Chapter 3: Water Resources

Question 1: Multiple choice questions.

(i) 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.

(ii) Which one of the following statements is not an argument in favour of multipurpose 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.

(iii) 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 utilization of water resources.

(b) Regulating and damming of rivers does not affect the river's natural flow and its sediment flow.

(c) In Gujarat, the Sabarmati basin farmers were not agitated when higher priority was given to water supply in urban areas, particularly during droughts.

(d) Today in Rajasthan, the practice of rooftop rainwater water harvesting has gained popularity despite high water availability due to the Indira Gandhi Canal.

Answer :

(i)

(a) A region with high annual rainfall. - Not suffering from water scarcity

(b) A region having high annual rainfall and large population. - Suffering from water scarcity

(c) A region having high annual rainfall but water is highly polluted. - Suffering from water scarcity

(d) A region having low rainfall and low population - Not suffering from water scarcity

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

(iii)

(a) Multiplying urban centres with large and dense populations and urban lifestyles have resulted in improper utilization of water resources.

(b) Regulating and damming of rivers does affect the river's natural flow and its sediment flow.

(c) In Gujarat, the Sabarmati basin farmers were agitated when higher priority was given to water supply in urban areas, particularly during droughts.

(d) Today in Rajasthan, the practice of rooftop rainwater water harvesting popularity has declined due to high water availability from Indira Gandhi Canal.

Question 2: Answer the following questions in about 30 words.

(i) Explain how water becomes a renewable resource.

Answer : Water can be considered as a renewable resource as the groundwater and surface water is recharged continuously by rains due to the process involved in the hydrological cycle-

1. Evaporations
2. Condensation
3. Precipitation

(ii) What is water scarcity and what are its main causes?

Answer : Water scarcity is the lack of sufficient available water resources to meet the demands of water usage within a region. Following are its main causes-

1. Growing population
2. over-exploitation
3. unequal distribution of water among social groups.

(iii) Compare the advantages and disadvantages of multi-purpose river projects.

Answer :

Advantages:

1. Irrigation
2. Electricity generation
3. Flood control
4. Water supply for industrial and domestic purposes.
5. Tourist attraction
6. Inland navigation

Disadvantages:

1. The natural flow of water is affected
2. Aquatic life gets affected
3. Submergence of land in surrounding areas
4. Ecological consequences
5. Large scale displacement of local people.

Question 3: Answer the following questions in about 120 words.

(i) Discuss how rainwater harvesting in semi-arid regions of Rajasthan is carried out.

Answer : In the semi-arid and arid regions of Rajasthan, particularly in Bikaner, Phalodi and Barmer, almost all the houses traditionally had underground tanks or tankas for storing drinking water. The tanks could be as large as a big room. The tankas were part of the well-developed rooftop rainwater harvesting system and were built inside the main house or the courtyard. They 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'. The first spell of rain was usually not collected as this would clean the roofs and the pipes. The rainwater from the subsequent showers was then collected. The rainwater can be stored in the tankas till the next rainfall making it an extremely reliable source of drinking water when all other sources are dried up, particularly in the summers. Rainwater, or palar pani, as commonly referred to in these parts, is considered the purest form of natural water.

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

Answer : Water harvesting system is a viable alternative, both socio-economically and environmentally. In ancient India, along with the sophisticated hydraulic structures, there existed an extraordinary tradition of water-harvesting system. People had in-depth knowledge of rainfall regimes and soil types and developed wide-ranging techniques to harvest rainwater, groundwater, river water and floodwater in keeping with the

local ecological conditions and their water needs. In hill and mountainous regions, people built diversion channels like the 'guls' or 'kuls' of the Western Himalayas for agriculture. 'Rooftop rainwater harvesting' was commonly practiced to store drinking water, particularly in Rajasthan. 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 like the 'khadins' in Jaisalmer and Johads' in other parts of Rajasthan. In Gendathur, a remote backward village in Mysuru, Karnataka, villagers have installed, in their household's rooftop, rainwater harvesting system to meet their water needs. Rooftop rainwater harvesting is the most common practice in Shillong, Meghalaya. It is interesting because Cherapunjee and Mawsynram situated at a distance of 55 km. from Shillong, receive the highest rainfall in the world. Nearly every household in the city has a rooftop rainwater harvesting structure. Nearly 15-25 per cent of the total water requirement of the household comes from rooftop water harvesting. Tamil Nadu is the first state in India which has made rooftop rainwater harvesting structure compulsory to all the houses across the state.

