided to urban areas even at the time of drought.

Q. 3. What were the traditional systems of rainwater harvesting used in Rajasthan?

Answer: Rooftop harvesting, rain-fed storage structures and tankas.

Explanation: Rooftop harvesting was one of the traditional systems commonly followed in Rajasthan where the rainwater falling on the roof would go through a pipe and get collected in a container. The second method was to store the water in the agricultural fields. Tankas were another form of rain harvesting system used in Rajasthan where large tanks also known as tankas were used to store water.

Q. 4. Where is Gul or Kul water harvesting system practised?

Answer: Western Himalayas

While keeping the ecological condition and their water needs, in the mountainous region, i.e., the western Himalayas there were the diversion channels "kuls" and "guls" built for the agricultural purpose.

Q. 5. What water conservation method is used in Gendathur village?

Answer: Rooftop harvesting

A village in Mysore (Gendathur) have adopted the rainwater harvesting system in households' rooftop to meet their water needs. It has earned the rare distinction for rainwater harvesting system. Nearly 200 households have adopted this technique.

Self Assessment

Q. 1. What is fresh water? What is its availability on the earth?

Answer: 2.5%

Fresh water is the water that can be used by living beings such as water for drinking, irrigation etc. Three-fourth of the world is covered with water. 2.5 % of the total water available on the earth's surface is fresh water which can be used by living beings.

Q. 2. Write any one pre-independence hydraulic structure in Delhi?

Answer: Tank at Hauz Khas

To supply water to the Siri Fort area, Iltutmish had constructed a tank in Hauz Khas, Delhi in the 14th century.

Q. 3. What are the Major causes of water stress in India? Give at least two reasons

Answer: Global Precipitation and renewable water sources

Explanation: The two major causes are 1) India receives only 4% of global precipitation 2) There are only 1,897 sq. km per annum total renewable water resources in India. The above two causes are the one due to which many places in India today are scarce in water.

Q. 4. State the role of MNCs in depletion of fresh water?

Answer: Use of water and power

The immense increase in industrial areas which include MNCs require more fresh water for use and consume more power. The power supplied to the industries is from hydroelectric plants. 22% of the total electricity is taken from the hydroelectric plants.

Q. 5. What do you understand by hydrological cycle?

Answer: The fresh water obtained from the surface runoff and groundwater is continually renewed through the hydrological cycle for usage. Hydrological cycle ensures that water is a renewable source.

Q. 6. The per capita availability of fresh water is depleting in India gradually. Why?

Answer: Depletion of fresh water in India is taking place gradually due to increase in population, urbanisation, agriculture modernisation and unaccounted demand for water. Deforestation is indirectly a reason for scarcity in India.

Q. 7. Why is rainwater harvesting better than a multipurpose project?

Answer: The three major reasons why rainwater harvesting is better than the multipurpose project is:

(1) Surveys show that Multipurpose projects could not meet the goal it was made for.

(2) Rain harvesting is socio-economically better.

(3) Also, environmentally it is a good alternative.

Q. 8. which river project faced the public agitation in Gujarat?

Answer: Sabarmati -basin

The Sabarmati-basin farmers had agitated because the water supply was provided to urban areas even at the time of drought and it became difficult for them to irrigate.

Q. 9. How would you define inter-state water disputes?

Answer: Interstate water disputes take place when either of the states is dependable on water resource and the needs for water are not satisfactory in either of the villages and are suffering from water scarcity. One of the examples is the Kaveri water dispute between Tamil Nadu and Karnataka.

Q. 10. Mentions two merits of tankas.

Answer: Tankas or tanks were used by many villages in Rajasthan for storing water. They were very large and could store large quantities of water. They were 6.1 meters deep, 4.27 meters long and 2.44 meters wide. Apart from that, they provided relief during peak summers.

Q. 11. Read the following passage and answer the question given below:

Answer: "The long-term average annual rainfall for the country is 1160 mm, which is highest anywhere in the world for a country of comparable size. The annual rainfall, however, fluctuates widely".

Write briefly about the possible consequence of such a situation of water supply.

The fluctuation of annual rainfall in the country will mostly lead to scarcity of water in urban areas and drought in some areas if the amount of rainfall reduces and in case of increase will lead to floods in most of the areas where there is no proper water management system.

Q. 12. Rooftop rainwater harvesting is quite beneficial for urban people. Do you agree with it?

Answer: Yes, rooftop harvesting is beneficial for urban areas as it will be of great use. Rainwater can be filtered and can be used for household works such as washing clothes etc. Also, when there is any kind of scarcity in water supply this water can be utilised in a very appropriate manner.

Q. 13. What are the various reasons for diminishing levels of groundwater in the state of India? Suggest some measure to improve the situation?

