Chapter 6

Water Resources

1. Choose the right answers of the followings from the given options:

Question 1.(i)

Which one of the following types describes water as a resource?

(a) Abiotic resource

(b) Non-renewable Resources

(c) Biotic Resource

(d) Cyclic Resource

Answer:

(d) Cyclic Resource

Question 1.(ii)

Which one of the following rivers has the highest replenishable ground water resource in the country?

(a) The Indus

(b) The Brahmaputra

(c) The Ganga

(d) The Godavari

Answer:

(a) The Indus

Question 1.(iii)

Which of the following figures in cubic kilometres correctly shows the total annual precipitation in India?

(a) 2,000

(b) 3,000

(c) 4,000

(d) 5,000

Answer:

(c) 4,000

Question 1.(iv)

Which one of the following south Indian states has the highest groundwater utilization (in per cent) of its total ground water potential?

(a) Tamil Nadu

(b) Karnataka

(c) Andhra Pradesh

(d) Kerala

Answer:

(a) Tamil Nadu

Question 1.(v)

The highest proportion of the total water used in the country is in which one of the following sectors?

(a) Irrigation

(b) Industries

(c) Domestic use

(d) None of the above

Answer:

(a) Irrigation

2. Answer the following questions in about 30 words:

Question 2.(i)

It is said that the water resources in India have been depleting very fast. Discuss the factors responsible for depletion of water resources?

Answer:

Water scarcity is possibly to pose the greatest challenge on account of its increased demand coupled with shrinking supplies due to over utilization and pollution. The per capita availability of water is dwindling day by day due to increase in population. The available water resources are also getting polluted with industrial, agricultural and domestic effluents, and this, in turn, is further limiting the availability of usable water resources.

Some states utilize large proportion of their ground water potential which has resulted in ground water depletion in these states. Over withdrawals in some states like Rajasthan, and Maharashtra has increased fluoride concentration in ground-water, and this practice has led to increase in concentration of arsenic in parts of West Bengal and Bihar. Water, gets polluted by foreign matters such as microorganisms, chemicals, industrial, domestic and other wastes. When toxic substances enter lakes, steams, rivers, ocean and other water bodies, they get dissolved or lie suspended in water. This results in pollution of water whereby quality of water deteriorates affecting aquatic systems. Sometimes, these pollutants also seep down and pollute groundwater. The Ganga and the Yamuna are the two highly polluted rivers in the country,

Question 2.(ii)

What factors are responsible for the highest groundwater depletion in the states of Punjab, Haryana, and Tamil Nadu?

Answer:

The states of Punjab, Haryana and Tamil Nadu have agriculture supported mainly by irrigated water and the main source for it is the underground water. These reasons were the target regions for green revolution. All the green revolution crops are water intensive, hence the demand for water in these states is very high. These regions have soft alluvial soil which allows the rain water to seep down and recharge the underground water table. This area is easy to be dug, hence extraction of underground water is easiest source of water.

It has also been found that irrigated lands have higher agricultural productivity than unirrigated land. Further, the high yielding varieties of crops need regular moisture supply, which is made possible only by a developed irrigation systems. In Punjab, Haryana and Western Uttar Pradesh more than 85 per cent of their net sown area is under irrigation. Wheat and rice are grown mainly with the help of irrigation in these states. Of the total net irrigated area 76.1 per cent in Punjab and 51.3 per cent in Haryana are irrigated through wells and tube wells. This shows that these states utilize large proportion of their groundwater potential which has resulted in groundwater depletion in these states. The overuse of groundwater resources has led to decline in ground water table in these states.

Question 2.(iii)

Why the share of agricultural sector in total water used in the country is expected to decline?

Answer:

At present the agriculture use accounts for the highest share of utilization for both ground and surface water resources. The main reason being that the agriculture accounts or the largest share in economy of the country, but in recent times the share of secondary and tertiary activities have been rising in the economy. This in turn will reduce the share of the agriculture and increase the share of industrial and domestic sector in the consumption of all resources including the water resources of the country.

Question 2.(iv)

What can be possible impacts of consumption of contaminated/unclean water on the people?

Answer:

Water constitutes a large proportion of human body. Water intake is an essential part of human life. Contaminated water intake is one of the biggest reasons of many chronic diseases. The intake of contaminated water is the cause of severe water borne disease and is also one of the main causes of high infant mortality rates. The contaminated water is the reason for several diseases like Cholera, typhoid, etc. which are major killer diseases in India.

3. Answer the following questions in about 150 words:

Question 3.(i)

Discuss the availability of water resources in the country and factors that determine its spatial distribution?

Answer:

India accounts for about 2.45 per cent of world's surface area, 4 per cent of the world's water resources and about 16 per cent of world's population. The total water available from precipitation in the country in a year is about 4,000 cubic km. The availability from surface water and replenishable groundwater is 1,869 cubic km. Out of this only 60 per cent can be put to beneficial uses. Due to topographical, hydrological and other constraints, only about 690 cubic km (32 per cent) of the available surface water can be utilised. Water flow in a river depends on size of its catchment area or river basin and rainfall within its catchment area.

