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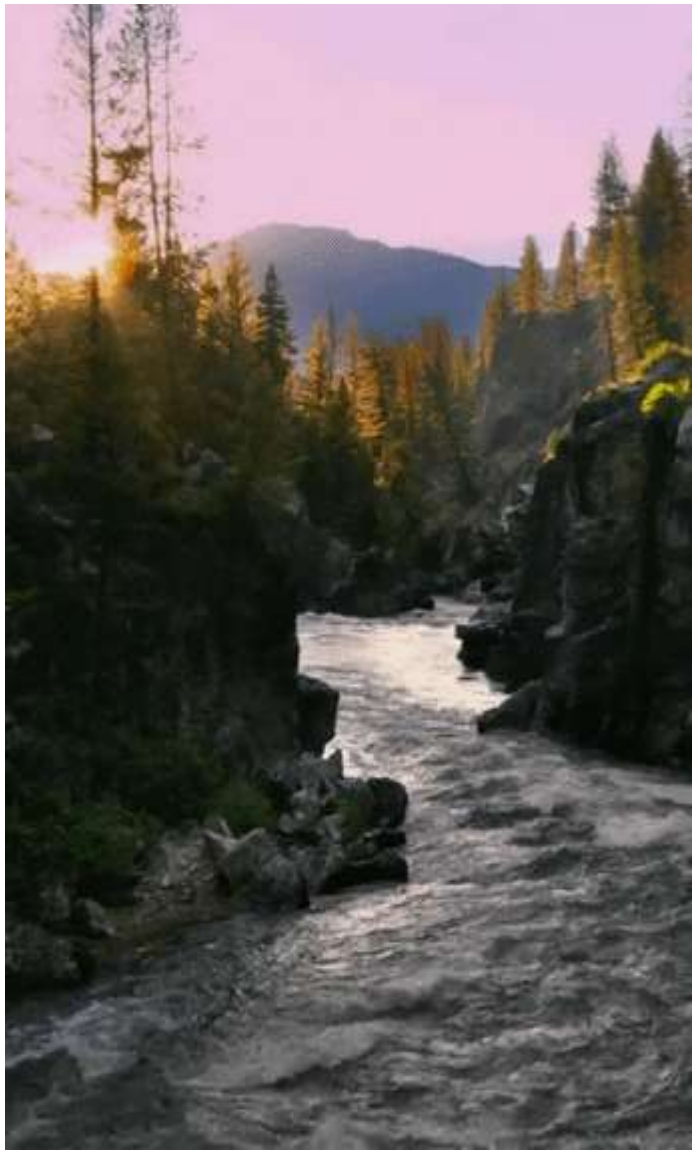
WATER

RAIN WATER HARVESTING

SUBJECT : GEOGRAPHY
CHAPTER NUMBER: 03
CHAPTER NAME : WATER



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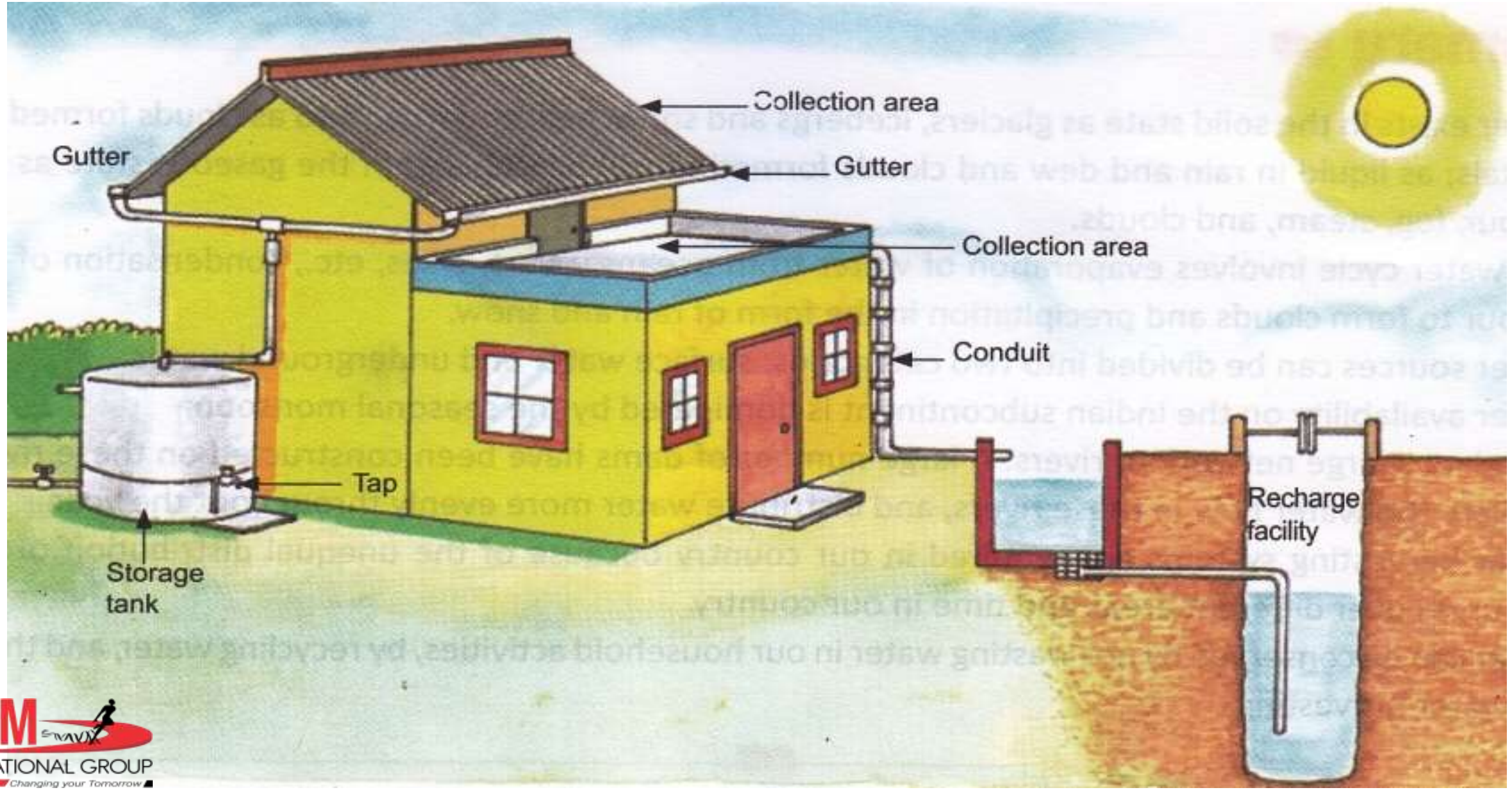
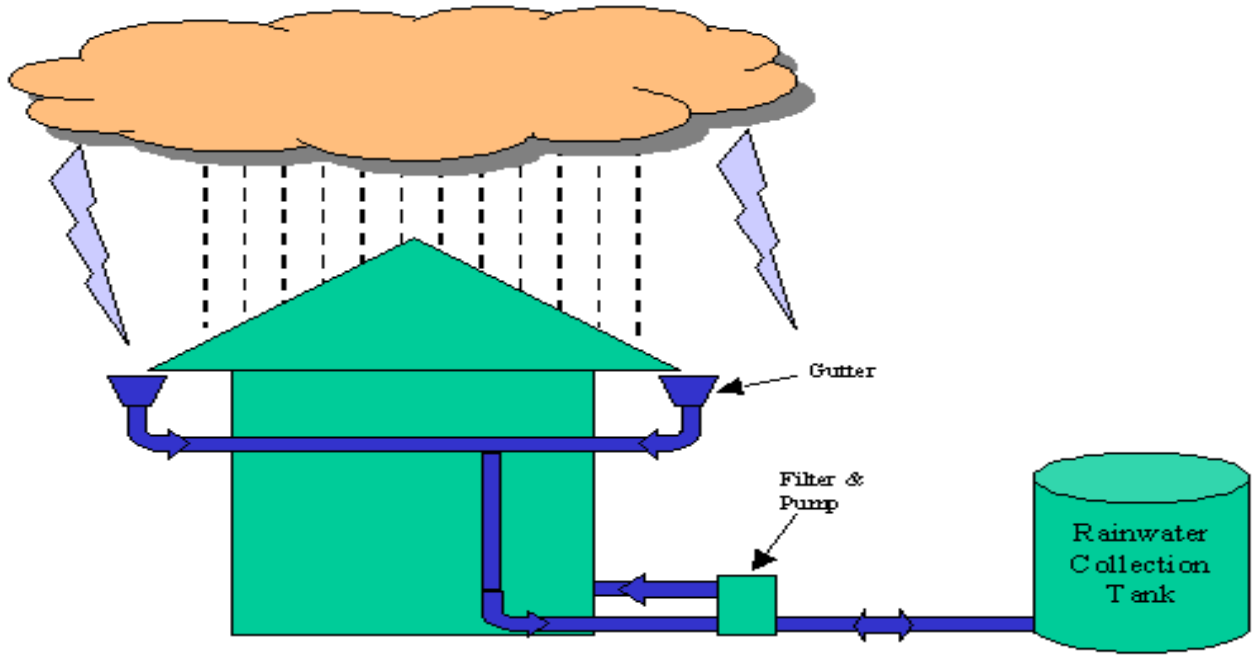
RAIN WATER HARVESTING



Different methods have been adopted in different areas for Rain Water Harvesting.

- In hill and mountainous regions, people built diversion channels like the ‘guls’ or ‘kuls’ of the Western Himalayas for agriculture.
- “Rooftop rainwater harvesting” is commonly practiced to store drinking water, particularly in Rajasthan.



Rainwater Collection Overview

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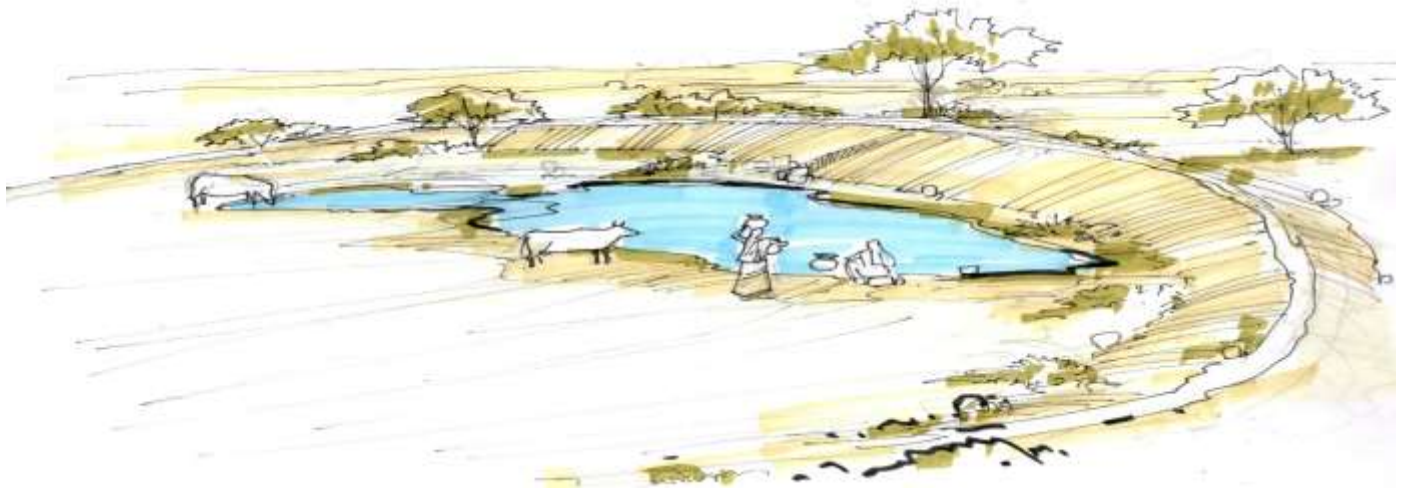
- In the flood plains of Bengal, people developed inundation channels to irrigate their fields.
- In arid and semi-arid regions, agricultural fields were converted into rain-fed storage structures that allowed the water to stand and moisten the soil such as ‘khadins’ in Jaisalmer and ‘Johads’ in other parts of Rajasthan.



