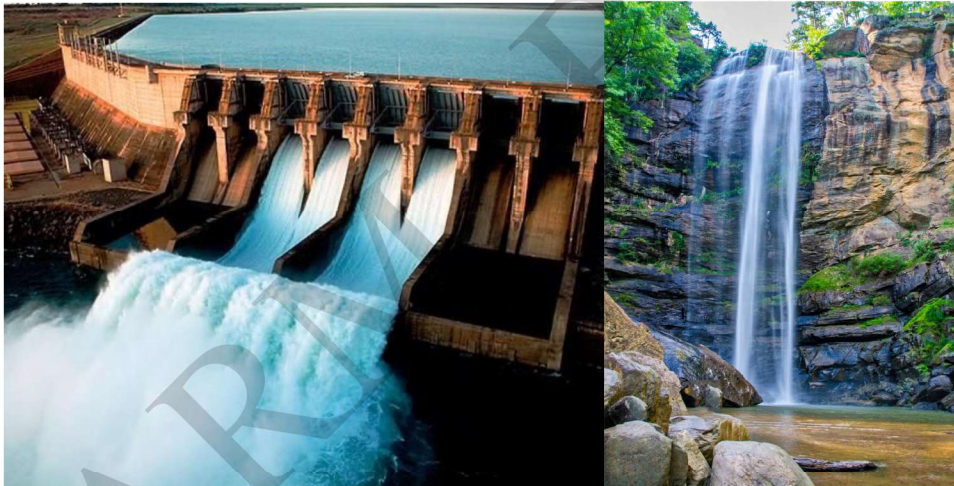




DAMS, LAKES, WATERFALLS





Hydroelectric Power Projects

• Multipurpose Project

Purpose: Flood control, hydropower generation, irrigation, tourism

• $M.E = P.E + K.E$

Negative/Drawbacks

- Displace large no. of tribals/peasants
- Create environment problems like biodiversity loss

- Potential Energy (P.E): P.E is the energy that is stored in an object in an object due to its position relative to some zero position

- Kinetic Energy (K.E): form of energy that shows an object or a particle has by reasoning of its motion

Water when stored gains P.E

- Mentioned as "Temple of Modern India" by Jawahar Lal Nehru

Important/Major Dams

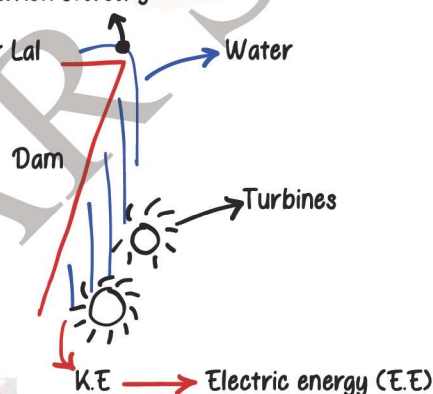
1. Damodar Valley Project

India's first river valley project (1948)

It is based on the Tennessee River of USA

There are 8 dams built on Damodar and its tributaries

Maithon	Jharkhand	Borakar River
Tilaiyah	Jharkhand	Borakar River
Panchet	Jharkhand	Damodar
Konar	Jharkhand	Konar



- Another type of Dam: Earthen Dam

2. Bhakra Nangal Project

- Constructed during First Five Year Plan
- Built on Sutlej river
- Consists of two dams:
 - Bhakra: Himachal Pradesh (Gobind Sagar Lake from Bhakra Nangal Dam)
 - Nangal: Punjab
 - Highest Gravity Dam → bears forces on its own
 - Largest Dam of India in terms of area

3. Hirakud Dam

- In Odisha, Sambalpur district
- Built on Mahanadi river
- Longest dam of world/India (4.8 km/25.8 km)

4. Tehri Dam

- In Uttarakhand
- Built on Bhagirathi river
- Highest Dam of India (261 m)

5. Farakka Dam

- In West Bengal, built on Ganga river
- This dam was built to provide water to the Hooghly river

Sunderlal Bahuguna

↓
Chipko Movement against deforestation
Anti-Tehri Movement

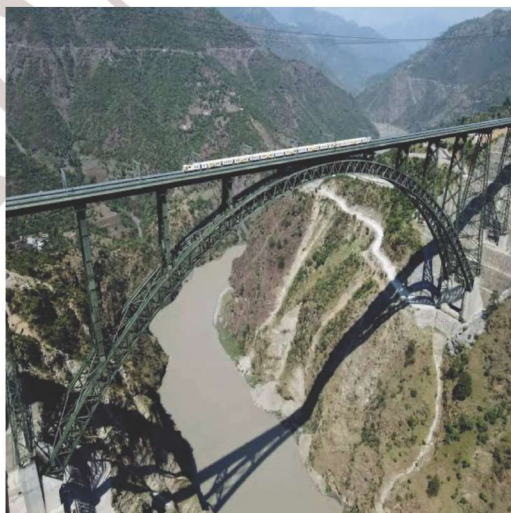
State-wise

Jammu and Kashmir

- Dulhasti Hydroelectric Project
 - Baglihar Hydroelectric Power Project
 - Salal Hydroelectric Power Station
- } All on Chenab river

