

Natural Resource – Water

Can you think of something without which you wouldn't be able to survive? Can we imagine our life without water? Our Earth would cease to be the 'Living Planet' in the absence of this special resource.

Water is required by plants, animals and humans for survival. We need water for drinking, cooking, washing, cleaning. We require adequate supply of water for growing crops. It is also required in the industries for various purposes. The force of falling water is utilised to produce hydroelectricity. This is one of the main sources of energy required in factories, offices, and homes.

Overall, the world is using 9087 billion cubic metres of water per year. China, India and the U.S. consume the highest annual totals, i.e., 1207 billion, 1182 billion and 1053 billion cubic metres respectively.

FRESH WATER RESOURCES

Our Earth's uniqueness lies in the fact that it has water and hence it is habitable. Earth is called the watery planet because 71% of its surface is covered with water. But out of this, 97.3% exists in the form of oceans, seas, gulfs and bays. These contain saline water unfit for drinking or irrigation. The rest 2.7% is in the form of freshwater. But again 70% of this freshwater is found as icesheets and glaciers. Thus, only 1 per cent of freshwater is available to us for our direct consumption and use. The main sources of fresh water are rivers, streams, lakes, ponds and groundwater. The supply of fresh water comes from rainfall and melting of glaciers. It collects in the waterbodies or seeps through the soil and collects as groundwater.

Did You Know?

World Water Resource Day is celebrated every year on March 22 with a specific theme.

You have learnt that water is a flow resource which is renewable and inexhaustible. It is

because water is renewed, recycled and recharged through the hydrological cycle or water cycle. The change of water from the liquid form to the gaseous form and then again to the solid or the liquid form is known as 'hydrological cycle'. This phenomenon makes water a renewable resource. But in this process the form of water may change and the ratio between usable freshwater and non-usable saline water may be altered. Also, the distribution of this water may be affected. This may result in floods in some parts of the world, while some other areas may face water scarcity. This makes us conscious about the importance of conserving the water resource. Water can neither be added nor subtracted from the earth. Its total volume remains constant. It is in constant motion, cycling through hydrosphere, the atmosphere and lithosphere, through the processes of evaporation, precipitation and run-off.

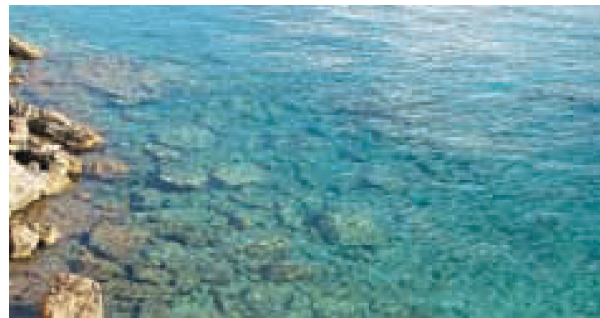


Fig. 3.1 : Sea – Saline Water



Fig. 3.2 : River – Fresh Water

DISTRIBUTION OF FRESH WATER

Distribution of fresh water is highly uneven throughout the world. Areas of heavy rainfall have good surface waterflow. The ground-water reserve is also high on account of seepage through the soil. However, excessive rainfall may result in floods. Water may destroy life and property and become unusable during that period. For example, floods are common in Hwang Ho basin of China, in Bangladesh and Eastern India.

On the other hand, vast areas suffer from acute water scarcity and droughts. They include the Sahara and Kalahari desert of Africa, Western Asia as well as arid areas of Western India and other parts of South Asia, North-West Mexico and Australia.

Did You Know?

Lack of water in Amreli, Gujarat, has forced people to pay more for water than what they earn in a day, i.e., average earnings are ₹ 100 a day and a water tank costs ₹ 150.