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The **tankas** are part of the well-developed rooftop rainwater harvesting system and are built inside the main house or the courtyard. This is mainly practiced in Rajasthan, particularly in Bikaner, Phalodi and Barmer areas for saving the rainwater. Many houses constructed underground rooms adjoining the ‘tanka’ to beat the summer heat as it would keep the room cool.

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Conserve water. Save the Planet.

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Are you

a water harvester?

This monsoon, join us in counting the raindrops

Home Assignment:-

1. Explain rain water harvesting with diagram.
2. Mention some of the examples of rain water harvesting followed in local areas of India.

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WATER

MAP SKILL

SUBJECT : GEOGRAPHY
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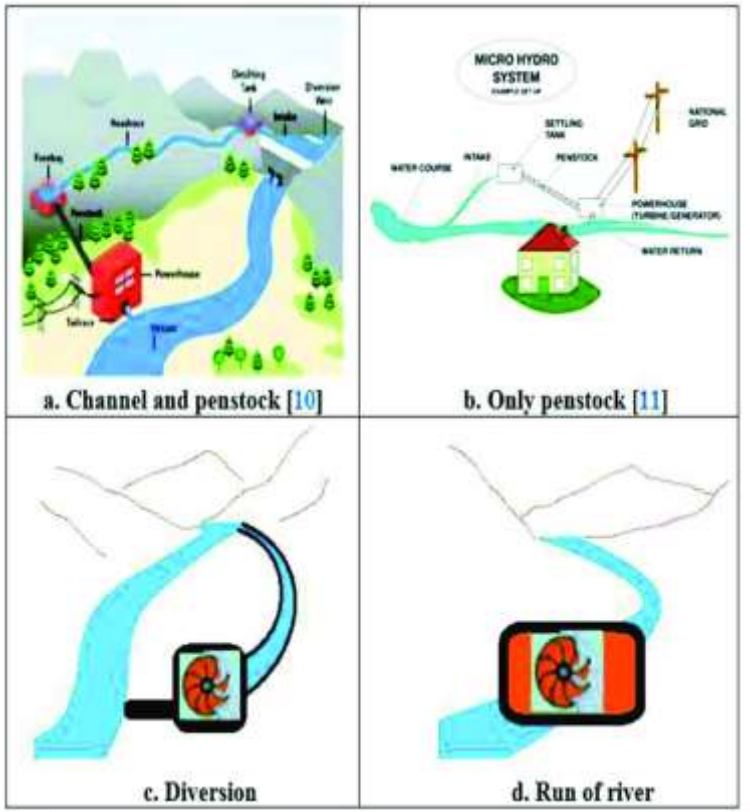

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Dams: a. Salal
b. Bhakra Nangal
c. Tehri
d. Rana Pratap Sagar
e. Sardar Sarovar
f. Hirakud
g. Nagarjuna Sagar
h. Tungabhadra

River	Dams constructed	State/place
Mahanadi	Hirakud Dam	Odisha
Satluj	Bhakhra Nangal Dam	Himachal Pradesh in northern India
Krishna	Nagarjuna Sagar Dam	Nalgonda District, Telangana State.
Chenab	Salal Dam*	Jammu and Kashmir.
Narmada	Sardar Sarovar Project*	Gujarat
Bhagirathi	Tehri Dam	Uttarakhand
Ganges	Naraura dam	Uttar Pradesh
Chambal River	Rana Pratap Sagar Dam	Rajasthan
Chambal	Gandhi Sagar Dam	Madhya Pradesh

TYPES OF DAMS

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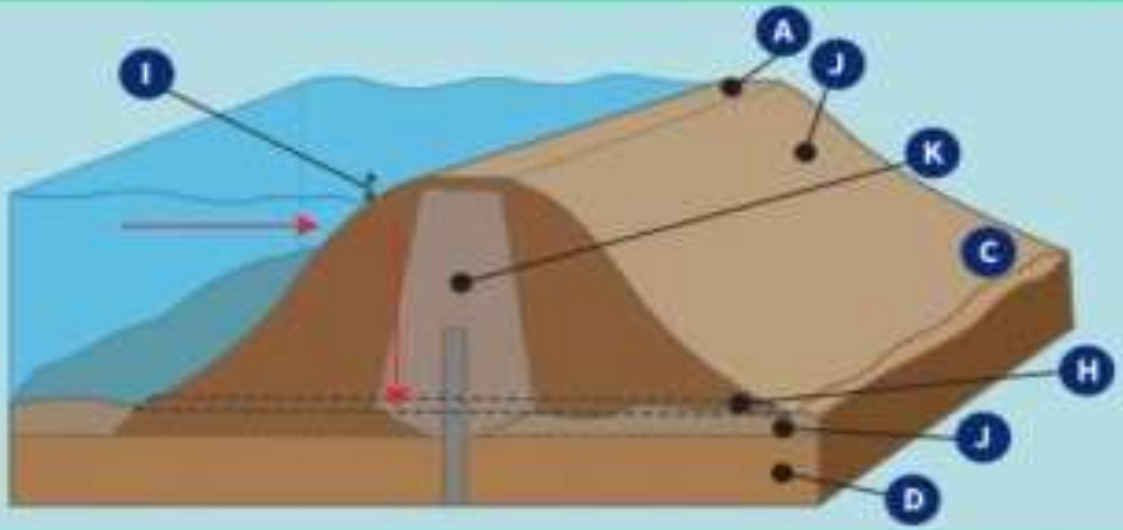
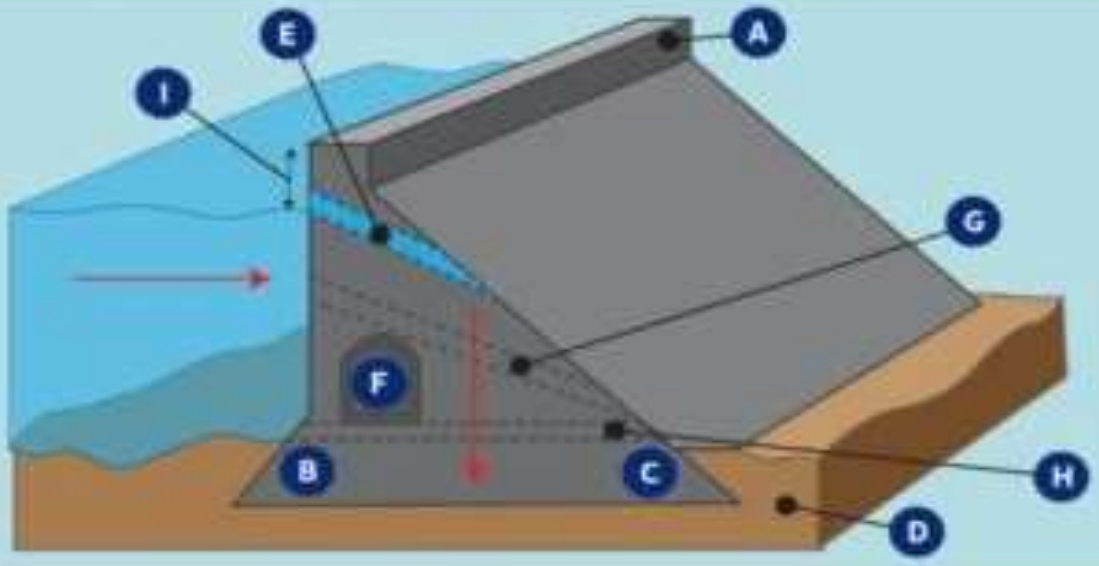


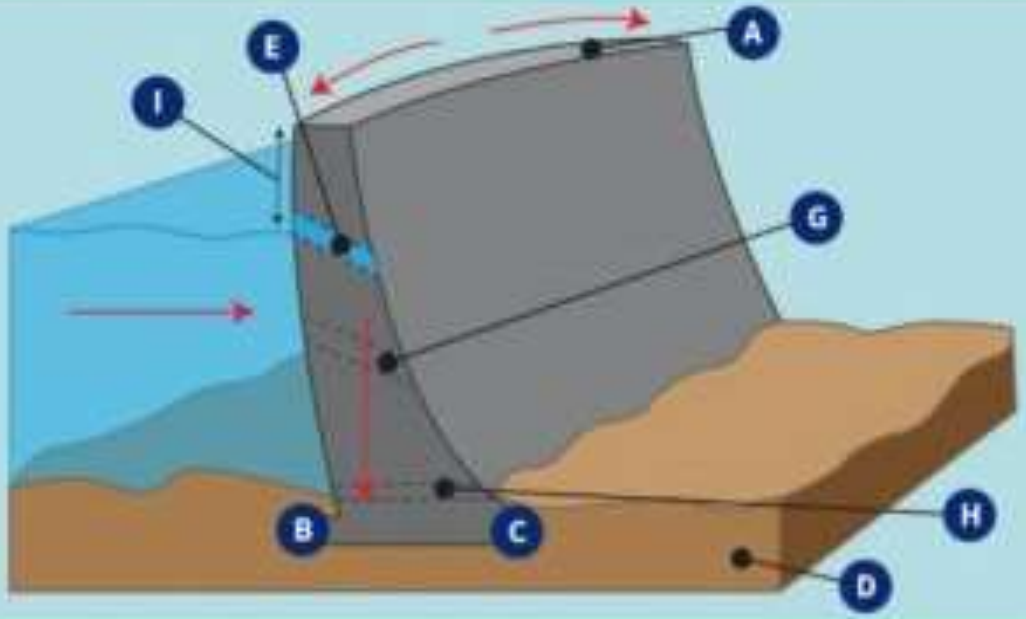
EMBANKMENT

- Constructed from compacted soil ("earthfill") or rock ("rockfill") with an impervious core
- Designed to transfer the entire water load downward
- 80% of all large dams in the U.S. are embankment dams
- Used to retain water across wide river valleys or for flood control
- Typically shorter and wider than other types of dams