Precipitation in India has very high spatial variation, and it is mainly concentrated in Monsoon season. Rivers in the country like the Ganga, the Brahmaputra, and the Indus have huge catchment areas. Given that precipitation is relatively high in the catchment areas of the Ganga, the Brahmaputra and the Barak rivers, these rivers, although account for only about one-third of the total area in the country, have 60 per cent of the total surface water resources. Morever Himalayan rivers are glacial fed perennial whereas Southern rivers are rainfed seasonal rivers. Much of the annual water flow in south Indian rivers like the Godavari, the Krishna, and the Kaveri has been harnessed, but it is yet to be done in the Brahmaputra and the Ganga basins.

Groundwater Resources: The total replenishable groundwater resources in the country are about 432 cubic km. The level of groundwater utilisation is relatively high in the river basins lying in north-western region and parts of south India. The groundwater utilisation is very high in the states of Punjab, Haryana, Rajasthan, and Tamil Nadu. However, there are States like Chhattisgarh, Odisha, Kerala, etc., which utilise only a small proportion of their groundwater potentials. States like Gujarat, Uttar Pradesh, Bihar, Tripura and Maharashtra are utilising their ground water resources at a moderate rate.

Lagoons and Backwaters: India has a vast coastline and the coast is very indented in some states. Due to this, a number of lagoons and lakes have formed. The States like Kerala, Odisha and West Bengal have vast surface water resources in these lagoons and lakes. Water is generally used for fishing and irrigating certain varieties of paddy crops, coconut, etc.

Surface Water Resources: There are four major sources of surface water. These are rivers, lakes, ponds, and tanks. In the country, there are about 10,360 rivers and their tributaries longer than 1.6 km each. The mean annual flow in all the river basins in India is estimated to be 1,869 cubic km.

Question 3.(ii)

The depleting water resources may lead to social conflicts and disputes. Elaborate it with suitable examples?

Answer:

It can be said with some certainty that the societies will witness demographic transition, geographical shift of population, technological advancement, degradation of environment and water scarcity. Water scarcity is possibly to pose the greatest challenge on account of its increased demand coupled with shrinking supplies due to over utilisation and pollution. Water is a cyclic resource with abundant supplies on the globe. Approximately, 71 per cent of the earth's surface is covered with it but fresh water constitutes only about 3 per cent of the total water. In fact, a very small proportion of fresh water is effectively available for human use. The availability of fresh water varies over space and time. The tensions and disputes on sharing and control of this scare resource are becoming contested issues among communities, regions, and states.

India accounts for about 2.45 per cent of world's surface area, 4 per cent of the world's water resources and about 16 per cent of world's population. The total utilizable water resource in the country is only 1,122 cubic km. This dearth of utilizable water has been cause of several disputes in India at local, state and national levels. Sadly in India there is conflict on issues like social structure (casteism, communalism etc.)

Rivers of Northern India have condition of water surplus and many regions face flood situation whereas, the rivers in Southern India have perennial flow concentrated in the months of monsoon leading to water scarcity during rest of the year. To solve the situation there have been many proposed river linkage schemes which became causes for disputes among the states over the sharing of water resources.

It is the scarcity of water that has caused longstanding disputes between the state of Karnataka and Tamil Nadu over sharing of waters of Kaveri River. Sharing of water of Brahmaputra has always been a cause of conflict between India and Bangladesh. Much to India's dislike and concern China is planning to build a dam on river Brahmaputra.

Question 3.(iii)

What is watershed management? Do you think it can play an important role in sustainable development?

Answer:

Watershed management basically refers to efficient management and conservation of surface and groundwater resources with community participation. It involves prevention of runoff and storage and recharge of groundwater through various methods like percolation tanks, recharge wells, etc. However, in broad sense watershed management includes conservation, regeneration and judicious use of all resources – natural (like land, water, plants and animals) and human within a watershed. Watershed management aims at bringing about balance between natural resources on the one hand and society on the other. The success of watershed development largely depends upon community participation. In short community is the soul of the entire scheme.

Watershed management not only conserves the entire ecosystem of an area but also empowers the people by making them socially and economically self reliant as it has community participation as its vital component. Since local people understand the local ecosystem in the best way, therefore they conserve in the best way. Sustainable development is the development, which fulfills the needs of present generation without depriving the future generations from the benefits arising from the resources. Watershed management helps conserving the environment along with fulfilling need of the people.

The importance of watershed management in sustainable development has been identified and many programmes both by government and NGOs have been launched for the watershed management. Some examples are—

Haryalis, a watershed development project sponsored by the Central Government which aims at enabling the rural population to conserve water for drinking, irrigation, fisheries and afforestation. The Project is being executed by Gram Panchayats with people's participation.

Neeru-Meeru (Water and You) programme (in Andhra Pradesh) and Arvary Pani Sansad (in Alwar, Rajasthan) have taken up constructions of various water -harvesting structures such as percolation tanks, dug out ponds (Johad), check dams, -etc. through people's participation. Tamil Nadu has made water harvesting structures in the houses compulsory. No building can be constructed without making structures for water harvesting.