Intext Questions:

Question : From your everyday experiences, write a short proposal on how you can conserve water.

Answer :

- Turn off the water while brushing your teeth.
- Check faucets and pipes for leaks.
- Take shorter showers.
- Water your lawn only when it needs it.
- Plant drought-resistant trees and plants.
- We should try to reuse our rainwater.
- When you drink water from a glass only take as much as you need.
- Put your dishwasher and washing machine on with full loads and on an eco-setting wherever possible.

Question : Find out more about any one traditional method of building dams and irrigation works.

Answer :

Building the dam:

Concrete dams will need a large quantity of ready concrete, so, a concrete batching plant is often built on site. Concrete is then transferred to the dam either using a system of conveyor belts or using trucks and cranes.

The traditional method of placing the concrete is to pour it into a formwork mould made in the required shape of the dam. The dam is built upwards 1-2 m at a time, and the concrete left to cure before the next section is formed on top.

Strip Irrigation Method:

In strip irrigation method, fields are divided into strips of different size. A boundary called 'Med' is formed to separate the strips. These strips are constructed according to the slope. The source of water is situated at the highest place in the field from where the whole field can get the flow of water.

The width of strips is decided as per quantity of water. More wastage of water is caused if strips are wider. Length of strip is decided by the slope of land and its structure. Effect of soil composition is also visible on it

Question : Make a list of inter-state water disputes.

Answer :

1. Godavari Water Disputes Tribunal
2. Krishna Water Disputes Tribunal –I
3. Narmada Water Disputes Tribunal
4. Ravi & Beas Water Tribunal
5. Cauvery Water Disputes Tribunal
6. Krishna Water Disputes Tribunal –II

7. Vansadhara Water Disputes Tribunal
8. Mahadayi Water Disputes Tribunal

Question : Collect information about flood prone areas of the country.

Collect information about flood prone areas of the country

Answer : India, being a peninsular country and surrounded by the Arabian Sea, Indian Ocean and the Bay of Bengal, is quite prone to flood. As per the Geological Survey of India (GSI), the major flood prone areas of India cover almost 12.5% area of the country.

The states falling within the periphery of "India Flood Prone Areas" are West Bengal, Orissa, Andhra Pradesh, Kerala, Assam, Bihar, Gujrat, Uttar Pradesh, Haryana and Punjab. The intense monsoon rains from southwest causes rivers like Brahmaputra, Ganga, Yamuna etc. to swell their banks, which in turn floods the adjacent areas.
The major flood prone areas in India are the river banks and deltas of Ravi, Yamuna-Sahibi, Gandak, Sutlej, Ganga, Ghaggar, Kosi, Teesta, Brahmaputra, Mahanadi, Mahananda, Damodar, Godavari, Mayurakshi, Sabarmati and their tributaries.

Question : Find out other rainwater harvesting systems existing in and around your locality.

Answer :

1. Water Butt:
   One of the most basic types of rainwater harvesting systems; water Butt collects rainwater in a container from natural rainfall and/or drain pipes. The collected water is used mainly for watering the garden.

2. Retention Ponds:
   Retention ponds are used to collect surface runoff water and improve the quality of water by natural processes like sedimentation, decomposition, solar disinfection, and soil filtration. The most common use of water collected and harvested by pond harvesting is watering livestock, however, it can also be used for groundwater recharge, irrigation or any other purpose other than potable uses.

3. In-Ground Storage:
   Underground storage tanks are very popular in areas where the majority of rainfall occurs in one single season. These underground tanks are insulated and have a very low rate of evaporation.

Question : Collect information on how industries are polluting our water resources.

Answer :

- Industries discharge chemical wastes comprising substances called effluents in rivers, lakes, streams etc.
- Factories sometimes turn waterways into open sewers by dumping oil, toxic chemicals and other harmful liquids called effluents into them

- These chemicals not only pollute the water reservoirs but also disturb the natural purification cycle of water carried out by microorganisms.
- Waste from tanneries and other heavy industrial plants contain heavy elements such as Chromium, Lead, Mercury etc which pose severe threats to the aquatic life.
- Moreover, the fertilizer industries dump nitrogenous and phosphate-containing waste into the rivers, lakes and other reservoirs causing Eutrophication.