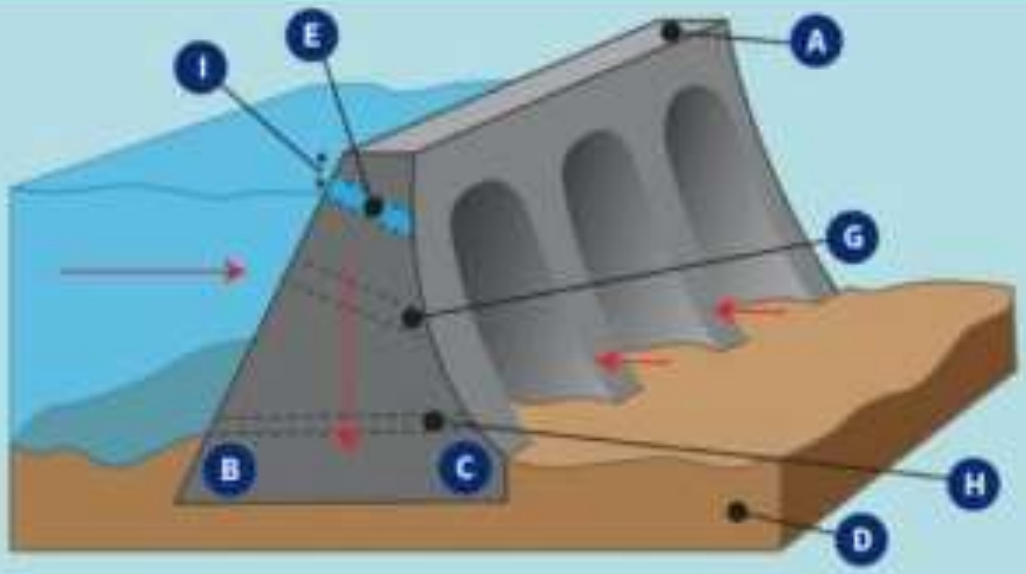
GRAVITY

- Constructed of concrete or stone masonry
- Designed to transfer the entire water load downward
- Typically span narrow river valleys with bedrock abutments and foundations
- Retain water by utilizing the weight of the dam to resist the horizontal water load pushing against it
- Each section of the dam is independently stable



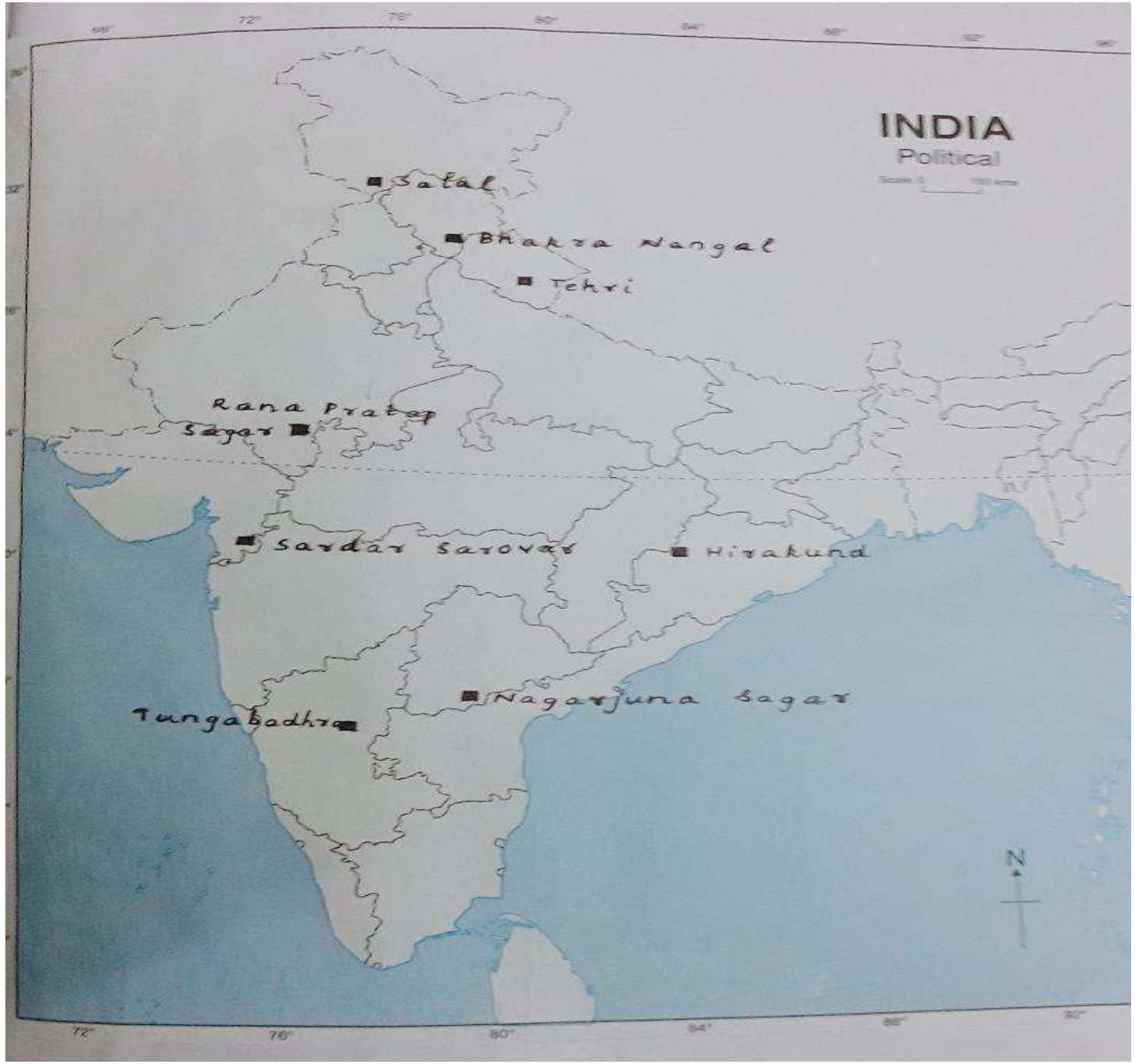
ARCH

- Constructed of concrete
- Designed to transfer water loads to the adjacent rock formations
- Constructed only in canyons with solid rock walls that are able to resist the pressure of the dam
- Because the canyon walls bear the bulk of the load, arch dams are thinly constructed, requiring less material than other types of dams



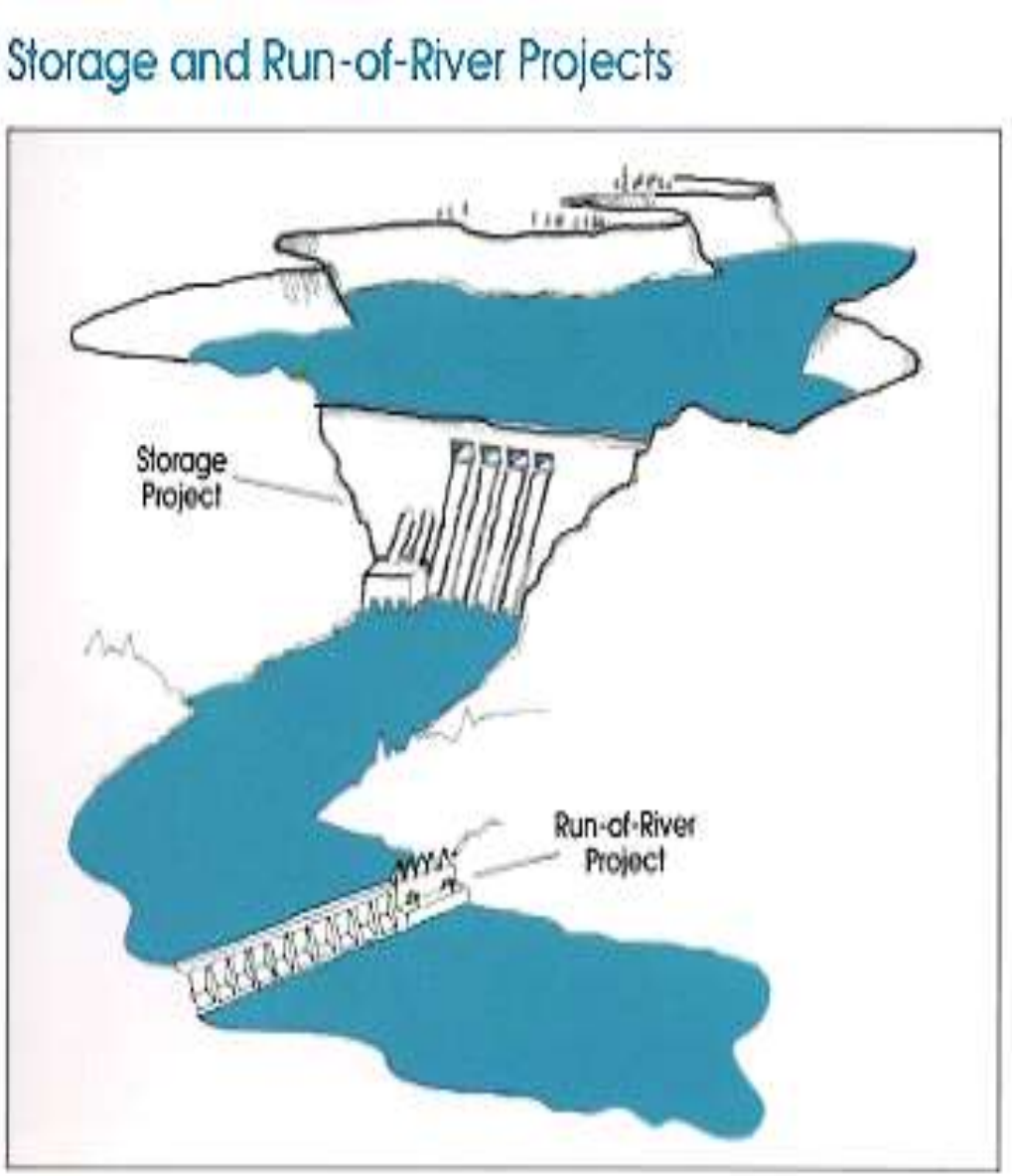
BUTTRESS

- Constructed of reinforced concrete
- Designed to transfer the water load both downward and to the buttresses
- Hollow gravity dams with a solid upstream face and a buttressed downstream side
- Buttresses are supports that transmit the water force to a bedrock foundation



Salal Hydroelectric Power Station

- A run-of-the-river hydropower project on the Chenab River in the Reasi district of the Jammu and Kashmir.
- It was the first hydropower project built by India in Jammu and Kashmir under the Indus Water Treaty regime.

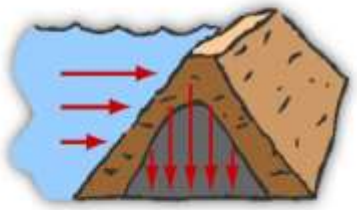


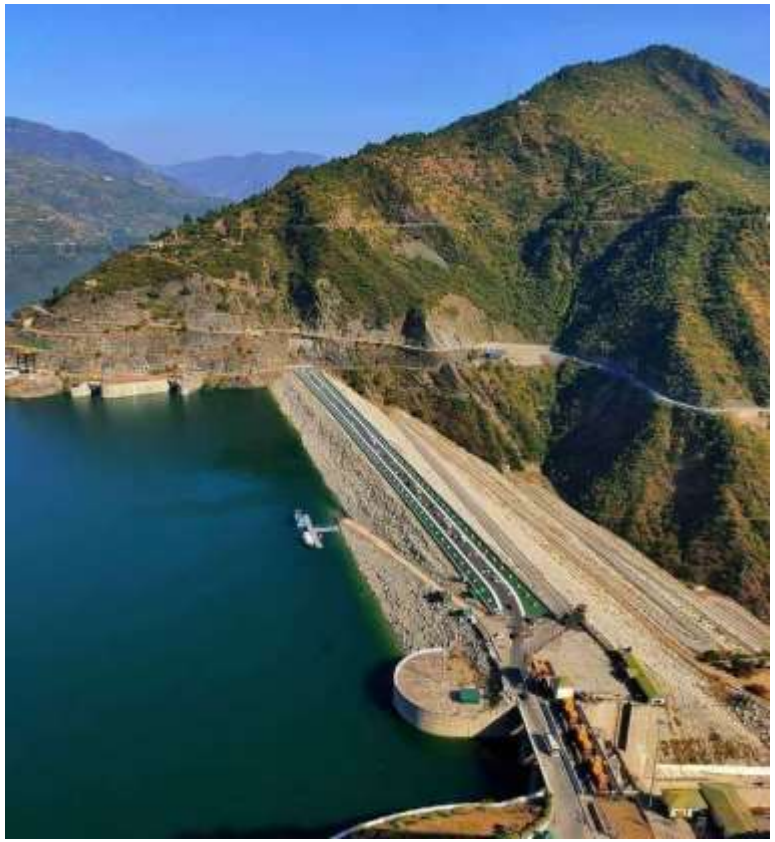
- **Bhakra Dam** is a concrete gravity dam on the Sutlej River in Bilaspur, Himachal Pradesh in northern India.
- The dam forms the Gobind Sagar reservoir.
- In terms of quantity of water, it is the third largest reservoir in India, the first being Indira Sagar dam in Madhya Pradesh with capacity of 12.22 billion cu m and second Nagarjunasagar Dam.