WATER RESOURCES OF INDIA

Our country, India, is drained by many big rivers. Indus, Ganga, Brahmaputra and their tributaries like Satluj and Yamuna drain Northern India. Narmada, Tapi, Mahanadi, Godavari, Krishna and Kaveri flow through Southern India. The northern rivers are perennial as they have their source in the glaciers of the Himalayas. The Southern rivers are seasonal.



Fig. 3.3 : Canal

India also receives good amount of rainfall through monsoons. In spite of this, our country suffers from acute water shortage in many areas. The reasons behind this are :

- the unequal distribution of rainfall.
- uncertainty of the monsoon rains.

- Concentration of most of the rain within four months of rainy season.

As a result the supply of fresh water is also highly unreliable.

Limited land resource and increasing population in our country requires high productivity of crops. This requires adequate supply of water for irrigation. This requirement is met through wells, tubewells, tanks and canals. The Indira Gandhi Canal, Upper Doab Canal, Bhakra Canal and Upper Ganga Canal are some of the major canals of India.

A number of multipurpose projects, across rivers, have been constructed after independence. The objective was overall management of water resource for the country's development. They have been called 'Temples of Modern India' as they have led to all-round development.



Fig. 3.4 : Multipurpose River Valley Project

Their benefits include :

- generation of hydroelectricity,
- providing water for irrigation,
- flood control,
- navigation facilities,
- promoting fisheries,
- afforestation,
- soil conservation and
- recreation facilities.

CONSERVATION OF WATER RESOURCES

In spite of availability of water, many parts of the world face water scarcity. Water scarcity is caused due to over-exploitation and excessive, uncontrolled use of available freshwater. A dripping tap wastes about 1200 litres of water in a year.

Human beings use huge amounts of water not only for drinking and washing but also for irrigation, in factories and construction of houses.