Answer: Overexploitation of water by the societies in urban areas and by the industries have led to the diminishing levels of groundwater. Adoption of rainwater harvesting techniques by societies is one of the best solutions for such diminishing water levels.

Q. 14. What are the implications of pollution of river water?

Answer: The implications of the pollution in rivers are:

- (1) Scarcity of water
- (2) Increase in global warming
- (3) Threatens aquatic flora and fauna.
- (4) This water when used by animals and plants can be a cause of health issues.

Q. 15. Explain how the people of Rajasthan use to overcome the problem of water scarcity.

Answer: One of the commonly used technique was rooftop rainwater harvesting. In the semi-arid regions of Rajasthan agricultural fields were converted into storage structures. In some regions such as Bikaner, Phalodi tankas, i.e. the underground water storage tanks were used to store water.

Q. 16. Give an example to prove that a multi-purpose project creates social, economic and environmental imbalances.

Answer: The biggest example is the floods in Maharashtra and Gujarat in 2006 which had occurred because of the aggravation of floods on opening the doors of dams. This not only led to the loss of lives but also led to soil erosion and disruption in the lives of people.

Q. 17. Analyse the factors causing a problems associated with water resources in India.

Answer: Post-independence, the factors that caused problems with water resources in India are as follows:

1. Increasing industrialisation
2. Urbanization and their demands for water
3. Industrial wastes released into water bodies such as rivers, lakes etc.
4. More demand for hydroelectric power by the industries.
5. Indiscriminate use of water.

The above are some of the major factors due to which India is facing a problem of water scarcity.

Q. 18. What are multi-purpose projects and why they are called so?

Answer: Multi-purpose projects are the projects which were constructed after the independence of India to use the water for various purposes. Dams are one of the major multi-purpose projects. The uses of multi-purpose projects are:

- (1) They provide water for irrigation.
- (2) Dam water is used for hydroelectric plants to generate electricity.
- (3) Dam water is also supplied for domestic use.

These multi-purpose projects were also used to stop floods, but they have failed many a times. Bhakra Nangal project is one of the biggest multi-purpose projects in India.

Q. 19. Describe in brief the categorisation of dams in India.

Answer: 1. Dams are generally built for the purpose of hydroelectricity, irrigation, water storage, flood control, etc.

2. Dams are classified according to structure, intended purpose or height.
3. Based on structure and the materials used, dams are classified as timber dams, embankment dams or masonry dams, with several subtypes.
4. According to the height, dams can be categorised as large dams and major dams or alternatively as low dams, medium height dams and high dams.

Q. 20. How are rainwater systems prevalent in India with different names and methods?

Answer: There are traditional rainwater harvesting systems followed in India. They are:

- 1) In mountainous regions, the technique named as 'kul' and 'gul' is used where the diversion channels are built.
- 2) Next is the rooftop technique which is mostly used in Rajasthan.
- 3) Structures named 'khadins' and 'johad' are also used in Rajasthan where the agricultural fields are converted into storage structures.
- 4) In Bikaner, Phalodi tankas which are the underground water storage tanks are used to store water.

The rooftop technique is used even today in urban areas to conserve rain water and use it when needed.

Q. 21. Despite various advantages, multi-purpose projects are opposed by people. Why?

Answer: One of the major reasons the multi-purpose projects were opposed was that it could not complete the purpose it was built for.

- 1) One of its purposes was to avoid floods. Instead, it is found that these multi-purpose projects aggravated the flood water which led to the loss of lives and soil erosion.
- 2) It disturbed the lives of people living by rehabilitating them.
- 3) It does not satisfy the socio-economic principles whereas the rainwater harvesting system does.
- 4) Environmentally rainwater harvesting systems are considered more environmentally friendly compared to multi-purpose projects.

Q. 22. Analyse how can an individual contribute to saving water.

Answer: The best way an individual can contribute to saving water is as follows:

- 1) Use water only as needed.
- 2) Preventing the water bodies from polluting by not throwing waste into it.
- 3) Planting trees in their own surroundings which will eventually increase rainfall.
- 4) Preventing the misuse of electricity will indirectly contribute to the saving of water, as most of the electricity generated is through the hydroelectric power plants.

Q. 23. Narrate how particular dam in a flood-prone area has recently failed to prevent a flood. Find out why it happened. Could this be avoided? How?

Answer: In the year 2006, the floods that occurred in Maharashtra and Gujarat were due to the aggravation of floods by the opening of gates of dams.

The major cause of this was the sedimentation in the reservoir.

Short-term measure to avoid this could be better management of dams, issuing a warning to the people regarding heavy rains, making arrangements for them for minimising human damage, etc.

Long-term measures include - adapting the rain water harvesting systems both in urban areas and villages.

- 1) Using the roof top system rain water can be used in a proper way and floods can be prevented.
- 2) Underground water tanks if made in every house, will help in storing water in the case of heavy rainfall.