- The **Tehri Dam** is the highest dam in India.
- One of the highest in the world.
- It is a multi-purpose rock and earth-fill embankment dam on the Bhagirathi River near Tehri in Uttarakhand, India.

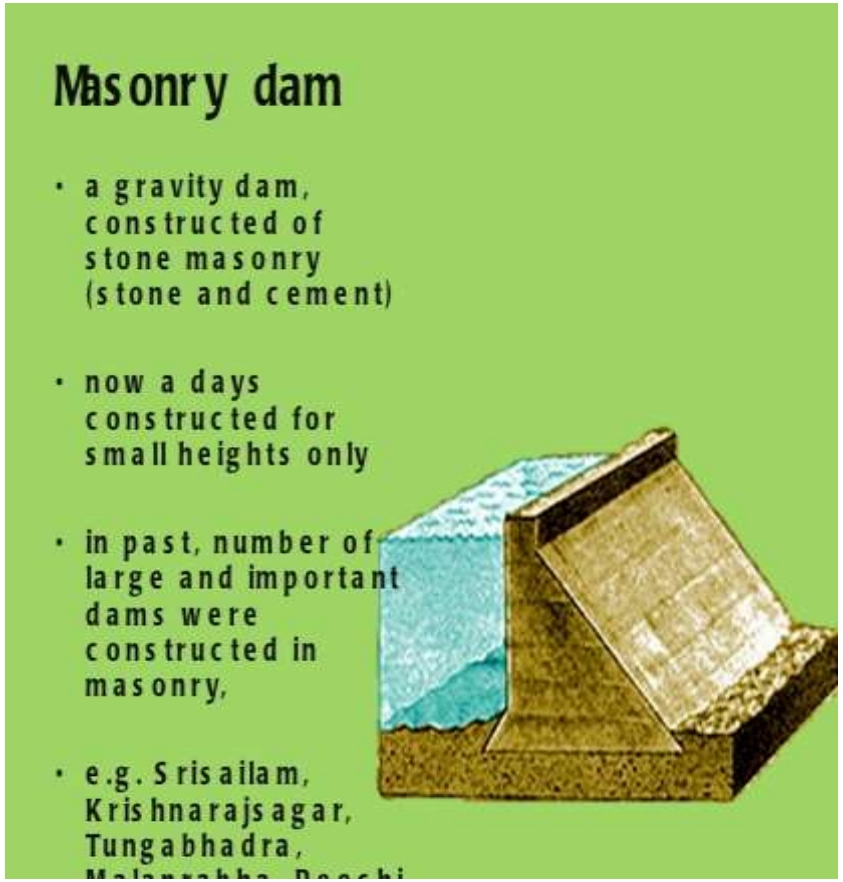
EMBANKMENT DAM

- It is a non-rigid dam which resists the forces acting on it by its shear strength and upto some extent by its own weight
- Earth dams are constructed where the foundation or the underlying material are weak to support the masonry dam.
- They are trapezoidal in shape and mainly built with clay, sand and gravel, hence they are also known as Earth fill dam or Rock fill dam.

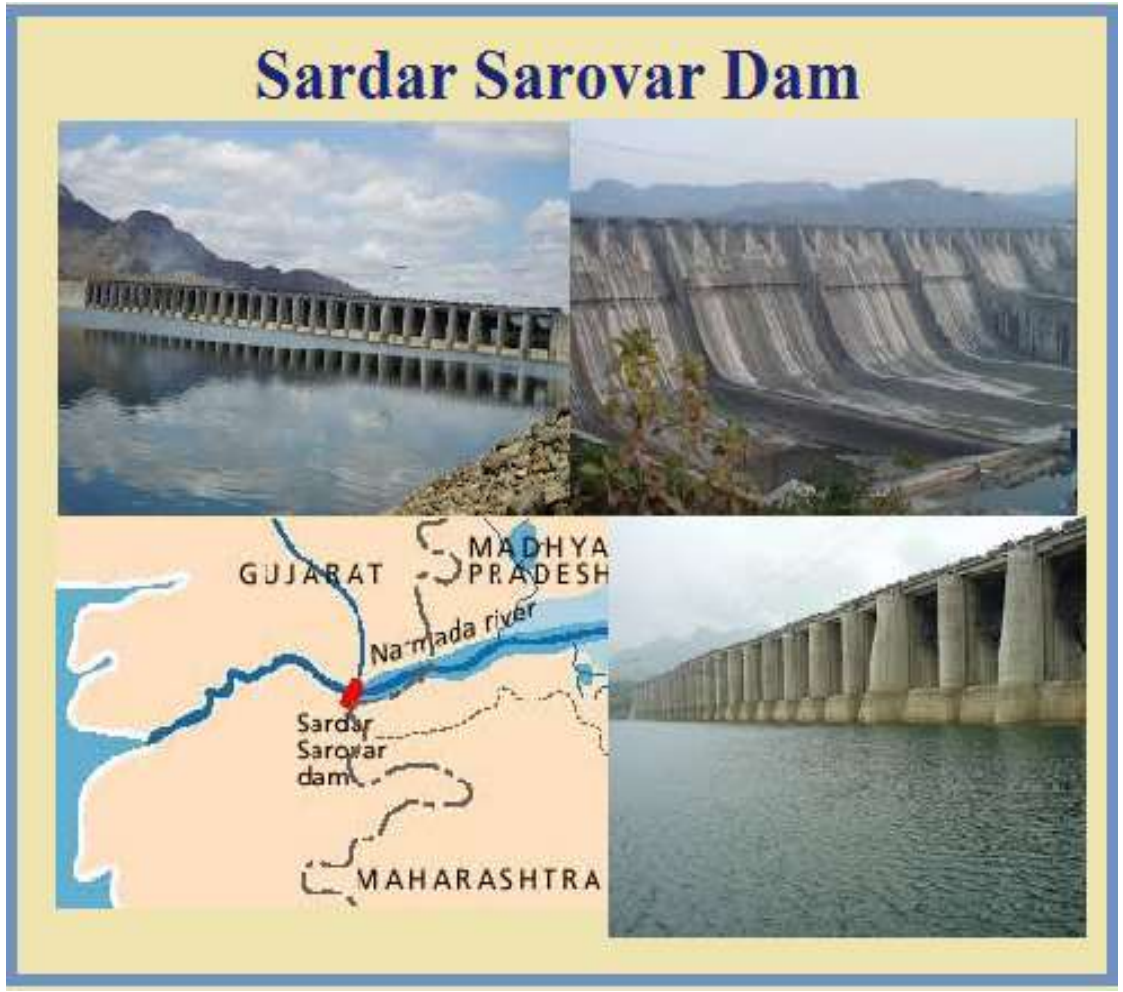




- The **Ranapratap Sagar Dam** is a gravity masonry dam of 53.8 meters (177 ft) height built on the Chambal River at Rawatbhata in Rajasthan in India.



- The **Sardar Sarovar Dam** is a concrete gravity dam on the Narmada river in Kevadiya near Navagam, Gujarat in India.
- Four Indian states, Gujarat, Madhya Pradesh, Maharashtra and Rajasthan, receive water and electricity supplied from the dam.



- **Hirakud Dam** is built across the Mahanadi River, about 15 kilometers (9 mi) from Sambalpur in the state of Odisha in India.
- Behind the dam extends a lake, Hirakud Reservoir, 55 km (34 mi) long.
- It is one of the first major multipurpose river valley projects started after India's independence.

- **Nagarjuna Sagar Dam** is a masonry dam across the Krishna River at Nagarjuna Sagar which straddles the border between Guntur district, Andhra Pradesh and Nalgonda district, Telangana.
- Nagarjuna Sagar Dam was the earliest in a series of large infrastructure projects termed as "modern temples" initiated for achieving the Green Revolution in India. It is also one of the earliest multi-purpose irrigation and hydroelectric projects in India.

- The **Tungabhadra Dam** also known as **Pampa Sagar** is constructed across the Tungabhadra River, a tributary of the Krishna River.
- The dam is in Hosapete, Ballari district of Karnataka. It is a multipurpose dam serving irrigation, electricity generation, flood control, etc.

Home Assignment:-

1. *On which river the Sardar Sarovar Dam built?*
2. *Name any two river valley projects or dams which have led to social movements.*
3. *Practice Map skill : Dams of India*

- *Dam on river Narmada*
- *Tehri Dam*
- *Sardar Sarovar dam*
- *Rana Pratap Sagar Dam*
- *Bhakhra Nangal Project*
- *Hirakud Dam*

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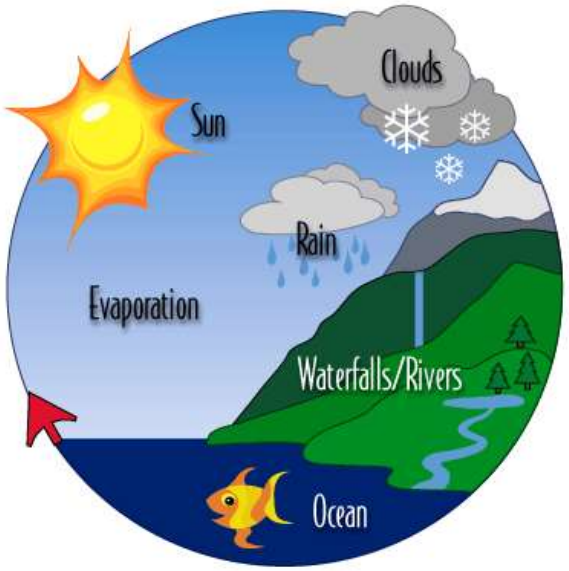
WATER



SUBJECT : GEOGRAPHY
CHAPTER NUMBER: 03
CHAPTER NAME : WATER
SUB-TOPIC: Multi-Purpose River Projects and Integrated Water Resources Management

