

Very Short Answer Questions

Q. 1. How is freshwater obtained?

Ans. Freshwater is mainly obtained from surface run off and groundwater that is continually being renewed and recharged through the hydrological cycle.

Q. 2. What is water scarcity?

Ans. Water scarcity may be an outcome of large and growing population and consequent greater demands for water and unequal access to it.

Q. 3. Explain the causes of water scarcity.

Ans. Water scarcity is caused by over-exploitation, excessive use and unequal access to water among different social groups.

Q. 4. What was the method used in ancient period to conserve water?

Ans. Archaeological and historical records show that from ancient times, we have been constructing sophisticated hydraulic structures like dams built of stone rubble, reservoirs or lakes, embankments and canals for irrigation.

Q. 5. What is a dam?

Ans. A dam is a barrier across flowing water that obstructs, directs or retards the flow, often creating a reservoir.

Q. 6. What are the benefits of dams?

Ans. Dams are built for irrigation, electricity generation, water supply for domestic and industrial uses, flood control, recreation, inland navigation and fish breeding.

Q. 7. Why were multi-purpose projects launched after independence of India?

Ans. Multipurpose projects, launched after independence with their integrated water resources management approach, were thought of as the vehicle that would lead the nation to development and progress, overcoming the handicap of its colonial past.

Q. 8. Why have multipurpose dams come under great scrutiny?

Ans. Regulating and damming of rivers affect their natural flow causing poor sediment flow and excessive sedimentation at the bottom of the reservoir, resulting in rockier stream beds and poorer habitats for the rivers aquatic life.

Q. 9. How do dams create conflicts between people?

Ans. In Gujarat, the Sabarmati–basin farmers were agitated and almost caused a riot over the higher priority given to water supply in urban areas, particularly during

droughts. Interstate water disputes are also becoming common with regard to sharing the costs and benefits of the multipurpose projects.

Q. 10. How are dams responsible for causing floods?

Ans. Ironically, the dams that were constructed to control floods have triggered floods due to sedimentation in the reservoir. Big dams can be unsuccessful in controlling floods at the time of excessive rainfall. Release of water from dams during heavy rains aggravate the flood situation.

Q. 11. What is the viable alternative of multipurpose projects?

Ans. Rising resistance against the multi-purpose projects, water harvesting system was a viable alternative, both socio economically and environmentally.

Q. 12. How did people in ancient times exercise water harvesting system?

Ans. People had in-depth knowledge of rainfall regimes and soil types and developed wide ranging techniques to harvest rainwater, groundwater, river water and flood water in keeping with the local ecological conditions and their water needs.

Q. 13. What were 'Kuls' or 'Guls'?

Ans. These are the diversion channels for irrigational purposes. These are mainly used in western Himalayas for water harvesting and agriculture.

Q. 14. How did people in West Bengal practise water harvesting?

Ans. In the flood plains of Bengal, people developed inundation channels to irrigate their fields.

Q. 15. What were 'johads' and 'khadins'?

Ans. 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. These were called 'khadins' in Jaisalmer and 'Johads' in other parts of Rajasthan.

Q. 16. What are 'tankas'?

Ans. Tankas were underground storing tanks of drinking water in arid and semi-arid regions of Rajasthan. Tankas were big huge tanks for storing rain water from the roof top of all the houses.

Q. 17. What does 'Palar Pani' mean?

Ans. Rain water or 'Palar Pani' as commonly referred to in parts of Rajasthan, is considered the purest form of natural water.

Q. 18. Is rain water harvesting practised these days in western Rajasthan? Support your answer.

Ans. These days, in western Rajasthan, sadly the practice of rooftop rainwater harvesting is on the decline as plenty of water is available due to the perennial Rajasthan Canal, though some houses still maintain the tankas since they do not like the taste of tap water.

Q. 19. How is Gendathur included as one of the rare villages to adopt rainwater harvesting?

Ans. In Gendathur, a remote backward village in Mysore, Karnataka, villagers have installed, in their household's rooftop rainwater harvesting system to meet their water needs. Nearly 200 households have installed this system and the village has earned the rare distinction of being rich in rainwater.

Q. 20. Which state has made rooftop rainwater harvesting compulsory?

Ans. Tamil Nadu is the first and the only state in India which has made rooftop rainwater harvesting structure compulsory to all the houses across the state. These are legal provisions to punish the defaulters.

Q. 21. What is bamboo drip irrigation?

Ans. In Meghalaya, a 200 year old system of tapping stream and spring water by using bamboo pipes, is practised. It is called bamboo drip irrigation.

Short Answer Questions

Q. 1. What are the main causes of water scarcity?

Ans. (i) Overpopulation: Water scarcity may be an outcome of a large and growing population which results in greater demand for water and unequal access to it.

(ii) Commercialisation of agriculture: After the success of the Green Revolution, farmers are producing commercial crops. The commercial crops need more water for irrigation.