Highest railway bridge (Chenab rail bridge) is constructed on Chenab river near Salal Hydroelectric Project

→ Height: 359 m high (1,178 ft)



CHENAB RAIL BRIDGE



- Kishan Ganga
- Tulbul
- Uri

All on Jhelum river

Himachal Pradesh

- Pong Dam (Maharana Pratap Sagar): Beas river
- Chamera Dam: Ravi river
- Nathpa Jhakri: Sutlej
- Baira Siul Dam (Chamba district): Ravi river
- Bassi Dam: Ravi river

Uttar Pradesh

- Matatila Dam
 - Lakshmibai Dam
- Betwa river
- Largest artificial lake of India
- Rihand Dam: Rihand river (Govind Ballabh Pant Sagar Reservoir)
- Built on Rihand river (tributary of Son)

Gujarat

- Ukai Dam: Tapi river
- Kakrapar Dam: Tapi river
- Sardar Sarovar Dam: Narmada river
- Kandana Dam: Mahi river

Punjab

- Thein dam (also known as Ranjit Sagar Dam)
 - Shahpur Kandi Dam
 - Harike Dam: On Sutlej and Beas confluence
- Indira Gandhi Canal developed on it
- } Ravi river

Madhya Pradesh

- Tawa Dam: Tawa river (tributary of Narmada)
- Ban Sagar Dam: Son river
- Omkareshwar Dam: Narmada river
- Indira Sagar Dam: Narmada river
- Gandhi Sagar Dam: Chambal river

Rajasthan

- Mahi Bajaj Sagar Dam: Mahi river
 - Bisalpur Dam: Banas river
 - Rana Pratap Sagar Dam: Chambal river
 - Jawahar Sagar Dam (on Chambal river)
- Is in Rawatbhata



Maharashtra → State with maximum number of large dams in the country

- Jayakwadi Dam: Godavari river
- Isapur Dam: Penganga river
- Dhom Dam: Krishna
- Ujjaini Dam: Krishna river
- Koyna Dam (largest dam of Maharashtra): Koyna river

Jharkhand

- Panchet Dam: Damodar river
- Maithon + Tilaiyah: Barakar
- Konar dam: Konar

Chhattisgarh

- Indravati Dam: Godavari river
- Hasdeo Dam: Hasdeo river (largest tributary of Mahanadi)

Karnataka

- Jog/Mahatma Gandhi Dam: Sharavati river
- Linganamakki Dam: Sharavati river
- Shivasamudram Dam: Kaveri river
- Almatti Dam: Krishna river
- Krishnaraja Sagar Dam: Kaveri

Kerala

- Periyar/Mullaperiyar/Idukki Dam: Periyar (life line of Kerala)

Telangana

- Pochampad (Sriram Sagar) Kaleshwaram Lift Irrigation Project : Godavari river
- Nizam Sagar Dam: Majira river
- Nagarjuna Sagar Dam: Krishna river

Tamil Nadu

- Pykara Dam: Pykara river
- Mettur Dam: Kaveri river

Andhra Pradesh

- Srisailem Dam
 - Nagarjuna Sagar Dam
 - Somasila Dam: Pennar/Penna river (Nellore district)
- Krishna river

Types of Waterfall

- **Cataract Waterfall:** A large, powerful waterfall that occurs when a large amount of fast moving water falls over a cliff (large volume of water)
- **Plunge Waterfall:** a waterfall where water falls straightly down without touching the cliff face below (water velocity high)
- **Cascade Waterfall:** A waterfall that consist of series of small falls where water flows over rocks or boulders (multi-step waterfall)

Some Important Waterfalls of India

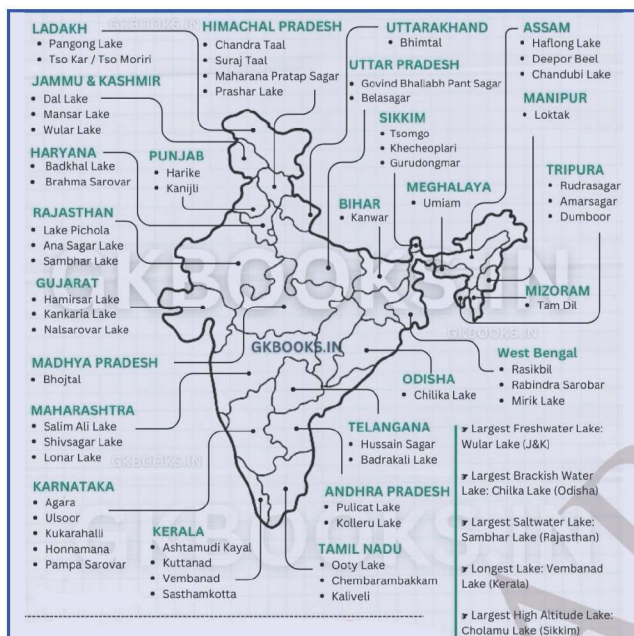
Name	River	State
Kunchikal (Highest waterfall: 455 m)	Varahi	Karnataka (Shimoga)
Jog/Gersoppa/Mahatma Gandhi (2nd highest waterfall in India)	Sharavati	Karnataka
Shivsamundram	Kaveri	Karnataka
Chulia	Chambal	Rajasthan
Dhuandhar Kapildhara	Narmada	Madhya Pradesh
Hundru	Subarnarekha	Jharkhand
Dudh Sagar	Mandvi	Goa