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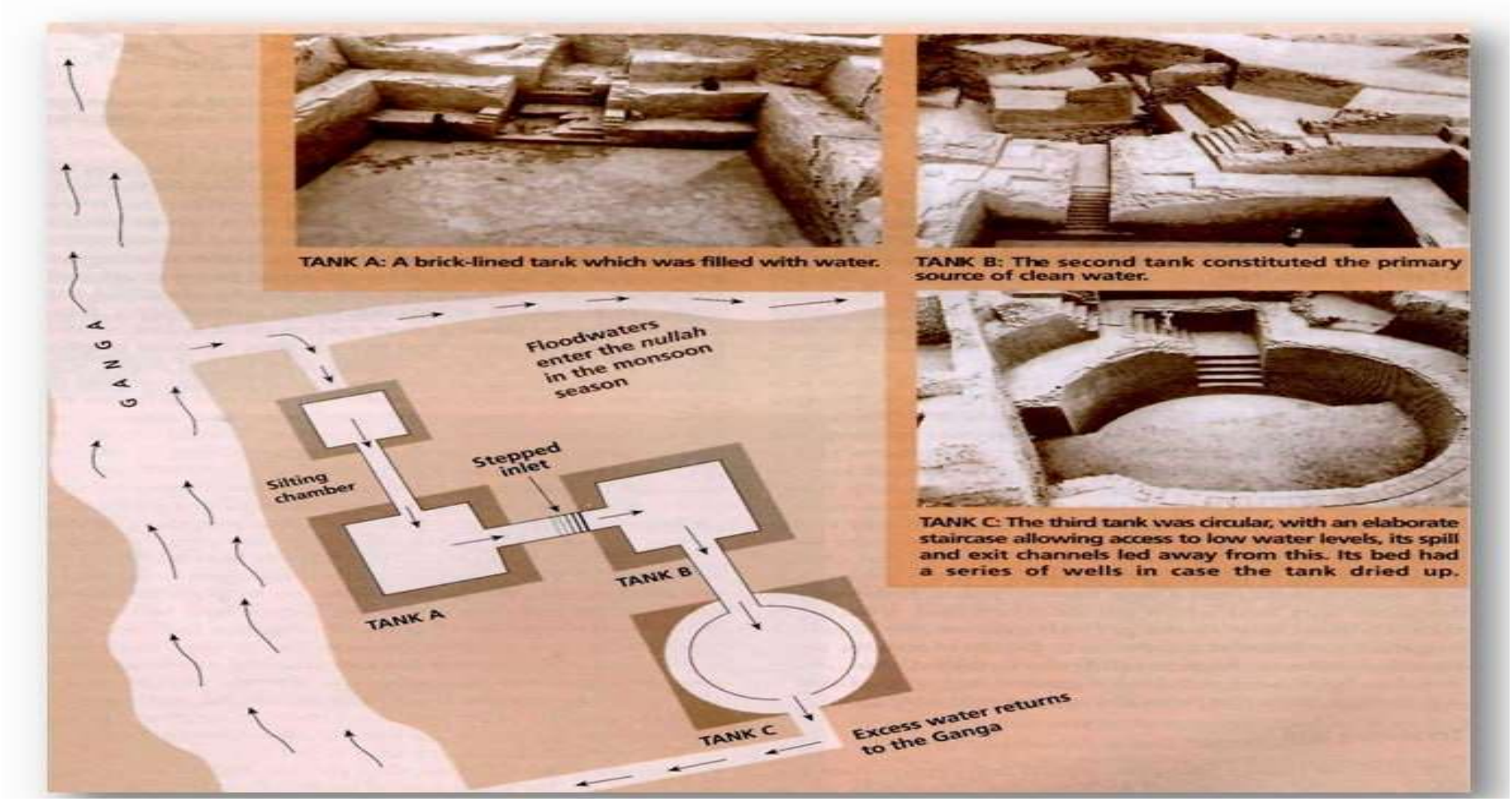
HYDRAULIC STRUCTURES IN ANCIENT INDIA

- In the first century B.C., Sringaverapura near Allahabad had sophisticated water harvesting system channeling the flood water of the river Ganga.



https://www.youtube.com/watch?v=ZMhvzMc0CjI

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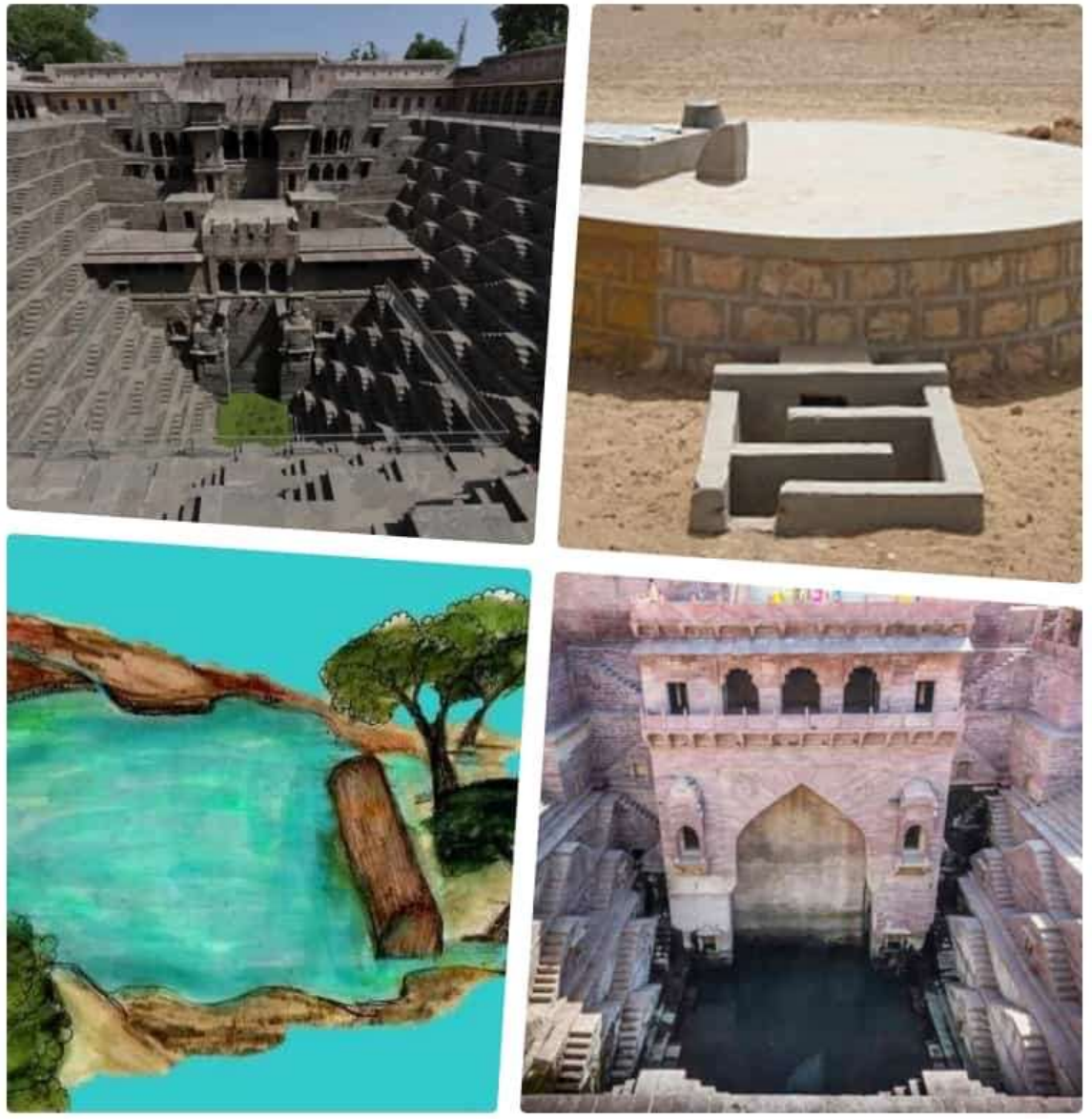
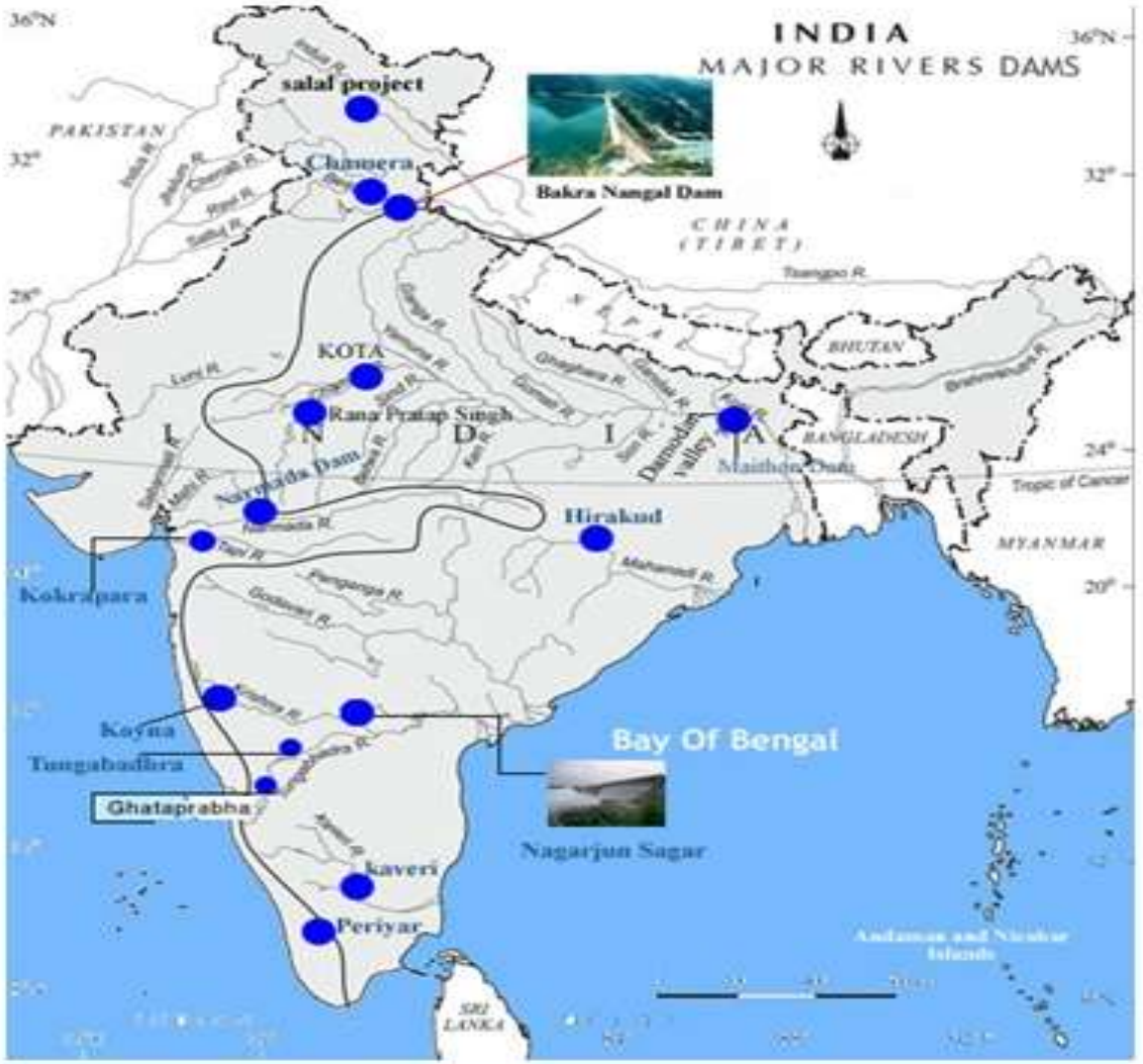
- During the time of Chandragupta Maurya, dams, lakes and irrigation systems were extensively built.
- Evidences of sophisticated irrigation works have also been found in Kalinga, (Orissa), Nagarjunakonda (Andhra Pradesh), Bennur (Karnataka), Kolhapur (Maharashtra), etc.
- In the 11th Century, Bhopal 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.



MULTIPURPOSE RIVER VALLEY PROJECT are basically designed for the development of irrigation for agriculture and electricity through the construction of dams. Initially, dams were built only for storing rain water to prevent flooding but now it became multipurpose.