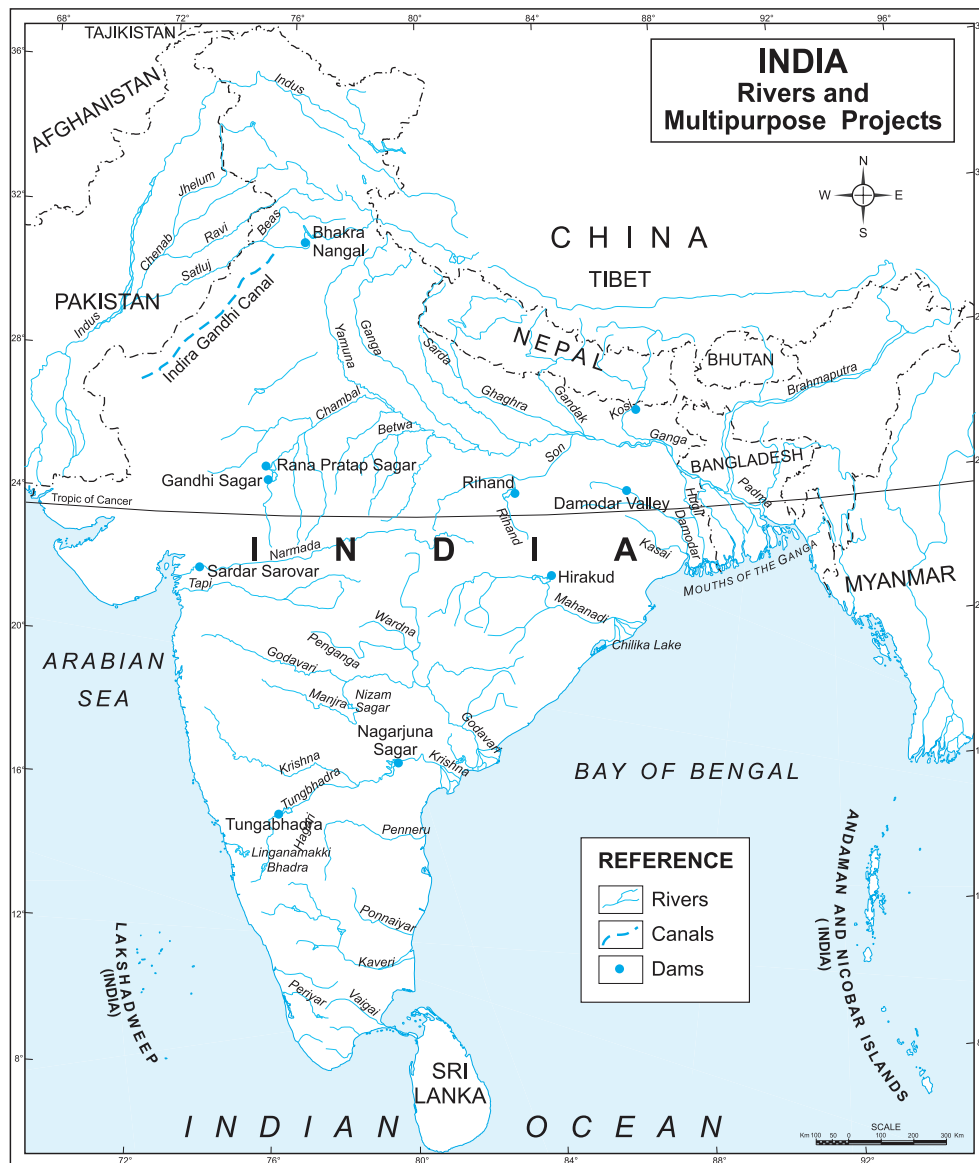


Fig. 3.5 : Rivers and Multipurpose Projects

Unequal distribution of water due to natural causes i.e. variation in annual and seasonal precipitation and surface run off as well as social causes also leads to water scarcity for many. Pollution of rivers and lakes by discharge of sewage water and industrial waste is a big menace. People are changing the life-giving rivers into toxic streams. Man is himself turning available freshwater into dirty water unfit for use. We have to take steps to conserve water.

Some steps that can be taken to conserve water are:

- Stop wastage of water,
- Control flow of water by proper distribution,
- Prevent water pollution

- Adopt rainwater harvesting and
- Train the people.
- Adopt proper means of irrigation to reduce wastage through seepage, e.g., sprinkler irrigation, drip irrigation.
- Afforestation also helps to increase underground water level as it checks surface runoff and recharge ground water.

Thus, as responsible citizens of the world, you should also try to save this precious resource. You should be conscious as well as make others conscious about the importance of water. You must remember that 'every drop of water is precious.'

Multipurpose Projects

Project	River	States Benefitted	Main Benefits
Damodar Valley Project Dams – Tilaiya, Konar, Bokaro, Panchet and Maithon. The first multipurpose project of India.	Damodar	West Bengal and Jharkhand	Hydroelectricity, Irrigation by Durgapur Barrage, Flood Control
Bharkra Nangal Project – Highest dam in the world	Satluj	Punjab, Haryana, Rajasthan	Hydroelectricity, Irrigation
Rihand Project	Rihand, tributary of Son	Uttar Pradesh	Hydroelectricity, Flood Control, Navigation
Chambal Project	Chambal	Rajasthan, Madhya Pradesh	Hydroelectricity, Irrigation, Soil Conservation
Hirakud Project (Longest dam in the world)	Mahanadi	Odisha	Hydroelectricity, Irrigation, Navigation
Nagarjunsagar Project	Krishna	Telangana, Andhra Pradesh	Irrigation, Hydroelectricity
Tungabhadra Project	Tungabhadra	Telangana, Andhra Pradesh, Karnataka	Irrigation, Hydroelectricity

Did You Know?

Rainwater harvesting is a technique of increasing the recharge of ground water by capturing and storing rainwater by constructing wells, pits and check dams.