- **Highest waterfall in the world:** Angel waterfall in Venezuela
- **2nd highest in the world:** Niagara Falls (in USA-Canada border)
- **Niagara Falls of India:** Chitrakoot waterfall in Chhattisgarh

Some more Waterfalls

- Barehipani waterfalls } Odisha
- Khandadhar waterfalls }
- Athirappilly waterfalls: Kerala
- Duduma waterfalls: Odisha (Koraput)
- Gokak waterfalls: Karnataka (Ghataprabha)
- Nohkalikai falls: Meghalaya
- Hebbe waterfalls: Karnataka

Lakes of India (state-wise)



Jammu & Kashmir

- Wular lake: Largest freshwater lake in India, it is also formed as a result of tectonic activity
- Anchar lake
- Mansar lake
- Dal lake (Jewel of Srinagar)
- Manasbai lake

Ladakh

- Pangong Tso lake
 - Lake Tso kar
 - Lake Tso Moriri
 - Aksai Chin Lake
- In Aksai Chin border
- Salt water lakes

Uttarakhand

- Dodital lake
- Bhimtal lake
- Roop Kund lake
- Nainital lake
- Suryadhar lake

Bihar

- Kanwar Tal: Largest Ox-bow lake (Ramsar site in 2022)
- Gogabill lake

Gujarat

- Nalsarovar lake
- Rann of Kutch lake
- Thol lake: Ramsar site in 2021

Madhya Pradesh

- Bhojtal/Bhopal lake: Was formally known as Upper lake
- Constructed by Raja Bhoj (Parmar Dynasty's most famous and powerful ruler, who also established Bhopal city)
- Asia's largest artificial lake

Rajasthan

- Pushkar lake (in Ajmer)
- Sambhar lake: Largest inland saltwater lake (salinity more than Chilika but area less than Chilika (Odisha))
- Jaisamand/Dhebar lake: 2nd largest artificial lake in Asia (Udaipur)

Uttar Pradesh

- Keetham lake/Sur Sarovar (Agra): it is a man-made reservoir added to Ramsar site in year 2020
- Gobind Vallabh Pant Sagar: largest artificial lake of India (Sonbhadra district)

Himachal Pradesh

- Govind Sagar lake
- Renuka lake

Haryana

- Surajkund lake

Maharashtra

- Bhushi lake
- Lonar lake: Also called crater lake (Created due to meteorite) → Buldhana district

Kerala

- Vembanad lake: Longest lake of India (Pamba river falls on it)
- Sasthamcotta lake
- Ashtamudi lake

Tamil Nadu

- Pulicat lake: Between Andhra Pradesh and Tamil Nadu (India's 2nd largest brackish water lake)
- Kaliveli lake

Telangana

- Srisailem lake
- Nagarjuna Sagar lake
- Hussain Sagar lake: Connects Hyderabad & Secunderabad
- Nizam Sagar lake

Sikkim

- Tso Lhamo lake/Cholamu lake: Highest lake in India
- Tsomgo Chho lake

Andhra Pradesh

- Pulicat lake (between Andhra and Tamil Nadu)
- Kolleru lake

Odisha

- Anshupa Lake
- Chilika Lake: Largest brackish water lake (freshwater + salt water)
→ 1st Ramsar site

Assam

- Haflong lake
- Chandubi lake
- Deepor Beel lake

Meghalaya

- Barapani/Umiam lake: Shillong

Manipur

- Loktak lake: It is famous for phumdis floating over it
→ World's only floating lake
• Keibul Lamjao National Park: World's only floating NP

Lakes of the World

Africa

- Lake Victoria (White Nile originates from here) → Is in three countries: Kenya, Tanzania, Uganda
- Lake Tana (Blue Nile originates from here)

South America

- Lake Titicaca (highest navigable lake in the world)

Canada → Has the most natural lakes in the world

- **H**: Lake Huron
 - **O**: Lake Ontario
 - **M**: Moraine lake
 - **E**: Lake Erie
 - **S**: Lake Superior (world's largest freshwater lake)
- Caspian Sea: Surrounds five countries → Russia, Iran, Azerbaijan, Turkmenistan, Kazakhstan

Russia

- Lake Baikal: Deepest lake of the world
- Black Sea: Bordered by Ukraine, Russia, Georgia, Turkey, Bulgaria, Romania