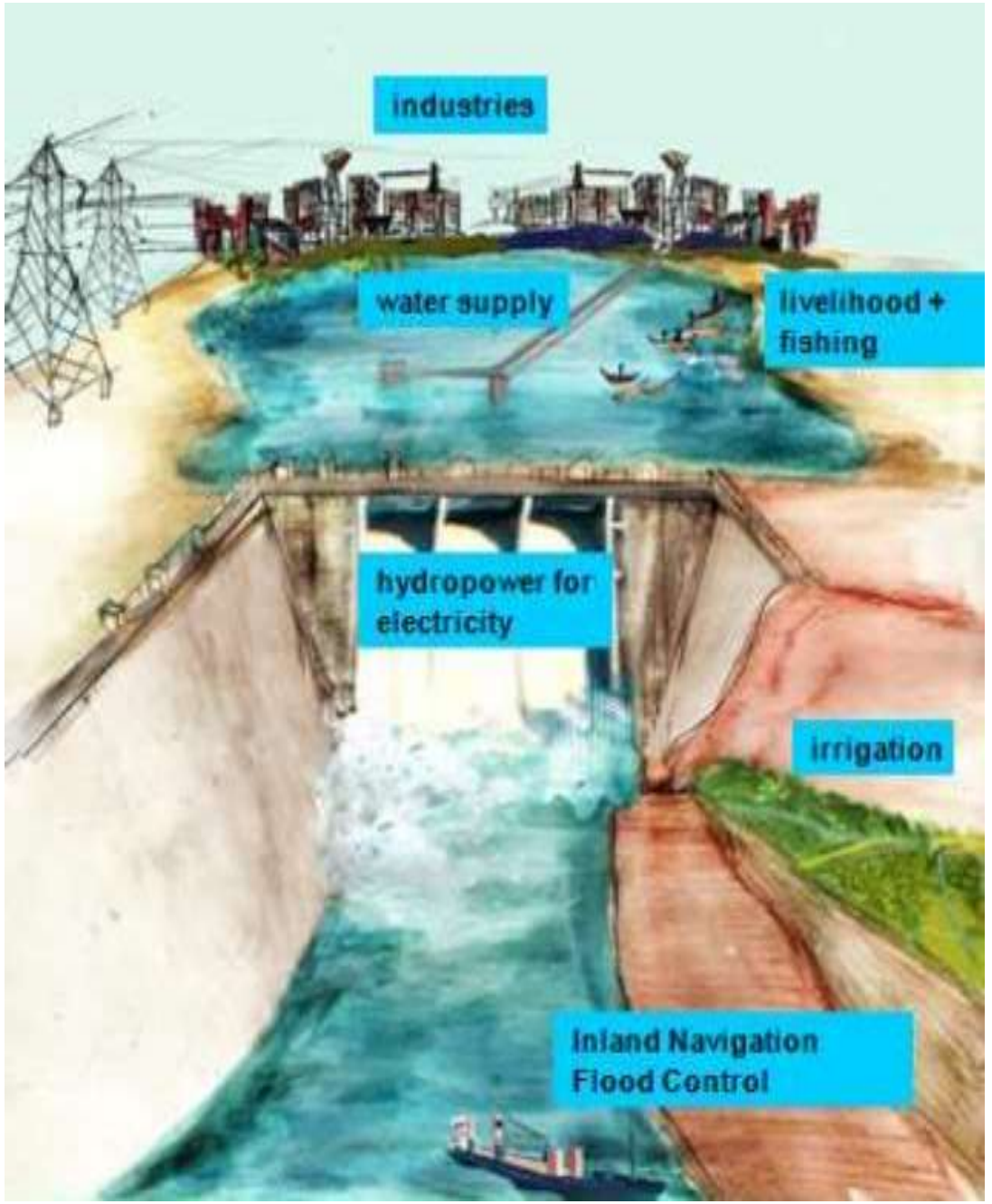


Major irrigation projects of India

Name	River	State	CCA, ha	Year of completion
Bhakra Nangal Project	Sutlej	Punjab and Himachal Pradesh	40,00,000	1963
Beas Project	Beas River	Punjab, Haryana and Rajasthan	21,00,000	1974
Indira Gandhi Canal	Harike (Satlej and Beas)	Punjab	5, 28,000	1965
Koshi Project	Kosi River	Bihar and Nepal	8.48,000	1954
Hirakund Project	Mahanadi	Orisa	10,00,000	1957
Tungabhadra project	Tungbhadra -Krishna	AP-Karnataka	5,74,000	1953
Nagarjuna Sagar Project	Krishna	AP	13,13,000	1960
Chambal Project	Chambal	Rajasthan and Madhya Pradesh	5,15,000	1960
Damodar valley project	Damodar	Jharkhand, West Bengal	8,23,700	1948
Gandak project	Gandak	Bihar-UP	16,51,700	1970
Kakrapar project	Tapti	Gujarat	1,51,180	1954
Koyna Project	Koyna- krishna	Maharashtra		1964
Malprabha project	Malprabha	Karnataka	2,18,191	1972
Mayurakshi Project	Mayurakshi	West Bengal	2,40,000	1956
Kangsabati project	Kangsabati and Kumari river	West Bengal	3,48,477	1956

ADVANTAGE OF MULTIPURPOSE PROJECT -

- (1) It controls floods.
- (2) It provides irrigation facilities and navigation.
- (3) It generates electricity.
- (4) It promotes inland irrigation, fishing and afforestation.
- (5) Human consumption.



DISADVANTAGE OF MULTIPURPOSE PROJECT –

(1) It induces earthquakes.

(2) Population gets displaced.

(3) Aquatic life gets affected.

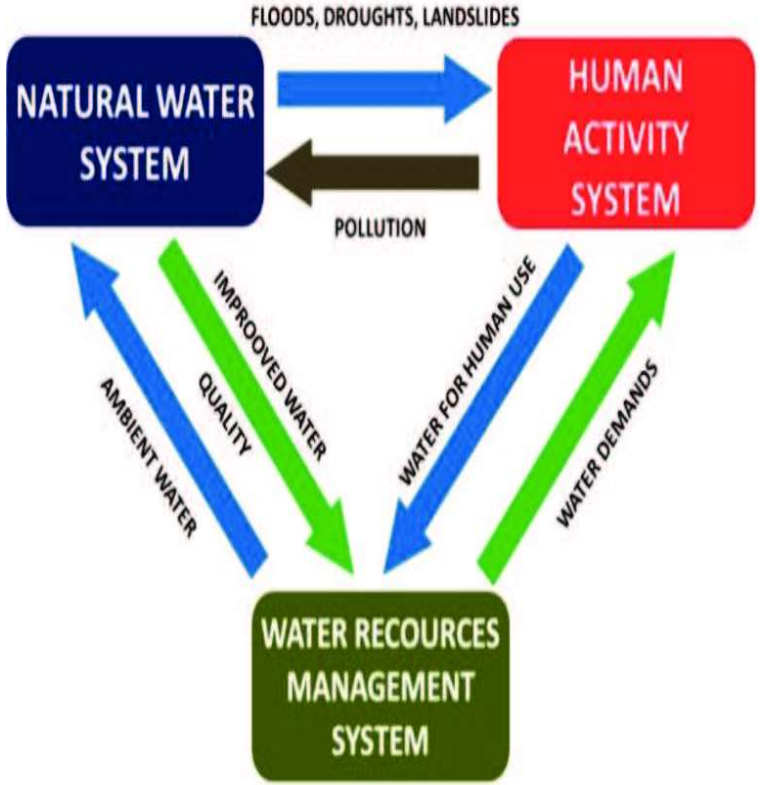
(4) Flow of underground water is also checked.

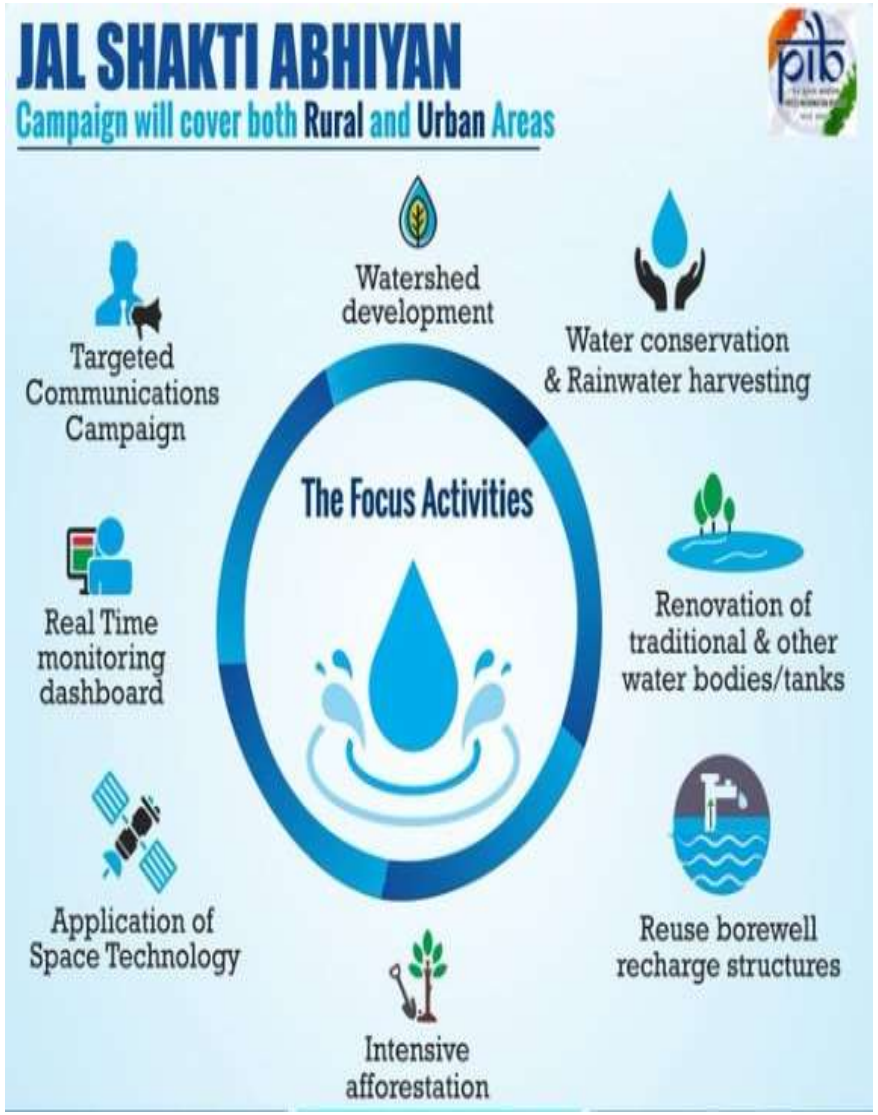
(5) River water gets diverted.

(6) Extensive forests submerged under water.

Integrated Water Resources Management

From constructing sophisticated hydraulic structures to building dams in most of our river basins.