Points to Remember

- Earth is called the watery planet because 71% of its surface is covered with water.
- Water is a flow resource which is renewable and inexhaustible.
- Distribution of water is highly uneven throughout the world.
- Water scarcity is caused due to over-exploitation and excessive, uncontrolled use of available freshwater.
- In India, many multipurpose projects have been constructed after independence to manage water resources for the country's development.
- As responsible citizens of the world, we should try to save this precious natural resource i.e., water.

Glossary

GROUNDWATER	:	Store of rainwater or other surface water that seeps through the porous soil and collects under the ground over an impervious layer which does not allow water to pass through it.
GLACIERS	:	Rivers of ice, or huge block of ice in high mountains.
ICE SHEETS	:	Big continental ice mass.
CANALS	:	Channels that divert water from the main river to agricultural fields.
MULTIPURPOSE PROJECTS	:	Integrated water management by constructing dams across rivers with the objective to derive manifold benefits.

A. Multiple Choice Questions (MCQs)

- Water of which of the following water sources is unfit for consumption or use in agriculture?
 (a) Rivers (b) Tanks (c) Oceans (d) Rainfall
- Which of the following areas suffers from acute water shortage?
 (a) Hwang Ho Basin (b) Northern Plains, India
 (c) Deccan Plateau, India (d) Western Asia
- Which of the following is not influenced by availability of water?
 (a) Mining (b) Agriculture (c) Settlement (d) Industries
- Which of the following is constructed in rocky areas?
 (a) Wells (b) Tubewells (c) Tanks (d) Canals
- Which of the following rivers is seasonal?
 (a) Ganga (b) Brahmaputra (c) Yamuna (d) Godavari
- Pollution of rivers may be caused by :
 (a) Agriculture (b) Domestic use (c) Industrial waste (d) Floods

B. Fill in the blanks with the words given below :

rainfall	hydroelectricity	monsoons	water	uneven
	habitable	glaciers	perennial	

- The force of falling water is utilised to produce _____.
- Our Earth's uniqueness lies in the fact that it has _____ and hence is _____.
- The supply of freshwater comes from _____ and melting of _____.
- Distribution of freshwater is highly _____ throughout the world.
- The northern rivers are _____ as they have their source in the glaciers of the Himalayas.
- India receives a good amount of rainfall through _____.

C. Identify and name the following :

- Temples of modern India _____.
- First multipurpose project of India _____.
- Highest dam in the world _____.
- Longest dam in the world _____.
- A canal in Rajasthan _____.
- Collection of rainwater for future use _____.

D. Short answer type questions.

- Why is water considered to be a flow resource?
- State the uses of water as a resource.
- State any three main reasons for water shortage in India.
- What are the main means of irrigation in different regions of India?

5. "Three-fourths of the world is covered with water which is a renewable resource. Yet many countries and regions around the globe suffer from water scarcity." Explain. [HOTS]

E. Long answer type questions.

1. What are mutipurpose projects? Describe the main benefits of such projects. Why are they called the 'Temples of Modern India'?
2. 'Our ancestors were wise enough to harvest the rainwater in a number of ways.' What are the advantages of harvesting rain water? [Value Based Question]
3. What is meant by conservation of water? Mention some measures to conserve water.
4. Why is water resource very important for our country? What are the main means of irrigation in different regions of India?
5. How industrialisation and urbanisation have exerted a great pressure on existing fresh water resources in India? Explain with an example of each.

TIME TO DO

TASKS FOR FA

F. Picture Study



Observe the picture carefully and answer the following questions :

- Which is the highest dam in the world?
- On which river is it constructed?
- Which states are benefitted by it?
- What are its main benefits?

G. Assignment

Almost 23,000 million litres of waste water is generated in India per day. Out of this only 6000 million litres is treated. This means that about 17,000 litres of waste water is dumped into our rivers everyday. Pollution of oceans is also increasing at a fast rate. Fill up the table by giving information on how pollution is caused by the following sources by giving two instances for each :

Industries	Agriculture	Individuals
1.	1.	1.
2.	2.	2.

