Chapter 8: Water Resources

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Exercise 8.1 — Multiple Choice Questions

Q1 Based on the information given below classify each of the situations as 'suffering from water scarcity' or 'not suffering from water scarcity'. (a) Region with high annual rainfall. (b) Region having high annual rainfall and large population. (c) Region having high annual rainfall but water is highly polluted. (d) Region having low rainfall and low population.

SOLUTION

Water scarcity is not caused by low rainfall alone. As the chapter explains, in most cases it is caused by over-exploitation, excessive use, unequal access, growing population and poor (polluted) quality of water.

(a) A region with only high annual rainfall and nothing to strain it is NOT suffering from water scarcity.
(b) High annual rainfall but a large population creates greater demand and unequal access, so it IS suffering from water scarcity.
(c) High annual rainfall but highly polluted water means the water is unfit for use, so it IS suffering from water scarcity (scarcity of good quality water).
(d) Low rainfall with low population means demand stays low, so it is NOT suffering from water scarcity.

Answer: (a) Not suffering; (b) Suffering; (c) Suffering; (d) Not suffering.

Q2 Which one of the following statements is not an argument in favour of multi-purpose river projects? (a) Multi-purpose projects bring water to those areas which suffer from water scarcity. (b) Multi-purpose projects by regulating water flow helps to control floods. (c) Multi-purpose projects lead to large scale displacements and loss of livelihood. (d) Multi-purpose projects generate electricity for our industries and our homes.

SOLUTION

Options (a), (b) and (d) describe benefits of multi-purpose projects — supplying water to scarce areas, controlling floods, and generating electricity — so they are arguments in favour.

Option (c) points to large scale displacements and loss of livelihood, which is a disadvantage, not an argument in favour.

Answer: (c) Multi-purpose projects lead to large scale displacements and loss of livelihood.

Q3 Here are some false statements. Identify the mistakes and rewrite them correctly. (a) Multiplying urban centres with large and dense populations and urban lifestyles have helped in proper utilisation of water resources. (b) Regulating and damming of rivers does not affect the river's natural flow and its sediment flow. (c) Today in Rajasthan, the practice of rooftop rainwater water harvesting has gained popularity despite high water availability due to the Indira Gandhi Canal.

SOLUTION

(a) Correct statement: Multiplying urban centres with large and dense populations and urban lifestyles have added to water and energy requirements and have over-exploited water resources, causing their depletion.

(b) Correct statement: Regulating and damming of rivers affects the river's natural flow, causing poor sediment flow and excessive sedimentation at the bottom of the reservoir.

(c) Correct statement: Today in Rajasthan, the practice of rooftop rainwater harvesting is on the decline as plenty of water is available due to the perennial Indira Gandhi Canal.

Answer: (a) Urban growth over-exploited and depleted water resources; (b) Damming affects natural flow and causes poor sediment flow with reservoir sedimentation; (c) Rooftop rainwater harvesting is on the decline in Rajasthan due to the Indira Gandhi Canal.

Exercise 8.2 — Answer the following questions in about 30 words

Q1 Explain how water becomes a renewable resource.

SOLUTION

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

Because all water moves within the hydrological cycle, it is constantly recharged, ensuring that water is a renewable resource.

Answer: Water is continually renewed and recharged through the hydrological cycle, which is why it is a renewable resource.

Q2 What is water scarcity and what are its main causes?

SOLUTION

Water scarcity is the shortage of water. Even areas with ample water resources can face it — for example many of our cities.

Its main causes are over-exploitation, excessive use and unequal access to water among different social groups. It also results from a large and growing population and consequent greater demand (for domestic use and food production), over-exploitation to expand irrigated agriculture, industrialisation and urbanisation, and bad (polluted) quality of water.

Answer: Water scarcity is a shortage of usable water, caused mainly by over-exploitation, excessive use, unequal access, growing population and demand, and pollution.

Q3 Compare the advantages and disadvantages of multi-purpose river projects.

SOLUTION

Advantages: Dams and multi-purpose projects are built for irrigation, electricity generation, water supply for domestic and industrial uses, flood control, recreation, inland navigation and fish breeding. For example, the Bhakra-Nangal project provides both hydel power and irrigation, and the Hirakud project integrates water conservation with flood control.

Disadvantages: Regulating and damming rivers affects their natural flow, causing poor sediment flow and excessive sedimentation in the reservoir, rockier stream

beds and poorer aquatic habitats. Dams fragment rivers, making migration and spawning difficult for aquatic fauna. Reservoirs submerge vegetation and soil, and can trigger floods due to sedimentation, induce earthquakes, cause water-borne diseases and pollution, and lead to displacement, changed cropping patterns and soil salinisation.

Answer: Advantages: irrigation, electricity, water supply, flood control, navigation and fish breeding. Disadvantages: disrupted river flow, sedimentation, harm to aquatic life, submergence, displacement and ecological damage.

Exercise 8.3 — Answer the following questions in about 120 words

Q1 Discuss how rainwater harvesting in semi-arid regions of Rajasthan is carried out.

SOLUTION

In the semi-arid and arid regions of Rajasthan, particularly in Bikaner, Phalodi and Barmer, almost all houses traditionally had underground tanks or 'tankas' for storing drinking water. A tanka could be as large as a big room; one household in Phalodi had a tank 6.1 metres deep, 4.27 metres long and 2.44 metres wide.

The tankas were part of a well-developed rooftop rainwater harvesting system and were built inside the main house or the courtyard, connected to the sloping roofs of the houses through a pipe. Rain falling on the rooftops would travel down the pipe and be stored in these underground tankas.

The first spell of rain was usually not collected, as it would clean the roofs and the pipes; the rainwater from the subsequent showers was then collected. This water could be stored till the next rainfall, making it an extremely reliable source of drinking water, especially in the summers. This rainwater, called 'palar pani', is considered the purest form of natural water. Some houses even built underground rooms adjoining the tanka to beat the summer heat.

Answer: Rooftop rainwater is channelled through pipes into underground 'tankas' built in the house or courtyard; the first spell is discarded and later showers stored as 'palar pani', a reliable, pure source of drinking water.

Q2 Describe how modern adaptations of traditional rainwater harvesting methods are being carried out to conserve and store water.

SOLUTION

In many parts of rural and urban India, rooftop rainwater harvesting is being successfully adapted to store and conserve water.

In Gendathur, a remote backward village in Mysuru, Karnataka, villagers have installed rooftop rainwater harvesting systems on their households' rooftops to meet their water needs. Nearly 200 households have installed the system and the village has earned the rare distinction of being rich in rainwater. Gendathur receives an annual precipitation of 1,000 mm, and with 80 per cent collection efficiency and about 10 fillings, every house can collect and use about 50,000

litres of water annually; from the 200 houses, the net rainwater harvested annually amounts to 1,00,000 litres.

Rooftop rainwater harvesting is also the most common practice in Shillong, Meghalaya, where nearly every household has a structure supplying 15–25 per cent of its water needs. Tamil Nadu is the first state in India to make rooftop rainwater harvesting structures compulsory for all houses, with legal provisions to punish defaulters.

Answer: Rooftop rainwater harvesting is being adapted across India — e.g. Gendathur (Mysuru) with 200 households, Shillong meeting 15–25% of needs, and Tamil Nadu making it compulsory by law.