(iii) Urbanisation: Urbanisation is another factor for scarcity of water. Since new lifestyles have developed in the urban cities overexploitation of water continues; there is water scarcity.

Q. 2. Explain 'Narmada Bachao Andolan'.

Ans. Save Narmada Movement is a Non-Governmental Organisation.

It mobilised tribal people, farmers, environmentalists and human rights activists against the Sardar Sarovar Dam, being built across the Narmada River in Gujarat.

It focused on the environmental issues related to trees that would be submerged under the dam water.

Recently, it has refocused its aim to rehabilitate displaced people.

Q. 3. Give various methods of rainwater harvesting since ancient times.

Ans. (i) Guls or Kuls: In hilly and mountainous regions, people built diversion channels called Kuls or Guls in the Western Himalayas. A Kul or Gul leads to a circular village tank, from which water is released as and when required.

(ii) Inundation Channels: In the flood plains of Bengal, people developed inundation channels to irrigate their fields.

(iii) Khadins and Johads: 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, called 'Khadins' in Jaisalmer and 'Johads' in other parts of Rajasthan.

(iv) Tankas: Circular holes are made in the ground, lined with fine polished line. In Bikaner, Phalodi and Barmer of Rajasthan, almost all the houses traditionally had underground tanks or tankas for storing drinking water.

Q. 4. What is Gendathur village renowned for?

Ans. (i) The villagers of Gendathur village had installed in their household's rooftop, rainwater harvesting system to meet their water needs.

(ii) Nearly 200 households had installed this system and the village earned a rare distinction of being rich in rainwater.

(iii) Gendathur receives an annual precipitation of 1,000 mm, and with 80 per cent of collection efficiency, every house can collect and use about 50,000 litres of water annually.

Q. 5. What do you understand by the term 'scarcity of water'?

Ans. It is a situation where water is sufficiently available to meet the needs of the people, but the area still suffers from water scarcity.

(i) This scarcity may be due to bad quality of water.

(ii) There has been a growing concern that even if there is ample water to meet the needs of the people, much of it may be polluted by domestic and industrial wastes, chemicals, pesticides and fertilisers used in agriculture, thus, making it hazardous for human use.

Q. 6. What are the main factors of river pollution in India?

Ans. India's rivers, especially the smaller ones have all turned into toxic streams. Even the big ones like Ganga and Yamuna are far from being pure. The assault on Indian rivers is from the population growth. It increases the pollution in the river and reduces the amount of water available for industries and agriculture. Besides that, other culprits are the modernisation of agriculture, urbanisation and the growth of industries. The chemical fertilisers and the effluents from industries on the river banks are also responsible for its pollution.

Q. 7. What is a dam? What are the different types of dams?

Ans. A dam is a barrier across flowing water that obstructs, directs or retards the flow, often creating a reservoir, lake or impoundment.

Dams are classified according to their structure, intended purpose or height. On the basis of structure and material used, dams are classified as:

(i) Timber dams

(ii) Embankment dams or masonry dams.

According to their height, dams can be categorised as:

(i) Large dams or major dams

(ii) Low dams

(iii) Medium height dams

(iv) High dams

Q. 8. Why did Jawaharlal Nehru proudly proclaim the dams as the ‘temples of modern India’?

Ans. Multipurpose projects launched after independence with their integrated water resources management approach, were thought of as the vehicle that would lead the nation to development and progress. Jawaharlal Nehru proclaimed the dams as the temples of modern India’ as it would integrate the development of agriculture and village economy with rapid industrialisation and growth of the urban economy.

Q. 9. Explain the river-water dispute between the states of India.

Ans. Krishna-Godavari dispute is due to the objections raised by the governments of Andhra Pradesh and Karnataka. It is regarding the diversion of more water at Koyna by the Maharashtra government for a multipurpose project. This would reduce downstream flow in their states with adverse consequences for agriculture and industry. Similar disputes arise as Kaveri issue between the states of Karnataka and Tamil Nadu, and Yamuna water dispute between Haryana and Delhi governments regarding the use of water.

Long Answer Questions

Q. 1. In what ways are intensive industrialisation and urbanisation responsible for water scarcity?

Or

“It is essential to conserve and manage our water resources.” Support the statement with suitable examples.

Ans. (i) The ever increasing number of industries has made matters worse by exerting pressure on existing freshwater resources.

(ii) Industries, apart from being heavy users of water, also require power to run them. Much of this energy comes from hydroelectric power.

(iii) Multiplying urban centres with large and dense populations and urban lifestyles have not only added to water and energy requirements but have further aggravated the problem.

(iv) In housing societies or colonies, we would find that most of these have their own groundwater pumping devices to meet their water needs. With the result, fragile water resources are being overexploited and have caused their depletion in several cities.

Q. 2. How have multi-purpose projects and large dams been the cause of many new social movements?

Ans. (i) Narmada Bachao Andolan and the Tehri Dam Andolan, etc., were the movements to resist large-scale displacement of local communities. Local people often had to give up their land, livelihood and their control over resources for the greater good of the nation.