H. Word Grid :

Solve the puzzle by following your search horizontally and vertically and circle the answers for the following clues :

F	R	E	S	H	W	A	T	E	R	C
L	G	X	I	I	T	L	A	H	A	A
O	Y	A	F	R	J	B	N	S	I	N
O	J	E	I	A	H	M	K	L	N	A
D	L	C	V	K	P	N	S	R	F	L
S	E	A	R	U	M	U	O	E	A	S
D	K	Q	M	D	A	M	S	M	L	W
B	N	D	Q	T	P	G	S	O	L	Z
T	U	B	E	W	E	L	L	S	A	C
G	R	O	U	N	D	W	A	T	E	R

1. About 70% of this is found as ice sheets and glaciers.
2. Result of excessive rainfall.
3. Constructed to divert water from rivers to agricultural fields.
4. Longest dam in the world.
5. An important method of irrigation.
6. The main source of water on earth.
7. These are built across rivers to regulate the flow of water.
8. Water that seeps through the soil and gets collected.
9. Areas covered by saline water are known as.
10. These are dug to draw out ground water to the surface for use.

LIFE SKILLS

The method of rainwater harvesting is the best possible way to conserve water. Develop your own rainwater harvesting system by following certain steps :

- **Catchment:** Select any surface or paved area as catchment. Rooftops are the best because of the large run off generated from them with less chances of water contamination.
- **Conveyance:** Through pipes collect the rainwater from rooftop to the storage tank.
- **Storage:** The storage system should be designed according to the amount of water that is to be stored. Make sure that the storage system is properly sealed and does not leak.

This stored water can be used for different household activities like, washing, cleaning, gardening etc. This will help in water conservation.

TASKS FOR FORMATIVE ASSESSMENT-I (FA-1)

(Based on Chapters 1 to 3)

A. Unscramble the letters to form correct words :

1. Substances that have utility and capacity to fulfill human needs _____ (SERCUROES)
2. Areas presently not under cultivation _____ (DFSAWNLOLAL)
3. Huge landmasses which rise to great heights _____ (NMSONUTIA)
4. Rivers of ice in high mountains _____ (CSGARLEI)
5. Channels that divert water from the main river to agricultural fields _____ (NACSAL)

B. Observe the picture carefully and answer the following questions :

1. Which type of soil is shown in the picture?
2. In which type of areas is it found?
3. What is the quality of the soil?
4. Mention the areas of this type of soil in India.



C. Select a water body with fresh water like a tank, pond or river. Study the various purposes for which the water is used. Make a chart on the utilisation of water in a project book.

D. Survey the locality in which you live. Identify the land use pattern i.e., the various type of uses that land has been put into. Find out the causes of land degradation in the area where you live.

E. Discuss in the class how can we conserve resources at our homes and in school.

F. Solve the puzzle by following your search horizontally and vertically and circle the answers for the following clues :

1. The main source of fresh water on earth.
2. Resources which do not get exhausted with use.
3. A mineral resource used to generate power.
4. Solid upper crust of the Earth along with the soil.
5. Rivers of ice or huge blocks of ice in high mountains.
6. Channels that divert water from the main river to agriculture fields.
7. The application of latest knowledge in doing or making things.
8. Another name for black soil.
9. An example of biotic resource.
10. Soil having high iron content.

G	R	O	U	N	D	W	A	T	E	R
L	E	B	A	B	L	E	I	E	Q	E
A	T	H	M	J	O	U	D	C	F	N
C	A	N	A	L	S	I	Y	H	O	E
I	V	S	N	K	H	Z	G	N	P	W
E	G	L	V	C	F	K	E	O	U	A
R	E	G	U	R	B	X	Z	L	L	B
S	C	Q	A	D	R	S	C	O	A	L
W	R	E	D	S	O	I	L	G	N	E
M	T	W	R	Y	N	X	P	Y	D	J