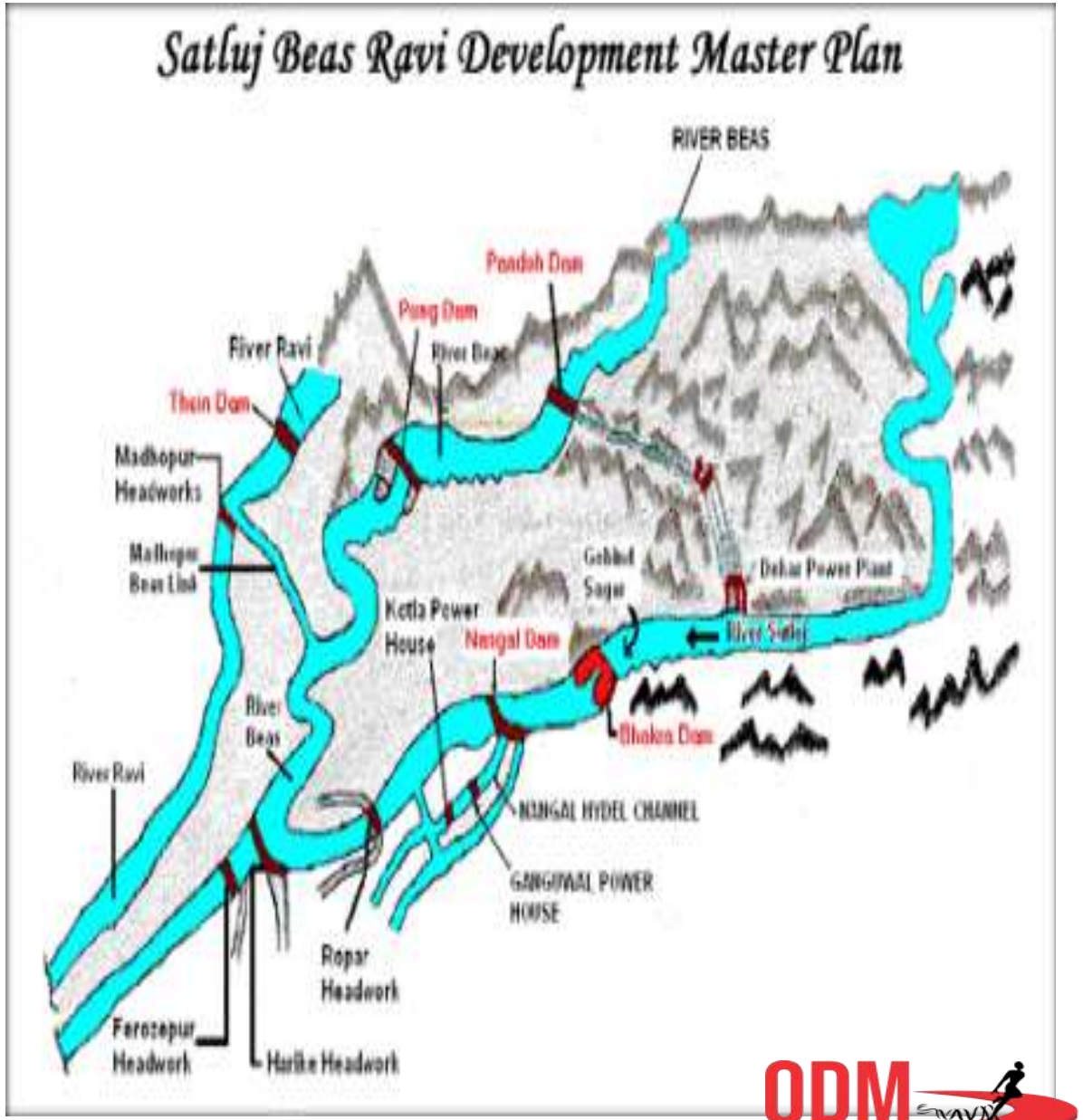


DAMS

- A dam is a barrier across flowing water that obstructs, directs or retards the flow, often creating a reservoir, lake or impoundment. “Dam” refers to the reservoir rather than the structure.

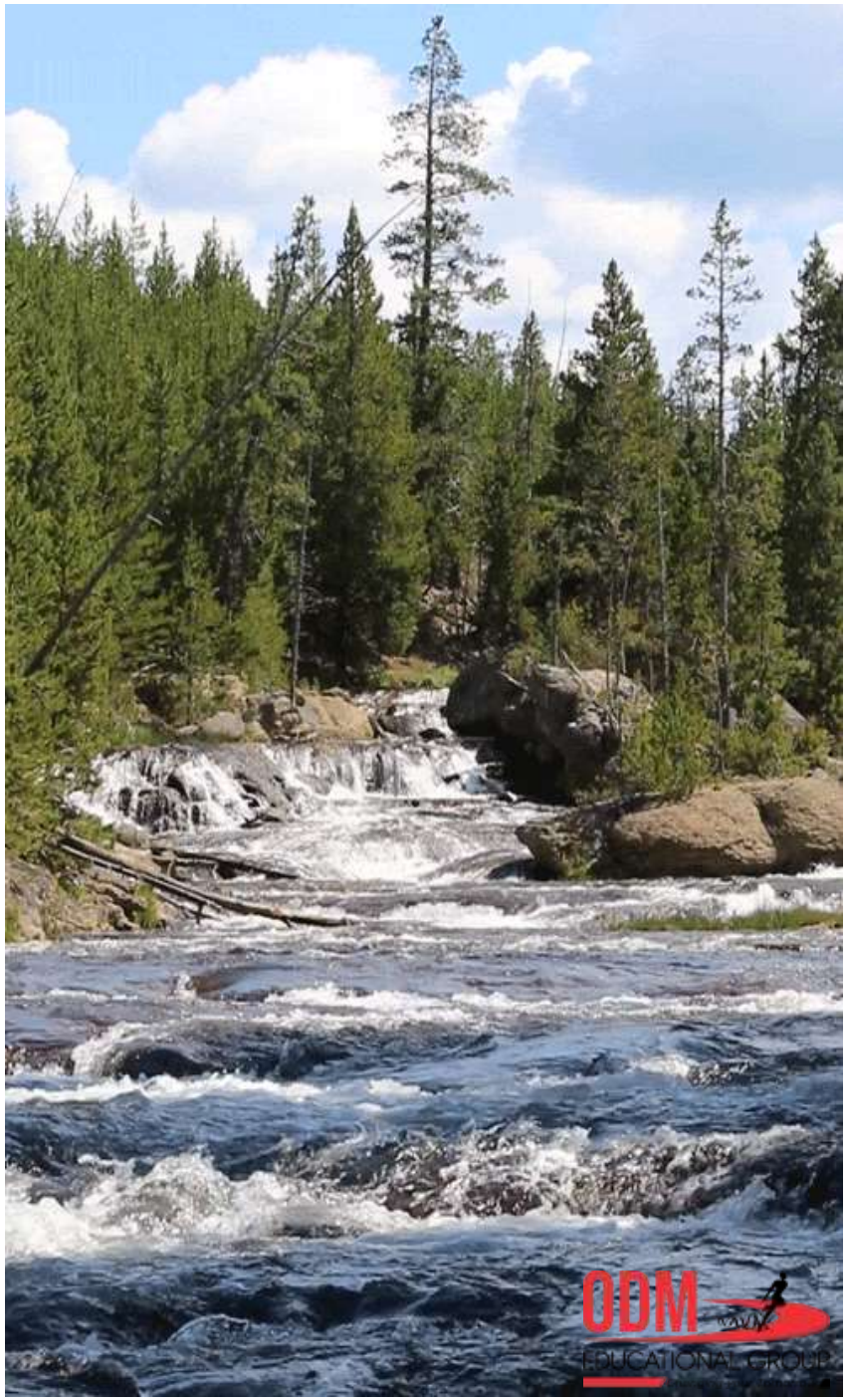
USES OF DAM:

- Dams are built:
- To impound rivers and rainwater that can be used later to irrigate agricultural fields.
- For electricity generation.
- Water supply for domestic and industrial uses.
- Flood control.
- Recreation, inland navigation and fish breeding.



SIDE EFFECTS OF CREATING DAMS

- Regulating and damming of rivers affect their natural flow.
- Poorer the habitats for the rivers' aquatic life.
- Fragment rivers make it difficult for aquatic fauna to migrate.
- Dams created on the floodplains submerge the existing vegetation and soil leading to its decomposition over a period of time.
- Creating of large dams has been the cause of many new environmental movements like the 'Narmada Bachao Andolan' and the 'Tehri Dam Andolan' etc.
- Many times local people had to give up their land, livelihood and their control over resources for the construction of the dam.



Dams: a. Salal

b. Bhakra Nangal

c. Tehri

d. Rana Pratap Sagar

e. Sardar Sarovar

f. Hirakud

g. Nagarjuna Sagar

h. Tungabhadra

Home Assignment:-

1. Name hydraulic structures of ancient India.
2. What is multi-purpose river valley project? Give Example.
3. Mention merits and demerits of constructing dams.
4. Name any 5 dam and the river they are built over in India.

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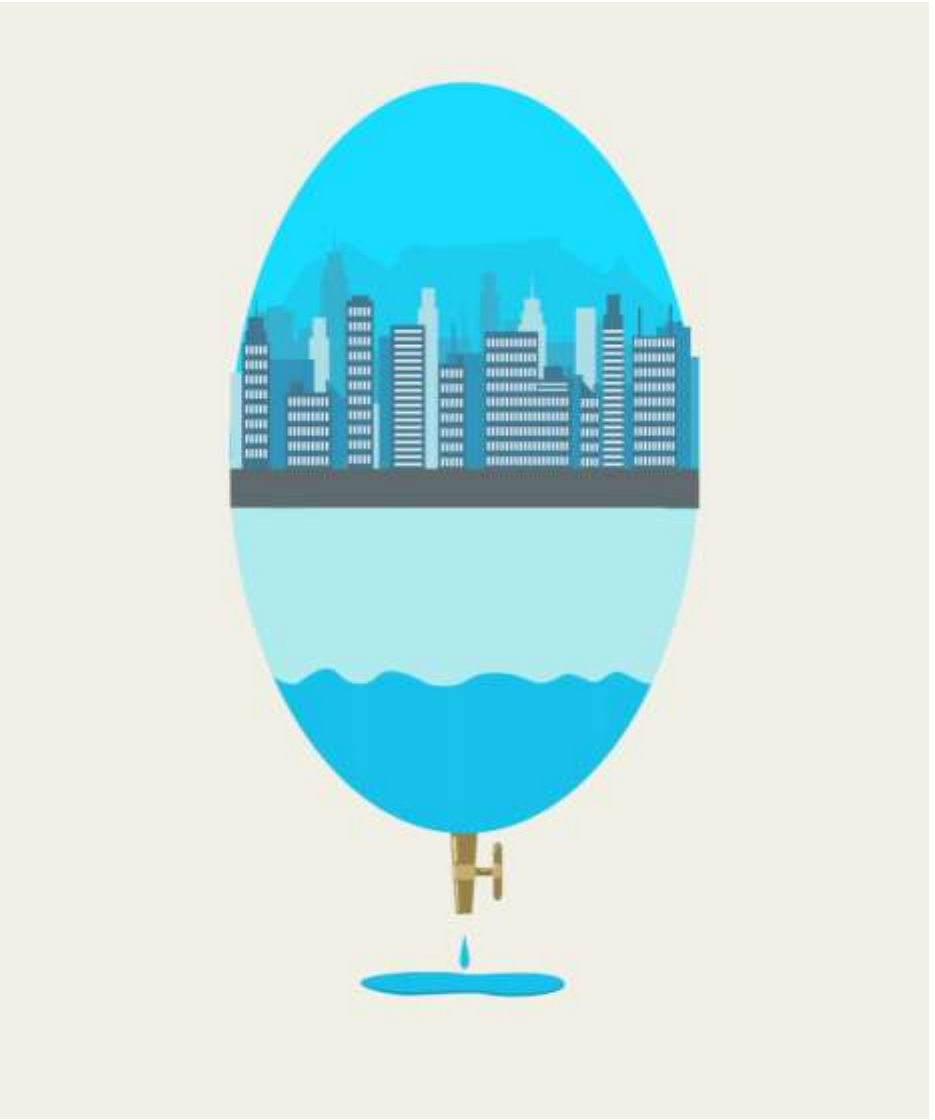
WATER

INTRODUCTION

SUBJECT : GEOGRAPHY
CHAPTER NUMBER: 03
CHAPTER NAME : WATER
SUB-TOPIC : Water Scarcity and The Need for Water Conservation and Management



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Water Scarcity
The Need for Water Conservation and Management

WATER RESOURCES

Chapter 3 - Class 10

ODM

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Water

- 96.5% exist as oceans.
- 2.5% freshwater (ice sheets and glaciers in Antarctica, Greenland and the mountainous regions of the world, while a little less than 30 per cent is stored as groundwater in the world's aquifers)
- India receives 4% of the global precipitation and ranks 133 in the world in terms of water availability per person per annum.
- The total renewable water resources of India are estimated at 1,897 sq. km per annum.
- By 2025, it is predicted that large parts of India will join countries or regions having absolute water scarcity.