(ii) Irrigation has changed the cropping pattern from shifting to commercial crops. It is responsible for salinisation of the soil. At the same time, it has its social impact by increasing the social gap between the rich landowners and the landless poor.

(iii) Dams also created conflicts between people wanting different uses and benefits from the same water resource. In Gujarat, the Sabarmati basin farmers were agitated over the priority given to water supply in urban areas, particularly during droughts.

(iv) Interstate water disputes are also common with regard to sharing the costs and benefits of the multi-purpose projects. For e.g., Krishna-Godavari dispute, is due to the objections raised by Karnataka and Andhra Pradesh governments regarding the diversion of more water at Koyna by the Maharashtra government for a multi-purpose project.

Q. 3. What do you know about the ‘Bamboo-Drip Irrigation System’?

Ans. In Meghalaya, a 200 year old system of tapping stream and spring water by using bamboo pipes, is prevalent.

Bamboo pipes are used to divert perennial springs on the hilltops to the lower reaches by gravity.

The channel sections made of bamboo, divert water to the plant site, where it is distributed into branches.

If the pipes pass roads, they are taken high above the land on the tree branches.

Reduced channel sections and diversion units are used at the last stage of water application. The last channel section enables water to be dropped near the roots of the plant.

Q. 4. Give a brief description of 'Hydrological Cycle'.

Ans. Three-fourth of the earth's surface is covered with water, but only a small proportion of it accounts for freshwater that can be put to use.

The process of hydrological cycle begin with the evaporation process due to heat of Sun on all water bodies of the earth including seas and oceans.

These minute particles of the water then get condensed. In this process of condensation, clouds are formed with dust particles and pollen grains present in the atmosphere.

When saturation takes place, then clouds precipitate in the form of rain or snow. This fresh water then becomes surface run-off water, in the form of rivers, ponds and lakes. This water again gets drained into sea or ocean and forms a hydrological process.

Hots (Higher Order Thinking Skills)

Q. 1. How does urbanization and urban lifestyle lead to over-exploitation of water?

Ans. Multiplying urban centres with large and dense population and urban lifestyles have not only added to water and energy requirements but have further aggravated the problem. Fragile water resources like groundwater are being overexploited and have caused their depletion in several cities.

Q. 2. Highlight any three hydraulic structures as a part of water management programmes initiated in ancient India.

Ans. In the first century BC, Sringaverapura near Allahabad had sophisticated water harvesting system, channelling the flood water of river Ganga.

During the time of Chandragupta Maurya, dams, lakes and irrigation systems were extensively built.

Evidences of sophisticated irrigation works have also been found in Kalinga (Odisha), Nagarjun-Konda (Andhra Pradesh), Bennur (Karnataka) and Kolhapur (Maharashtra).

In the 11th century, Bhopal Lake, one of the largest artificial lakes of its time, was built.

In the 14th century, the tank in Hauz Khas, Delhi was constructed by Iltutmish for supplying water to Siri Fort area.

Q. 3. Explain the ecological problems being faced due to multi-purpose river valley projects.

Ans. In recent years, the multipurpose projects and large dams have come under great scrutiny and opposition for a variety of reasons:

(i) Regulating and damming of rivers affect the natural flow of rivers, causing poor sediment flow and excessive sedimentation at the bottom of the reservoir, resulting in rockier streambeds and poorer habitats for the rivers' aquatic life.

(ii) Adverse environmental effects in the form of water-logging, salinity have led to the degradation of soil. Cropping patterns of many regions have changed due to irrigation with farmers shifting to water intensive and commercial crops.

(iii) Dams also fragment rivers, making it difficult for the aquatic fauna to migrate, especially for spawning.

(iv) The reservoirs that are created on the floodplains also submerge the existing vegetation and soil leading to its decomposition over a period of time.

Q. 4. Why is the practice of rooftop rainwater harvesting slowly declining in Rajasthan? Which state has made rooftop rainwater harvesting compulsory?

Ans. (i) In Rajasthan, sadly the practice of rooftop rainwater harvesting is on decline.

(ii) It is due to availability of plenty of water from Perennial Rajasthan Canal.

(iii) New generation considers stored water of rainwater unhygienic so they don't prefer to drink that water.

(iv) Tamil Nadu is the state which has made rooftop rainwater harvesting compulsory.

Q. 5. 'Rainwater harvesting system is viable alternative both ways socio-economically and environmentally.' Support the statement with three examples.

Ans. Keeping into view the disadvantages and rising resistance against the multipurpose dams, water harvesting system is considered viable alternative both socio-economically and environmentally.

For example, rooftop rainwater harvesting is the most common practice in Shillong, Meghalaya. Though this region receives the highest rainfall in the world, yet the state capital, Shillong faces acute shortage of water. Nearly every household in the city has a rooftop rainwater harvesting structure.