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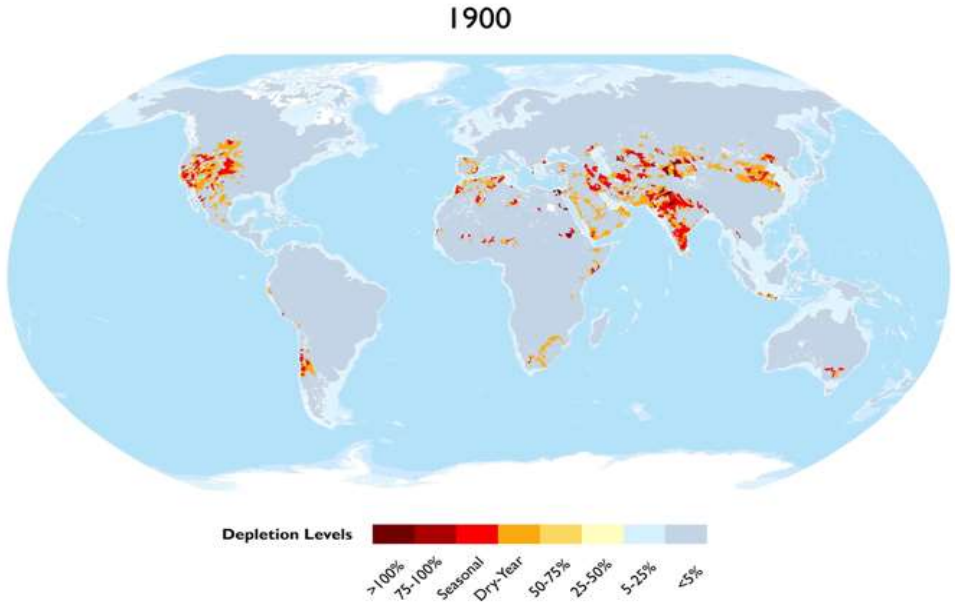


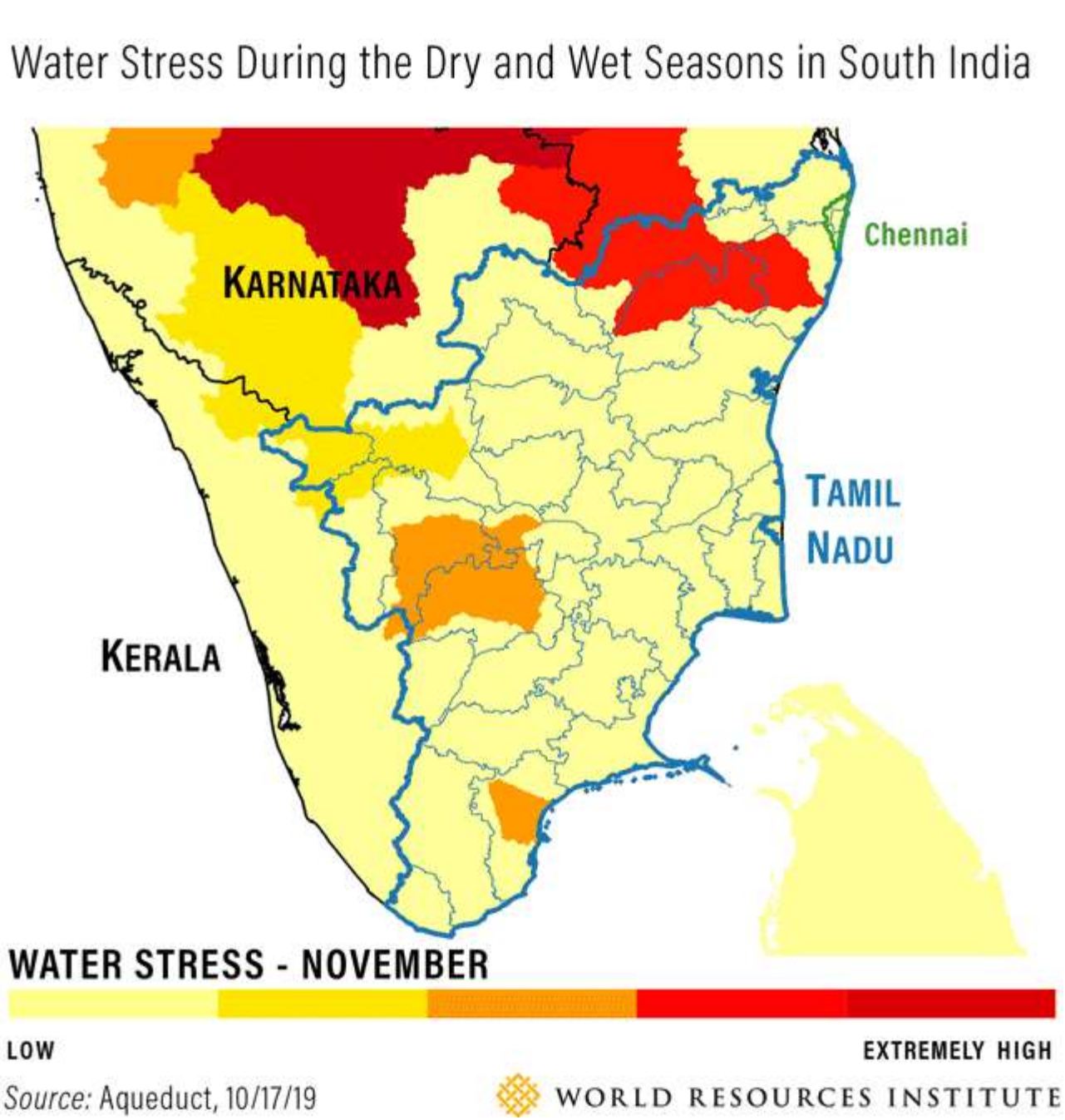
WATER SCARCITY

Water scarcity is caused by :-

- over-exploitation(excessive use)
- unequal access to water among different social groups.
- expanding irrigated areas for dry-season agriculture.
- bad quality of water.

- **WATER STRESS** occurs when water availability is less than 1,000 cubic meter per person per day.
- India's rivers, especially the smaller ones, have all turned into toxic streams(population growth, agricultural modernization, urbanization and industrialization)

Entire life stands threatened.



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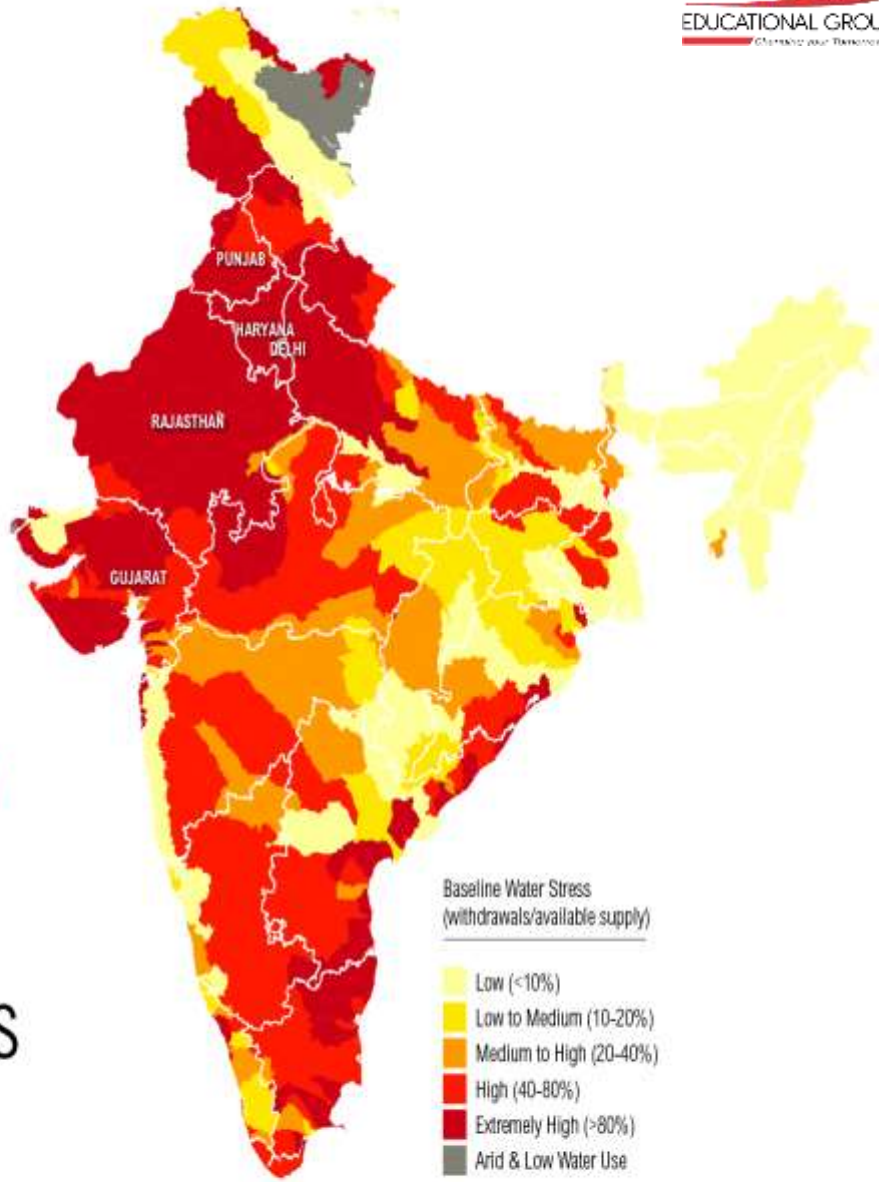
54%

of India Faces **High** to **Extremely High** Water Stress



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WORLD RESOURCES INSTITUTE

NEED FOR WATER CONSERVATION AND MANAGEMENT

- To safeguard ourselves from health hazards.
- To ensure food security, continuation of our livelihoods and productive activities.
- To prevent degradation of our natural ecosystems.
- Over exploitation and mismanagement of water resources will impoverish this resource and cause ecological crisis that may have profound impact on our lives.

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Home Assignment:-

1. Define water scarcity?
2. Mention reasons of increasing water scarcity?
3. What is water stress?
4. You grow up in a city of Gujarat and have witnessed many changes. Mention some of the reasons you find for decrease in the water sources.

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